Primary Years Programme

Learning and teaching

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The International Baccalaureate Organization (known as the IB) offers four high-quality and challenging educational programmes for a worldwide community of schools, aiming to create a better, more peaceful world. This publication is one of a range of materials produced to support these programmes.

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IB mission statement

The International Baccalaureate aims to develop inquiring, knowledgeable and caring young people who help to create a better and more peaceful world through intercultural understanding and respect.

To this end the organization works with schools, governments and international organizations to develop challenging programmes of international education and rigorous assessment.

These programmes encourage students across the world to become active, compassionate and lifelong learners who understand that other people, with their differences, can also be right.

IB learner profile

The aim of all IB programmes is to develop internationally minded people who, recognizing their common humanity and shared guardianship of the planet, help to create a better and more peaceful world.

As IB learners we strive to be:

INQUIRERS
We nurture our curiosity, developing skills for inquiry and research. We know how to learn independently and with others. We learn with enthusiasm and sustain our love of learning throughout life.

KNOWLEDGEABLE
We develop and use conceptual understanding, exploring knowledge across a range of disciplines. We engage with issues and ideas that have local and global significance.

THINKERS
We use critical and creative thinking skills to analyse and take responsible action on complex problems. We exercise initiative in making reasoned, ethical decisions.

COMMUNICATORS
We express ourselves confidently and creatively in more than one language and in many ways. We collaborate effectively, listening carefully to the perspectives of other individuals and groups.

PRINCIPLED
We act with integrity and honesty, with a strong sense of fairness and justice, and with respect for the dignity and rights of people everywhere. We take responsibility for our actions and their consequences.

OPEN-MINDED
We critically appreciate our own cultures and personal histories, as well as the values and traditions of others. We seek and evaluate a range of points of view, and we are willing to grow from the experience.

CARING
We show empathy, compassion and respect. We have a commitment to service, and we act to make a positive difference in the lives of others and in the world around us.

RISK-TAKERS
We approach uncertainty with forethought and determination; we work independently and cooperatively to explore new ideas and innovative strategies. We are resourceful and resilient in the face of challenges and change.

BALANCED
We understand the importance of balancing different aspects of our lives—intellectual, physical, and emotional—to achieve well-being for ourselves and others. We recognize our interdependence with other people and with the world in which we live.

REFLECTIVE
We thoughtfully consider the world and our own ideas and experience. We work to understand our strengths and weaknesses in order to support our learning and personal development.

The IB learner profile represents 10 attributes valued by IB World Schools. We believe these attributes, and others like them, can help individuals and groups become responsible members of local, national and global communities.

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Contents

Overview

A model of transdisciplinary learning

Through acknowledging and aiming to foster the diverse capacities—physical, social, intellectual, aesthetic, cultural—of learners, IB World Schools implementing the Primary Years Programme (PYP) ensure that learning is engaging, relevant, challenging and significant. A transdisciplinary approach encapsulates these aspects of learning; transdisciplinary learning in the PYP conveys learning that has relevance between, across and beyond subjects and transcends borders that confine them to connect to what is authentic in the world.

This resource aims to do the following.

- On a **theoretical** level, it reflects on transdisciplinarity in the PYP and reviews its transformative nature for early and primary years learners in the context of consolidated research and curriculum development worldwide.
- On an **operational** level, it demonstrates how the PYP framework and key elements of the PYP are designed to promote and strengthen transdisciplinary learning and teaching.
- On a **practical** level, it offers reflective questions for IB World Schools to push beyond traditional subject-based teaching to innovative concept-based and transdisciplinary approaches that bring relevance, authenticity, and connection to student learning.

Transdisciplinarity

Definition of transdisciplinary and related terms

"Transdisciplinary" is often used interchangeably with "interdisciplinarity" and "multidisciplinarity". In fact, these models are not interchangeable; there are nuanced differences. As Nicolescu (1999: 3)—a physicist and leading transdisciplinary theorist—articulates, "transdisciplinarity is … distinct from multidisciplinarity and interdisciplinarity because of its goal, the understanding of the present world, which cannot be accomplished in the framework of discipline research".

What is the difference? The following provides the most basic definitions of the terms.

Interdisciplinarity is concerned "with the links and the transfer of knowledge, methods, concepts, and models from one discipline to another" (Padurean and Cheveresan 2010: 128). Disciplinary boundaries may blur. The transfer of knowledge can sometimes yield a new discipline. For example, when the disciplines of nuclear physics and medicine came together, they yielded a new treatment called chemotherapy (Choi and Pak 2006). Again, in everyday analogy, interdisciplinarity is represented as stew, where ingredients are partially distinguishable (Choi and Pak 2006).

Multidisciplinarity is concerned with studying a topic "in not just one discipline only, but several at the same time" (Nicolescu 2014: 187). Multidisciplinary learning begins and ends with the subject-based content and skills (Beane 1997). The boundaries among the subjects remain. Using an everyday analogy, multidisciplinarity is represented as a mixed salad where the ingredients remain separate and distinguishable (Choi and Pak 2006).

Transdisciplinarity "concerns that which is at once between the disciplines, across the different disciplines, and beyond all disciplines" (Nicolescu 2014: 187). Nicolescu notes that a key imperative of transdisciplinary learning is to unite knowledge for the understanding of the present world. In transdisciplinarity, the disciplines are no longer distinguishable, like the ingredients in a cake, and the result is something completely different (Choi and Pak 2006).

Transdisciplinarity transcends subjects. Learners' interests and questions form the heart of transdisciplinary learning. It is a curriculum-organizing approach where commonalities of human experience rise to the top without regard for subject boundaries. Subjects become an instrument/tool/resource to explore a theme, issue, or concept in depth. The result is a different or new organizing framework (Beane 1997; Klein 2006).

Transdisciplinarity in the PYP framework

A transformative programme

The transformative nature of the PYP lies in its commitment to student learning in a transdisciplinary context, embedded in the curriculum framework and connected across key elements of the programme. It is a fundamental PYP belief that for early and primary years learners, continuous integration and connection of prior and new knowledge and experiences is the most meaningful way to broaden their understandings about the world. When a curriculum approach goes across, between, and beyond subjects, and emphasizes participatory and integrated learning, it honours the learners' curiosity, questions, and voice, for whom the curriculum is intended (Beane 1995). Transdisciplinary learning in the PYP refers to learning that is not confined within the boundaries of traditional subjects but is supported and enriched by them.

The PYP transdisciplinary model differs from the interdisciplinary and multidisciplinary approaches of the Middle Years Programme (MYP), the Diploma Programme (DP) and the Career-related Programme (CP). Despite their differences, all IB curriculum frameworks are broad, balanced, conceptual and connected. They "emphasize the importance of making connections, exploring the relationships between academic disciplines, and learning about the world in ways that reach beyond the scope of individual subjects" (IBO 2017: 5). The differences between the IB programmes are summarized in figure 1.

Figure 1

Explanation of the IB programme differences

Programme	PYP	MYP	DP/CP
Model	**Transdisciplinary (transforming subject knowledge)**	**Interdisciplinary (integrating subject knowledge)**	**Disciplinary/Multidisciplinary**
Primary organizer	Key elements are: • knowledge • conceptual understandings • skills • dispositions • action. These are developed through six themes and supported by six subjects.	Eight subject groups are explored through the global contexts of: • identities and relationships • orientation in space and time • personal and cultural expression • scientific and technical innovation • globalization and sustainability • fairness and development.	Six DP subject groups support and are supported by the core, which include: • creativity, activity, service (CAS) • extended essay (EE) • theory of knowledge (TOK) CP students undertake a minimum of two DP courses, a career-related study and a core which includes: • community engagement (CE) (service learning until 2025) • language and cultural studies (LCS) (language development until 2025) • personal and professional skills (PPS) • reflective project (RP).

A new approach in education

By espousing the transdisciplinary approach in the late 1990s, the PYP charted a different course in school education. Early education literature with references to transdisciplinary learning relates mainly to tertiary education, specifically in the areas of science, technology, and medicine. In 2006, UNESCO sponsored a presentation by Joy de Leo (2006: 10), entitled "Beyond the four pillars", which states that "UNESCO encourages transdisciplinary approaches to education for sustainable development". The presentation listed emerging transdisciplinary approaches, many of which were already exemplified in the PYP, such as:

- the need for coherence in curriculum design
- schools as learning communities
- a collaborative, discovery approach to issues-based learning
- an active, participatory approach promoting critical thinking.

When first designing the PYP curriculum framework, the developers considered different approaches to organize the curriculum. In an effort to identify what 3–12-year-old learners need to know and that could, at the same time, address globally significant issues, they drew on the work of Boyer (1995) and Tye and Kniep (1991). The "human commonalities" put forward by Boyer in his seminal work, *The Basic School*, provided inspiration for defining the significant themes. The work of Tye and Kniep (1991) on global education inspired the foundations of globally significant context.

Figure 2

PYP transdisciplinary themes

Transdisciplinary themes
Who we are
Where we are in place and time
How we express ourselves
How the world works
How we organize ourselves
Sharing the planet

These themes are worth exploring regardless of where PYP learners are in the world and the diverse and divergent communities to which they belong. Framing the programme of inquiry, they provide a starting point from which learners can engage with local and global issues and opportunities. Taken together, the transdisciplinary themes provide learners with authentic, relevant and transformative learning experiences that go beyond the boundaries of subjects because local and global issues transcend boundaries. The perspectives of Tye and Kniep (1991) on issues that crossed national boundaries and were interconnected culturally, ecologically, politically, economically, and technologically, led to the focus on transdisciplinarity as a means to integrate the curriculum and as a philosophy to differentiate the PYP from other curriculums (IBO 2013a). Together, the transdisciplinary model and the transdisciplinary themes enable learners and teachers to intentionally and contextually put knowledge to work in important ways for learners, which Dewey and Dewey (1915) advocated:

- focus on personal and social significance
- unify learning in all its aspects.

Working together, the transdisciplinary themes and the transdisciplinary approach promote learning as outlined in figure 3.

Figure 3

Holistic learning in the PYP (Beane 1997; Boyer 1995; Vars 2000; Drake and Burns 2004)

Learning …	How
extends the international dimension of the PYP	The themes have local, global and planetary significance for all learners in all contexts.
is authentic and engaging	The themes address the social, cultural, environmental, political, and historical dimensions of local and global challenges and opportunities.
is deep	The themes are revisited throughout the learners' primary years so that the end result is immersion in broad-ranging, in-depth, articulated curriculum content.
is cohesive	The themes contribute to the common ground that unifies the curriculum in all IB World Schools offering the PYP.
is connected	The model is supported by knowledge, conceptual understandings and skills from the subject areas, but it uses them in ways that transcend the confines of these subjects.
is relevant and current	The model allows for resources to be drawn from authentic interactions, situations, circumstances and contexts.

IB mission alignment

Nicolescu (1996) argues that the global challenges of the era require that diverse systems of education focus on a common approach of questioning if we are to achieve a harmonious world. The themes identified in figure 3 are themes of local and global relevance—indicators of our shared humanity—and are key drivers of the PYP framework. Through these transdisciplinary and globally important themes, the IB mission permeates the PYP framework.

Transdisciplinarity provokes learners into reflecting on, and reconsidering, what they believe about the world and about their place in it. In his seminal work, Freire (2005: 81) believed:

"students, as they are increasingly posed with problems relating to themselves in the world and with the world, will feel increasingly challenged and obliged to respond to that challenge".

And, in accordance with the IB mission statement, it challenges all members of IB World Schools to "create a better and more peaceful world" (IBO 2017: 7).

Characteristics of the PYP framework

Developmentally appropriate learning

The transdisciplinary themes are cognitively and developmentally appropriate for young learners because they have enduring importance, and children can identify with them. Gardner and Boix Mansilla (1999: 83) maintain that these generative themes are "issues for which answers of various degrees of adequacy have been promulgated over the centuries in diverse cultures. These fundamental questions are articulated by young children, on the one hand, and by seasoned philosophers on the other …". The PYP transdisciplinary themes are broad in scope and timeless by nature. Yet, when given the opportunity, children can demonstrate their capacity to use their incipient theories and explanatory framework to explore complex themes and to solve problems, as witnessed and documented at Reggio Emilia learning centres (Rinaldi 2006).

Indeed, young children naturally explore their questions through play and discovery (Bruner 1960). As they grow, children's play, or "early common sense", gradually evolves to "enlightened common sense" (Gardner and Boix Mansilla 1999: 85). This enlightened knowledge, however, is not a result of greater disciplinary knowledge, but of children's "potential for reflecting critically on an answer, for drawing on relevant daily experience, for engaging in discussion and dialogue and benefiting from such interchange" with people in their environment (Gardner and Boix Mansilla 1999: 85).

Beane (1995) further suggests that children do not come to school knowing the departmentalization of disciplines because their daily lives are not compartmentalized. Therefore, subject delineation is neither necessary nor natural. Subject-specific teachers at PYP schools extend their support for learners transitioning to disciplinary and interdisciplinary thinking in the next stage of education in the MYP or other programmes. Through the transdisciplinary themes, learners have opportunities to practise the habits and methods of a disciplinary thinker.

Connecting transdisciplinarity

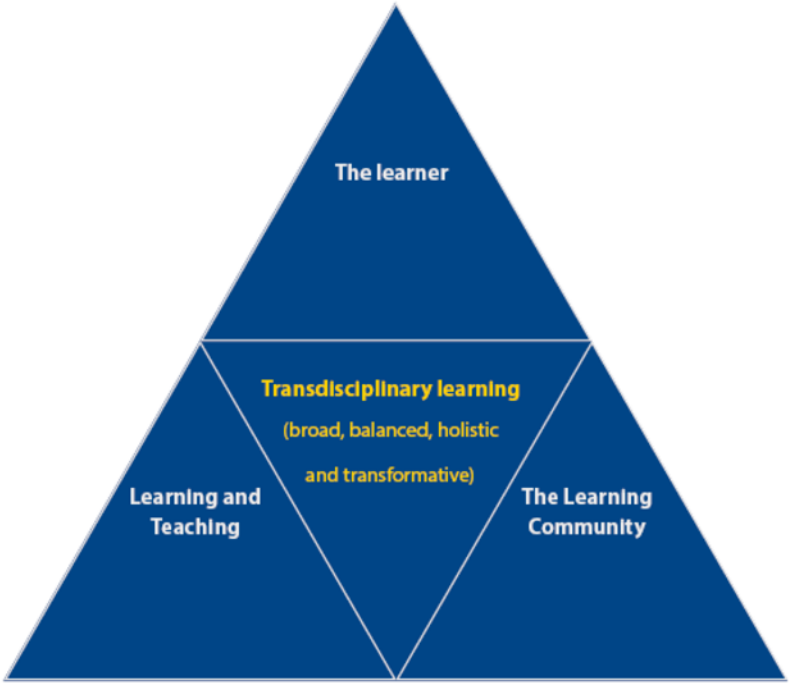
The PYP framework supports the symbiotic relationship between the **learner, learning and teaching**, and **the learning community**. Transdisciplinarity serves as an organizing principle for planning, learning and teaching. The intended output of the PYP framework and curriculum model is an educational experience that is coherent in all its aspects.

The transdisciplinary model aims to move learners beyond looking for "correct" solutions towards a model that reflects the changing times (Mishra, Koehler, and Henriksen 2011). It encourages the integration of many forms of knowledge and perspectives from all members of the learning community to make sense of a world that has become "too big to know" (Weinberger 2011).

The transdisciplinary model permeates all three pillars of the PYP curriculum framework—the learner, learning and teaching, and the learning community. Together, the PYP framework and elements within it contribute to a learning experience that is transdisciplinary (figure 4).

Figure 4

Transdisciplinary learning and the PYP framework



A transdisciplinary education, according to Nicolescu (2006: 14), "allows us to establish links between persons, facts, images, representations, fields of knowledge, and action and to discover the Eros [love] of learning during our entire life".

Organized around transdisciplinary themes of personal, local, global, and planetary significance, explored collaboratively by the learners and teachers, and supported by the learning community and rigorous approaches to learning and approaches to teaching, the PYP framework:

- inspires a coherent educational experience that is broad, balanced, and holistic
- incorporates the needs and developmental stages of learners
- considers the knowledge, conceptual understandings, skills and dispositions learners need to engage in a rapidly changing, uncertain, and complex world
- embraces the principles of an inclusive and equitable education.

Connecting the learner

To understand the significance of the learner in transdisciplinary learning, it is necessary to review the definition of transdisciplinary in the literature. Piaget initially introduced the term "transdisciplinary" in 1970 as a "superior stage" of interdisciplinary where the prefix **trans-** referred to "across" and "between" disciplines (Nicolescu 2006). In 1985, Nicolescu (2006) introduced "beyond" to the definition. He argued that "across" and "'between" concerned mainly the **object**, namely knowledge. The inclusion of "beyond" emphasizes the role of the **subject** in knowledge creation, and clearly distinguishes transdisciplinary from multidisciplinary and interdisciplinary.

Transdisciplinarity reflects the interactions between the subject and object, and pushes thinking beyond the dichotomous—either/or filter—in classical problem-solving (Nicolescu 2010). He argues that the traditional binary logic of A or B (that is, the room is empty, or the room is not empty) leaves no room for a third possibility or reality. However, in the real world, there are many realities or possibilities.

In Nicolescu's (2014: 187) view, "the transcendence, inherent in transdisciplinarity, is the transcendence of the *Subject*," which is not captured in disciplinary or interdisciplinary learning. This view is supported by Montuori's assertion that knowledge is inherently relative and changeable precisely because the inquirers are the main actors of every inquiry (Montuori 2013). The learners or inquirers, individually and collectively, have "a history, a social and historical context, beliefs, values, biases, blind spots, ways of thinking, and so on" which frame their way of thinking (Montuori 2013: 205). Because of the inquirers' unique contexts and interpretations of data and events, it is unlikely that two inquiries of the same theme will arrive at the same outcome, leading to potentially new realities and the transcendence of learning.

By design, the language and intent of the transdisciplinary themes encourage learners to share their voices and experiences to explore their understandings of human and natural worlds collaboratively. This sharing of experience increases learners' awareness of, and sensitivity to, the experiences of others beyond their communities. Unplanned and planned access to learning and content are now given the same status, hence promoting learning that is more learner-centric and more accessible to them (Beane 1995).

In highlighting the importance of learner voice, the PYP transdisciplinary model upholds the belief that learners are better served when we support knowledge as a socially constructed process rather than an end goal, fixed and universal (Dewey 1991; Vars 1991; Beane 1997).

Connecting learning and teaching

The transdisciplinary approach is "the science and art of discovering bridges between different areas of knowledge and different beings. The principal task is elaboration of a new language, logic, and concepts to permit genuine dialogue" (Klein 2004: 516). By design, PYP inquiry and concept-based learning align neatly with, and contribute to, the transdisciplinary model. Supported by the subject continuums and the key programme elements, the transdisciplinary themes provide the means for learners and members of the learning community to engage in genuine dialogues. Emerging through the inquiry process, these dialogues bridge subject knowledge and individual and collective experiences to articulate responsive, responsible, and reciprocal action for a more peaceful world.

Specifically, learners and teachers engage with:

- the **programme of inquiry**—the structure that articulates loosely what, when and how to explore the transdisciplinary themes from 3–12 years
- **concepts** that have relevance across, between and beyond the subjects and that connect wide-ranging knowledges to arrive at conceptual understandings
- the **approaches to learning** and **approaches to teaching** that are crucial for exploring subject knowledge in context with the transdisciplinary themes
- the opportunities to **reflect** and take **action** to enhance individual and collective understanding and learning or to address local and global challenges and opportunities.

The PYP framework and the transdisciplinary approach encourage and support connections across learning and teaching as a means to raise learner awareness of the relevance of their learning to their reality. PYP classrooms and schools are where the framework is turned into effective and innovative practice. Implementing the PYP in their own context, schools and their teaching teams bring to life the transdisciplinary learning experience for all in the community. They do so by developing curriculums, designing learning environments and experiences, and consolidating schedules to allow for collaboration. Every planning meeting is an opportunity for teachers to rework their personal interpretation of the relationship between theory and practice. They reflect on how their interpretation relates to the articulation of transdisciplinarity within an inquiry. Together, the PYP and IB World Schools provide learners with the necessary knowledge, conceptual understandings, skills and dispositions so that they can "[sail] in and around islands of certainty" as well as "navigate on a sea of uncertainties" (Morin 1999: 3).

Connecting the learning community

While individual context, knowledge and experience contribute to and shape dialogues and inquiries, transcending knowledge requires that the "individual is mindful of the collective" (Augsburg, 2014: 237). Article 13 of the *Charter of Transdisciplinarity,* adopted at the First World Congress of Transdisciplinarity presupposes "Shared knowledge should lead to a shared understanding based on an absolute respect for the collective and individual otherness united by our common life on one and the same Earth regardless of background or beliefs**"** (CIRET 1994).

In other words, the value of transdisciplinary learning is the integration of knowledge and experiences from different participants, disciplines and perspectives, and not merely those of any single individual. Transdisciplinarity calls for a collaborative, community-based approach to addressing issues, and to considering opportunities centred on common themes. Transdisciplinary learning is about the human subject, namely learners, teachers, members of the wider learning community and the "emotional relations between them and the object of knowing …" (Bostan 2015: 490). Designed to embrace personal, social and ecological significance, "the transdisciplinary themes provide a basis for much discussion and interpretation within a school, and allow for both local and global perspectives to be explored" in every unit (IBO 2008b: 12).

On many levels, the IB World School community is a representation of new possibilities and realities to be explored. PYP learners in over 100 countries bring to the IB community unique contexts. Their differences and commonalities not only have an impact on their individual exploration and interpretation of the transdisciplinary themes, but enrich and extend the collective dialogues across IB World Schools. By situating learning within local, national and global communities, we consider outcomes from both individual and collective perspectives, honour the rich cultural traditions of IB World School communities, and highlight the interdependence of everyone and everything to create a shared understanding of the world. Everyone in the IB community has agency to take action for a better world.

Many of the transdisciplinary themes, such as "Sharing the planet", "Where we are in place and time" and "How we express ourselves", signal a shared responsibility and accountability which invite communities to act based on collectively shared ethical values. This sense and role of community in learning and teaching is a universal asset, particularly towards developing and demonstrating international-mindedness.

The diverse geographical, cultural and linguistic representations, experiences, and communities of the IB learners (the subject) bring unique perspectives and dialogues to the complex issues of the time (the object), contributing to creative insights, knowledges, solutions or innovations (the "new realities").

Elements of the PYP framework

Exploring the elements

Effective teaching, Albright (2016: 532) believes, "is implicitly transdisciplinary", and, by design, multiple elements of the PYP bring to life transdisciplinary learning and teaching. These elements provide the foundation for learners to develop transdisciplinary thinking, to explore authentic issues and to effect change. They support the development of "internationally minded people who recognize their common humanity and shared guardianship of the planet" (IBO 2017: 2).

Figure 5

The transdisciplinary elements of the PYP

Learning through the transdisciplinary themes

The transdisciplinary themes mark the starting point of learner inquiries. It is within the context of each theme that learners explore related central ideas and assimilate knowledge. These themes engage the learning community in rich dialogues and ongoing collaboration to build an understanding of themselves, their wider community and the world. Designed to have enduring value regardless of the geography or background of IB World Schools and learners, the six themes provide guidance for what learners will inquire into (figure 6). They:

- encompass today and tomorrow's challenges and opportunities acknowledge the complexity, interconnectedness, and interdependence of human and natural worlds
- invite curiosity, openness and compassion in engaging in local and global issues
- allow for authentic embeddedness of subject areas
- contribute to the uniqueness of the PYP.

Figure 6

Transdisciplinary themes and their descriptors

Transdisciplinary themes	Descriptions
Who we are	An inquiry into identity as individuals and as part of a collective through: • physical, emotional, social, and spiritual health and well-being • relationships and belonging • learning and growing.
Where we are in place and time	An inquiry into histories and orientation in place, space, and time through: • periods, events, and artefacts • communities, heritage, culture, and environment • natural and human drivers of movement, adaptation, and transformation.
How we express ourselves	An inquiry into the diversity of voice, perspectives, and expression through: • inspiration, imagination, creativity • personal, social, and cultural modes and practices of communication • intentions, perceptions, interpretations, and responses.
How the world works	An inquiry into understandings of the world and phenomena through: • patterns, cycles, systems • diverse practices, methods, and tools • discovery, design, innovation—possibilities and impacts.
How we organize ourselves	An inquiry into systems, structures and networks through: • interactions within, and between, social and ecological systems • approaches to livelihoods and trade practices—intended and unintended consequences • representation, collaboration, and decision-making.
Sharing the planet	An inquiry into the interdependence of human and natural worlds through: • rights, responsibilities, and dignity of all • pathways to just, peaceful, and reimagined futures • nature, complexity, coexistence, and wisdom.

Transdisciplinary themes	Descriptions

Transcending knowledge through a programme of inquiry

The transdisciplinary themes of personal, local, and global significance provide the context for schools to frame a whole-school programme of inquiry, which is a cornerstone of the PYP pedagogy and its flexible framework. The programme of inquiry articulates how the six transdisciplinary themes will be explored across the different grades/years. It provides learners in the early and primary years with the opportunity to experience a coherent and balanced curriculum. On one level, it is planned; on another level, it is dynamic because a transdisciplinary programme of inquiry leaves room for emergent and unexpected ideas, directions and connections that learners might encounter. When this happens, the teaching team might modify the programme of inquiry or develop additional learning engagements outside the programme of inquiry.

The programme of inquiry fosters learners' development of subject knowledge, skills, conceptual understandings and dispositions while simultaneously communicating to the learning community that transdisciplinary inquiries are creative rather than reproductive (Montuori 2013). Reproductive inquiries focus on topics; creative inquiries focus on themes or enduring understandings. Creative inquiry is a means to investigate the world and ourselves (Augsburg 2014). When the teaching team collaboratively plans each unit in the programme of inquiry to identify significant, relevant, challenging and engaging central ideas for investigations, creative inquiries flourish and the transcendence of knowledge follows.

Designed collaboratively, each school's programme of inquiry reflects the unique aspects of that school community—from its geography, to the needs and experience of its members and associated local/regional/national education requirements. Through the programme of inquiry, all learners—students, teachers, and members of the community—are researchers. They move from what they know through personal experience and prior knowledge into ways of seeing, knowing, and doing that may be new or unfamiliar to them. They locate and work with subject-specific knowledge and skills in relation to the themes. They compare and contrast the subjects' respective methods, tools and approaches to generate theories that support their conceptual understandings of the transdisciplinary themes. Through the programme of inquiry, they understand the essential interconnectedness and interdependence of themselves, others, and the planet.

Integrating subjects in the curriculum

While the PYP model espouses transdisciplinary learning, it is important to acknowledge that "the disciplines of knowledge are not the enemy. Instead, they are a useful and necessary ally" (Beane 1995: 616). So, the question is not whether there is a place for subject knowledge, but how to bring knowledge into the transdisciplinary unit in a compelling and authentic way.

Because transdisciplinarity cannot happen without disciplinarity (Nicolescu 2014), it is necessary that learners gain understanding and skills in the disciplines to support knowledge integration. A functional command of the appropriate literacies (such as language, mathematics, science and the arts), and the motivation that comes from a level of mastery of those literacies, enable learners to feel confident to contribute to collaborative problem-solving. Through subjects, learners learn to appreciate the "ways of knowing"—the modes of thought and communication associated with a subject or discipline. They develop, for example, understandings of the methodologies associated with thinking like a scientist, a historian or an artist (Gardner and Boix Mansilla 1999).

Supporting the exploration of the transdisciplinary themes in context are six subject knowledge areas: language; mathematics; science; social studies; arts; physical, social and personal education. Each subject has its place in transdisciplinary learning because transdisciplinarity is as much about the liberal arts, cultural symbolisms and the social and natural sciences (Macdonald 2000). However, subject knowledge is not an end. Rather, it is a means to illuminate larger, more integrative ends (Boyer 1995).

The transdisciplinary theme and central idea of a unit under investigation contextualize subject knowledge in the inquiry process. While the subject continuums provide a roadmap for subject-specific knowledge, teachers sequence subject knowledge based on its relevance to the theme or central idea under investigation. Fostering transdisciplinary understanding requires that teachers consider subjects in relational terms to each other—and to the theme—as opposed to in isolationist or oppositional terms (Giri 2002). Specifically, transdisciplinary thinking requires that all specialists begin as a generalist so that the whole is more than the sum of its parts. The role of the teachers—classroom or specialist—is to support the creative reimagining of the subjects and to identify possibilities for combining them (Bernstein 2015) in context of the transdisciplinary themes.

See the PYP subject overviews and subject continuums.

Crossing boundaries with concepts

A concept-driven curriculum, another cornerstone of an IB education, helps the learner to construct meaning through improved critical-thinking and the transfer of knowledge and understanding. In transdisciplinary learning, concepts play a particularly important role in "linking operators" of knowledge (Klein 2004). Whereas knowledge and boundaries between disciplines can change over time (Nicolescu 2014), concepts are abstract ideas that have relevance within and across subjects (Erickson 1998; Fogarty and Stoehr 2008) as well as across national and cultural boundaries.

The PYP has identified seven specified concepts, and examples of other concepts that have significance for both transdisciplinary and subject-specific learning. These specified concepts help provide a structure to explore authentic content. Each concept and combination of concepts link the subjects and increase coherence across the curriculum. In the course of this exploration, learners deepen their disciplinary understandings, build capacity to engage with complex ideas, and activate transfer between disciplinary and transdisciplinary learning, and across educational and geographical contexts.

The sample unit of inquiry summaries (figure 7A–D) illustrate how the intended flexibility of the transdisciplinary programme of inquiry allows for the creative integration of the PYP specified concepts both inside and outside of the programme of inquiry.

Figure 7A

Integrating concepts in a unit of inquiry

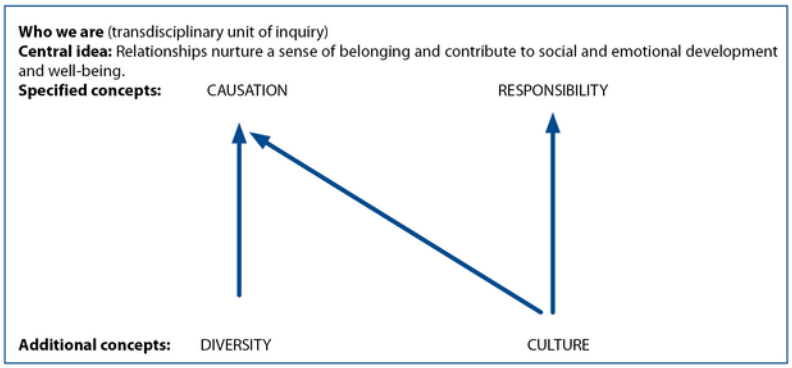


Figure 7B

Integrating concepts in a unit of inquiry

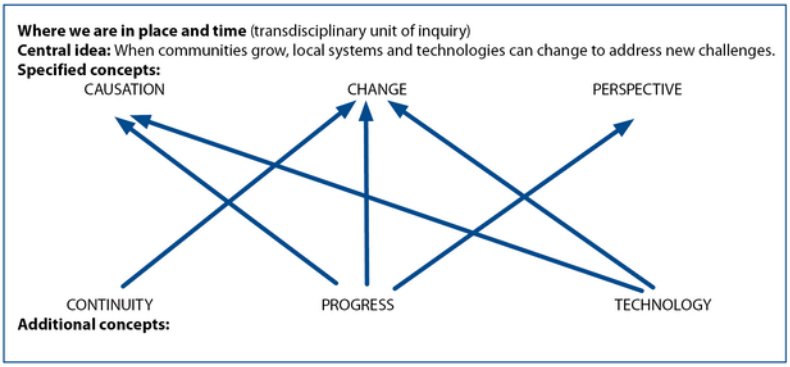


Figure 7C

Integrating concepts in a unit of inquiry

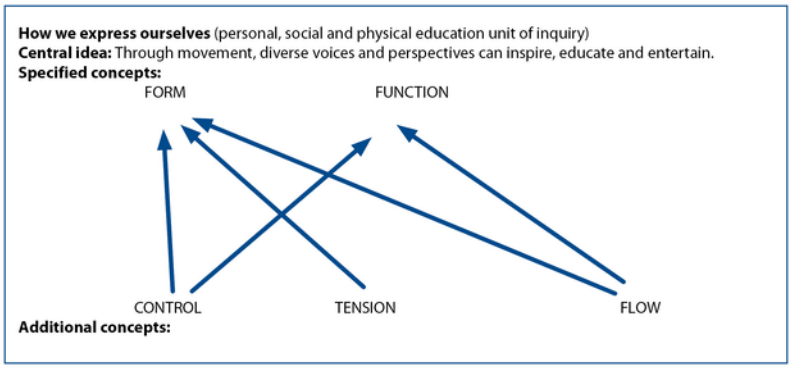
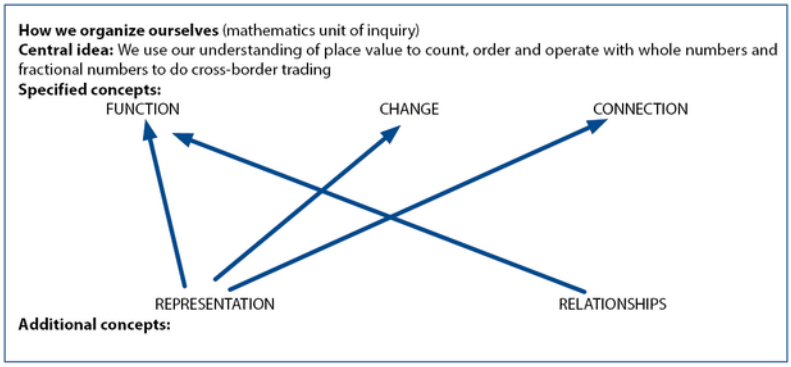


Figure 7D

Integrating concepts in a unit of inquiry



Developing the skills and dispositions of a transdisciplinary learner

Just as the IB has identified a set of attributes for the IB learner profile to nurture active, compassionate and lifelong learners, transdisciplinary researchers have also identified a set of ideal characteristics critical for cultivating a transdisciplinary attitude among individuals. These two sets of attributes share many commonalities, indicating a close alignment between a PYP learner and a transdisciplinary learner. As a start, the *Charter of transdisciplinarity* (CIRET 1994) lists **rigour**, **openness**, and **tolerance** as the fundamental characteristics of the transdisciplinary attitude and vision. In parallel, the PYP encourages learners to be open-minded and inclusive.

One attribute of the IB learner profile, **knowledgeable**, embodies the meaning of knowing through the transdisciplinary approach as described by Klein (1994): to know or to conceptualize knowledge involves moving from singularity to an integrative process. Specifically, learners move from simple to complex, from fragmented to connected and collaborative, from boundary-forming to boundary-blurring and from analysis to synthesis. This definition of knowledge is in keeping with the PYP commitment to transdisciplinarity.

Figure 8 outlines other examples of transdisciplinary characteristics articulated in research, together with their parallels in the IB learner profile and approaches to learning and approaches to teaching. These attributes are aimed at supporting learners to navigate across subjects, cross-group functions, processes and team dynamics.

Figure 8

Comparing characteristics of a transdisciplinary learner and a PYP learner

IB learner profile attributes and skills	Transdisciplinary characteristics and attitudes (Augsburg 2014)
IB learner profile: Inquirer, principled, open-mindedness, risk-taking	Curiosity, respect, open-mindedness, risk-taking
Approaches to learning and approaches to teaching: Inclusivity, communication and listening skills, collaboration	Tolerance, communication and listening skills, teamwork

A separate strand of research suggests that teachers, too, can develop transdisciplinary habits of mind to support creative teaching (Henriksen 2016). Transdisciplinary thinking skills support effective approaches to thinking and working that cut across subject boundaries.

Constructing shared understanding through language

How we know and how we communicate what we know rely on the power of language. Language learning and teaching is transdisciplinary by nature (Albright 2016). Learners use language to draw upon their prior knowledge, experiences and cultural contexts to explore their inquiries and human connection. Learners use language to construct meaning through a process of exploration, negotiation, and cooperation. Language enables the learner to access and to communicate knowledge, both general and subject-specific, to support meaning-making. Within this context, a multiliteracy approach to language learning provides a framework for deconstructing disciplinary meaning-making, resulting in new artefacts and understandings that relate to and represent the learners and their learning (Byrd Clark 2016).

The PYP's commitment to multilingualism is central both to fostering international-mindedness and to changing and shaping understanding based on the inquirer's perspectives and backgrounds. As discussed previously in "Connecting the learner", **beyond** disciplines in transdisciplinarity reflects active interactions among the inquirers whose dialogues and negotiations are context-specific and context-responsive. Paraphrasing Despre et al., Klein (2004: 521) states that "rational knowledge … comes out of not only 'what we know but how we communicate' it. This realization underscores the emergent quality of transdisciplinarity". Through language, learners express their unique perspectives and negotiate their ideas to shape new understandings. This inquiring process is what makes transdisciplinary learning a lived and context-specific experience. For this reason, language is equally important to sense-making as it is to the construction of shared and new knowledge and conceptual understandings.

By definition, multilingualism reflects the crossing of linguistic codes (Byrd Clark 2016). In the multilingual environment of many IB World Schools, multilingualism provides opportunities to explore cultural symbolism which, in turn, enriches transdisciplinary learning. In learning a new language, we take a step back from our ways of seeing the world, and explore other world views through the eyes of speakers of other languages. When members of a learning community reflect on their diversity through language, they move beyond the traditional national, cultural and social boundaries in their daily lives to develop and demonstrate international-mindedness.

Learn about the IB approach to language.

Bridging differences with ongoing collaboration

Just as transdisciplinarity cannot happen without disciplinarity, the programme of inquiry cannot happen without a high level of collaboration among teachers, learners and members of the learning community. Collaboration enables lateral, imaginative and creative thinking about solutions to problems, and about opportunities that are not imaginable within the confines of one field. While early application of the transdisciplinary approach began largely in scientific research, it is generally believed that inputs from the arts and humanities have the potential to transform research and education related to sustainability into an entirely new experience (Clark and Button 2011). Therefore, PYP teachers—regardless of their subject expertise—are encouraged to engage in collaborative planning. Collaborative planning, teaching and reflection between classroom and specialist teachers ensure a robust programme of inquiry that provides learners with current, coherent and connected learning experiences throughout their time in school.

Engaging with the concept of transdisciplinarity forces a paradigm shift that moves most teachers out of their comfort zone. Effective implementation of transdisciplinary learning through the PYP redefines traditional teacher–learner relationships in the classroom. In this relationship, learners become co-investigators in dialogue with the teacher, and they are jointly responsible for a process in which both learners and teachers will grow (Beane 1997; Freire 2005). Similarly, the transdisciplinary approach asks that specialist teachers in the PYP step out of their areas of expertise to think as a generalist. This is necessary

both to acknowledge that knowledge in all fields is subjective and fluid, and to support learners to make authentic connections to their personal and collective interests. Tension is inherent in transdisciplinary learning and necessary for learning; it is through constantly questioning and challenging previously held assumptions that learning discoveries are shaped and connections are made.

School leaders play a key role in creating and supporting a culture of collaboration where members of the learning community find mutual trust, personal chemistry and a feeling of safety (Augsburg 2014) to enable them to take risks by stepping outside their boundaries. Through collaboration, teachers gain "the ability of look[ing] beyond [their] own disciplinary boundaries, the capacity for disciplined self-reflexivity, the ability to reflect on knowledge integration processes, and the ability to take on new ideas" (Augsburg 2014: 238)—all are necessary to bridge and to transcend knowledge.

Transcending learning through learner action

In the last two decades, the concept of transdisciplinarity has also been adopted as an approach to address complex projects relating to authentic issues around built and natural environments. One such example is the concept of sustainability as an approach to address societal problems and to find solutions to environmental, social, economic and cultural challenges (Lawrence and Després 2004). This new direction implies that beyond bridging the gap between disciplines, the transdisciplinary approach can also bridge the gap between knowledge derived from disciplinary research and societal decision-making processes. This move highlights transdisciplinarity simultaneously as "an attitude" to approach complex issues and as "a form of action" to address them (Klein 2004). The shift is not entirely surprising in that "transdisciplinarity presupposes an individual ethics, a desire to improve society and to contribute to the advancement of the common good" (Augsburg 2014: 233).

Indeed, the IB was founded on a desire to provide an education that enables learners to understand and manage the complexities of the world in order to create a better and more peaceful world. International-mindedness goes beyond developing awareness and understanding to fostering engagement and action. With their focus on human and natural worlds, the PYP's transdisciplinary themes offer learners opportunities to transcend learning through authentic and meaningful action. These themes provide authentic contexts to evoke learner-initiated action in response to their inquiries. In a PYP school where learners have agency, action is a tangible demonstration of personal and collective understandings of the transdisciplinary themes to make a difference for positive change.

Learn how to support learners to take action.

Celebrating and demonstrating transdisciplinary learning through the exhibition

In the final year of the PYP, learners engage in an exhibition—a culminating learner-led inquiry into an issue or opportunity of interest to them. This is both a demonstration of learner agency and a reflection on learners' capacity to orchestrate their own learning. The exhibition offers learners the opportunity to put their interests, transdisciplinary thinking, knowledge, conceptual understandings, skills and attributes of the IB learner profile into action. They undertake their investigation both individually and with their peers, together with the guidance of a mentor, who can be from within or outside the school community.

A case study (Medwell, Cooker, Bailey and Winchip 2017) involving 334 learners in five countries provides clear evidence that the PYP exhibition leaves tangible impacts on learners. It highlights the development of international-mindedness and critical-thinking skills being the positive results of the exhibition, as reported by the learners. The study also finds learners to have strong interests in engaging with societal issues including the environment (23%), human rights (26%), science (20%) and humanities (18%). Families felt similarly positive about the exhibition, stating that the skills their children developed through the exhibition provided them with "real-world" competencies to further their education and life beyond school.

The exhibition and its benefits are important reminders of the powerful educational effect when learner agency, and the agency of the community, are combined with a transdisciplinary curriculum. The result is

the development of internationally minded learners who can make a positive difference in their own lives and the lives of others.

Learn how to support the exhibition.

Evidence of transdisciplinary learning

Consideration of practices

The goal of transdisciplinarity in the PYP is to unite knowledge and skills for the understanding of the transdisciplinary themes. Subject knowledge is a means to explore and to construct understanding of the transdisciplinary themes, rather than an end in itself.

Transdisciplinary learning requires not only a high degree of collaboration among all members of the learning community, but also a shift in mindset. It necessitates that specialists think as generalists, even as they facilitate understanding of a subject in which they have expertise to support learner inquiries. As article 3 of the *Charter of transdisciplinarity* (CIRET 1994) states:

"Transdisciplinarity does not strive for mastery of several disciplines but aims to open all disciplines to that which they share and to that which lies beyond them."

As such, the role of the teachers—both specialists and generalists—is to provide learners with the necessary understandings, tools and ways of knowing from subjects to explore the opportunities and challenges of each transdisciplinary theme. Beyond supporting the inquiry process, thinking as a generalist or classroom teacher can strengthen teacher–learner interactions, leading to learner engagement and well-being not achievable through the specialization model of teaching (Fryer 2016).

The starting point of a PYP inquiry is the central idea. During planning and reflection, teachers may consider the following guiding questions to enhance transdisciplinary learning and thinking.

- Are learners and teachers exploring their unit of inquiry through the lens of **learner-initiated questions** that lead to understanding of the transdisciplinary themes, rather than through the lens of the subjects?
- Is the **starting point of an inquiry to explore the central idea**, drawing on subject-specific knowledge to support the inquiry? Or is it to first teach subject-specific skills and knowledge and see how the subjects support the understanding of the central idea?
- Do learning activities and experiences reflect **authentic contexts**, using appropriate subjects as tools to evaluate the central idea, as well as associated opportunities and challenges?
- Do the lines of inquiry enhance the **possibilities for personal and collective integration of subject knowledge** in order to arrive at shared conceptual understandings of the central idea?
- Is subject-specific teaching aimed at uniting knowledge by identifying **opportunities to connect to the theme under investigation** or is it aimed at developing subject expertise?
- Do all teachers, including specialists, collaborate to find **shared conceptual understandings** of the central idea without specifically calling out the specificity of a subject?

Figure 9 provides further reflective statements for schools to self-assess their transdisciplinary practices. These statements support schools to move from practices that resemble multidisciplinary and interdisciplinary learning and teaching to transdisciplinary learning and teaching.

Figure 9A

Reflection statements to self-assess transdisciplinary practices

Practice	Moving from	Moving to
Planning	The central idea provides the starting point for specialists and the grade/year-level teacher to plan their respective inquiries and activities separately.	The central idea provides a starting point and continues to be the context and the motivation from which the teaching team

Practice	Moving from	Moving to
		plans, shares and reflects with learners collaboratively.
	Teachers plan the units of inquiry to strictly follow the guidance for each subject as it is laid out.	Teachers plan the units of inquiry in response to the interests and emerging theories of learners, and incorporate the subject continuums in context.
	The teaching team formally pre-plans all inquiring activities and knowledge-integration opportunities at the start of a unit and implements the unit according to the plan.	The teaching team loosely pre-plans learning experiences and then modifies these as necessary to respond to learner-directed questions and investigations during implementation.
	The planner is a record of transdisciplinary teaching.	The planner is a living illustration of ongoing collaboration to facilitate transdisciplinary thinking and learning.
	The teaching team plans the entire unit of inquiry without consultation with learners.	Teachers co-construct a unit of inquiry with learners.
	Learning goals are planned using the backward design approach (Wiggins and McTighe 2005) at the start of the unit and are assessed at the end of the unit.	Learning goals are articulated using the backward design approach at the start of the unit, and are adjusted based on ongoing monitoring and documenting of learner questions, theories, knowledge and skills development.

Figure 9B

Reflection statements to self-assess transdisciplinary practices

Practice	Moving from	Moving to
Specialist teaching	Subject knowledge is taught separately from the unit of inquiry.	Subject knowledge is integrated as the instrument of the learning process from which learners draw to explore the central idea and related lines of inquiry.
	Subject knowledge and skills are taught when it is convenient for the teachers.	Subject knowledge and skills are taught when it is pertinent for the exploration of the central idea and associated lines of inquiry.
	Specialist teachers approach the central idea firstly as a specialist and secondly as a generalist.	Regardless of their expertise, all teachers approach the central idea firstly as a generalist and secondly as a specialist.

Figure 9C

Reflection statements to self-assess transdisciplinary practices

Practice	Moving from	Moving to
Scheduling	The schedule revolves around the subjects.	The schedule revolves around the lines of inquiry and related learning experiences.
	The schedule places artificial starting and ending points for an inquiry.	The schedule flexibly accommodates the inquiry based on the context and

Practice	Moving from	Moving to
		relevance of subject integration, interests and events at the time.

Figure 9D

Reflection statements to self-assess transdisciplinary practices

Practice	Moving from	Moving to
Inquiring	Investigations of a unit and learning experiences draw on subjects, concepts and skills one at time or sequentially.	Investigations of a unit and learning experiences draw on a combination of concepts, subject knowledge and approaches to learning skills as needed in reference to the lines of inquiry.
	Lines of inquiry or activities focus on topics, for example, dinosaurs, volcanoes, festivals, and so on.	Lines of inquiry or activities focus on enduring concepts that span subjects, for example, perspective, connection, change, adaptation, transformation, interdependence, and so on.
	Learners are encouraged to find the one "correct" reality/answer/solution.	Teachers acknowledge that there could be multiple realities/answers/solutions and encourage learners to identify, inquire into and share them.
	The use of one language is preferred in researching an inquiry and articulating learning.	The use of multiple languages is encouraged, depending on the comfort and preference of the learner.

Figure 9E

Reflection statements to self-assess transdisciplinary practices

Practice	Moving from	Moving to
Reflecting	The teaching team comes together to reflect at the end of each unit.	The collaborative teaching team, or a subset of the teaching team, meets, exchanges formal and informal observations in person or through planning documentations throughout the inquiry process.

Figure 9F

Reflection statements to self-assess transdisciplinary practices

Practice	Moving from	Moving to
Learner grouping	Learners begin and end the inquiry in the same group.	Learners have opportunities to work with peers based on interests, skills, knowledge, personal preference and other criteria.

Summary

A commitment to transdisciplinary learning

The PYP's commitment to a transdisciplinary programme of inquiry in the 1990s was ahead of its time. Today, the PYP transdisciplinary programme remains developmentally appropriate for young learners and a powerful way to support active learning, creativity, critical abilities and imagination—all of which influential sociologist Bourdieu (1990) believed should be the driving principles of a curriculum. Through its commitment to transdisciplinary learning, students learn to appreciate knowledge, conceptual understandings, skills and personal attributes as a connected whole. They can reflect on the significance of their learning to take meaningful action in their community and beyond. Through this process of learning in the PYP, students become competent learners who have the cognitive, affective and social tools to engage in lifelong learning in a self-directed manner.

In evaluating the prospect of tertiary education reform, Ertas (2000: 14) asserts, "the most important aspect of education is not the imparting of specific knowledge, but rather the learning of how to find knowledge when it is needed, how to assimilate that knowledge, how to integrate that knowledge, and how to synthesize new ideas and solve problems". The PYP transdisciplinary programme is doing exactly that. What's more, by emphasizing transdisciplinary themes, inquiry and conceptual understandings, the PYP supports learner agency and values learner contribution and diversity as integral to the learning process. It further honours the finely honed intuition and experience of classroom teachers as they are given the autonomy to develop a programme of inquiry that is fit for purpose. In a healthy, conducive learning environment where everyone has voice, choice and ownership in the learning process, learners and teachers flourish because they are complementary and supplementary to the success of the other. Finally, it recognizes the need for flexibility among schools to adopt and adapt the transdisciplinary programme of inquiry to meet local, regional, and national standards, to provide opportunities for learners to address local opportunities and challenges, and to simultaneously support learners in developing the necessary competencies to navigate this rapidly changing, uncertain, and complex world.

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What is the evidence of the effectiveness of integrated curriculum approaches?

Transdisciplinary learning has no precedent in primary schooling. However, variants of integrated learning have been subjects of empirical research since the early 1900s, when Dewey advocated inquiry-based learning based on lived experiences and social justice. The frequently cited evidence supporting the effectiveness of integrated curriculums include the "Eight Year Study" (Aikin 1942, Lipka et al 1998) and two follow-up studies.

Collectively, research reviews (Vars 2000; Caskey and Anfara 2006; Drake et al. 2015) found multiple positive learner effects for a variety of approaches that have elements of curriculum integration such as problem-based, inquiry, interdisciplinary or experiential learning, and so on. These reviews cover primary to high school. Figure 10 includes the results of these reviews, as well as research-evaluated PYP learner outcomes (Sillisano et al. 2010; Tan and Bibby 2011; Pushpanadham 2013).

Figure 10

Benefits of curriculum integration in comparison with traditional curriculums

Learner engagement	Academic learning	Affective responses/ dispositions
Intellectually curious	Similar, and often better, results than conventional programmes	Better critical-thinking skills
More motivated to learn	Higher grade-point average	Better problem-solving skills
Higher, or more consistent, attendance	More academic honours	Objective and systematic thinking
A feeling of connection to school and educators	Higher graduation rate	Stronger sense of self-efficacy and self-confidence
Higher degree of social and teacher–learner interaction	Greater college attainment	More self- and culturally aware

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An integral part of an IB education

Summary

- Approaches to learning are grounded in the belief that learning how to learn is fundamental to a learner's education.
- Five categories of interrelated skills and associated sub-skills support learners of all ages to become self-regulated learners.
- Through a variety of strategies, teachers collaboratively plan for implicit and explicit opportunities to develop approaches to learning both inside and outside the programme of inquiry.

Approaches to learning are an integral part of an IB education and complement the IB learner profile, knowledge, conceptual understanding and inquiry.

These skills are grounded in the belief that learning how to learn is fundamental to a learner's education. Five categories of interrelated skills aim to support learners of all ages to become self-regulated learners who know how to ask good questions, set effective goals and pursue their aspirations with the determination to achieve them. These skills also help to support learners' sense of agency, encouraging them to see their learning as an active and dynamic process (IBO 2017).

Although the approaches to learning are relevant from 3 to 19 years of age, it is particularly important for PYP teachers to interpret these skills in ways that are appropriate for early and primary years learners. All teachers foster and support the development of these skills by providing opportunities embedded in authentic learning experiences.

Subject-specific skills and approaches to learning

When learning about and through the subjects, learners acquire skills that help them to learn those subjects. For example, in language, learners become literate, and in mathematics they become numerate. The acquisition of literacy and numeracy skills, in their broadest sense, is essential, as these skills provide learners with the tools to inquire.

Beyond the skills of literacy and numeracy, there are a range of interrelated approaches to learning that are transferable across contexts. These skills support purposeful inquiry and set the foundations for lifelong learning. The development of these skills is frequently identified in education literature as crucial in supporting learners to effectively learn and succeed inside and outside of school, (Trilling and Fadel 2009; Wagner 2014). The five interrelated approaches to learning are:

Figure ATL0

The five interrelated approaches to learning

The IB's approaches to learning aim to support learner agency. They foster the development of cognitive and metacognitive skills and dispositions so that learners view learning as something they "do for themselves in a proactive way, rather than as a covert event that happens to them in reaction to teaching" (Zimmerman 2000, p.65). Together, these approaches to learning help learners think, research, communicate, socialize and manage themselves effectively.

Embedded within the approaches to learning are digital literacy skills that can be an invaluable resource for information gathering or processing, as well as for critical and creative thinking, communication and collaboration.

By combining approaches to learning and the attributes of the IB learner profile, PYP learners become self-regulated learners. Self-regulated learners are agents of their own learning. They know how to:

- set learning goals
- ask open-ended questions
- generate motivation and perseverance
- reflect on achievement
- try out different learning processes
- self-assess as they learn
- adjust their learning processes where necessary.

(Zimmerman and Schunk 2001; de Bruin et al. 2012; Wolters 2011).

The inquiry learning progressions also complement the approaches to learning and the development of self-regulated learners. The inquiry progressions explicitly describe certain skills with greater and more specific information which supports learner learnings.

Figure ATL0

Connections between the inquiry learning progressions and the approaches to learning

Learning progression	Example approaches to learning connections
Questioning to explore and play with ideas	**Research skills**—information literacy **Communication skills**—exchanging information
Observation	**Thinking skills**—creative thinking (considering perspectives) **Communication skills**—representation (verbal and non-verbal) **Self-management skills**—states of mind (habits of attention, self-motivation)
Decision-making	**Thinking skills**—critical thinking, creative thinking, reflection and metacognition **Self-management skills**—organization skills (managing time and tasks effectively)
Role and turn-taking	**Communication skills**—exchanging information (listening, interpreting, speaking) **Social skills**—collaboration skills **Self-management skills**—emotional management

The approaches to learning and sub-skills

Although the approaches to learning are presented as distinct categories with associated sub-skills, there are close links and areas of overlap between them. For learning that is connected, it is important that learners and teachers recognize these skills as interrelated. For example, the skill to synthesize information or data, and the ability to draw conclusions from the data, are related to thinking and research skills.

Figure ATL02 provides some examples of sub-skills—which schools may choose to focus on, modify or add to—based on their contexts. Working collaboratively during the planning process, teachers are encouraged to determine necessary skills, based on context and need, and document and monitor them as learning goals.

Figure ATL02

The five interrelated skills and example sub-skills

Categories	Example sub-skills
Thinking skills	• Critical-thinking skills (analysing and evaluating issues and ideas) • Creative-thinking skills (generating novel ideas and considering new perspectives) • Transfer skills (using skills and knowledge in multiple contexts) • Reflection/metacognitive skills ((re)considering the process of learning)
Research skills	

Categories	Example sub-skills
	• Information-literacy skills (formulating and planning, data gathering and recording, synthesizing and interpreting, evaluating and communicating) • Media-literacy skills (interacting with media to use and create ideas and information) • Ethical use of media/information (understanding and applying social and ethical technology)
Communication skills	• Exchanging-information skills (listening, interpreting, speaking) • Literacy skills (reading, writing and using language to gather and communicate information) • ICT skills (using technology to gather, investigate and communicate information)
Social skills	• Developing positive interpersonal relationships and collaboration skills (using self-control, managing setbacks, supporting peers) • Developing social-emotional intelligence
Self-management skills	• Organization skills (managing time and tasks effectively) • States of mind (mindfulness, perseverance, emotional management, self-motivation, resilience)

Connecting approaches to learning and approaches to teaching

The learning community has an important role in supporting the understanding and development of approaches to learning. In a social-constructivist environment, learners co-construct knowledge with peers and teachers, and develop their skills more effectively with guidance and support from teachers and mentors (Toshalis, Nakkula 2012).

Many of the approaches to learning can be seen in the context of a learner's natural abilities. The IB believes that proficiency in any of these skills can be supported through the deliberate use of techniques and strategies, feedback and challenge (Toshalis, Nakkula 2012).

For example, research on "creativity" challenges conceptions of creativity as limited to individual psychological traits; it is also learnable and can be achieved in dynamic groups (McWilliam 2009). Functional intelligence, creativity and other skills are malleable and can be developed when learners are given opportunities to practise them (Bransford et al. 2005; Mangels et al. 2006).

The changeable nature of intelligence, ability and motivation highlights the need for teachers to personalize learning based on individual needs and learners' development (Toshalis, Nakkula 2012). Through collaboration with learners and ongoing assessment, teachers effectively group and regroup learners to support the development of the approaches to learning. A classroom that honours learner voice, choice and ownership also encourages them to identify peers with whom to practise their skills.

Teachers create opportunities for skill development inside and outside the programme of inquiry, and map them vertically and horizontally across the curriculum. Teachers understand that proficiency in using and applying a skill comes with practice. To achieve this, teachers model the skill and provide scaffolds when introducing a skill for the first time. They consider the multiple contexts across the units of inquiry in which learners can practice and transfer skills. In goal-setting, learners and teachers collaborate to identify skills for development or for further practice. The inquiry learning progressions are a bridge between the

approaches to teaching and the approaches to learning, and can support learners and teachers in this goal setting.

It is important to recognize that all members of the learning community continue to develop the approaches to learning and associated sub-skills throughout their lives. With exposure and experience, learners improve and become better at learning to learn; therefore, skills can be at different levels of proficiency. For example, a research skill looks very different in the early and primary years, in high school, in university and in the workplace. Knowing where learners' skill levels are relative to the context, the learning goal or developmental stage can help teachers personalize the opportunity for skills practice and application.

Reflecting on learners' abilities, and through ongoing documenting and monitoring of learners' emergent skills, teachers provide opportunities for learners to be exposed to new skills, to further develop existing skills and to apply and transfer skills in various contexts (Berliner 2004).

Developing approaches to learning holistically

Through collaborative planning, teachers also consider the IB learner profile attributes and identify a connection to the approaches to learning. For example, thinking skills are necessary to become an effective thinker or an inquirer.

Consider a unit of inquiry with the central idea "Government systems address the diverse and divergent needs of a variety of communities". The teachers decide to challenge learners to choose a community issue that is relevant to them and find out how the government made (or is making) decisions to address the issue. Learners decide to consider a novel solution to the issue that could be administered within the current government system. The inquiry requires the development of critical- and creative-thinking processes. Through the inquiry, learners demonstrate the IB learner profile attributes of "reflective thinker" and "open-minded" in response to the central idea and the approaches to learning that will be developed in the unit of inquiry.

Supporting the development of the approaches to learning holistically also requires that teachers seamlessly integrate them implicitly as part of the classroom culture and explicitly as part of inquiry.

Embedding the approaches to learning implicitly in the classroom culture

Teachers may consider:

- using the language of the approaches to learning
- modelling the approaches to learning
- giving feedback about approaches to learning
- highlighting the use of approaches to learning in children's literature and in the learning spaces
- setting up essential agreements and routines around the approaches to learning.

Establishing the approaches to learning explicitly through an inquiry

Together with learners, teachers may consider:

- co-constructing approaches to learning goals
- identifying specific approaches to learning for development in a unit of inquiry
- reflecting on specific approaches to learning from the unit
- personalizing approaches to learning for further support
- designing specific learning engagements to support the development of an approaches to learning
- monitoring the development of approaches to learning.

Fostering the development of the approaches to learning

All approaches to learning can be facilitated explicitly or implicitly through a variety of strategies. In supporting learners' skill development, teachers are mindful of the difference between opportunities that arise authentically and those that are explicitly planned. While there are times when explicit skills teaching is necessary, teachers aim to support the development of these skills in authentic, integrated and meaningful contexts.

When appropriate, teachers use examples to demonstrate what skills look like in different learning contexts; use the language of skills in feedback; share their own experiences using and practising a particular skill; and encourage transfer of skills across contexts and the curriculum.

Teacher support material (TSM): Explicitly teaching thinking skills

Tool: Embedding the approaches to learning

These tables are for use with primary years learners. For early years guidance on the approaches to learning, find more information available in the section "Approaches to learning in the early years".

Figure ATL03 provides some examples of sub-skills—which schools may choose to focus on, modify or add to—based on their contexts.

Figure ATL03

How teachers support approaches to learning

Categories	What teachers do:
Thinking skills	• Model the language of thinking and reinforce the processes of thinking. • Ask open-ended questions. • Provide sufficient thinking time. • Implement and model a range of "visible thinking" techniques. • Explicitly ask learners to discuss and reflect on the value and limitations of the resources used through their inquiries. • Provide time for reflection at all stages of learning—before, during and after inquiries. • Promote a range of tools for reflection and ensure that reflection activities are responsive and varied. • Through the use of inquiry learning progressions, reflect on abilities and co-create learning goals.
Research skills	• Plan transdisciplinary and subject-specific inquiries in which learners can develop, apply and reflect on their research skills. • Provide a range of tools for learners to organize their research so that all stages are documented. • Model academic integrity by providing proper citations and references for materials and ideas that are shared with learners. • Collaborate with, for example, the librarian and technology specialists to support learners to build research skills and to learn how to identify reliable sources of information.
Communication skills	• Plan opportunities for learners to practise and apply these skills in meaningful contexts. • Provide time for learners to plan and prepare communication activities. • Encourage learners to consider potential challenges and opportunities arising from shared ideas.

Categories	What teachers do:
	• Encourage physical cues. • Encourage communication using different languages. • Ask open-ended questions. • Put thinking ahead of knowing. • Have informal conversations. • Encourage learners to explore a variety of perspectives and modalities.
Social skills	• Provide explicit opportunities for learners to practise and develop social skills. • Provide opportunities for learners to reflect on their social skills. • Reflect and feedback on different interactions they observe. • Offer learners opportunities to see that "other people, with their differences, can also be right". • Use the language of the IB learner profile in conversations and discussions, and in the development of essential agreements. • Model the social skills.
Self-management skills	• Provide opportunities for learners to monitor and manage their learning to make progress. • Involve learners in planning. • Build resilience by ensuring that learning goals co-constructed with learners are challenging but achievable. • Create an atmosphere where learners regard learning as a process of gradual improvement. • Continually reflect on how they are supporting learner agency as an intrinsic motivation to success. • Support learners to manage distractions.

Learners have a key role in the development of the approaches to learning, figures ATL04–08 provide some examples of sub-skills—which learners may choose to focus on, modify or add to—based on their learning.

Figure ATL04

Thinking skills – what learners do

Thinking skills	
Sub-skills	**What learners do:**
Critical thinking Analysing and evaluating issues and ideas, and forming decisions	**Analysing** • Observe carefully in order to recognize problems. • Consider meaning of materials. • Take knowledge or ideas apart by separating them into component parts. • Use models and simulations to explore complex systems and issues. **Evaluating** • Organize relevant information to formulate an argument. • Evaluate evidence and arguments, and associated decisions. • Recognize unstated assumptions and biases. • Consider ideas from multiple, diverse, and divergent perspectives.

Thinking skills	
Sub-skills	**What learners do:**
	• Synthesize new understandings by finding unique characteristics; seeing relationships and connections. • Test generalizations and conclusions. • Identify obstacles and challenges. • Reflect critically on their position or research. **Forming decisions** • Develop contrary or opposing arguments. • Propose and evaluate a variety of solutions. • Revise understandings based on new information and evidence. • Draw conclusions and generalizations.
Creative thinking Generating novel ideas and considering new perspectives	**Generating novel ideas** • Use discussions and diagrams to generate new ideas and inquiries. • Practise thinking strategies and techniques (e.g. visible thinking). • Make unexpected or unusual connections between objects and/or ideas. • Design improvements to existing products, processes, media and technologies. **Considering new perspectives** • Ask "what if" questions and generate testable hypotheses. • Apply existing knowledge to design new products processes, media and technologies. • Consider multiple alternatives, including those that might be unlikely or impossible. • Practise flexible thinking—develop multiple opposing, contradictory and complementary arguments. • Explore one's own positionality. • Generate metaphors and analogies.
Information transfer Using skills and knowledge in multiple contexts	• Use memory techniques to develop long-term memory. • Inquire in different contexts to gain different perspectives. • Make connections between units of inquiry and between subjects. • Transfer conceptual understandings across transdisciplinary themes and subjects. • Combine knowledge, conceptual understandings and skills to create products or solutions. • Apply skills and knowledge in unfamiliar situations or outside of school. • Help others develop conceptual understandings and skills.
Reflection and metacognition Using thinking skills to reflect on the process of learning	• Identify strengths and areas for improvement. • Consider new skills, techniques and strategies for effective learning. • Record thinking and reflection processes. • Reflect on their learning by asking questions such as: • What did I learn today? • What don't I yet understand?

Thinking skills	
Sub-skills	**What learners do:**
	• What questions do I have now? • What can I already do? • What will I work on next? • What can I do to become a more effective learner? • What factors are important for helping me learn well? • Have I been a principled and balanced thinker? (for example, considering ethical, cultural and environmental implications).

Figure ATL05

Research skills – what learners do

Research skills	
Sub-skills	**What learners do:**
Information literacy Formulating and planning, data gathering and recording, synthesizing and interpreting, evaluating and communicating	**Formulating and planning** • Ask or design relevant questions of interest that can be researched. • Outline a plan for finding necessary information. • Evaluate and select appropriate information sources and/or digital tools based on the task. **Data gathering and recording** • Gather information from a variety of primary and secondary sources. • Use all senses to find and notice relevant details. • Record observations by drawing, note taking, charting, tallying, writing statements, annotating images. **Synthesizing and interpreting** • Sort and categorize information: arrange information into understandable forms such as narratives, explanatory and procedural writing, tables, timelines, graphs and diagrams. • Use critical literacy skills to analyse and interpret information. **Evaluating and communicating** • Draw conclusions from relationships and patterns that emerge from data. • Present information in a variety of formats and platforms. • Understand the significance of academic integrity and intellectual property rights. • Create references and citations, use footnotes/endnotes and construct a bibliography according to recognized conventions.
Media literacy Interacting with media to use and create ideas and information	• Locate, organize, analyse, evaluate and synthesize information from a variety of trusted sources, social media and online networks. • Compare, contrast and draw connections among (multi)media resources. • Seek a range of perspectives from multiple and varied media sources. • Demonstrate awareness of media interpretations of events and ideas.

Research skills	
Sub-skills	**What learners do:**
	• Communicate information and ideas effectively to multiple audiences using a variety of media and modalities.
Ethical use of media/ information Understanding and applying social and ethical technology	• Use media ethically to communicate, share and connect with others. • Differentiate reliable from unreliable resources. • Understand the impact of media representations and modes of presentation.

Figure ATL06

Communication skills – what learners do

Communication skills	
Sub-skills	**What learners do:**
Exchanging information Listening, interpreting and speaking	**Listening** • Listen to, and follow the information and directions of others. • Listen actively to other perspectives and ideas. • Ask for clarifications. • Listen actively and respectfully while others speak. **Interpreting** • Interpret visual, audio and oral communication: recognizing and creating signs, interpreting and using symbols and sounds. • Understand the ways in which images and language interact to convey ideas. • Recognize the meaning of kinaesthetic communication (body language). • Be aware of cultural differences when providing and interpreting communication. **Speaking** • Speak and express ideas clearly and logically in small and large groups. • Give and receive meaningful feedback and feedforward. • State opinions clearly, logically and respectfully. • Discuss and negotiate ideas and knowledge with peers and teachers. • Communicate with peers, experts and members of the learning community using a variety of digital environments and media.
Literacy Reading, writing and using language to gather and communicate information	**Reading** • Read a variety of sources for information and for pleasure. • Read critically and for comprehension. • Make inferences and draw conclusions. • Use and interpret a range of terms and symbols. **Writing** • Use appropriate forms of writing for different purposes and audiences. • Paraphrase accurately and concisely.

Communication skills	
Sub-skills	**What learners do:**
	• Record information and observations by hand and through digital technologies. • Use a variety of scaffolding for writing tasks. • Organize information logically. • Make summary notes. • Communicate using a range of technologies and media. • Understand and use mathematical notation and other symbols. • Responsibly participate in, and contribute to, digital social media networks.
ICT Communicating using technology to gather, investigate and share information	• Understand the impact of media representations and modes of presentation. • Make informed choices about modes of communication based on audience. • Communicate information and ideas effectively to multiple audiences using a variety of media and modalities.

Figure ATL07

Social skills –what learners do

Social skills	
Sub-skills	**What learners do:**
Interpersonal relationships, social and emotional intelligence Developing positive interpersonal relationships and collaboration	**Interpersonal relationships** • Practise empathy and care for others. • Listen closely to others' perspectives and to instructions. • Be respectful to others. • Learn cooperatively in a group: being courteous, sharing, taking turns. • Help others to succeed. • Build consensus and negotiate effectively. • Make fair and equitable decisions. • Encourage others to contribute. • Take on a variety of roles in group learning. • Advocate for one's own rights and needs, and those of others. **Social and emotional intelligence** • Be aware of own and others' emotions. • Manage anger and resolve conflict. • Be self and socially aware. • Be aware of own and others' impact as a member of a learning group.

Figure ATL08

Self-management skills –what learners do

Self-management skills	
Sub-skills	**What learners do:**
Organization Managing time and tasks effectively	• Plan short- and long-term tasks. • Set goals that are challenging and realistic. • Use time effectively and appropriately. • Bring necessary equipment and supplies to class. • Keep an organized and logical system to document learning. • Understand and use learning preferences. • Use technology effectively and productively. • Take on and complete tasks as agreed. • Delegate and share responsibility for decision-making.
States of mind Using strategies that manage state of mind	**Mindfulness** • Use strategies to support concentration and overcome distractions. • Be aware of body–mind connections. **Perseverance** • Demonstrate persistence. • Use strategies to remove barriers. **Emotional management** • Take responsibility for one's own actions. • Use strategies to support emotional regulation. • Use strategies to support engaging in dialogue/mediation. • Use strategies to reduce stress and anxiety. • Manage anger and resolve conflict. **Self-motivation** • Practice positive thinking and language that reinforces self-motivation. **Resilience** • Manage setbacks. • Work through adversity. • Work through disappointment. • Work through change.

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Inquiry in the PYP

Summary

- Play, problem-based learning, collaboration, experimentation, and explicit teaching all have a place within well-considered inquiry-based learning experiences.
- Inquiry is purposeful and authentic.
- The inquiry process builds capacity through learner agency where voice, choice and ownership feature strongly.
- The skills of inquiry can be intentionally planned for, and developed, through well-designed learning opportunities.

The spirit of inquiry

Inquiry, as the leading pedagogical approach of the Primary Years Programme (PYP) recognizes learners as being actively involved in their own learning and as taking responsibility for that learning. PYP learning is approached with a spirit of inquiry. Drawing from the transdisciplinary themes and learners' interests, inquiry is an authentic way for learners to relate to, explore and understand the world around them.

A large body of research, supported by experiences of teachers worldwide, has informed the IB in committing to purposeful conceptual inquiry that engages learners actively in their own learning (Kuhlthau, Maniotes, Caspari 2015), (Bonnstetter 1998). The IB believes that this is the way in which learners learn best.

To help develop the IB learner profile, learners are supported in becoming "inquirers". Inquiry nurtures curiosity and promotes enthusiasm for life-long learning. Effective inquiry encourages learners to think, challenge and extend their ideas; it prompts learners to reflect and take action. Through the inquiry process, learners develop, demonstrate and practise the approaches to learning and attributes of the IB learner profile.

Inquiry is purposeful and authentic. It incorporates problem solving and supports learners in achieving personal and shared goals. Inquiry extends learners' learning when the exploration of initial curiosity generates new questions and wonderings. By situating inquiry in meaningful contexts, connections are made between personal experiences to local and global opportunities and challenges.

Learning and teaching in the IB grows from an understanding of education that celebrates the many ways people work together to construct meaning and make sense of the world. The inquiry process supports the development and demonstration of international-mindedness. Represented as the interplay between asking (inquiry), thinking (reflection) and doing (action), this constructivist inquiry process leads towards open classrooms where different views and perspectives are valued. This process is the basis of the design and implementation of learning and teaching in all IB programmes.

The skills of inquiry

Skills which support successful inquiry can be identified in the approaches to learning. A selection of these skills are further described and developed in the inquiry learning progressions. The learning progressions explicitly describe what inquiry looks like within and across subjects and support the monitoring and documenting of learning and the giving of feedback.

Inquiry learning progressions

The inquiry process

Connecting passion with intention, the inquiry process builds capacity through learner agency where voice, choice and ownership feature strongly. PYP teachers and learners collaborate to plan for inquiry through a wide range of strategies, tools and practices that suit learning goals, reflect the IB learner profile, respond to learners' interests and understandings, and the school's culture and context.

Through a multi-layered inquiry process, learners develop skills and move from current understandings to new and deeper understandings. This process involves but is not limited to:

- exploring, wondering and questioning
- experimenting and playing with possibilities
- making connections between previous learning and current learning
- making predictions and acting purposefully to see what happens
- collecting data and reporting findings
- clarifying existing ideas and reappraising perceptions of events
- applying concepts to deepen conceptual understanding
- researching and seeking information
- establishing and testing theories
- solving problems in a variety of ways
- collaborating
- taking and defending a position
- sharing and reflecting.

Designing an inquiry

Inquiry can range from teacher guided to completely open inquiries (Bonnstetter 1998). The PYP emphasizes guided inquiry as a leading pedagogical approach. Guided inquiry scaffolds learners' cognitive processing, supporting them to gradually learn and construct more complex understandings (Hmelo-Silver, Duncan, Chinn 2007).

Play, problem-based learning, collaboration, experimentation, and explicit teaching all have a place within well-considered inquiry-based learning experiences. In these experiences, teachers respond to learners' emergent questions, theories and discoveries. In addition, they create opportunities for open, learner-initiated inquiries. These inquiry approaches are fit for purpose to facilitate the development of the IB learner profile and inquiry skills, and support learners to become critical and creative thinkers, researchers, collaborators and communicators.

Considerations for inquiry learning

What does inquiry learning look like?

Move from	Move towards
Time	
A timetabled methodology for specific lessons/ activities at specific times.	A rigorous process of continuous learning through inquiry.
Fixed time frames and prescribed inquiry stages.	Open-ended time frames and flexible processes for inquiry.
Facilitation	

Move from	Move towards
Adherence to one style of inquiry as a recipe for learning.	Conscious decisions regarding guided and open learner-initiated inquiry as it fits the purpose of learning.
Linear process of inquiry, reflection then action.	Inquiry as an ongoing, iterative process of asking, thinking and doing.
Skills taught in isolation of the programme of inquiry.	Development of skills are considered in authentic contexts within the units of inquiry.
Teaching as moving learners through lists of activities with pre-determined timelines and learning goals.	Inquiry as multi-layered process, balancing planned learning experiences with emergent avenues for exploration.
Use of concepts and questions to find pre-determined answers.	Use of concepts and questions as a means to construct new understandings.
Assessment as a final phase of learning.	Assessment as an ongoing, varied and integral process to inform teaching and next steps in the inquiry.
Learner action planned by the teachers at the start of an inquiry	Responsible learner-initiated action, emerging throughout inquiry
Collaboration	
An individualized, isolated learning experience.	A collaborative, co-constructed experience.
Learners as recipients of teaching.	Learners as active partners in constructing meaning.
Fixed ability groups for subjects and programme of inquiry	Planning for grouping and regrouping throughout learning experiences.
Teachers work individually to support the unit of inquiry	Teachers continuously collaborate to support the unit of inquiry.

Time for inquiry

Conceptual inquiry through transdisciplinary themes requires some timetable considerations. The process of inquiry needs sustained time. Short class times or continual interruptions to learning result in disruption to learner questioning, collaboration, reflection and action. Lack of sustained time for learning undermines the self-efficacy of learners and can have an impact on the depth of understanding.

Collaborative practice

The key to developing collaborative practices and a successful inquiry programme is regular and systematic planning among grade/year level teachers, specialists and other support staff using the PYP collaborative planning process. This planning, whilst regular and systematic, should also leave space for learner questions, wonderings, interests, and personal inquiries. Multiple PYP planners for planning "units of inquiry" are provided to PYP schools to support each learning community in designing and facilitating learner inquiries.

PYP planner templates

PYP collaborative planning process

Explicit teaching

There is a role for direct subject specific knowledge and skills teaching to support the cognitive processing for learning (Sweller 2004) and to add richness to the inquiry process. There are times when this explicit teaching may be a moment with a whole class before, during or after an inquiry. At other times, it may be with a small group or an individual. In an inquiry classroom, explicit teaching occurs "just in time" (Hmelo-

Silver, Duncan, Chinn 2007) not "just in case". Learners build their conceptual understanding by connecting factual, procedural, and metacognitive knowledge and consciously organizing connections between prior and new knowledge.

Resources

In addition to time, learner/teacher collaboration and foundational knowledge and skills, resources in schools such as technology, the library, books, design materials, manipulatives, arts and science supplies and more contribute equally to the depth of an inquiry. Carefully considered resources and learning spaces extend learners' thinking, research and communication skills during the inquiry process. In addition, learners and teachers may consider resources in the learning community to further and extend their inquiry.

Action and inquiry

Successful inquiries generally lead to responsible learner action; action can lead to further inquiry. Actions initiated by the learners as a result of the learning process are most powerful. This may include action that extends the learners' learning or have a wider social and/or ecological impact. Inquiry and action will look different within each age range and from one age range to the next. The transdisciplinary themes provide the authentic contexts for inquiry and can encourage learners to take responsible action both locally and globally.

Inquiry in practice

The role of teachers

PYP teachers understand that learning is activated when learners can connect knowledge to concepts and personal experiences in meaningful ways. To support agency, teachers use multiple strategies, tools and resources to spark interest and create tension through provocation, collaboration, investigation and reflection. The sample learning opportunities in the inquiry learning progressions are another support for teachers when designing inquiry opportunities.

TSM: Inquiry in a primary setting

Inquiry manifests itself in different ways, depending on the nature of learners' curiosity and on their desire to know more about the world. Connecting learners' interests with intention, teachers nurture authentic learning experiences by creating opportunities for learner voice, choice and ownership in the inquiry process.

Figure IN01 unpacks the different aspects of the teacher's role in inquiry.

Figure IN01

Teachers' role in inquiry

Teachers continually group and regroup learners during the inquiry process to:

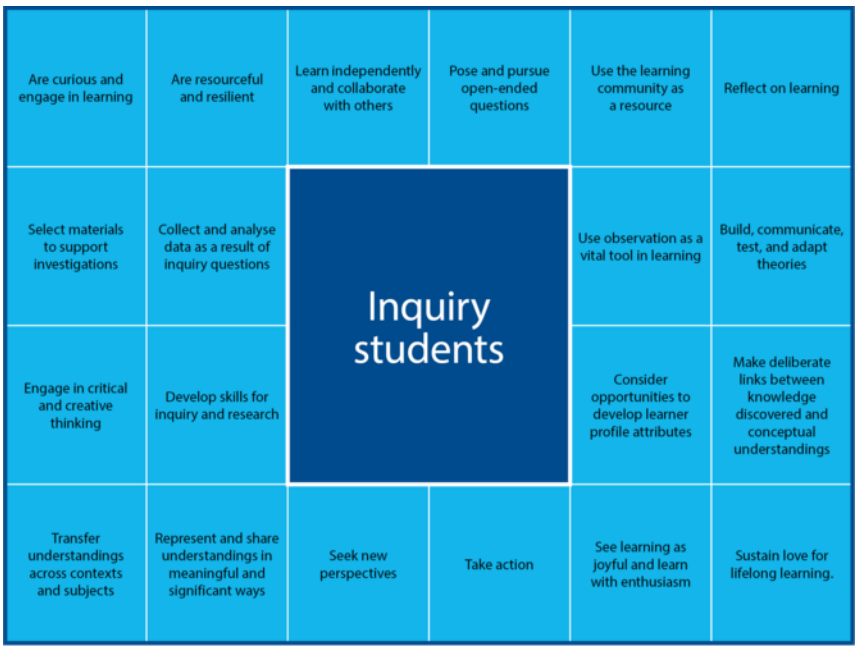
- support the development of meaning making and skills in different contexts
- support relationship building
- build on learners' shared interests

Learners as inquirers

Recognition of the value of positive relationships forms the foundation for successful inquiry and builds self-efficacy and agency. Through the inquiry process, learners develop and sustain positive relationships with peers, teachers and others in the learning community in a spirit of active engagement. They also strive to make meaningful connections with environments, ideas, materials and concepts. Learners acquire knowledge, build conceptual understandings, and develop skills. The inquiry learning progressions make skills of inquiry visible and explicit. The progressions can support learners to set their goals and deepen their understanding of their inquiry skills. Figure IN02 unpacks the different aspects of learners as inquirers.

Figure IN02

Learners as inquirers



TSM: Developing a culture of questions

The learning community and inquiry

Inquiry in the PYP is explored, experienced, and framed through the transdisciplinary themes. These themes are underpinned by a balance between human and natural worlds and have relevance to everyone in the learning community. Members of the wider community also play a meaningful role in the inquiry process. There are multiple ways they can support learner inquiries:

- serve as experts in a unit of inquiry
- serve as mentors in inquiries, such as the exhibition
- provide opportunities for learners to take action through local groups, projects or organizations.

Family members can further support learner inquiry by:

- talking about the inquiry being explored in class
- talking about the value of the inquiry process as well as learning goals
- encouraging interest and curiosity with learning activities at home
- encouraging and modelling communication skills
- supporting children in developing research skills
- encouraging children to share their inquiries with extended families or friends
- conducting open inquiries or building projects together.

Further reading

Background: Theory of inquiry learning

Reflective inquiry

The inquiry models described in education literature has its origins in Dewey's five stages of reflective thinking, placing critical thinking, reflection and action as inseparable in an inquiry environment (Dewey 1933).

Inquiry stands at the heart of social constructivism. "Inquiry, as Dewey conceived it, is transformational and transactional. Both learner and teacher are called to be artists in the construction of a better life and a better world" (Wickersham 2002).

Implementation of Inquiry

Inquiry can range from a structured form where learners are provided with data or information to analyse, through guided inquiry where teachers present the initial questions but leave the methods, solutions and development of further questions for learners, to open inquiry where learners pose questions and find solutions (Bonnstetter 1998; Jordan 2005). Direct teaching occurs in inquiry classrooms. Teachers direct learning by "careful prompts at strategic times" (Audet 2005). This teaching may be with the whole class, small groups or individuals, but it occurs where needed to support a learning community working together to build shared understandings (Lave, Wenger 1991).

Inquiries take different paths depending on the starting points, interests and experiences of learners and teachers. This means that teaching through inquiry is inherently open and can take many directions based on ongoing learner and teacher reflections.

Inquiry is often falsely equated with "hands-on" or "experiential learning". Although these facets may be observed in an inquiry classroom, it is the attempt to draw meaning out of the experience through continual reflection which distinguishes inquiry from any other paradigm (Audet 2005). Reflection leads to the development of dispositions that support learners in managing their own learning. As they are guided through inquiry, learners learn how to reflect, find, and solve problems themselves.

Inquiry supports true differentiation. When learners are encouraged to follow a reflective pathway, the need for streaming or acceleration of learners mostly disappears. They develop the ability to inquire into the known and unknown, to think critically and creatively about their own actions and those of others, to request proof, to critique opinions and to look for diverse points of view (Zuckerman 2003). Inquiry with reflection and action weaves international-mindedness into the daily fabric of IB classrooms. The relationships involved in this process call on all attributes of the IB learner profile. The "what to learn" merges with how it is learned (Harrison, Behrenbruch 2013).

Inquiry learning and other constructivist models

Inquiry learning is often equated with discovery learning, project based, problem based or experiential learning. As similar as these may sound to inquiry learning, it is important to make distinctions. In some of these methods, the emphasis is on the end product rather than the inquiry process. In many cases, discovery learning and problem-based learning focus on solving problems generated only by the teacher rather than those generated by learners, in contrast to inquiry which considers the agency of the learner. In other cases, discovery and problem-based learning provide less guided or scaffolded experience for learners to develop knowledge, conceptual understandings and skills. In addition, problems are not the only basis for inquiry. It can be provoked by curiosity, joy and wonderment (Behrenbruch 2012).

Experiential learning is often observed in PYP classrooms, but it is the attempt to draw meaning out of the experience through reflection which distinguishes PYP inquiry from any other paradigm (Audit 2008).

All these models have a place at different points in the inquiry process. For example, the "puzzlements" that may arise through discovery learning could serve as a differentiation point where interests and questions of the learners drive the inquiry. The engagements and experiences in a relevant and challenging inquiry could result in the development of an individual or group project focused on action.

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Conceptual understanding in the PYP

Summary

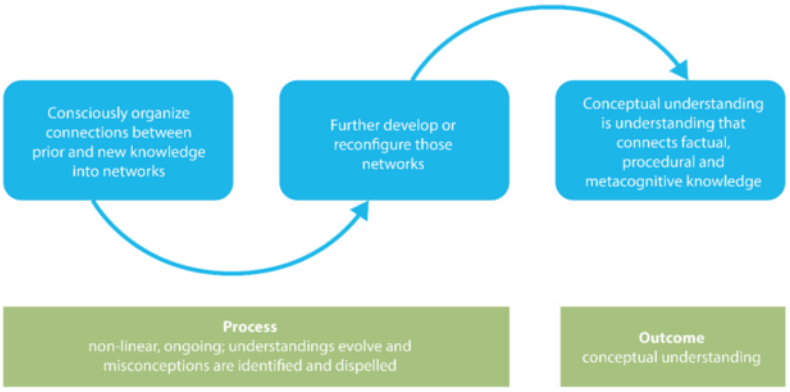
- Conceptual understanding is key to an IB education.
- Conceptual understanding creates opportunities for learners to make connections, transfer and apply skills, knowledge, and understanding across, between and beyond subjects.
- Concepts are fundamental, abstract ideas and play a critical role in organizing, designing and planning curriculum and learning.
- In the PYP, concept-based inquiry is a powerful vehicle for learning that promotes meaning and understanding, and challenges learners to engage with significant ideas.

What is conceptual understanding?

- The IB defines conceptual understanding as understanding that connects factual, procedural and metacognitive knowledge.
- It results from a process in which one **consciously** organizes connections between prior and new knowledge into networks, then further develops or reconfigures those networks.
- This is a non-linear, ongoing process throughout which understandings evolve and misconceptions are identified and dispelled.

Figure CO01

Conceptual understanding: process and outcome



The importance of conceptual understanding

- Conceptual understanding enables learners to be **aware** and **critical** of their own knowledge and understandings.
- It allows them to apply skills, knowledge, and understandings to new or different contexts in generative, autonomous, dynamic ways.
- Conceptual understanding supports the IB mission because it enables learners to:

- conceive of multiple solutions to a problem
- imagine multiple perspectives on issues
- understand more deeply how ideas change in different contexts.

A concept-driven curriculum

Concept-based inquiry is a powerful vehicle for learning that promotes meaning and understanding, and challenges learners to engage with significant ideas. This is central to the Primary Years Programme (PYP) philosophy. Purposeful inquiry is supported by a concept-driven curriculum (Wiggins, McTighe 2005).

A concept-driven curriculum is the means through which learners develop their conceptual understandings. Learners co-construct meaning and mental models about how the world works based on their experiences and prior learning. They connect and integrate new knowledge with their existing knowledge and apply these understandings in a variety of new contexts. They learn to recognize patterns and see the connections between discrete examples to strengthen conceptual understandings.

Learners bring varying degrees of prior knowledge and diverse and divergent social, cultural and personal perspectives and experiences to the inquiry. These differences may result in a range of conceptual understandings. Whereas knowledge is locked in time and place, the rich and fluid context of the learners and the learning community renders conceptual understandings that are changeable and may be elaborated or reinterpreted (Milligan and Wood, 2010). For this reason, Milligan and Wood (2010: 492) suggest that "conceptual understandings are better understood as transition points rather than endpoints".

Defining concepts

Concepts are fundamental, abstract ideas (often encapsulated in one word) which support the development of conceptual understanding.

They can vary in terms of their level of abstraction and/or universality, can be used at different levels of generality and complexity, and serve different purposes in the learning environment.

Concepts can:

- mean different things in different curriculum areas and to different age groups
- impact pedagogy and drive conceptual understanding: both at the curriculum level and the content level
- function as curriculum organizers or content organizers.

Differentiating concept- and fact-based learning

Compared to simply learning or memorizing isolated facts that are locked in place and time, conceptual understandings are changeable, contextual, and may be elaborated or reinterpreted (Milligan, Wood 2010). Exploring concepts distinctly differs from exploring facts in the following ways.

Figure CO02

Facts versus concepts

Facts	Concepts
• Knowledge-based • Content-heavy • Skills-related • Supported by evidence • Frequently topical • Encourage recall and comprehension	• Open-ended • Enable exploration of complex issues • Highlight opportunities to compare and contrast • Explore contradictions • Lead to deeper disciplinary and transdisciplinary understandings

Facts	Concepts
	• Promote transfer to familiar or less familiar situations, issues, ideas and contexts • Encourage analysis and application

The role of concepts

Designing for conceptual understanding

Designing for conceptual understanding requires appreciating what is meant by a concept and how concepts can be used to design and teach for conceptual understanding.

Teaching for conceptual understanding is supported by the approaches to teaching. In particular, **collaboration and inquiry activities support the development of a learner's conceptual understanding**. In turn, teaching for conceptual understanding enhances the process and outcomes of inquiry.

Concepts as content organizers

- Concepts are used to organize prescribed content, are used as prescribed content, or are used to establish connections across content, e.g. multiple lessons or units.
- This is what learners will learn: it will therefore directly affect the aims, objectives, assessment and learning activities. Concepts are part of the delivered teaching and assessment.

Concepts as curriculum organizers

- Concepts are used as a rationale for all aspects of curriculum and assessment. They can directly shape a coherent curriculum and many learner experiences.
- They help determine the methodologies used in areas such as unpacking learning, timetabling, teacher roles, collaboration.
- For example, in the Primary Years Programme (PYP), transdisciplinary themes are an example of using concepts to organize the entire curriculum. See for example the online workshop "Learning in a transdisciplinary world".

Concepts and the unit of inquiry

Within each transdisciplinary theme, educators develop units of inquiries with central ideas and lines of inquiry. Creating units of inquiry using concepts supports learners in developing conceptual understandings that go within, across, between, and beyond the transdisciplinary themes. Units of inquiry begin with the central idea. The central idea is a statement from which learners explore the transdisciplinary themes. Written in a neutral voice, the central idea should be substantial and open-ended enough to support learners' understanding of the transdisciplinary theme. It also provides educators with a structure to introduce concepts that span national, cultural and subject boundaries to support learners' understanding of a transdisciplinary theme.

Carefully-developed central ideas invite learners to:

- think critically about opportunities and challenges of local, global, and planetary significance
- recognize patterns
- make generalizations, predictions and connections across their learning
- transfer understanding to different contexts.

This can be demonstrated in the following example.

Figure CO03

Unit example

Transdisciplinary theme	Central idea	Specified concepts	Concepts
Who we are	People's relationships have an impact on health and well-being.	Function Connection Responsibility	Cooperation Friendship Balance

Development of central ideas that are broad and extend learners' conceptual understandings within, between and beyond subjects requires time, careful thought and collaboration among members of the teaching team.

Specified concepts

The PYP identifies seven specified concepts (table CO04) that facilitate planning for a conceptual approach to transdisciplinary and subject-specific learning. Together, these concepts drive the educator- and/or learner-constructed inquiries that are situated at the heart of the PYP curriculum.

Figure CO04

Seven specified concepts

Specified concepts	Questions	Definition
Form	What is it like?	The understanding that everything has a form with recognizable features that can be observed, identified, described and categorized.
Function	How does it work?	The understanding that everything has a purpose, a role or a way of behaving that can be investigated.
Causation	Why is it as it is?	The understanding that things do not just happen; there are causal relationships at work, and that actions have consequences.
Change	How is it changing?	The understanding that change is the process of movement from one state to another. It is universal and inevitable.
Connection	How is it linked to other things?	The understanding that we live in a world of interacting systems in which the actions of any individual element affect others.
Perspective	What are the points of view?	The understanding that knowledge is not neutral, is incomplete, and is socially and contextually constructed; it can be moderated by different points of view which lead to different interpretations, understandings and findings; perspectives may be individual, group, cultural or subject-specific.
Responsibility	What are our obligations?	The understanding that people make choices based on their understandings, beliefs and values, and the actions they take have intended and unintended impacts and consequences.

Specified concepts are a starting point. They help to frame a unit of inquiry and drive learning experiences. When these concepts are explored through questions, the inquiry is purposeful and manageable. The questions associated with the specified concepts represent an introduction to a way of thinking about learning and teaching. They can be used in any order and as regularly as the learners and educators require. There can be more than one specified concept in an inquiry.

As an example, consider a unit under the transdisciplinary theme "How the world works" with the central idea "Over time, living things adapt to their unique environments" (unit example 1).

- The concept of "form" could focus the unit on classification and geographical descriptions.
- The specified concept of "connection" could focus the unit on how the characteristics of the species connects to features of the environment to ensure survival.
- The specified concept of "perspective" could focus the unit on the theories of evolution and adaptation.

In this example, learners may choose particular geographies, species or human-initiated change that are significant, relevant, challenging and engaging within this inquiry. Concepts place no limits on breadth of knowledge or on depth of understanding, and therefore provide opportunities for every learner to participate, regardless of backgrounds or interests.

Concepts

Alongside the specified concepts, other concepts are explored within and outside of units of inquiry. For example, all subjects have concepts that reflect the nature of the subject. In science, "adaptation" could be a concept connected to the specified concept of "change"; in social studies, "sustainability" could be a concept associated with "change" and "responsibility".

Figure CO05 provides some examples of specified and other concepts. Further examples of concepts can be found in the PYP subject guidance. However, there are an unlimited number of concepts that may be drawn from local/regional/national curriculums to support the inclusion of those requirements into the units of inquiry.

Figure CO05

Examples of concepts

Specified concepts	Guiding questions	Examples of concepts
Form	What is it like?	Properties Structure Similarities Differences Pattern
Function	How does it work?	Behaviour Communication Pattern Role Systems
Causation	Why is it as it is?	Consequences Sequences Pattern Impact
Change	How is it transforming?	Adaptation Growth

Specified concepts	Guiding questions	Examples of concepts
		Cycles Sequences Transformation
Connection	How is it linked to other things?	Systems Relationships Networks Homeostasis Interdependence
Perspective	What are the points of view?	Subjectivity Truth Beliefs Opinion Prejudice
Responsibility	What are our obligations?	Rights Citizenship Values Justice Initiative

Concepts and the single subjects

Learners and educators also use specified concepts, associated questions and other concepts to guide inquiries in subject-specific learning and teaching. In this way, learners and educators are using concepts as content organizers. The PYP subject continuums provide many examples of concepts and conceptual understandings.

PYP learning and teaching, including subject knowledge acquisition, is implemented through conceptual inquiry. As PYP educators become familiar with concepts and conceptual understandings, they identify authentic links between different subjects, and within the programme of inquiry. Single-subject and support educators connect learning through the programme of inquiry's central ideas wherever authentic connections can be made. At other times, single-subject educators plan their own conceptual inquiries to explore concepts relevant to the subject.

For example, an inquiry may be developed around the specified concept of change. An art educator explores how art aesthetics have "changed" over time and a PE educator inquires into the skills needed to "change" from an offence to a defence position in a team sport. Learners transfer their understanding of how to inquire into "change" from one context to a new one. By exploring a similar concept in different contexts, learners come to appreciate, and develop, new understandings and ideas that transcend subject boundaries. Educators collaboratively plan, reflect and make adjustments as a teaching team throughout the year to ensure a coherent learning experience.

Designing learning experiences to develop conceptual understanding

When designing for learning, educators select the most effective strategies based on their context and learner needs. Common strategies include classification, representation, generalization, concepts-in-use, internalization and near-and-far transfer. These strategies can be employed in the design and planning process to intentionally embed the development of conceptual understanding into learning experiences.

The strategies draw on different theoretical frameworks and are supported by academic literature (IBO 2023).

Figure CO06

Strategies to support the development of conceptual understanding

Classification: Connecting physical objects or phenomena to a conceptual category. Examples "This is not a mammal because ..." "This is an ecosystem because ..." "This is a polygon because …"	**Representation: Using multiple modes to represent ideas (e.g. visualization, formulas) which apply across various problems, contexts or situations.** Examples "The same representation can show how to split a dollar into quarters and how to divide 100 by 4." Using graphs to look at trends. Using number frames to represent a number in different ways, such as dots, cubes, beads.
Generalization: Connecting and moving from facts, to concepts, to generalizations. Concepts interact with each other to create wider generalizations. Examples Learners explore different conflicts and determine common causes. Learners explore their own community and make generalizations about the wider community.	**Concepts-in-use: Concepts are explicitly modelled and linked together. They are learned and assessed within conceptual models, then applied in different contexts.** Examples Educators combine two or more concepts in a visual model that creates a path showing how the concepts are connected. The relationships between characters in a book are explored through a concept map. The relationships between government systems are explored through a concept map.
Internalization: Transforming an individual physical or material activity into other mental and conceptual forms of that same external activity, to acquire new understandings. Examples Practising sports techniques and tactics and connecting them to broader strategy. Learners deconstruct how they practise a piece of music to improve the whole piece.	**Near-and-far transfer: The application of concepts across different aspects of a knowledge domain (near), or across other knowledge domains (far), to develop skills and understandings across physical and social contexts.** Examples Near transfer: Understanding the process of mixing primary colours to create secondary colours to create a painting of a rainbow. Far transfer: The understanding of mixing colour to then transfer understanding to experiment with prisms and light.

Additional learning and teaching strategies

Sketch the concept: On a blank piece of paper, learners create a sketch that visually represents their understanding of the central idea. They use symbols and/or pictures only—no words.

Concept map: Learners use a concept map to show connections and relationships that develop through the inquiries. These concept maps provide an ongoing representation of the central idea as learners add ideas and adjust their thinking.

Exit cards: Learners develop questions that they still have about the central idea.

Observation: Educators observe learners as they explore an idea or task and engage the learners in conversation about their current understandings of the central idea. Observations may be recorded as anecdotal notes, audio recordings or by using a checklist or rubric.

Self-assessment: Learners make entries in their journals or discuss what they have learned about the central idea/ conceptual understanding being explored. They analyse their thinking and plan for how they might further investigate the central idea.

Bus stop: The concepts being explored in the unit are presented on separate sheets. In groups, learners creatively think about, and record, their ideas about the connection to the central idea using symbols and words. Each group moves around each sheet and reads what others are thinking, adding new ideas to the original ideas presented.

This list is not exhaustive and schools are encouraged to explore other ideas.

Provocations

The use of provocations as a learning and teaching strategy to develop conceptual understanding is prevalent in the PYP. Throughout an inquiry, educators and learners initiate, stimulate, challenge and extend learning through activities or artefacts that invite (and provoke) new thinking about the central idea. Provocations can include posing questions and wonderings for discussion, making a change to the physical or social learning.

Carefully crafted provocations:

- stimulate critical-thinking skills by:
  - providing opportunities to build on prior knowledge and experience
  - expanding beyond factual knowledge
  - stressing the importance of the "how" and "why" of learning
  - sparking learners' curiosity and engaging them to think conceptually
  - inviting investigation
  - inviting learners to justify their answers
  - wording questions in ways that are accessible to learners
  - asking open-ended questions to allow for personal interpretation
  - encouraging pattern-finding in learner thinking
- expand thinking by:
  - generating further questions and inquiries
  - seeking clarification and deepening understanding
  - opening up possibilities for collaborative dialogues
  - emphasizing breadth and depth of understanding
  - facilitating the co-construction of meaning and engaging learners in their reasoning
- connect learning and support the transfer of knowledge by:
  - encouraging the application of prior knowledge and skills
  - creating opportunities to reflect on concepts across, between and beyond subjects
  - ensuring relevance to learners' experiences inside and outside school
  - opening up possibilities for further inquiry
  - offering opportunities to revisit concepts over time
  - encouraging application and transfer of learning in different contexts
  - linking prior understanding to current inquiry and current understanding to future inquiry.

Additional considerations

- How might evidence of conceptual understanding be documented?

- How does the design of learning spaces continually promote and provoke learner questions and wonderings?
- What resources might engage learners in thinking about the central idea? (For example, artefacts, experts, field trips, literature, and multimedia).
- How might multimodal communication strategies be available to express conceptual understanding?
- What connections can be made to the local environment to ensure authentic learning engagements?
- How might learning engagements lead to deepening conceptual understanding as the unit progresses?

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Developing a transdisciplinary programme

Summary

- A transdisciplinary programme of inquiry offers learners a broad, balanced, conceptual and connected learning experience.
- Six transdisciplinary themes form the structure of the programme of inquiry. They are the starting point for engaging critically with local and global issues.
- The themes, underpinned by a balance between human and natural worlds, are future facing, relevant and transformative.
- A well-designed programme of inquiry ensures learners gain a balance of subject-specific knowledge, conceptual understandings and skills, alongside opportunities to develop the attributes of the IB learner profile and to take action.
- Units of inquiry are collaboratively planned, developed and continually modified based on ongoing reflection and co-construction with learners.

Transdisciplinarity: a principle

Transdisciplinarity is a curriculum-organizing principle that offers learners a broad, balanced, conceptual and connected learning experience. In order to engage learners in transdisciplinary learning, schools create a programme of inquiry that maps the transdisciplinary themes learners explore each year and throughout their time in the school. The programme consists of units of inquiry that span across, between and beyond subjects at each grade/year level.

A well-designed programme of inquiry ensures learners experience a balance of subject-specific knowledge, conceptual understandings and skills, alongside opportunities to develop the attributes of the IB learner profile and to take action.

The programme of inquiry is a long-term plan that provides learners the opportunities to evolve their theories, address misconceptions and deepen understandings. Through the programme of inquiry, they build upon what they have learned in previous years, extending their understanding of the transdisciplinary themes as they revisit them throughout the early and primary years of education.

Transdisciplinary themes

The focus on transdisciplinarity as a means to integrate subject knowledge that transcends traditional subject boundaries in the Primary Years Programme (PYP) was influenced by the work of Boyer (1995) on commonalities of human experience, and the perspectives of Tye and Kniep (1991) on global education. This focus addressed challenges that crossed national boundaries, while being interconnected in the following ways.

- Culturally
- Ecologically
- Politically
- Economically
- Technologically

The six transdisciplinary themes that captured commonalities of human experience have now moved towards a balance between human and natural worlds, reflecting and responding to the call for a greater

emphasis on the interconnectedness and interdependence of social and ecological systems, alongside the health and well-being of people and planet (Andreotti et al., 2018; Selby, 2017; Selby, Kagawa, 2018).

The transdisciplinary themes:

- are broad, balanced, relevant, and transformative, reflecting the world today and tomorrow
- encompass the interconnectedness and interdependence of social and ecological systems
- provide the starting point for exploring local, global, and planetary challenges and opportunities
- are supported by knowledge, concepts, and skills from a range of subject areas that provide disciplinary points of view
- are revisited throughout the learners' years in school to facilitate wide-ranging, in-depth, articulated curriculum content
- propose other ways of knowing, being, and doing
- engage with individual and collective perspectives, worldviews, and critically reflective action.

The transdisciplinary themes provide the starting point for integrating and uniting knowledge, conceptual understandings and skills, and act as a conceptual curriculum organizer to subjects and components of the PYP. They also provide opportunities for exploring local and global issues.

Each transdisciplinary theme descriptor consists of an opening statement and three bullet points.

The opening statement is designed to:

- capture the essence of the theme
- support the conceptual and transdisciplinary nature of the theme
- rebalance subject connections and make it easier to see connections across and between the themes.

The three bullet points are designed to:

- unpack, broaden, and deepen the theme and facilitate more curriculum connections
- support transdisciplinary learning by linking concepts across the descriptors
- generate possibilities and alternatives in ways of knowing and being
- strengthen and connect the development and demonstration of action, the IB learner profile, and international-mindedness.

The three bullet points are designed to be connected yet distinct enough to stand on their own and to be read individually and/or as a whole narrative. When learning is organized around transdisciplinary themes, authentic and meaningful connections are made across, between and beyond subjects. The iterative relationship between the learner, the learning community, and learning and teaching bring to life this transdisciplinary experience.

Transdisciplinary units of inquiry

The programme of inquiry consists of transdisciplinary units of inquiry that include:

- a central idea—the overarching conceptual statement that frames the transdisciplinary unit of inquiry and supports learners' conceptual understandings within, between, across, and beyond the transdisciplinary themes
- concepts—specified and other concepts that support making connections and provide lenses for considering knowledge related to the central idea in a range of ways
- lines of inquiry—statements that define the potential scope of an inquiry.

Subjects play an important role in planning transdisciplinary units of inquiry. They can determine, support, enrich and connect learning.

To understand a central idea, or engage with particular lines of inquiry or learning experiences, knowledge conceptual understandings and specific skills from one or more subjects may be required to support and inform learning. This support may be planned for in advance, or developed within a unit of inquiry.

The integration of subjects within the programme of inquiry ensures that the expertise and collaborative effort of the learning community are integral to supporting learners to construct, unite and transform

knowledge. Schools have the flexibility to present the programme of inquiry horizontally and vertically or in any other manner they see fit.

Collaboratively designing a programme of inquiry

Collaborative planning starts by developing a shared understanding of what learners will learn, based on the IB philosophy and what is considered as being significant for learners as individuals, as a learning community, and as internationally minded citizens. Once broad understandings are reached, schools outline the content and process of learning and teaching, which include:

- a transdisciplinary programme of inquiry
- planning for units of inquiry
- planning for subject-specific inquiry.

The six transdisciplinary themes provide a basis for discussion and integration of the PYP subject continuums or national/state/local curriculums into the programme of inquiry. They scaffold the development and demonstration of international-mindedness and engage learners with issues of personal, local, global, and planetary significance as outlined in figure PO01.

Figure PO01

Transdisciplinary themes

Transdisciplinary themes	Description
Who we are	An inquiry into identity as individuals and as part of a collective through: • physical, emotional, social, and spiritual health and well-being • relationships and belonging • learning and growing.
Where we are in place and time	An inquiry into histories and orientation in place, space and time through: • periods, events, and artefacts • communities, heritage, culture, and environment • natural and human drivers of movement, adaptation, and transformation.
How we express ourselves	An inquiry into the diversity of voice, perspectives, and expression through: • inspiration, imagination, creativity • personal, social, and cultural modes and practices of communication • intentions, perceptions, interpretations, and responses.
How the world works	An inquiry into understandings of the world and phenomena through: • patterns, cycles, systems • diverse practices, methods, and tools • discovery, design, innovation: possibilities and impacts.
How we organize ourselves	An inquiry into systems, structures, and networks through:

Transdisciplinary themes	Description
	• interactions within and between social and ecological systems • approaches to livelihoods and trade practices—intended and unintended consequences • representation, collaboration and decision-making.
Sharing the planet	An inquiry into the interdependence of human and natural worlds through: • rights, responsibilities, and dignity of all • pathways to just, peaceful, and reimagined futures • nature, complexity, coexistence, and wisdom.

Developing a programme of inquiry

Each school's programme of inquiry is collaboratively developed to reflect the unique aspects of that school's community, from its geography to the needs and experience of its members. Following the PYP planning process, a collaboratively designed programme of inquiry builds a whole-school, long-term plan for learning based on its specific context. The programme of inquiry further ensures that learners experience broad, balanced, conceptual and connected learning throughout their time in school. It considers and supports:

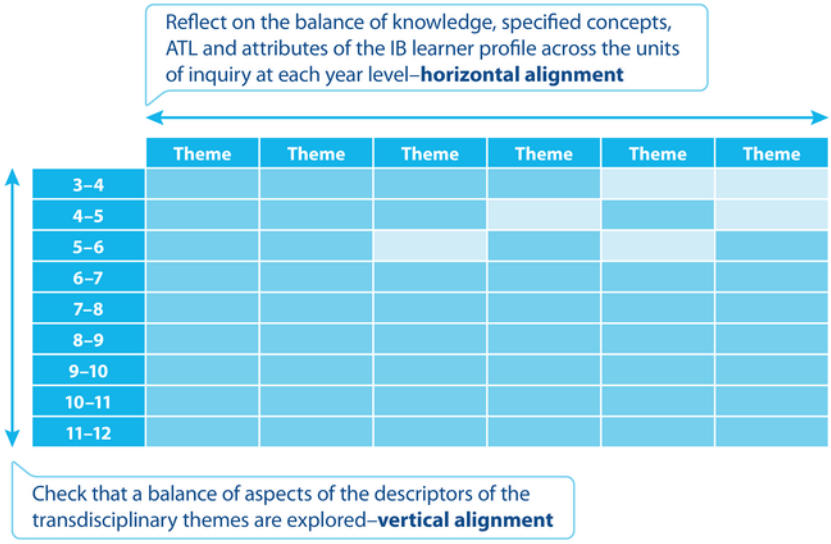
- transdisciplinary learning experiences
- subject continuums
- development and demonstration of approaches to learning, the IB learner profile and international-mindedness
- inclusion of all learners, their interests, cultural diversity and variability in learning
- learning within and beyond the learning community
- personal and collective action.

Schools can use a matrix to set out the full programme of inquiry (with each cell representing a unit of inquiry) or design their own way of organizing and presenting their programme of inquiry. The units of inquiry build on previous learning and are developmentally appropriate.

The proposed units of inquiry at each grade/year level are articulated from one year to another (vertical alignment) and can follow any order.

Figure PO02

Required number of annual units



Schools take a whole-school approach when developing, reviewing and refining the programme of inquiry throughout the year. It is the role and responsibility of the PYP coordinator to facilitate the planning process. This may involve a series of small-group meetings, and/or whole-staff meetings. Examples of how the process could work include the following.

- A core group of teachers develops a skeleton programme of inquiry that is then shared and fully developed with the rest of the staff.
- Groups of teachers develop units, either by age range or under each of the transdisciplinary themes. The whole staff then reviews the programme of inquiry to consider areas of redundancy or omissions.

The whole staff works together all the way through the process to develop the complete programme of inquiry. For learners from three to six years of age, a minimum of four units should be planned for each year, two of which need to be "Who we are" and "How we express ourselves". For schools where learners are in the early years for two or more years, each transdisciplinary theme needs to be explored at least once.

When developing a programme of inquiry, schools carefully consider their available resources, such as artefacts, people, places and technology. Additionally, consideration is given to the resources available in the local or virtual community—library, local and wider communities—in order to provide a meaningful and authentic context for inquiry.

Schools organize and share the programme of inquiry to communicate the agreed learning taking place within and beyond the transdisciplinary themes. By doing this, the entire learning community sees how the programme of inquiry creates a vision for learning and supports development and demonstration of the attributes of the IB learner profile and international-mindedness.

TSM: Developing a programme of inquiry

Reviewing and refining a programme of inquiry

The development of a programme of inquiry is an ongoing process. Schools are required to systematically (at least annually) review and refine the programme of inquiry to look for opportunities to expand or adjust the scope of the central ideas to make them more substantial, interconnected and aligned with the subject continuums or the local, regional and national curriculum.

When reviewing and refining a programme of inquiry, schools check for breadth and balance both vertically (in each transdisciplinary theme) and horizontally (across the grade/year level). This ensures that a balance

of subject-specific knowledge, concepts and skills is included in the programme of inquiry, allowing learners to build conceptual understandings and explore the essence of each transdisciplinary theme.

There are different processes that a school might use to collaboratively review its programme of inquiry. This process could include one or more of the following strategies.

- Arrange a collaborative meeting with all teachers at a specific time of year to reflect on and agree to changes.
- Post the programme of inquiry in a shared space on which members of the learning community can make comments and suggestions.
- Undertake a detailed analysis of different aspects to check on balance and articulation of all elements, including the quality of individual units.

Any proposed changes that emerge as part of the review process are considered in light of the impact they might have on learner learning and on the programme of inquiry as a whole. For example, some changes may have a significant overlap with units in other grade/year levels or identified omissions may leave an aspect of the transdisciplinary theme under-represented.

Schools ensure balance throughout the entire programme of inquiry by:

- checking that all specified concepts are represented at each grade/year level
- ensuring that a balance of specified concepts is used throughout each transdisciplinary theme
- cross-referencing between units to check for coherence in central ideas and lines of inquiry
- ensuring there is a balance of aspects of the six transdisciplinary themes explored across the programme of inquiry
- mapping PYP and/or national/state/local subject-specific continuums
- checking that all PYP subjects are represented at each grade/year level
- checking the balance of PYP subjects identified to support understanding of each transdisciplinary theme.

Evaluating a programme of inquiry

Reflecting on the integration of the units throughout the programme of inquiry provides evidence of its effectiveness. Teachers collaboratively reflect on the success of the programme and make ongoing modifications based on these reflections. Schools are encouraged to self-assess the programme of inquiry.

Collaboratively developing units of inquiry

A high level of collaboration is required when planning transdisciplinary units of inquiry. The planning teams, consisting of teachers, subject specialist teachers and learners (where appropriate) plan the units together throughout the year.

All subjects are represented at each grade/year level in the required units of inquiry. The school ensures balance and articulation between the programme of inquiry and any additional single-subject teaching (horizontal alignment).

Learners inquire into, and learn about, locally and globally significant themes through individual units of inquiry, each of which addresses a central idea relevant to the transdisciplinary theme. The following features will always be present in a unit of inquiry.

- A transdisciplinary theme
- A central idea, specified and other concepts, and lines of inquiry

Figure PO03

Example of a unit in a programme of inquiry

Example of a unit on a programme of inquiry
Transdisciplinary theme: How we express ourselves **Central idea:** People create messages to target or influence specific audiences.

Example of a unit on a programme of inquiry
Specified concepts: function, perspective, responsibility
Concepts: media, advertising, propaganda
Lines of inquiry
• How images, text and music are used to influence behaviour of target audiences
• Critical evaluation of messages presented in the media
• How people respond to messages

Central idea: The central idea is a broad overarching conceptual statement that frames the transdisciplinary unit of inquiry. It provides teachers with a structure to introduce concepts that span across, between and beyond subjects to support learners' conceptual understandings of the transdisciplinary theme. Central ideas have personal, local, and global significance and invite exploration of one or more of the transdisciplinary themes. In developing or revising a central idea, consider the following questions.

- Does it offer learners opportunities to explore the balance between human and natural worlds?
- Does it support the associated conceptual understandings?
- Is it broad enough to offer multiple lines of inquiry?
- Is it underpinned by concepts?
- Is it relevant to learners in diverse and divergent contexts?
- Will it engage learners in thinking critically, creatively and compassionately?
- Does it present an opportunity for learners to co-construct meaning of the conceptual statement being explored?
- Is it open to a range of learner responses?

The wording of a central idea can be analysed by the teachers and learners over the duration of the inquiry and discussed using language that facilitates learners' meaning-making. The development of central ideas requires time, careful thought and collaboration among members of the learning community, and, when appropriate, with learners.

Concepts: Concepts are the means through which teachers develop the central ideas and through which learners develop conceptual understandings.

Seven specified concepts are identified: form, function, causation, change, connection, responsibility and perspective. Schools balance the specified concepts across the programme of inquiry at each grade/year level, both vertically and horizontally.

Multiple specified concepts can be explored in each transdisciplinary theme; therefore, schools are mindful of repetition or under-representation of concepts within a transdisciplinary theme. During collaborative planning, schools ensure that there are appropriate opportunities for learners to revisit and develop their understanding of all specified concepts throughout the year.

Other concepts can deepen understanding of a specified concept, subject, or a transdisciplinary theme. As with specified concepts, some concepts have relevance across multiple subjects and provide further opportunities to make connections across, between and beyond subjects and the transdisciplinary themes.

Lines of inquiry: Each unit of inquiry contains three or four lines of inquiry; these are written as statements or phrases. Refer to the example in figure PO03.

Do the lines of inquiry within each unit of inquiry:

- clarify and develop understanding of the central idea?
- define the scope of the inquiry and help to focus learning and teaching?
- remain distinctive, yet connected to one another, to support learner understanding of the central idea?
- invite learner inquiries?
- provide opportunities for learners to develop their understandings through multiple, diverse, and divergent perspectives?

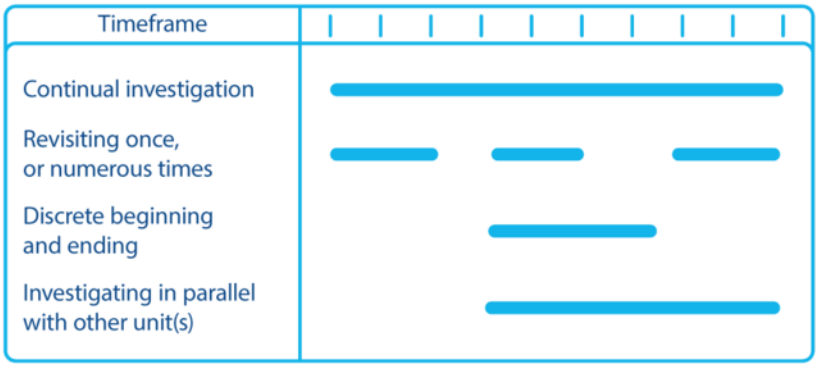
- relate to the experiences and interests of the learners?

Length of an inquiry

Teaching teams have the discretion to decide an appropriate starting point and time frame for the length of each unit of inquiry in order to ensure they are developmentally-appropriate and fit for purpose. An inquiry into a central idea considers the breadth and depth of the learning; therefore, a minimum duration of 3–4 weeks is recommended for each unit of inquiry.

Figure PO04

Units of inquiry time frames



TSM: Flexible times and timeframes

The PYP planning process and planners

Schools can either use one of the sample planner templates provided by the IB or develop their own planner template based on the planning process. Interconnected questions within these planner templates guide collaborative planning and reflection. All members of the teaching team collaboratively plan and reflect prior to the start of each unit, during implementation, and at the conclusion. Including learners in the planning and reflection process is an important strategy to promote learner agency.

PYP collaborative planning process for learning and teaching

TSM: PYP planners

The role of subjects

> Transdisciplinary involves, as a rule, disciplinary practice.
>
> Jahn, Bergmann and Keil 2012

Including specialists and members from the learning community to offer different perspectives into the inquiry process is a hallmark of the transdisciplinary model. Combining different subjects and perspectives enables lateral, imaginative and creative thinking about opportunities and solutions (Clark, Button 2011).

Whether subject knowledge is supported by the grade/year-level teacher or specialist teacher, subjects are a means "to illuminate larger, more integrative ends" (Boyer 1995). Together, the transdisciplinary themes and the subjects represent ways of thinking about a broad body of knowledge that helps learners inquire, discover connections and construct meaning.

Through the integrated subjects, learners come to appreciate that there is a body of subject-specific knowledge, conceptual understandings and skills that can be drawn upon in order to engage with local and global challenges and opportunities. Learners investigate the logic of mathematics, appreciate the

complexity of arts, play with language, enjoy physical activity, wonder at the natural and physical world, and celebrate the diversity of their social and ecological worlds.

Teachers facilitate learners' understanding of, and making connections between, the subjects by:

- identifying authentic opportunities for thinking and responding like historians, athletes, artists, scientists, and so on, within a unit of inquiry
- recognizing and responding to events that arise spontaneously by using subject-specific knowledge to enhance understanding
- providing an explicit focus on language learning, supporting each learner as they discover and investigate through the subjects and grow their language repertoire
- exploring questions through subject lenses wherever possible
- helping learners to make connections and recognize opportunities to transfer learning from one subject to another
- ensuring learning is purposeful and connects subject-specific learning goals to personal, local and global challenges and opportunities.

Promoting transdisciplinary learning across, between and beyond subjects involves the following (see figure PO06).

Figure PO06

Transdisciplinary learning across, between and beyond subjects

Moving from	Moving towards
Subjects as collections of related facts and isolated skills	Subjects as collections of concepts, skills, theories, methodologies and examples that contribute to an understanding of how a subject connects to the central idea
Stand-alone subjects as the sole driver for learning	Subjects as part of transdisciplinary learning
Teaching subject-specific lessons in isolation from the unit of inquiry	Making connections between one subject and another in planned, spontaneous or incidental ways through units of inquiry
Subject-specific knowledge, conceptual understandings and skills viewed through the lens of age-specific development	Assessing prior knowledge and the needs of learners before the selection of subject-specific conceptual understandings, knowledge and skills
Measuring learners' abilities within a subject only	Monitoring, documenting and measuring learners' capacity to understand and apply subject-specific knowledge, conceptual understandings and skills within authentic contexts

Supporting subject knowledge and skills acquisition

Learning begins at home and within the various communities to which learners belong. Young learners come to school with their own experiences, theories and capabilities. While a learner's prior knowledge may align with the subjects identified by the PYP, young learners do not experience the world through these lenses. Instead, they learn from their environments, people around them, seeing experts at work, questioning and reflection, with little need for specific knowledge instruction (Gardner, Boix Mansilla 1999). It is, therefore, important to acknowledge the prior knowledge and experiences of all of learners in the unit of inquiry to support learning that is connected to their worlds. Teachers prioritize purposeful learning over subject knowledge acquisition by building on the wonderings of learners inside and outside the programme of inquiry.

There are a number of ways teachers can facilitate the acquisition of knowledge.

Transdisciplinary unit of inquiry: Learning and teaching of subject-specific knowledge, conceptual understandings and skills is included within the school's programme of inquiry whenever possible and appropriate. Using the PYP planning process or planners, the teaching team integrates the subjects seamlessly into the units of inquiry.

Subject-specific inquiry: There are times when teachers will teach subject-specific knowledge (such as language conventions and order of operations in mathematics), conceptual understandings and skills outside the programme of inquiry using purposeful inquiry. The teaching team uses the planning process or planners to structure and plan for this type of inquiry to ensure that authentic connections are made with programme elements while maintaining the integrity of the subject.

Preparing for, or following on from, a unit of inquiry: The direct teaching of subject-specific knowledge, conceptual understandings and skills in a unit of inquiry may not always be feasible but, where appropriate, introductory or follow-up learning experiences may be useful to help learners make connections across the curriculum. Teachers plan and teach learning experiences that prepare the learners to participate in a unit of inquiry. Following on from a unit of inquiry, learners may extend a subject-specific related interest into another line of inquiry.

Skills-based teaching: This refers to the teaching of subject-specific skills not directly related to units of inquiry but to support mastery and increase learners' skills base in areas such as literacy, numeracy, arts and physical, social and personal education (PSPE). While these skills might be developed outside the programme of inquiry, teachers are mindful that subject-specific skills contribute towards the exploration of the programme of inquiry. Furthermore, teachers continuously monitor, document and measure progress in order to effectively support the development of subject-specific skills through grouping and regrouping.

Subject specific guidance

Determining a whole-school vision for learning involves an ongoing process of curriculum mapping. The IB has developed a suite of subject-specific guidance for optional use by schools. Language, mathematics, science, social studies, arts, and personal, social and physical education are the key subjects of the PYP curriculum. The subject-specific guidance consists of an overview of each subject, and sets of sample subject continuums. Each subject continuum contains:

- strand descriptors
- overall expectations
- example concepts
- example conceptual understandings and example learning outcomes.

The content of a school's scope and sequence documents may be partially or wholly mandated by a local, state or national authority, or they may be determined by the school itself. Schools may adopt and adapt the PYP subject continuums if they are in a position to do so. Teachers map the curriculum using these documents inside and outside of their school's programme of inquiry.

Together, the programme of inquiry and other school-based curriculum documents, such as scope and sequences, articulate what the school has agreed are the best possible learning opportunities to achieve the knowledge, conceptual understandings and skills of the subjects as well as the overall learning outcomes of an IB education.

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Assessment in the Primary Years Programme

Summary

- Assessment is an ongoing process of gathering, analysing, reflecting and acting on evidence of learner learning to inform teaching.
- Assessment involves teachers and learners collaborating to monitor, document, measure, report and adjust learning.
- Learners actively engage in assessing and reflecting on their learning, acting on feedback from peers and teachers to feed forward to next steps in learning.
- Fostering an assessment culture involves the development of assessment capability among all members of the learning community.
- Learning goals and success criteria are co-constructed and clearly communicated
- Both learning outcomes and the learning process are assessed.
- Assessment design is both backward and forward looking.

Integrated assessment

All IB programmes are informed by assessment, as indicated in the IB approaches to teaching. While assessments look different in each programme, all IB assessment methods are varied and fit for purpose.

Ongoing assessment is central to the Primary Years Programme (PYP) goal of thoughtfully and effectively supporting learners through the acquisition of knowledge and skills and the development of conceptual understanding and the approaches to learning.

The development of knowledge, conceptual understandings and skills requires that both teachers and learners demonstrate assessment capability.

Purpose of assessment

The purpose of assessment is to inform learning and teaching. It involves the gathering and analysis of information about learner learning to inform teaching practice. It identifies what learners know, understand and can do at different stages in the learning process.

Effective assessment that achieves this purpose provides valuable information to understand what constitutes learning and how to support it, and is meaningful to all members of the learning community.

Learners become effective, self-regulated learners when they are actively engaged in assessment and reflect on and act on constructive feedback. This helps them build their learner identity by setting goals for their learning and engaging in making decisions about what they need to do to achieve these goals.

Teachers become more effective when they continually learn about what learners know and can do. They reflect on their practice, adjust their teaching based on data, and offer timely, specific and well-considered feedback to better support learning.

Families become more informed when they understand the learning goals their child is working towards, and the progress their child is making. They extend their child's understanding and development of skills when they support learning. They contribute to their child's joy of learning and growth as a successful learner through sharing insights with the learning community.

Schools become more impactful learning communities when they use assessment as a tool to evaluate the depth of their curriculum and the effectiveness of their teaching. They make decisions about targeting resources and support to the most pressing priorities and professional development needs.

Characteristics of effective assessment

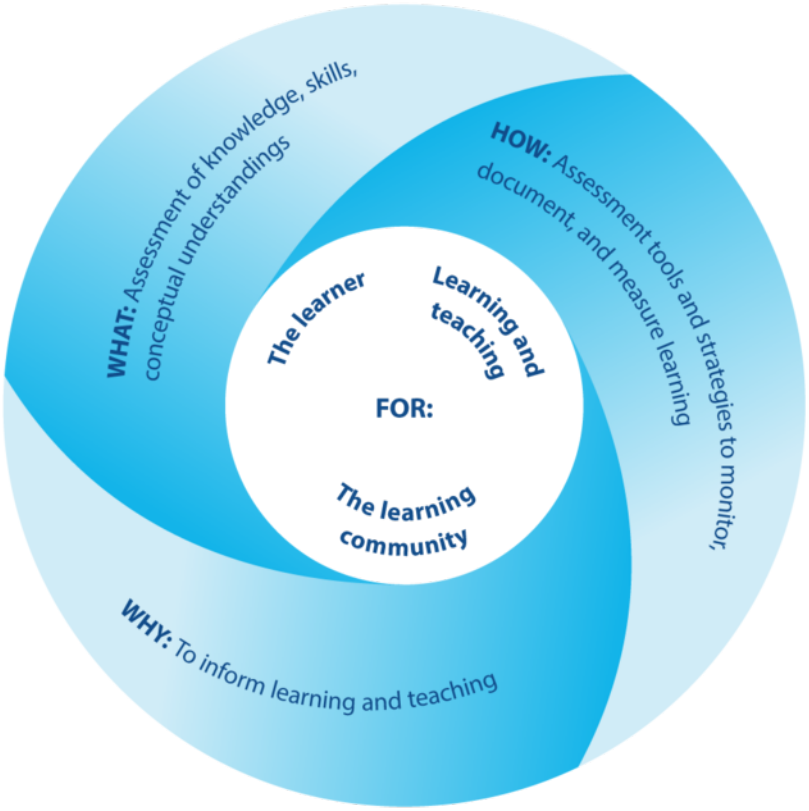
Highly effective assessment shares some key characteristics (Adapted from Clarke 2012).

- **Authentic:** It supports making connections to lived experiences to promote learner engagement.
- **Clear and specific:** This includes desired learning goals, success criteria and the process learners use to learn.
- **Varied:** It uses a wider range of tools and strategies that are fit for purpose in order to build a well-rounded picture of learner learning.
- **Developmental:** It focuses on an individual learner's progress rather than their performance in relation to others. It respects that each learner is on a personal learning journey.
- **Collaborative:** It engages both teachers and learners in the assessment development and evaluation process.
- **Interactive:** Assessment encompasses ongoing and iterative dialogues about learning.
- **Feedback to feedforward:** It provides feedback on current learning to inform what is needed to support future learning (Hattie, Timperley 2007) and raises learners' motivation.

The PYP approach to assessment gives the learners a vital role in the assessment process and engages the teachers in considering assessment as fit for purpose. Effective PYP assessment practice holistically integrates assessment for, of and as learning (Harlen, Johnson 2014) to support effective learning and teaching.

Figure AS01

Integrating assessment



PYP assessment informs the learner, learning and teaching, and the learning community through the monitoring, documenting and measuring of learning.

Developing an integrated assessment culture

Strong communication, of the purposes of assessment and reinforcement of the value of assessment in the monitoring, documenting, measuring and reporting of learning, is important in building a shared assessment culture. A school-wide assessment culture acknowledges the role assessment plays in informing the learner, learning and teaching, and the learning community about achievement, progress and in supporting decision-making.

Establishing and fostering a school-wide culture around assessment begins by:

- developing assessment capability within the learning community
- developing a comprehensive assessment policy that emphasizes assessment integration
- creating opportunities for teachers to plan, reflect and moderate assessment collaboratively
- providing school-wide professional development opportunities around integrating effective assessment
- reinforcing the role assessment plays in finding out what learners know and can do, and in identifying the next steps for their learning
- reinforcing the links between monitoring, documenting, measuring and reporting of learning.

Developing assessment capability to support learning

All members of the learning community develop assessment capability (Absolum et al. 2009) to make the "tacit knowledge that is 'hidden' within the learner transparent, explicit and available" (Clark 2012).

Members of the learning community are assessment capable when:

- everyone is aware of, and understands, why and what to assess
- everyone is aware of, and understands, what constitutes quality
- there is a shared understanding of how to assess and what data is being collected, analysed and reported.
- there is a shared language for talking about assessment
- the assessment process is collaborative and inclusive of all members

(Hipkins 2009; Booth, Hill, Dixon 2014)

When members of the learning community have a shared understanding and language to monitor, document and measure learning, they can make powerful contributions to learning and teaching.

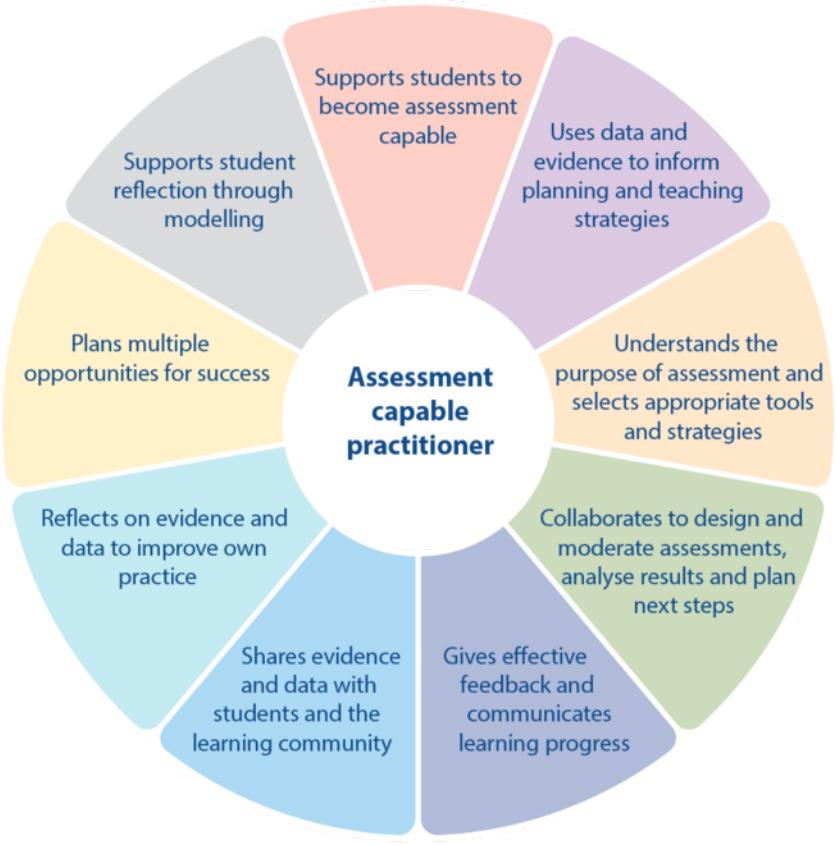
In an assessment-capable learning community, everyone has a clear understanding of the reasons for assessment, what is being assessed, the criteria for success, and the methods by which the assessment is made. In so doing, the entire school community is involved in the inquiry regarding the efficacy of the programme implementation (Hipkins 2009). This could have a powerful effect on the development of knowledge, conceptual understandings and skills.

Teachers

An assessment-capable teacher is supported through professional development and a shared assessment culture. As indicated in figure AS02, teachers support learners to become assessment capable in the following ways.

Figure AS02

Assessment-capable teacher



Teachers become more effective when they are open to actively learning about learner progress by monitoring what they know, understand and can do. Teachers inquire into learner learning as a way of assessing their own practice as educators. They continually adjust their teaching to better support individual and group learning.

Teachers in a learning community ask the following questions.

- What awareness and understanding do we have of learner learning?
- What is the evidence of what learners can do, say, write, create and demonstrate?
- How do we support learners to understand what constitutes quality?
- What other contexts can we provide for learners to practise their skills?
- What action needs to be taken to develop the learning further?
- How will we know that we have sufficiently supported learner learning?
- How can we identify progression in learning across multiple contexts or units of inquiry?
- How do we use evidence of learning to plan the next learning steps with learners?

Learners

Learners develop assessment capability when teachers provide them with multiple supported experiences in reflecting on their learning and how to make improvements. Using specific language to describe, discuss and evaluate learning, learners demonstrate their assessment capability by:

- partnering with teachers to design their learning goals and success criteria
- being able to self-assess and discuss their progress towards achieving learning goals

- selecting evidence, such as samples of their learning, that best demonstrate the intended learning goals
- developing the metacognitive skills to reflect on their learning and to plan next steps
- drawing on feedback and multiple strategies to adjust their learning and identify where and when to make improvements.

TSM: Supporting learner agency

From self-assessing to self-adjusting

By taking an active role in their own assessment, learners analyse how they think and learn. They develop skills to move from being self-assessors to self-monitors, with the aim of becoming self-adjusters.

Self-assessment involves learners reviewing and evaluating their knowledge, conceptual understandings and skills. It then leads to learners monitoring and adjusting their behaviour and planning, making corrections and implementing improvements in their learning. Self-adjusters use feedback to modify and improve their learning. Self-adjusting therefore requires both thought and action and supports learners' self-efficacy.

Assessment is a powerful tool to support learners in becoming self-adjusting learners. As they reflect on their progress and set goals for future learning, they may consider the following questions.

- What do I need to know?
- What knowledge and skills do I need to develop in order to answer my questions?
- What steps do I need to take to ensure that my learning exemplifies quality?
- What further possibilities do I see?
- How do I incorporate feedback to achieve my learning goals?

Co-constructing learning goals and success criteria

Learners and teachers set and reset learning goals to answer the questions "Where am I going in my learning?" and "What do I need to get there?" These are personalized for each learner and connect new learning to prior learning. Learning goals are revisited throughout the learning process to monitor progress.

In PYP schools, personal learning goals support the creation of high expectations by:

- making learning transparent to the teacher, the learner and their families
- building a shared understanding of what learning is to be achieved
- encouraging reflection and focused feedback
- inviting learners to take ownership of their own learning.

Success criteria describe what quality and achievement will look like. They are specific and measurable. Learners and teachers co-construct success criteria to answer the questions "What does successful learning look like?" and "What are we looking for during learning?"

Co-constructed success criteria support learning by:

- building a common understanding of what constitutes quality
- allowing for specific feedback on learning and feed forward into next steps of learning
- providing the structure and language for reflection, self-assessment and peer feedback
- providing the criteria against which learning is measured.

Learners in the early years learn about the role of learning goals and success criteria over time. Teachers support learners' development of goal and success criteria setting skills by modelling the skills and by offering multiple opportunities for learners to practise them.

Designing assessment to inform learning and teaching

> There are no year level expectations in a series of achievement standards. No one is at, on, above or below expectations. Every student is simply at a level of development defined by what learning is developmentally appropriate.
>
> (Griffin 2009)

Assessment in the PYP has generally followed the "backwards by design" process (Wiggins and McTighe, 2005). This assessment philosophy encourages teachers to design assessment by first identifying the desired knowledge, conceptual understandings and skills, followed by the design of the assessment, and finally planning learning activities to ensure acquisition of knowledge, conceptual understandings and skills.

"Forward by design" takes into consideration what other learning may have occurred beyond what has been planned. This design approach supports the development of "soft" skills, that are not immediately measurable, and that can emerge through the learning process. Forward by design is particularly relevant in supporting the development of approaches to learning and for the IB learner profile. This encourages learner participation in assessment design, inviting them to evidence what else they know or can do.

In the PYP inquiry learning environment, the learning process is valued as much as the learning outcomes. Designing assessment that are both backward by design and forward by design will ensure that knowledge, conceptual understandings, skills and attributes of the IB Learner profile are monitored, supported and valued.

In designing a holistic assessment, teachers consider the following questions.

- What learning goals will be achieved?
- How can I involve learners in the assessment design?
- How could learners engage in dialogues with teachers about the development and demonstration of the IB learner profile attributes?
- What data or evidence should be gathered?
- What tools or strategies should be used to gather data?
- How will the evidence be monitored, documented and measured?
- How could learners be asked to evidence any additional learning?
- How will the results be shared to feed back to the learner?
- How will the results be used to inform next steps in learning and teaching?
- How will the results of the assessment be used to inform the learning community?

What to assess

The significant content identified by the school supports the outcome of learners becoming internationally minded. Once this content is identified, teachers plan multiple opportunities for their learners to develop knowledge, conceptual understandings and skills to support self-regulatory learning. In determining what to assess, teachers might ask the following questions.

- Is it the process or product of learning we aim to evaluate?
- Is it to understand prior knowledge—what the learner already knows and can do?
- Is it to check if learning is on track or if the learner is ready for extension?
- Is it to elicit depth and breadth in understanding?
- Is it to extend learners' learning?
- Is it to understand how the learner makes connections and applies learning?

The criteria for assessment must be known to learners at the beginning of the inquiry and should be documented in one of the PYP planners, an adapted planner or the PYP planning process. The criteria accommodate a wide range of knowledge, conceptual understandings and skills. They are revisited and modified during the course of the inquiry, ensuring that they also reflect emergent knowledge, understandings and skills.

Inquiry

PYP assessment recognizes the importance of monitoring and documenting the process of inquiry. Through careful observation of the inquiry process, teachers monitor learners' ability to make connections across subjects and to apply skills to construct new knowledge.

When monitoring and documenting student learning, the teacher considers:

- the nature of learners' inquiry over time—observing for depth and breadth and growth
- learners' awareness that authentic challenges require solutions based on the integration of knowledge that spans and connects different subjects
- how learners demonstrate and develop subject knowledge
- how learners apply their conceptual understandings to further their inquiries successfully
- how learners demonstrate and develop the approaches to learning
- how learners demonstrate both independence and an ability to learn collaboratively.

The inquiry learning progressions focus on how inquiry skills develop over time and may be used by schools to further support understanding of learner growth in selected inquiry skills over time. The learning progressions complement the approaches to learning, allowing certain skills to be explicitly described with greater and more specific information which supports student learning.

Inquiry learning progression website

Inquiry learning progressions templates

Inquiry learning progressions examples

Conceptual understanding and approaches to learning

Monitoring, documenting and measuring conceptual understandings focus on how learners make connections, transfer and apply understanding of concepts across, between, and beyond subjects through

a range of learning experiences. Skills are monitored and documented for growth over time; they manifest at different points in time and in different ways, are closely interconnected and are open to interpretation. It is, therefore, important that teachers allow for flexibility to monitor and document conceptual understandings and skills over time and through a range of experiences.

TSM: Solo taxonomy

Progress in conceptual understandings is evident when:

- the use of abstract concepts increases
- connections are made between multiple concepts to explore the central idea
- understandings are transferred to more complex contexts
- actions are informed and taken based on existing and new understandings of concepts and of the central idea.

Learners increase their depth of understanding through adding to, expanding on, testing and adjusting their ideas. Strategies to support conceptual understandings include the following.

- Increase **wait time** strategy for learners to answer questions so they can move beyond factual understanding to make connections and discuss deeper understandings*.
- Encourage learners to use and add to **concept maps** to show connections and relationships between concepts.
- Use **exit cards** strategy for learners to list their understandings of the concepts and questions they may still have.
- Use the **bus stop strategy** to post concepts around the learning space. Learners individually or collaboratively record, challenge, expand or add their ideas using symbols or words as they move around the "bus stops".
- Provide opportunities for learners to **think in pairs or small groups** to encourage deeper discussions.
- Ask **open-ended questions**: For example, "What do you think?", "How could you change the issue?", "What other alternatives are there?".

*(Sackstein 2016)

Supporting self-regulated learning

Assessment is a powerful tool to support lifelong learning. Whenever and wherever possible, teachers provide opportunities for learners to practise self-assessing and self-monitoring so they can internalize their own learning and develop strategies to adjust their learning to become self-regulated learners. To develop learners' assessment capability, teachers:

- are mindful of the well-being of learners to ensure self-assessment promotes a positive sense of agency and self-efficacy
- provide timely, specific and well-considered feedback that learners can act upon
- provide learners with opportunities to experience success
- challenge learners to take risks to extend their learning
- challenge learners when there are misconceptions or misunderstandings so they can self-correct
- support learners in viewing mistakes as learning opportunities.

Learners and teachers are actively engaged in assessing learners' progress as part of the development of knowledge, conceptual understandings and skills. Recognizing that self-regulated learning is not a fixed personality trait (Clark 2012) and that learners learn in diverse, complex and sophisticated ways, teachers call on a variety of strategies and tools to support assessment of learners' work.

Teachers:

- provide multiple opportunities and contexts for learners to practise their skills
- clearly define and communicate learning goals and success criteria with learners and families

- design guided and open-ended learning experiences that allow for a range of opportunities to demonstrate skills in different contexts
- collect and use observable learning evidence that can be seen, heard or touched
- identify where and when learners are most ready to learn and be challenged.

Monitoring and documenting the growth of inquiry skills using the inquiry progressions can support goal-setting and building assessment capability in learners and educators. As learners and educators engage in ongoing conversations about learning and next steps, learners can use the progressions to support them in creating their own learning goals and criteria for success.

Inquiry learning progression website

Inquiry learning progression templates

Inquiry learning progressions examples

How to assess

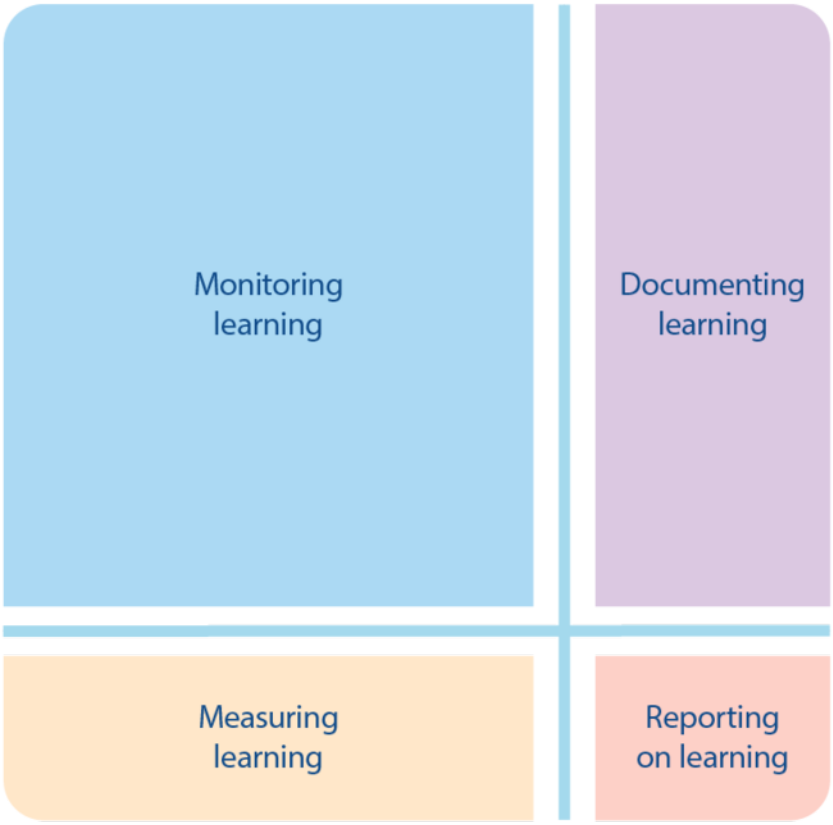
The four dimensions of assessment

Assessment provides evidence to inform learning and teaching. Both learners and teachers are continually asking themselves the questions "Am I making progress? How do I know?" They gather evidence of learning to answer these questions.

PYP assessment has four dimensions: monitoring, documenting, measuring and reporting on learning. Each of these aspects has its own function, but all aim to provide evidence to inform learning and teaching. Although the four dimensions of assessment are not weighted the same; each dimension has its own importance and value. The PYP chooses to put emphasis on monitoring and documenting learning as these dimensions are critical in providing actionable feedback for the learner.

Figure AS03

Assessment to inform learning and teaching



Monitoring learning

Monitoring of learning aims to check the progress of learning against personal learning goals and success criteria. It occurs daily through a variety of strategies: observation, questioning, reflection, discussing

learning with peers and teachers, and well-considered feedback to feed forward for next steps in learning. Tools used for monitoring include open-ended tasks, written or oral assessment, and a learning portfolio.

Documenting learning

The documenting of learning is the compilation of the evidence of learning. Documentation can be physical or digital, and can be displayed or recorded in a variety of forms. Documentation of learning is shared with others to make learning visible and apparent. It reveals insights into learning and provides opportunities to reconnect with learning goals and success criteria.

Learners and teachers can document learning goals, questions, reflections and evidence of learning using a variety of formats.

- **Learning logs or journals:** These are used to record feedback and reflections of ongoing learning.
- **Learning stories:** Narratives that document an instance when the learner shows knowledge, conceptual understandings or skills.
- **Portfolios:** A collection of artefacts that can also contribute to reporting.

Documentation tools could include exemplars, checklists, rubrics, anecdotal records, portfolios.

Measuring learning

The measuring of learning aims to capture what a learner has learned at a particular "point in time". Not all learning can be, or needs to be, measured. Measurement tools can be school-designed or commercial, but each measurement tool used provides further data to support a larger picture of learner achievement and progress in learning.

Some IB World Schools may administer government or commercially available standardized tests to measure their learners' performance. When standardized achievement tests are used, administrators and teachers are encouraged to carefully consider:

- how to minimize the impact of testing on learner well-being
- how to effectively use this data point to add to the comprehensive view of learner learning.

Analysing learning

Teachers use multiple data points to evaluate learner progress. The aim is to organize, aggregate and disaggregate data to derive information to support evidence-based decision-making. The PYP supports collaborative analysis of data undertaken for individual learners, learner cohorts and across the school to identify patterns and trends in learner learning. The outcome of this analysis informs and guides decisions about learning and teaching.

Teachers use a range of assessment tools and strategies to compile the most comprehensive picture of learner progress and achievement over time. This includes the participation of the learner within the process, which builds their assessment capability. Each tool and strategy chosen provides the learning community with accurate and accessible data on each learner's learning.

Teacher moderation

It is necessary to have a shared understanding of what quality and success look like for diverse learners before, during and after learning. Teacher moderation through professional discussions around learner samples is an effective strategy.

After any documenting and measuring of learning is complete, teachers collaboratively ask further questions.

- Have the learning experiences provided ample information to allow an evaluation to be made about whether the purposes or learning goals have been met?
- What does a learner's performance reveal about their level of understanding?
- Have any unexpected results occurred?
- How could the learning and teaching process be modified as a result of the assessment?
- Should any changes be made to the assessment design or procedure?

Figure AS04

Data-informed decision-making

Reporting learning

Reporting on learning informs the learning community and reflects the question "How well are we doing?" It describes the progress and achievement of the learners' learning, identifies areas for growth and contributes to the efficacy of the programme. Reporting is perhaps the most public aspect of assessment,

and therefore needs careful consideration in order to provide clear information that is useful to learners and families. If a school awards and communicates grades or other indicators of achievement, it should ensure that these processes are open, transparent and understood by all stakeholders.

No specific formats are preferred by the IB for reporting. The following ways have been used by schools offering the PYP that may be considered or adapted.

- Family/teacher/learner conferences
- Learner-led conferences
- Reports
- Learning progressions

Self-audit framework for teachers: Integrating assessment

Assessments are designed to produce data and/or evidence of learning and teaching. This optional tool offers considerations, when designing assessment for knowledge, conceptual understandings and skills, both individually and with collaborative planning teams.

Figure AS05

Self-audit framework for teachers: Integrating assessment

	Conceptual understandings	**Skills**	**Knowledge**
Monitoring learning			
The monitoring of learning occurs daily through a variety of strategies: observing, questioning, reflecting, discussing, and learning with peers and teachers to form meaningful feedback and feedforward for next steps in learning.	What conceptual understandings am I planning for and monitoring? How will my learners know the purpose of monitoring learning?	How am I modelling the skills I want my learners to build? How am I monitoring the skills I want my learners to build?	What relevant prior knowledge might my learners already have? How do I plan to find out?
Documenting learning			
The documenting of learning is shared with others to make learning visible and apparent. It reveals insights into learning and provides opportunities to reconnect with learning goals and success criteria.	How am I documenting feedback and reflection on new understandings? How am I using this information?	Are/how are my learners identifying connections to others learning and prior experience? In what ways are my learners and I documenting skill developing?	How have my learners and I identified and documented their learning?
Measuring learning			
The measuring of learning gathers "point-in-time" data on achievement and progress. Not all learning can be, or needs to be, measured.	How have I given multiple opportunities for my learners to access, use and demonstrate new understandings?	How might my learners use their strengthened skills in other contexts? What will support them to do so?	Have I got the right balance between challenge and knowledge? How do I know?

Assessing early learners

Learners in the early years acquire key learning milestones that are fundamental for future school success. This includes their cognitive ability to reflect on their knowledge, conceptual understandings and skills. A wide range of assessment strategies informs learning and teaching of young learners.

Early years teachers observe how learners monitor and adjust their own behaviour, especially at play, in order to:

- build a clear picture of the learner and their interests
- identify what and how the learner is thinking and learning
- assess the effectiveness of the learning environment on the learner's learning
- plan learning engagements for individuals and small groups.

When observing, teachers also document what the learners say and do. By listening carefully to the dialogue between learners, teachers learn about their current interests, existing knowledge, level of involvement and social skills. Teachers share these observations with learners and families. Collaborating with colleagues, they analyse group interactions, discover strengths, identify learning goals and reflect on the effectiveness of teaching practices.

Giving and receiving feedback

Feedback has been identified as one of the most effective teaching practices (Hattie, Timperley 2007) and should, therefore, form the core of assessment. Effective teacher feedback offers opportunities for reflection and action. It encourages learning adjustment, promotes continuous improvement and celebrates success. Effective feedback is timely, specific and well considered to provide learners with opportunities to practise metacognitive skills (Booth, Hill, Dixon 2014). It helps learners develop strategies to self-adjust and has a powerful influence on engagement and self-efficacy towards learning.

In providing feedback, teachers may also consider whether to focus on knowledge or skills, on the learning process or on self-regulation skills (Hattie 2012). All three types of feedback are necessary; however, learners benefit most from feedback that is based on their learning development. For example, a learner who is learning a skill for the first time might require more feedback relating to that skill or knowledge. At the same time, another learner who has had multiple opportunities to practise that skill will benefit from feedback relating to self-regulatory skills (Hattie 2012).

Feedback on knowledge, conceptual understandings and approaches to learning supports learners moving towards their desired learning goals. When giving feedback, teachers should therefore focus on:

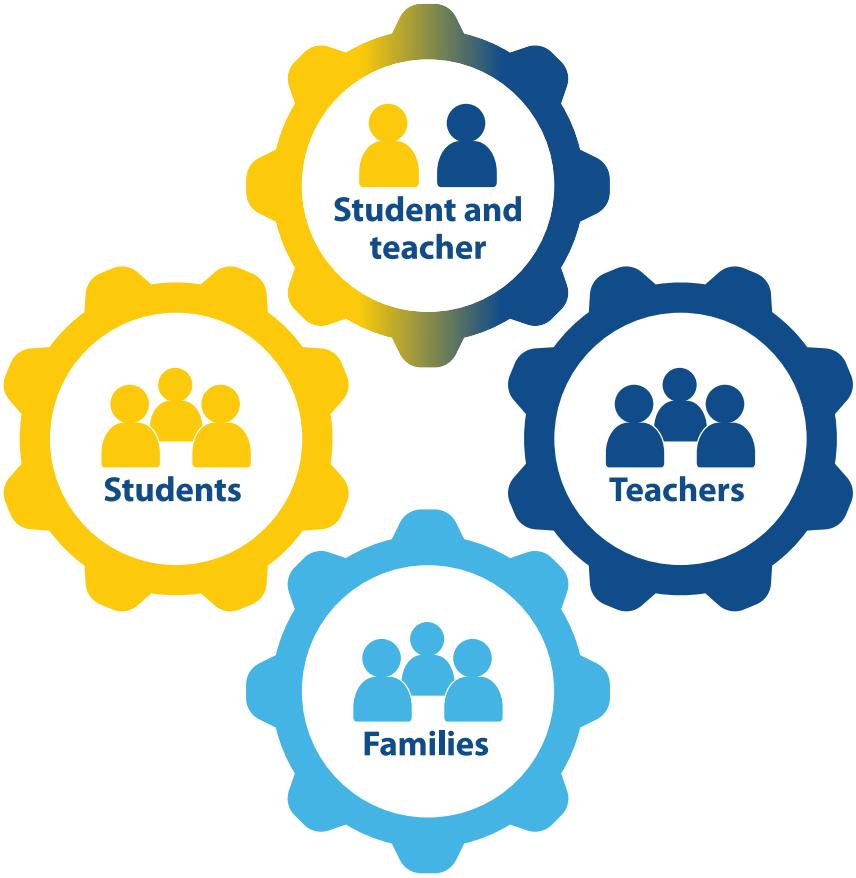
Feed**back**: How am I doing?

Feed**forward**: Where to next?

(Hattie and Timperley, 2007)

Figure AS06

Feedback and feedforward



Teacher feedback can also aim at challenging learners' reflection on misconceptions. Supporting learners' correction of misconceptions removes potential barriers to learning and enhances deeper conceptual understanding (Hattie 2012).

Peer feedback

Peer feedback is a key activity through which learners use the structure and language of success criteria to appraise and provide feedback on the learning of others. It emphasizes the importance of learning in the context of relationships by providing opportunities to communicate and be listened to. Peer feedback contributes to learning adjustment because:

- it is given in language that learners naturally use
- learners are more ready to accept feedback from one another.

(Black et al. 2004)

Learners who provide feedback to peers also benefit: in giving feedback, they increase their assessment capability. Peer feedback also gives teachers information about how a learner's understanding of a learning experience is similar to, or different from, their peers.

To support this, teachers model how to provide effective peer feedback by:

- using language that shows respect for the learning of others
- referring to shared understandings of what quality and success looks like for diverse learners
- providing authentic and ongoing experiences in giving meaningful feedback
- supporting learners to interact with the learning of others

- conferencing in small groups.

Further reading

Types of assessment

While school accountability reforms in many countries have put a spotlight on standardized assessments, education scholars are increasingly calling attention to the need to focus on assessment that connects learner learning in a meaningful way (Stiggins 2002; Absolum et al. 2009). Firm evidence supports the efficacy of assessment **for** learning and assessment **as** learning on learner outcomes, for they are an essential component of what learners and teachers do in the classroom (Black, Wiliam 2010).

The three assessment practices—for learning, of learning and as learning—serve different purposes. Of these practices, assessments for learning and of learning strongly align with the centrality of the PYP inquiry process and can support learners' cognitive, social emotional and behavioural development (Harlen, Johnson 2014). These practices may be formal or informal and internal or external. PYP learners' learning is evaluated through a combination of these practices.

Figure AS07

The three assessment practices

	Assessment for learning	Assessment of learning	Assessment as learning (Clark 2012; Earl 2012)
Purpose	Also known as formative assessment. Its goal is to inform teaching and promote learning.	Also known as summative assessment. Its goal is to certify and to report on learning progress.	As part of the formative process, its goal is to support learners in learning how to become a self-regulated lifelong learner.
Timing	It is conducted throughout the learning process. It is iterative and interactive.	It is typically conducted at the end of a unit, grade/year level or developmental stage, or programme.	It is conducted throughout the learning process. It is iterative and interactive.
Features	Learner involvement Quantitative and qualitative data Written and oral artefacts Observations and feedback Questionnaires Teacher/learner dialogues/ conferences Context-based Informal Indication of process Indication of knowledge/skill application	Limited learner involvement Quantitative data Tests, exams, standardized tests Indication of skills and knowledge acquisition or mastery Based on teacher judgment Norm- or criteria-referenced	Learners are active agents in their own learning by developing and using meta-cognitive strategies to: plan learning goals monitor goals reflect in order to modify learning and to adjust learning.

Assessment for learning is learner-centred, forward thinking and involves the entire learning community. It is a collaborative effort that starts with assessment of prior knowledge to determine what learners already know and what they are able to do with further guidance (Griffin 2014). Using pre-assessment data,

teachers design opportunities for learners to test and revise their models, and support them in making connections between their previous and current perceptions.

Assessment produces evidence of learner learning. Continuously monitoring, documenting and measuring learning, and then analysing assessment data, provides insights into learners' understanding, knowledge, skills and dispositions. Assessment is a means for teachers to personalize learning and for learners to self-adjust based on emerging data and feedback from teachers and peers.

Assessment as learning promotes learning by helping learners to take responsibility, while developing enthusiasm and motivation for their learning. By encouraging learners to actively design, manage and measure their own learning, they develop the skills to use assessments to self-assess, to reflect on and to make adjustments in future learning.

Assessment of learning is an integral part of learning. At appropriate points of the inquiry, it provides learners with the opportunity to gauge their acquisition of knowledge, development of conceptual understandings and skills during the inquiry.

The inquiry progressions

The inquiry progressions are skills-based learning progressions and focus on how inquiry skills develop over time. The inquiry progressions explicitly describe what inquiry looks like within and across subjects and support assessment for learning, assessment as learning and assessment of learning.

Inquiry learning progression website

Inquiry learning progressions templates

Inquiry learning progressions examples

Assessing understanding using SOLO

Many taxonomies outline the different levels of knowing and thinking, and can be used to design learning experiences and measurement tools for a deeper level of thinking. The structure of observed learning outcomes (SOLO) taxonomy (Biggs and Collis 1982) outlines five levels of thinking: one level where learners have no prior knowledge or understanding, two surface levels of knowledge and two deeper levels of thinking (conceptual understandings). This model can be used to develop rubrics, observations, design learning experiences, and assessment tasks. Learners require opportunities to acquire both surface and deep knowledge equally.

TSM: Solo taxonomy

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Language in the PYP

Summary

- Language learning includes the development of home and family languages, languages of the school, additional languages and literacy.
- Language is a means of affirming and expressing cultural identity and developing international-mindedness. Multilingualism benefits learners and the learning community in a variety of ways.
- Schools provide learners with multiple, authentic opportunities to learn language, learn about language and learn through language.
- Learners' complex language profiles are documented in collaboration with learners and their families.

Language development

The development of language is fundamental to the instinctive human need to communicate. The IB believes that "language development thrives in environments that by design embrace it" (IBO 2024). Language learning includes the development of the home and family languages, the languages of the school, additional languages and the development of literacy. This is integral to exploring and sustaining agency, cognitive and personal development and cultural identity. Language learning and teaching are social acts, dependent on relationships with the self and others, with context, with the environment, and with the world. The Primary Years Programme (PYP) beliefs and values about language are embedded implicitly throughout the IB learner profile and explicitly through the attribute of "communicator", as well as in the IB's approaches to learning. Through an IB education, PYP learning communities use language to build a better and more peaceful world.

A culture of language learning is foundational to a PYP learning community. Language has the power to bring the learning community closer together and overcome boundaries. It excites and invites communication in many ways, supporting and strengthening relationships and the building of international-mindedness. Language learning is located in both local and global communities. Learners are able to flourish in an interconnected global community using technologies to communicate and sustain relationships. At the same time, they are rooted in local communities through cultural and linguistic knowledge and skills. All members of the learning community are interested in, engaged with, and inquire about languages, and see themselves as agents in the process.

IB language tenets (2024)

IB World Schools are committed to multilingualism as a means of affirming cultural identity and developing international-mindedness. The term "multilingualism" in the PYP refers to communicating in more than one language, and recognizes that each of a learner's languages may be developed to different extents, and within different contexts, depending on their lived experiences.

Multilingualism involves the interplay among languages within a person, their interactions with others and also the learning community's attitudes towards languages. Becoming multilingual is a means through which we deepen our understandings of alternative perspectives and reach out to others. It takes into account the complex reality of our world's diverse sociocultural contexts.

PYP learners learn at least one additional language from the age of seven which supports the development of intercultural understanding. Learners who are multilingual also have an improved capacity to think, talk and reflect on how languages work. This is also why through learning additional languages, learners become more cognitively flexible and creative, and better at problem-solving (Kessler, Quinn 1980; Zelasko, Antunez 2000). Learners who see and hear their own languages within the learning environment, and who

are encouraged to actively make links to their prior linguistic experiences, connect more quickly to the community and learning engagements (Cummins 2000).

The language learner

Confident communicators

PYP learners learn to communicate confidently and creatively in more than one language, and with awareness of the power of language to have an impact on others. This is reflected in their language choices concerning style, tone, words, expression and gesture.

Through language, learners:

- develop and express identity
- develop and demonstrate international-mindedness
- become literate
- inquire
- communicate and collaborate.

Expressing identity

PYP schools welcome all learners and seeks to understand, affirm and promote their language and cultural backgrounds through the learning community and curriculum. All learners have a unique language profile shaped by relationships and interactions within their own family, community and the wider world. The continued development of home and family languages is crucial for cognitive growth and in nourishing cultural identity.

Learner language profiles

The complex and diverse language profiles among learners may mean that they are learning in a language additional to that of their home and family, or of their prior educational experience. School may be the first time that learners encounter an additional language or they may already be proficient in several languages. Some learners are familiar with the language of their school while, for others, the values, beliefs and behaviours around language and literacy are new.

The learner language portrait

Language backgrounds, experiences and goals are some of the factors inherent in a learner's language profile. These factors may be captured through the tool of a learner language portrait.

TSM: Learner language portraits

Collating a language portrait is an ongoing process that includes learners' perspectives and preferences and interviews with insights from families. It also documents language competencies in home and family languages and additional languages. This information informs planning, enabling teachers to design for the knowledge and strengths of learners and to facilitate further language development.

Developing international-mindedness

Multilingualism is significant in building international-mindedness as it gives learners insight into the thinking and perspectives of the self and others. Language enables learners to gather and compare points of view, and to show empathy, compassion and respect.

Learners' skills, knowledge and understandings of language play a fundamental role in the development of the attributes of the IB learner profile, for example, as communicators. Shared understandings of language are constructed and contribute to an ongoing exploration into what it means to be internationally minded.

Becoming literate

Literacy invites the learner into new ways of making meaning and exploring the world through language. Language learners develop skills to support meaning-making with written, viewed and oral text and apply their developing understandings of symbolic cues in a range of contexts. Multiliteracies involve learners in different ways of accessing and making meaning, including digital technologies and their vast potential for expression and audience. Through literacy, learners uncover perspectives in texts and learn about the power of communication. Literature is a source of pleasure and thoughtful provocation as learners use it to explore other ways of knowing and perceiving the world.

Becoming engaged inquirers

Language is intrinsic to learning and collaboration. Across PYP subjects, learners use language to navigate and interpret visual, oral and print text to make meaning and extend their inquiries. Language underpins the capacity to think critically and creatively, to question, investigate and to share thinking. It is the primary means through which knowledge is accessed and through which conceptual understandings are developed; it is the means to reflect on ideas, knowledge and experiences.

Communicating

The language of school is different in many respects from the languages children learn and use at home. Learners and teachers use language for specific purposes and within particular learning contexts, and these influence the language choices made. Language supports relationship-building and the negotiation of meaning. Through language, learners communicate their ideas and understandings to the local and global communities using multiple modes of expression. Learners use language to:

- question and probe
- collaborate
- construct and share understanding
- express and represent ideas
- navigate and interpret text
- compare, explain and influence.

The language learning community

School culture is a manifestation of the relationships, beliefs and values of a learning community. It shapes the ways members act and interact, and expresses the principles and values that underpin thinking and communicating. Every PYP learning community has a unique linguistic and cultural profile that forms the basis for its language policy and curriculum. For this reason, each school develops a school language policy that makes the most of its linguistic and cultural resources to meet its individual needs.

TSM: Reviewing a language policy

Using home and family languages in school supports learners who are new to the language of instruction, by building and extending their language repertoire. It engages them quickly in learning by helping them access their prior knowledge. Families and carers have a vital role to play as they discuss learning at home with their children, deepening understandings across and beyond the programme of inquiry. This also enables connections among languages to develop.

A learning community builds a positive culture of language learning by:

- embedding the values and beliefs that underpin multilingualism, such as being open-minded, caring communicators
- recognizing the importance of belonging and connectedness in personal and cultural identities
- recognizing the vital role families play in supporting, developing and sustaining children's language development
- designing environments where learners use their home language with pride, and access host or additional languages to engage with the world
- actively promoting the maintenance and development of home, and additional languages
- developing learners' metalinguistic skills and understandings by facilitating and actively encouraging opportunities to make connections between languages
- ensuring that multiple languages are seen and heard throughout the school and in communication between home and school
- promoting language learning as a means to build and strengthen intercultural relationships
- reflecting on the community's effectiveness of building a positive culture of language learning through collaboration.

Becoming a multilingual learning community

Learning communities view language as part of the learning landscape and encourage learners to identify the connections between languages and attributes of the IB learner profile. Creating a multilingual learning environment is a collaborative process involving all members. Learning communities collaborate to establish shared understandings about language and reach agreements together through the discussion and exploration of perspectives. Learners are agents of this process, exploring and establishing classroom agreements about the role and value of languages in the classroom and sharing their linguistic knowledge and skills with the learning community.

TSM: Learner language agreements

Children are naturally curious about other languages. Multilingual schools intentionally provide opportunities to explore language and stimulate curiosity and open-mindedness in a spirit of inquiry. These opportunities might include seeing, hearing and sharing languages:

- displayed on different alphabet and number charts, posters, labels
- used in learning spaces, games, poetry and performances
- used in displays of learning
- used within identity texts*, and bilingual texts (oral, written, digital, poetic, musical, and so on)
- chosen for the exhibition
- through technology
- in explorations of the similarities and differences between languages
- through learning experiences within a unit of inquiry
- from other members of the learning community
- within the context of action.

*(Adapted from Cummins, 2001)

In planning for the programme of inquiry, a learning community takes multilingual diversity into account and provides opportunities for its development within individuals, groups and local and global learning communities.

Beyond the languages of the learning community, opportunities to explore the multilingual nature of the world might include inquiries into family languages, historical or geographical languages within the local community, and the relationships among languages and cultures of the learning or local and global community.

TSM: How multilingual is my school—A self-audit tool

Language learning and teaching

Language learning—An overview

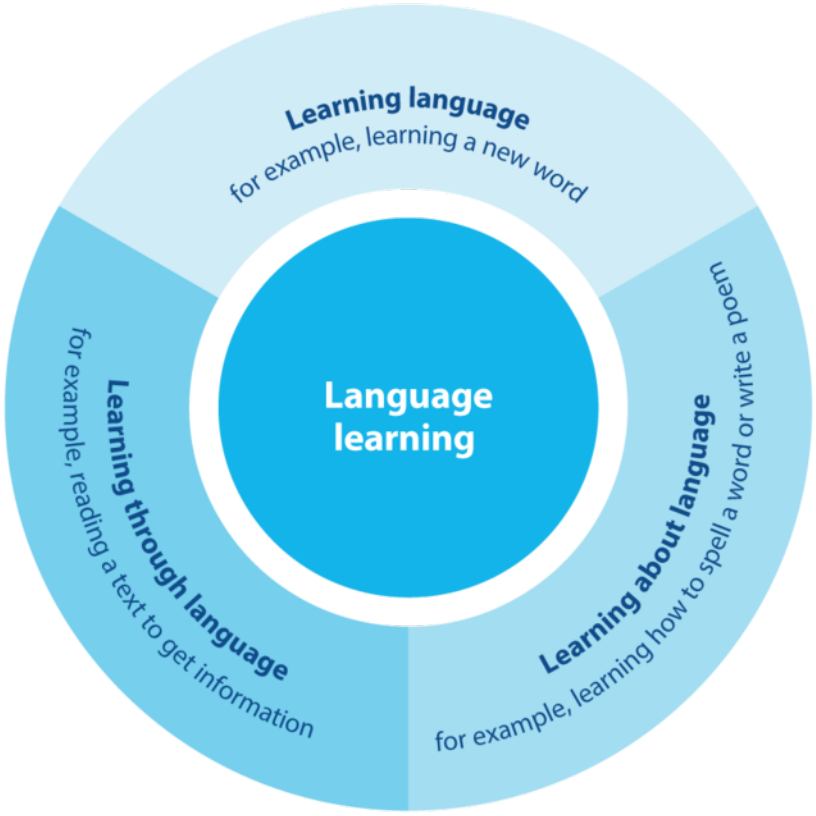
Language provides an intellectual structure for conceptual and critical thinking within and beyond the PYP transdisciplinary framework. All teachers are language teachers as all learning takes place through language. This is particularly evident in the early years where learning and teaching has a strong focus on language development.

All learners bring a significant body of language knowledge to school with them; knowledge about language and the way it works, knowledge about learning language, and knowledge of the social role of language. This includes understandings of literacy developed in the home and family language in either formal or family contexts.

Language learning and teaching immerses learners in the interplay between learning language, learning through language and learning about language. Although these aspects are inseparable, they are used here to support an understanding of how language is learned and used to make meaning.

Figure LA01

Language learning (Adapted from Halliday 1985)



Learning language

Learning takes place when new knowledge is integrated with existing knowledge and conceptual frameworks. Learners' language development thrives when they have opportunities to strengthen and build these frameworks by engaging in language learning in multiple modes within authentic, meaningful contexts. In an inquiry-based classroom, teachers and learners enjoy using language, appreciating its functionality and aesthetics. They have opportunities to engage with multiple languages through a variety of modes, such as literature, drama, story writing, technology and discussion. They reflect on their form and use across and within transdisciplinary and subject-specific contexts. Learners seek to make meaning from what they see and hear, and in responding to others they test out their hypotheses of language. From the responses they receive, learners formulate new understandings of language and how it works. Teachers and others in the learning community that learners interact with, interpret and rephrase, question and provide models in this process. This extends the knowledge, skills and understandings that learners develop; inherent in this process is the absorption of values about language and learning.

Language learning is a complex developmental process. The PYP Language overview and subject continuums (IBO 2025) present a set of tools and guidance that is underpinned by conceptual understandings. These assist teachers in planning language learning experiences for learners and in monitoring their language development. Schools may decide to use or adapt the language continuums according to their needs. The language continuums are designed to support the development of multilingual learners in all aspects of their language learning, and work in tandem with the PYP resources for the learning of additional languages.

Language: Subject overview

Additional language(s) resources

Teachers facilitate effective language learning when they:

- explicitly activate prior knowledge using home and family languages, and other languages where appropriate
- use their knowledge of learners' prior language skills and understandings to personalize learning engagements
- provide collaborative opportunities where learners learn from and with peers
- guide learners in reflecting on the intercultural and contextual nature of language
- identify language learning opportunities and co-construct learning goals within and across units of inquiry, and learning engagements
- record and share information to map development, plan for language learning and co-construct learning goals
- incorporate strategies needed to activate and build background knowledge when planning units of inquiry or lessons
- reflect on language obstacles to learning and how to remove them
- scaffold learning to extend language.

Scaffolding language learning

Scaffolding supports the assimilation of new language. Scaffolds are temporary supports given as new language is acquired. Question prompts when reading, picture prompts for story sequencing, or use of the home and family language to carry out research, are all examples of scaffolding. Other examples include:

- Visual, audio and practical aids (including technology)
- teacher language and questioning
- graphic organizers
- demonstrations
- dramatizations
- small, structured collaborative groups

- breaking learning into steps
- modelling by thinking out loud
- exploring vocabulary
- translanguaging strategies.

Extending language

Teachers extend learners' language learning by scaffolding opportunities using collaborative practices with rich oral, print, visual, or multimodal text. As learners progress through school they interact with increasingly sophisticated texts. These reflect the growing complexity of academic language and concepts, such as subject-specific vocabulary and grammatical constructions. From the early years, learners begin to use complex functions of language, such as classifying, justifying, hypothesizing, clarifying, explaining, comparing, and so on, at a developmentally appropriate level. By being aware of the nature of language used in school, teachers can extend learners' language repertoires.

The academic language of school is complex and context-specific; it therefore takes longer to acquire than language used in a social environment. Teachers explicitly model and scaffold the use of academic language in context and co-construct language learning goals in collaboration with learners and other teachers, where possible. The learner language portrait helps teachers learn more about the learners' language experiences and enables them to understand how learners' languages might best be integrated in school contexts.

Learning additional language(s)

The PYP requires the acquisition of an additional language from the age of 7 to support the development of international-mindedness. This additional language might be the language of a host country or another language that is part of the curriculum or community. Bilingual and dual language schools do not need to add another language to the curriculum, but may choose to do so. Schools are attentive to the development of each learner's multilingual repertoire.

Additional language(s) resources

New to the language of instruction

"Learners bring valuable, rich, complex linguistic repertoires to the communication and learning process" (IBO 2024). For many learners this may be the first time that they encounter the language of instruction used at school. Schools have language support and structures in place to ensure inclusivity for learners for whom the language of instruction is not their home and family language or the language of their prior school experience. Learners learning additional languages are simultaneously processing more than one language and this extra work for the brain is tiring. Where the learner is immersed in a language environment unfamiliar to them, there is an enormous amount of cultural information to be absorbed alongside the language, including unfamiliar patterns of social interaction. The learning community is concerned with the well-being of all learners and is aware of the needs of additional language learners. Schools take the time and make the effort to support and develop this awareness among all stakeholders.

Affirming identity

Key to language development is valuing the language repertoires of learners. Using artefacts, people, language resources, activities and other opportunities to enrich the learning community enables learners to connect personally to their learning, to promote self-efficacy and to build intercultural understanding. These environments support the development of linguistic identity and the attributes of the IB learner profile.

Identity can be affirmed by:

- establishing a learning environment that intentionally welcomes and embraces diversity in languages, cultures and perspectives
- valuing and using diversity as a resource to enhance learning
- providing opportunities to sustain home and family, and additional languages

- involving the learning community in establishing understandings of how best to collaborate to achieve shared goals.

Learning through language

As communicators and collaborators, learners engage with language at school in multiple contexts and multiple modes. They listen, read, speak, perform, write and view text in order to make meaning, and explore and share new understandings and knowledge. Learning is embedded within language and is underpinned by relationships as a reciprocal meaning-making process.

Teachers scaffold language within learning in order to facilitate successful agency and access to the resources and ideas learners need in the pursuit of their inquiries. They use language to provoke thought, spark interest and promote independent, motivated learners. Teachers are aware of barriers to learning that language might create, and personalize support for learners when necessary. Understanding that language is important in accessing knowledge, ideas and ways of thinking in subject areas; teachers ensure that learners have the appropriate linguistic tools and skills with which to learn.

Translanguaging

Learners use language most effectively by drawing on all their languages, or linguistic resources—their skills and knowledge about language and language learning. They benefit from awareness of the similarities and differences between their languages in phonemic, syntactic and grammatical aspects. Translanguaging is the process by which language learners actively draw on all their linguistic resources to communicate and make meaning (Garcia, Li Wei, 2014). This occurs, for example, when using bilingual books or working with someone who speaks the same language. By providing opportunities for learners to make connections between their languages and to draw on prior knowledge, the teacher facilitates effective learning while affirming identity (Cummins, 2000).

To support agency in language learning and effectively incorporate translanguaging strategies, learners discuss what language means to them personally and set language goals for themselves. A powerful means to establish a multilingual class community is for learners to develop their own "learner language agreements" as a group or learning community (Chumak-Horbatsch, 2012).

TSM: Translanguaging

Learning about language

Language is a visual, print and oral symbolic system with its own codes and signals. Therefore, language learning also involves learning about language—its form, conventions and contextual use.

Literacy

Through early experiences of reading with adults, children learn that reading is an enjoyable, achievable and rewarding activity. They learn that print and visual text conveys meaning and they are exposed to the print concepts, codes and conventions in the languages of their home and family and school. Drawing attention to the wide range and variety of texts around us (for example, stories, poems, lists, instructions, and posters in both print and digital media) supports this process. Making sense of and producing printed text are demanding skills that have to be intentionally learned. Foundational sound and word skills, comprehension, and writing skills are incorporated into the school curriculum to support literacy development. Approaches to this will look different in different languages and so are designed appropriately. Wherever possible these are approached or connected to the programme of inquiry to support a coherent learning experience. Texts in multiple languages in the home and the learning community are opportunities to understand different perspectives and develop understandings of the multilingual nature of our world. Family literacy traditions vary widely among different cultures, and teachers show interest in learning about these in order to better support learners and their families.

At school, learners and families are invited to share home and family language texts. Learners hear the sounds of other languages and develop awareness of different phonemic systems by joining in with poetry

and songs. Other writing systems are displayed and discussed as learners are invited to share their personal literacy knowledge with others. Schools explore ways to represent learners' literacy backgrounds in the learning environment and reflect on their success. These activities help build early metalinguistic skills to support the development of other languages. As learners develop understandings that other people communicate in ways that are the same and different from us, they strengthen and promote international-mindedness.

Multiliteracies

As the nature of literacy has changed in our world through developments in technology, education and the workplace, so our understandings of text, literacy and literacy practices have changed. Text can exist in a paper mode, live mode, electronic mode or a combination of these (Anstey, Bull 2006). These combined forms are called "multimodal" texts; for example, websites often have writing, pictures, cartoons or videos all operating in unison to communicate ideas. A book combining pictures and writing is also multimodal, as is a performance that combines music and movement.

The term "multiliterate" is used to describe a person who successfully engages with texts that are paper, live, electronic or multimodal—from simple signs to discussions, presentations, art, music and complex interactive digital technologies, in both receptive and productive modes. Multiliteracy recognizes the complexity of engaging with text, and the choices and decisions inherent in understanding and producing text. Electronic, live and paper texts in all modes offer new opportunities and challenges to learners to engage in learning. Through text, their understandings and views of the world and the self are influenced by new information, ideas and possibilities. Learners require the ability to make strategic, ethical choices and decisions as informed, internationally minded communicators. Schools ensure that resources reflect the diverse cultural backgrounds of local and global communities.

TSM: Multiliteracies

Critical literacy

Critical literacy enables learners to become active and reflective members of learning communities. Learners learn to identify perspectives, purpose and techniques within texts, and identify how an audience is positioned by a writer or producer of text in order to present their point of view. Across the curriculum, learners develop critical literacy through classroom experiences such as questioning and comparing texts, relating text to prior knowledge, and sharing personal reactions and experiences in everyday life.

Reflection on the power of language to convey perspectives supports the development of intercultural understanding. Through text, learners imagine and empathize with the lives of others and explore perspectives more deeply. They are encouraged to reflect on the connections between language and culture, and to draw on their personal linguistic repertoires (Blommaert 2010) to make and communicate meaning. Used together, the background knowledge of learners and the literacy experiences of the learning community can strengthen the diversity of voices in the school.

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Updates to the publication

This section outlines the updates made to this publication over the past two years. The changes are ordered from the most recent to the oldest updates. Minor spelling and typographical corrections are not listed.

Changes for April 2025

Throughout the publication

The term "real" or "real-life" has been replaced with "authentic".

The term "problem" has been replaced with "issue".

The terms "he or she" have been replaced with "they".

The term "scope and sequence" has been replaced with "subject continuums" where appropriate.

The transdisciplinary themes descriptors and their explanations have been updated.

The term "ATL" has been replaced with "approaches to learning".

The term "ATT" has been replaced with "approaches to teaching".

The term "student" has been replaced with "learner".

The term "parent" has been replaced by "families".

The term "additional concepts" has been replaced by "other concepts" or "concepts".

Transdisciplinarity in the PYP framework > A new approach in education

"A new approach in education"

The transdisciplinary themes descriptors and their explanations have been updated.

Elements of the PYP framework > Learning through the transdisciplinary themes

"Learning through the transdisciplinary themes"

The transdisciplinary themes descriptors and their explanations have been updated.

Inquiry > Inquiry in the PYP

"Summary"

The last bullet point in the table has been added: "The skills of inquiry can be intentionally planned for and developed through well-designed learning opportunities."

"The inquiry process"

The two bullet points have been added "collaborating" and "sharing and reflecting".

"Collaborative practice"

The sentence "This planning, whilst regular and systematic, should also leave space for learner questions, wonderings, interests and personal inquiries." has been added.

The links to the PYP planners and the PYP collaborative planning process have been added.

"Explicit teaching"

The last sentence has been updated.

Inquiry in the PYP > Inquiry in practice

"The role of teachers"

The last sentence was added: "The sample learning opportunities in the inquiry learning progressions are another support for teachers when designing inquiry opportunities."

"Learners as inquirers"

The last sentence changed to: "Learners acquire knowledge, build conceptual understandings and develop skills. The inquiry learning progressions make skills of inquiry visible and explicit. The progressions can support learners to set their goals and deepen their understanding of their inquiry skills. Figure IN02 unpacks the different aspects of learners as inquirers."

"The learning community and inquiry"

The first sentence changed to: "Inquiry in the PYP is explored, experienced and framed through the transdisciplinary themes. These themes are underpinned by a balance between human and natural worlds and..."

Developing a transdisciplinary programme

The transdisciplinary themes descriptors and their explanations have been updated.

Language learning and teaching > Learning language

The sentence "The Language continuums are designed to support the development of multilingual learners in all aspects of their language learning, working in tandem with the PYP resources for the learning of additional languages." was added.

Language learning and teaching > learning about language

"Literacy"

The last sentence was added.

Corrections for March 2024

Throughout the publication

Alignment of language with other IB documentation.

The term "key concepts" has been replaced by "specified concepts", the term "related concepts" has been replaced by "additional concepts".

Transdisciplinary learning > Elements of the PYP framework

"Crossing boundaries with concepts"

Correction of error in the previous version.

The last sentence of the first paragraph has been removed.

"In effect, concepts are transdisciplinary. Unlike subject-specific knowledge, concepts provide the language and the mental structure to foster ways of knowing and thinking across different subjects."

Conceptual understanding

"Conceptual understanding"

Introduction of revised or improved content.

The section "Concepts" has been revised and improved content has been added to align with new thinking on concepts, the title has also been changed to "Conceptual understanding".

A transdisciplinary programme of inquiry > Developing a transdisciplinary programme

"The PYP planning process and planners"

Correction of error in the previous version.

Caption of Figure PO05: changed from "collaborative planning for learning and teaching" to "PYP collaborative planning process".