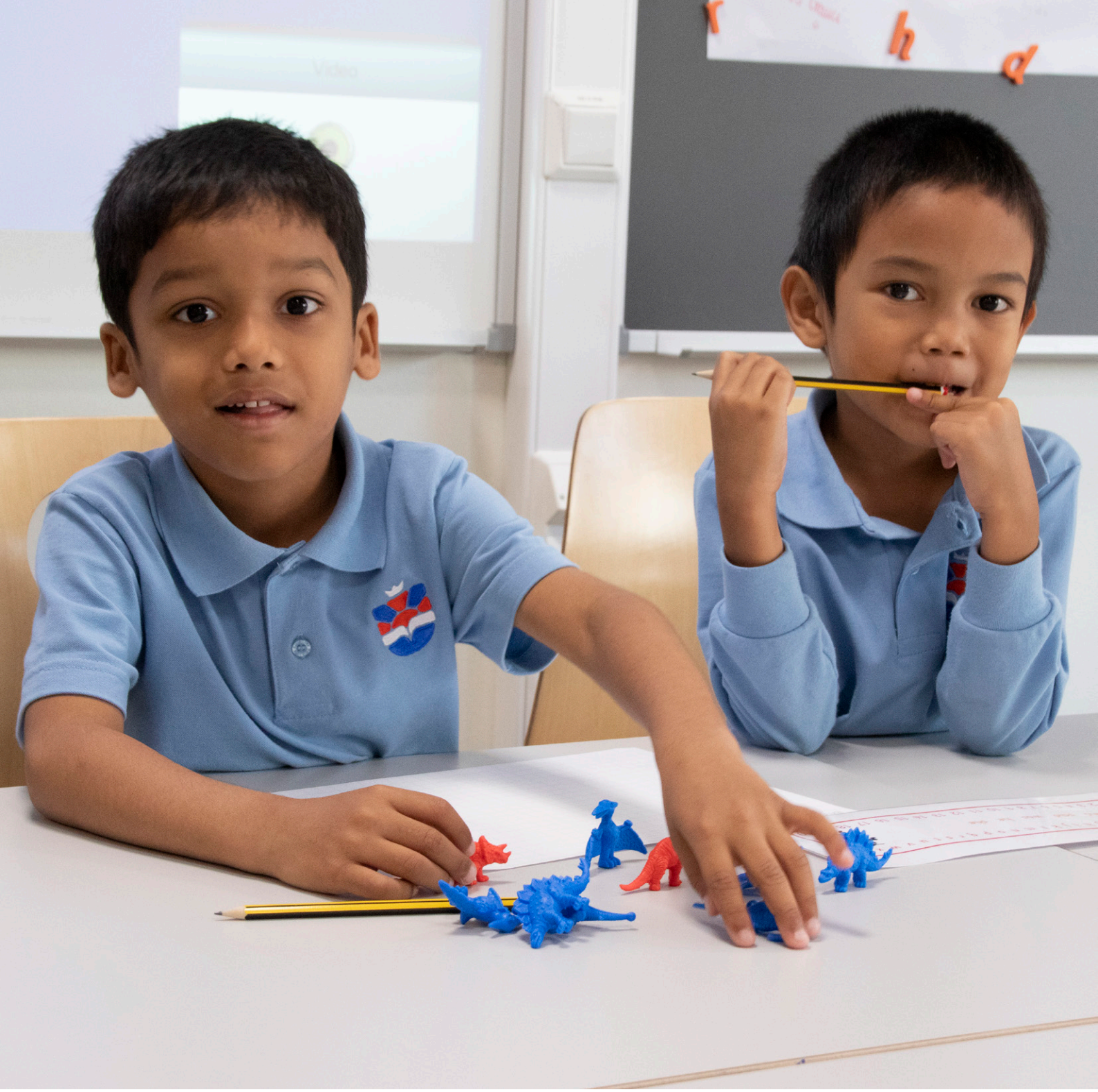

Mathematics

Scope and Sequence

BISS Gausel

BRITISH INTERNATIONAL SCHOOLS OF STAVANGER

Creating role models for the future

Contents

Introduction

Students construct their understanding of mathematics and its associated skills through a variety of abstraction (constructing meaning, transferring meaning into symbols, applying with understanding) .

In the PYP, skills are learned within a context where students can pose problems, solve problems and understand new ideas through inquiry, reflection and collaboration.

At BISS we are proud to be using a Scope and Sequence for our Maths tuition which was developed by our PYP team to accommodate not only the different phases recommended by the IB, but also the individual needs of our students.

Maths in the PYP department may be taught as stand-alone lessons to reinforce certain skills, though the majority of lessons will be taught in a trans-disciplinary way within our programme of inquiry.

We see each of our students as an individual learner and thus offer subject content in line with their skills and needs. That means that within a class, students may work within a different phase, which allows us to provide individual support to either enhance or extend their skills and knowledge.

How Children Learn Mathematics

It is important that learners acquire mathematical understanding by constructing their own meaning through ever-increasing levels of abstraction, starting with exploring their own personal experiences, understandings and knowledge.

Additionally, it is fundamental to the philosophy of the PYP that, since it is to be used in real-life situations, mathematics needs to be taught in relevant, realistic contexts, rather than by attempting to impart a fixed body of knowledge directly to students.

How children learn mathematics can be described using the following stages (see figure 1).

Constructing meaning about mathematics

Learners construct meaning based on their previous experiences and understanding, and by reflecting upon their interactions with objects and ideas. Therefore, involving learners in an active learning process, where they are provided with possibilities to interact with manipulatives and to engage in conversations with others, is paramount to this stage of learning mathematics. When making sense of new ideas all learners either interpret these ideas to conform to their present understanding or they generate a new understanding that accounts for what they perceive to be occurring. This construct will continue to evolve as learners experience new situations and ideas, have an opportunity to reflect on their understandings and make connections about their learning.

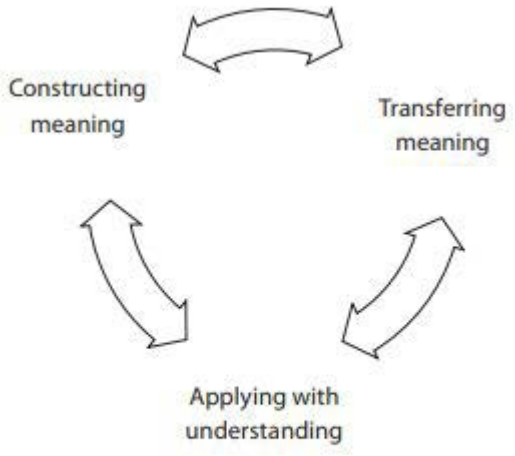

Figure 1
How children learn mathematics

Transferring meaning into symbols

Only when learners have constructed their ideas about a mathematical concept should they attempt to transfer this understanding into symbols. Symbolic notation can take the form of pictures, diagrams, modelling with concrete objects and mathematical notation. Learners should be given the opportunity to describe their understanding using their own method of symbolic notation, then learning to transfer them into conventional mathematical notation.

Applying with understanding

Applying with understanding can be viewed as the learners demonstrating and acting on their understanding. Through authentic activities, learners should independently select and use appropriate symbolic notation to process and record their thinking. These authentic activities should include a range of practical hands-on problem-solving activities and realistic situations that provide the opportunity to demonstrate mathematical thinking through presented or recorded formats. In this way, learners are able to apply their understanding of mathematical concepts as well as utilize mathematical skills and knowledge. As they work through these stages of learning, students and teachers use certain processes of mathematical reasoning.

- They use patterns and relationships to analyse the problem situations upon which they are working.
- They make and evaluate their own and each other's ideas.
- They use models, facts, properties and relationships to explain their thinking.
- They justify their answers and the processes by which they arrive at solutions.

In this way, students validate the meaning they construct from their experiences with mathematical situations. By explaining their ideas, theories and results, both orally and in writing, they invite constructive feedback and also lay out alternative models of thinking for the class. Consequently, all beenfit from this interactive process.

Number

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Phase 1 Conceptual understandings - PYP1

Numbers are a naming system.

Numbers can be used in many ways for different purposes in the real world.

Numbers are connected to each other through a variety of relationships.

Making connections between our experiences with number can help us to develop number sense.

Phase 2 Conceptual understandings PYP 1, 2 and 3

The base 10 place value system is used to represent numbers and number relationships.

Fractions are ways of representing whole part relationships.

The operations of addition, subtraction, multiplication and division are related to each other and are used to process information to solve problems.

Number operations can be modelled in a variety of ways.

There are many mental methods that can be applied for exact and approximate computations.

Phase 3 Conceptual understandings PYP 3, 4 and 5

The base 10 place value system is used to represent numbers and number relationships.

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Number operations can be modelled in a variety of ways.

There are many mental methods that can be applied for exact and approximate computations.

Phase 4 Conceptual understandings PYP 5 and 6

The base 10 place value system extends infinitely in two directions.

Fractions, decimal fractions and percentages are ways of representing whole-part relationships.

For fractional and decimal computation, the ideas developed for whole-number computation can apply.

Ratios are a comparison of two numbers or quantities.

Number

PYP 1

Constructing meaning:

use the language of addition and subtraction, for example, add, take away, plus, minus, sum, difference

model addition and subtraction of whole numbers

Transferring meaning into symbols:

Connect numerals to the quantities they represent

Applying with understanding:

count to determine the number of objects in a set

use numerals to represent quantities in real-life situations

use the language of mathematics to compare quantities in real-life situations, e.g. More, less, first, second

use simple fraction names in real-life situations

use fast recall of addition and subtraction number facts in real-life situations

use fractions in real-life situations

select an appropriate method for solving a problem, for example, mental estimation, mental or written strategies

PYP 2

Constructing meaning:

model numbers to hundreds or beyond using the base 10 place value system

estimate quantities to 100 or beyond

model simple fraction relationships

use the language of addition and subtraction, for example, add, take away, plus, minus, sum, difference

model addition and subtraction of whole numbers

develop strategies for memorizing addition and subtraction number facts

estimate sums and differences

understand situations that involve multiplication and division

model addition and subtraction of fractions with the same denominator

Transferring meaning into symbols:

read and write whole numbers up to hundreds or beyond

read, write, compare and order cardinal and ordinal numbers

describe mental and written strategies for adding and subtracting two-digit numbers.

Applying with understanding:

use whole numbers up to hundreds or beyond in real-life situations

use cardinal and ordinal numbers in real-life situations

use fast recall of addition and subtraction number facts in real-life situations

use fractions in real-life situations

use mental and written strategies for addition and subtraction of two- digit numbers or beyond in real-life situations

select an appropriate method for solving a problem, for example, mental estimation, mental or written strategies, or by using a calculator

use strategies to evaluate the reasonableness of answers

Number

PYP 3

Constructing meaning:

model numbers to thousands or beyond using the base 10 place value system

use the language of addition and subtraction, for example, add, take away, plus, minus, sum, difference

model simple fraction relationships

use the language of fractions, for example, numerator, denominator

model addition and subtraction of whole numbers

model multiplication and division of whole numbers

develop strategies for memorizing addition and subtraction number facts

understand situations that involve multiplication and division

model addition and subtraction of fractions with the same denominator

Transferring meaning into symbols:

read, write, compare and order whole numbers up to thousands or beyond

describe mental and written strategies for adding and subtracting two-digit numbers.

develop strategies for memorizing addition, subtraction, multiplication and division number facts

read, write, compare and order fractions

describe mental and written strategies for multiplication and division.

Applying with understanding:

use whole numbers up to thousands or beyond in real-life situations

use fast recall of multiplication and division number facts in real-life situations

use fast recall of addition and subtraction number facts in real-life situations

use mental and written strategies for multiplication and division in real-life situations

use fractions in real-life situations

use mental and written strategies for addition and subtraction of two- digit numbers or beyond in real-life situations

select an appropriate method for solving a problem, for example, mental estimation, mental or written strategies, or by using a calculator

use strategies to evaluate the reasonableness of answers

PYP 4

Constructing meaning:

model numbers to thousands or beyond using the base 10 place value system

model equivalent fractions

model decimal fractions to hundredths or beyond

model multiplication and division of whole numbers

use the language of multiplication and division, for example, product, quotient, prime numbers, composite number

model addition and subtraction of fractions with related denominators

model addition and subtraction of decimals.

Transferring meaning into symbols:

read, write, compare and order whole numbers up to thousands or beyond

develop strategies for memorizing addition, subtraction, multiplication and division number facts

read, write, compare and order fractions

read and write equivalent fractions

read, write, compare and order fractions to hundredths or beyond

describe mental and written strategies for multiplication and division.

Applying with understanding:

use whole numbers up to thousands or beyond in real-life situations

use fast recall of multiplication and division number facts in real-life situations

use decimal fractions in real-life situations

use mental and written strategies for multiplication and division in real-life situations

select an efficient method for solving a problem, for example, mental estimation, mental or written strategies, or by using a calculator

use strategies to evaluate the reasonableness of answers

add and subtract fractions with related denominators in real-life situations

add and subtract decimals in real-life situations, including money

estimate sum, difference, product and quotient in real-life situations, including fractions and decimals

Number

PYP 5

Constructing meaning:

model equivalent fractions

model multiplication and division of whole numbers

use the language of multiplication and division, for example, product, quotient, prime numbers, composite number

model addition and subtraction of fractions with related denominators and decimals

Model Numbers to millions or beyond using the base 10 place value system and decimal fractions to thousandths or beyond.

Model multiplying and dividing by 10, 100 and 1000.

Model ratios

Model integers in appropriate contexts, including negative numbers.

Model exponents

Model improper fractions and mixed numbers.

Simplify fractions using manipulatives.

Understand the relationship between fractions, decimals and percentages.

Model addition, subtraction of fractions.

Model rounding of whole numbers to a required degree of accuracy.

Transferring meaning into symbols:

read, write, compare and order whole numbers up to thousands or beyond

read, write, compare and order fractions

read and write equivalent fractions

read, write, compare and order fractions to hundredths or beyond

describe mental and written strategies for multiplication and division.

Read, write, compare and order whole numbers up to millions or beyond.

Round whole numbers and decimals to different degrees of accuracy.

Read and write integers (including negative numbers) in appropriate contexts.

Convert improper fractions to mixed numbers and vice versa.

Simplify fractions in mental and written form.

Read, write, compare and order decimal fractions to thousandths or beyond.

Read, write, compare and order percentages.

Convert between fractions, decimals and percentages.

Applying with understanding:

use fast recall of multiplication and division number facts in real-life situations

use decimal fractions in real-life situations

use mental and written strategies for multiplication and division in real-life situations

select an efficient method for solving a problem

add and subtract fractions and decimals in real-life situations, including money

estimate sum, difference, product and quotient in real-life situations, including fractions and decimals.

use whole numbers up to millions or beyond in real-life situations.

Mentally multiply & divide whole numbers &decimals by 10, 100 and 100 in real-life situations, and when converting units.

Convert improper fractions to mixed numbers and vice versa in real-life situations.

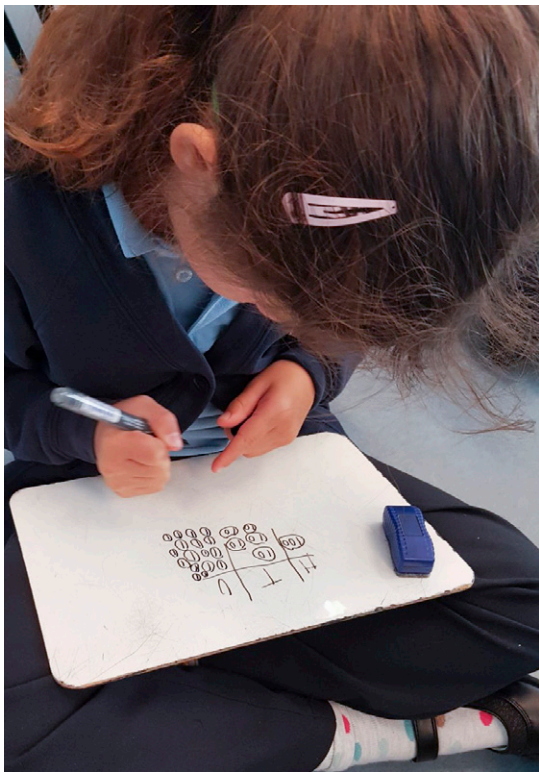
Simplify fractions in computation answers.

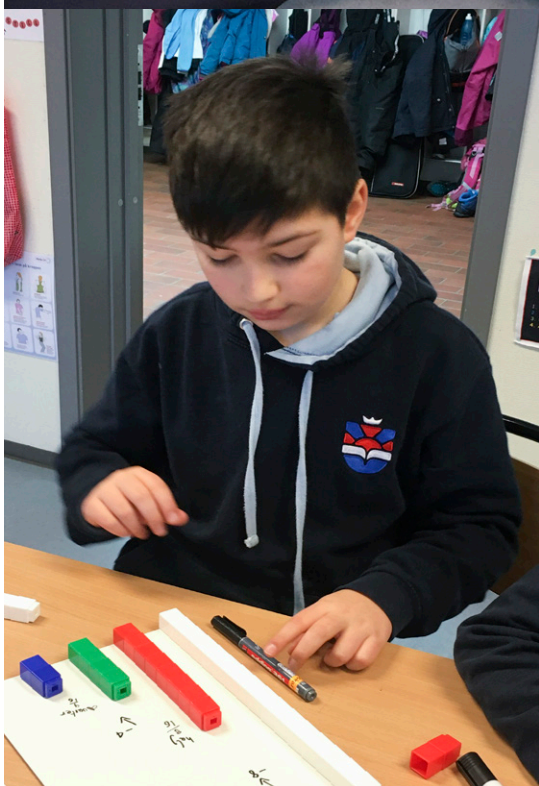
Use fractions, decimals and percentages interchangeably in real-life situations.

Select and use an appropriate sequence of operations to solve word problems.

Use strategies to evaluate the reasonableness of answers, such as rounding.

Estimate and make approximations in real-life situations involving fractions, decimals and percentages.





Number

PYP 6

Constructing meaning:

Model Numbers to millions or beyond using the base 10 place value system

Model multiplying and dividing by 10, 100 and 1000.

Model ratios

Model integers in appropriate contexts, including negative numbers.

Model exponents and square roots.

Model improper fractions and mixed numbers.

Simplify fractions using manipulatives.

Model decimal fractions to thousandths or beyond.

Model percentages.

Understand the relationship between fractions, decimals and percentages.

Model addition, subtraction, multiplication and division of fractions.

Model addition, subtraction, multiplication and division of decimals.

Use the language of multiplication and division, for example, factor, multiple, product, quotient, prime numbers, composite numbers.

Model rounding of whole numbers and decimals to a required degree of accuracy.

Transferring meaning into symbols:

Read, write, compare and order whole numbers up to millions or beyond.

Round whole numbers and decimals to different degrees of accuracy.

Read and write ratios

Read and write integers (including negative numbers) in appropriate contexts.

Read and write exponents and square roots.

Convert improper fractions to mixed numbers and vice versa.

Simplify fractions in mental and written form.

Read, write, compare and order decimal fractions to thousandths or beyond.

Read, write, compare and order percentages.

Convert between fractions, decimals and percentages.

Applying with understanding:

Use whole numbers up to millions or beyond in real-life situations.

Use rounding to varying degrees of accuracy, and in rounding remainders when dividing in real-life situations.

Use ratios in real-life situations.

Use integers (including negative numbers) in real-life situations.

Mentally multiply and divide whole numbers and decimals by 10, 100 and 100 in real-life situations, and when converting units.

Convert improper fractions to mixed numbers and vice versa in real-life situations.

Simplify fractions in computation answers.

Use fractions, decimals and percentages interchangeably in real-life situations.

Select and use an appropriate sequence of operations to solve word problems.

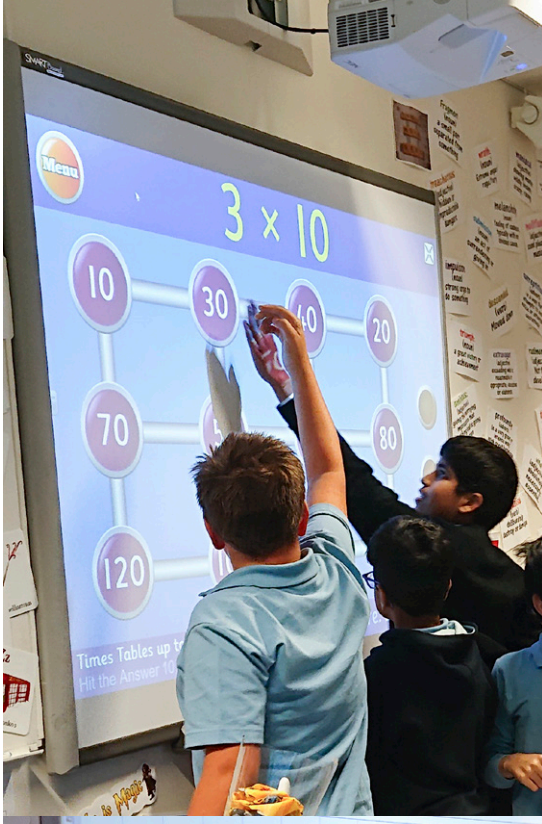
Select an efficient method for solving a problem: mental estimation, mental computation, written algorithms, by using a calculator.

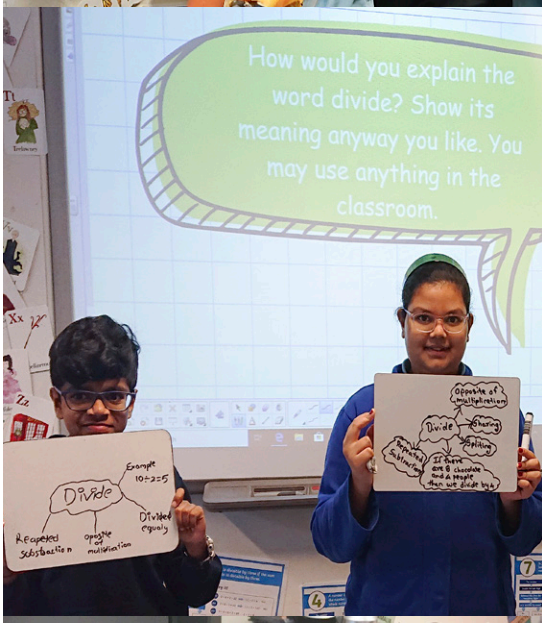
Use strategies to evaluate the reasonableness of answers, such as rounding.

Use mental and written strategies for adding, subtracting, multiplying and dividing fractions and decimals in real-life situations.

Estimate and make approximations in real-life situations involving fractions, decimals and percentages.

Use mental and written strategies for multiplication and division in real-life situations. **





Pattern and Function

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Phase 1 Conceptual understandings PYP 1

Patterns and sequences occur in everyday situations.

Patterns repeat and grow.

Phase 2 Conceptual understandings PYP 1, 2 and 3

Whole numbers exhibit patterns and relationships that can be observed and described.

Patterns can be represented using numbers and other symbols.

Phase 3 Conceptual understandings PYP 3, 4 and 5

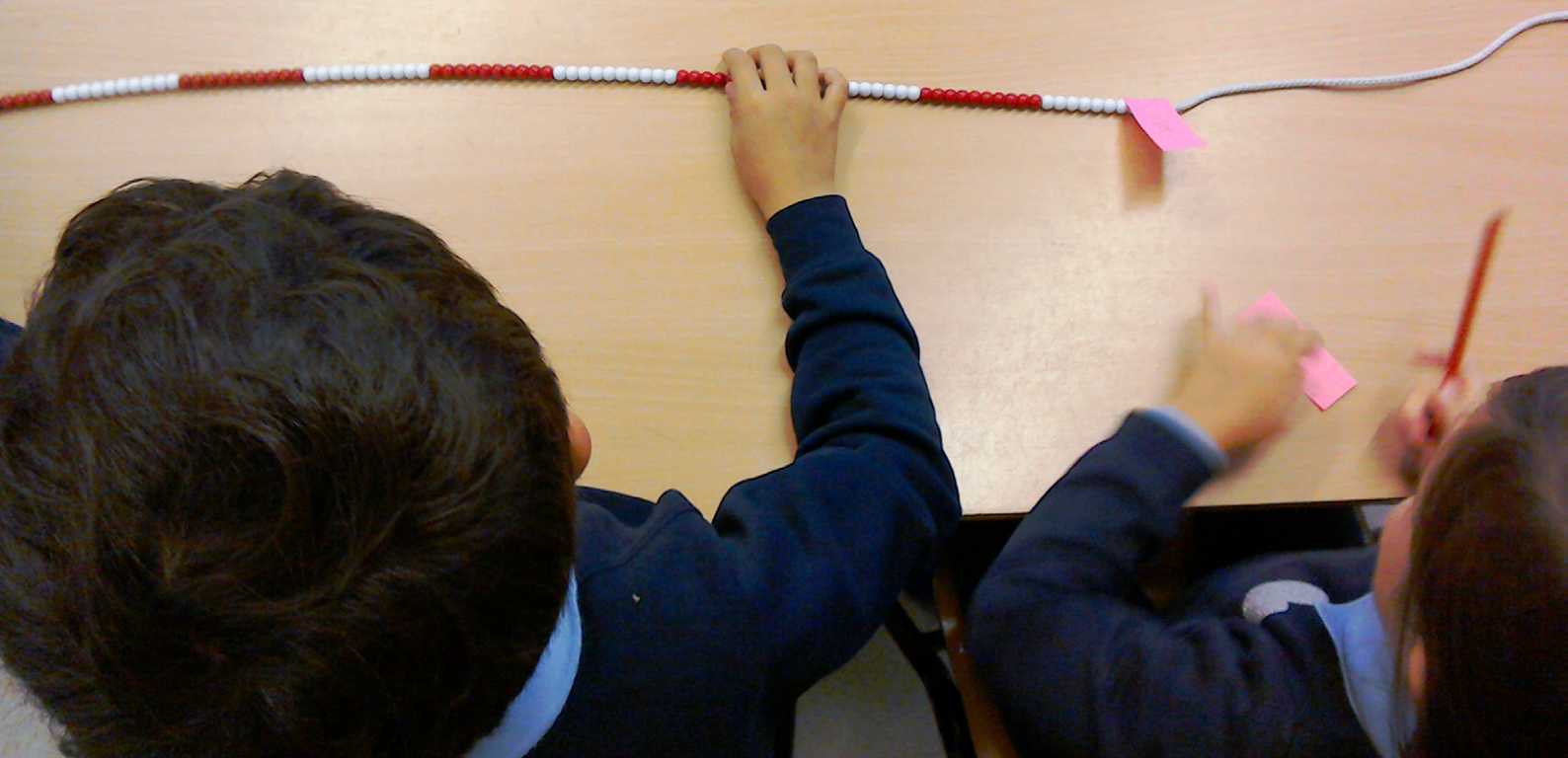
Functions are relationships or rules that uniquely associate members of one set with members of another set.

By analysing patterns and identifying rules for patterns it is possible to make predictions.

Phase 4 Conceptual understandings PYP 5 and 6

Patterns can often be generalized using algebraic expressions, equations or functions.

Exponential notation is a powerful way to express repeated products of the same number.



Pattern and Function

PYP 1

Constructing meaning:

understand that patterns can be found in numbers, for example, odd and even numbers, skip counting

Transferring meaning into symbols:

describe patterns in various ways, for example, using words, drawings, symbols, materials, actions, numbers

Applying with understanding:

extend and create patterns

PYP 2

Constructing meaning:

understand that patterns can be found in numbers, for example, odd and even numbers, skip counting

understand the inverse relationship between addition and subtraction

understand the associative and commutative properties of addition

Transferring meaning into symbols:

represent patterns in a variety of ways, for example, using words, drawings, symbols, materials, actions, numbers

describe number patterns, for example, odd and even numbers, skip counting.

Applying with understanding:

extend and create patterns in numbers, for example, odd and even numbers, skip counting

use number patterns to represent and understand real-life situations

use the properties and relationships of addition and subtraction to solve problems.

Pattern and Function

PYP 3

Constructing meaning:

understand that patterns can be analysed and rules identified

understand the inverse relationship between addition and subtraction

understand the associative and commutative properties of addition.

understand that multiplication is repeated addition and that division is repeated subtraction

understand the inverse relationship between multiplication and division

understand the associative and commutative properties of multiplication.

Transferring meaning into symbols:

describe the rule for a pattern in a variety of ways

represent rules for patterns using words, symbols and tables

Applying with understanding:

select appropriate methods for representing patterns, for example using words, symbols and tables

use number patterns to represent and understand real-life situations

use the properties and relationships of the four operations to solve problems

PYP 4

Constructing meaning:

understand the inverse relationship between multiplication and division

understand the associative and commutative properties of multiplication.

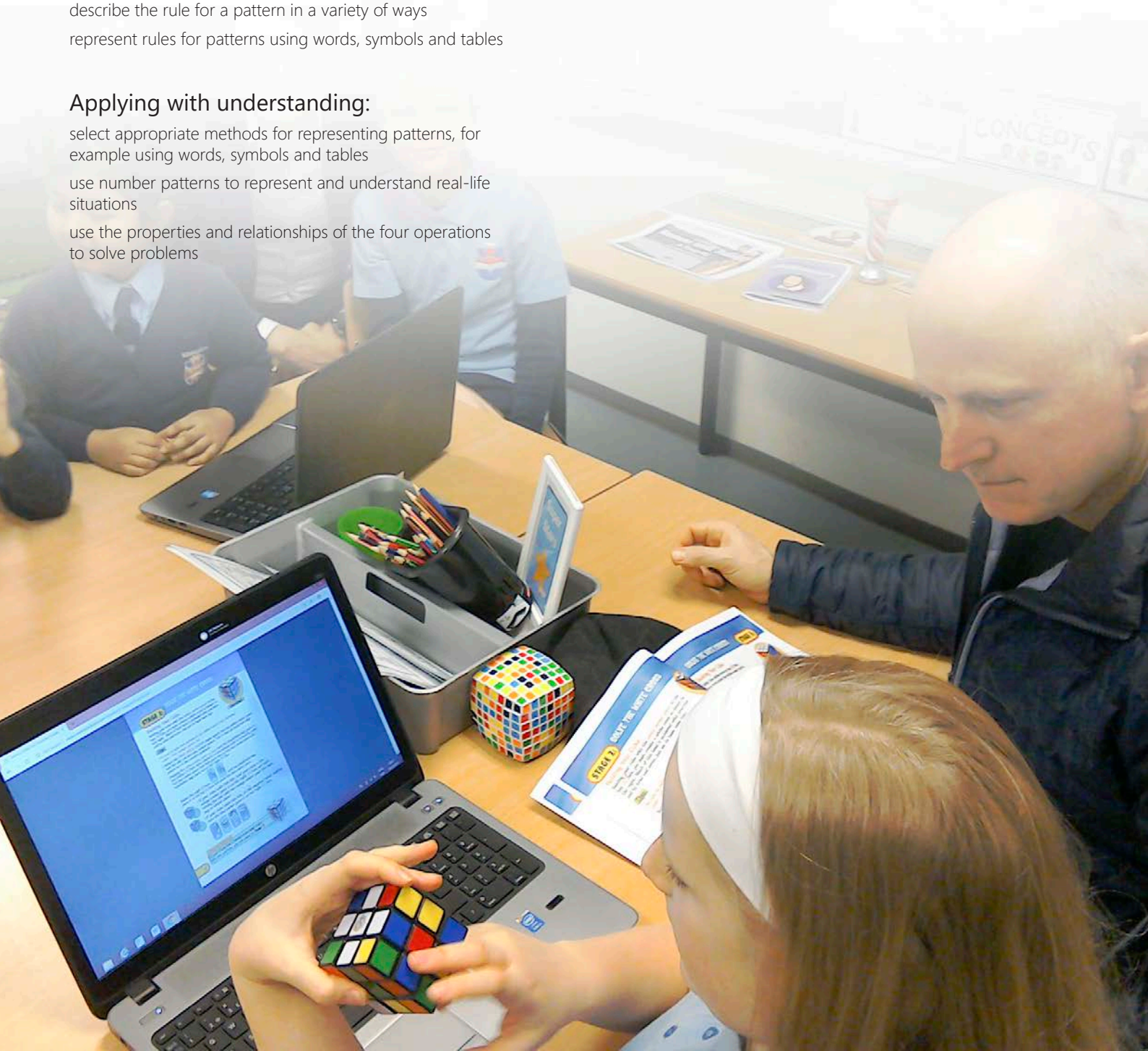
Transferring meaning into symbols:

identify a sequence of operations relating one set of numbers to another set.

Applying with understanding:

representing patterns, for example using words, symbols and tables

use the properties and relationships of he four operations to solve problems.



Pattern and Function

PYP 5

Constructing meaning:

understand that patterns can be analysed and rules identified

understand that multiplication is repeated addition and that division is repeated subtraction

understand the inverse relationship between multiplication and division

understand the associative and commutative properties of multiplication

Understand exponents as repeated multiplication.

Transferring meaning into symbols:

describe the rule for a pattern in a variety of ways

represent rules for patterns using words, symbols and tables

identify a sequence of operations relating one set of numbers to another set

Represent the rule of a pattern by using a function. Generate and describe linear number sequences.

Use simple formulae

Express missing number problems algebraically

Applying with understanding:

select appropriate methods for representing patterns, for example using words, symbols and tables

use number patterns to make predictions and solve problems

use the properties and relationships of the four operations to solve problems.

Select appropriate methods to analyse patterns and identify rules.

Use functions to solve problems

PYP 6

Constructing meaning:

Understand that patterns can be generalised by a rule.

Understand exponents as repeated multiplication.

Understand the inverse relationship between exponents and roots.

Understand that patterns can be represented, analysed and generalised using tables, graphs, words, and, when possible, symbolic rules

Transferring meaning into symbols:

Represent the rule of a pattern by using a function. Generate and describe linear number sequences.

Analyse pattern and function using words, tables and graphs, and, when possible, symbolic rules.

Use simple formulae

Express missing number problems algebraically

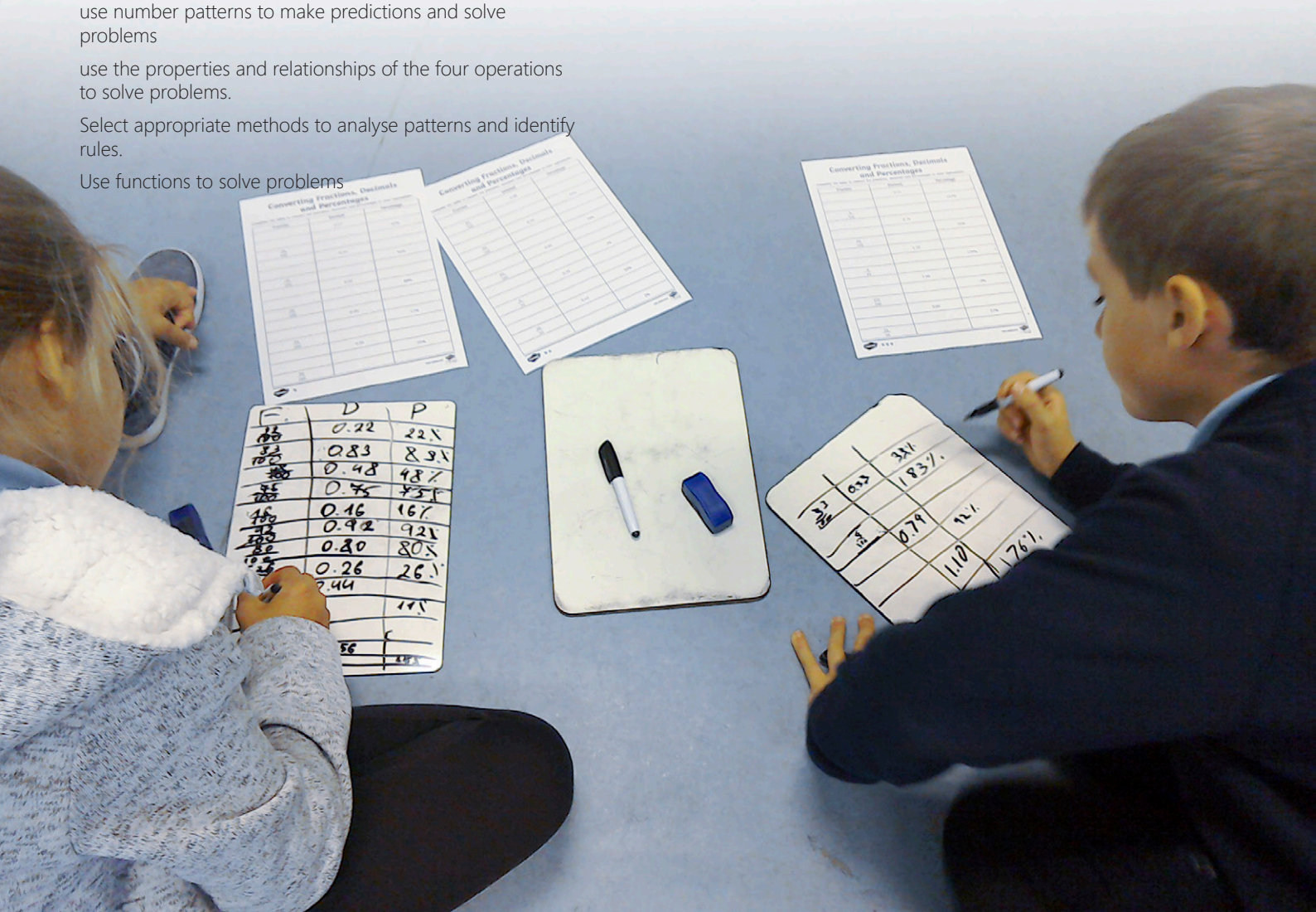
Find pairs of numbers that satisfy an equation with two unknowns.

Enumerate possibilities of combinations of two variables.

Applying with understanding:

Select appropriate methods to analyse patterns and identify rules.

Use functions to solve problems



Data Handling

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Phase 1 Conceptual understandings - PYP1

We collect information to make sense of the world around us.

Organizing objects and events helps us to solve problems.

Events in daily life involve chance.

Phase 2 Conceptual understandings - PYP1, 2 and 3

Information can be expressed as organized and structured data.

Objects and events can be organized indifferent ways.

Some events in daily life are more likely to happen than others.

Phase 3 Conceptual understandings - PYP 3, 4 and 5

Data can be collected, organized, displayed and analysed in different ways.

Different graph forms highlight different aspects of data more efficiently.

Probability can be based on experimental events in daily life.

Probability can be expressed in numerical notations.

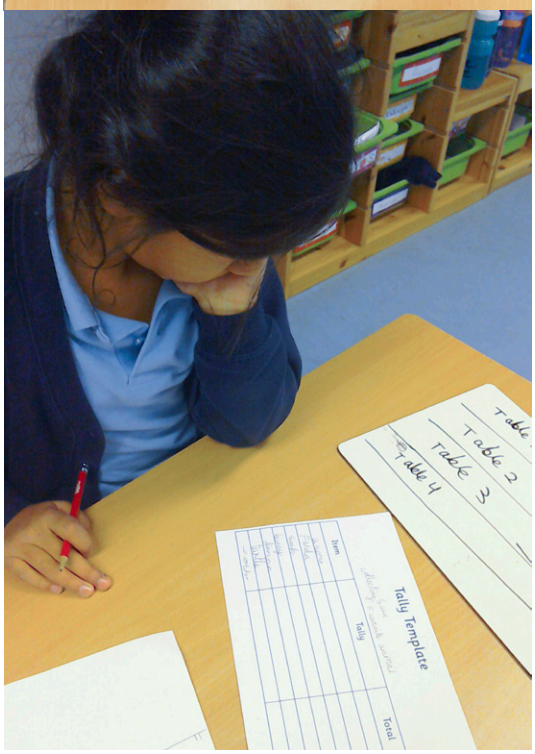
Phase 4 Conceptual understandings - PYP 5 and 6

Data can be presented effectively for valid interpretation and communication.

Range, mode, median and mean can be used to analyse statistical data.

Probability can be represented on a scale between 0–1 or 0%–100%.

The probability of an event can be predicted theoretically.



Data Handling

PYP 1

Constructing meaning:

understand that sets can be organized by different attributes

understand that sets can be organized by one or more attributes

Transferring meaning into symbols:

represent information through pictographs and tally marks

sort and label real objects by attributes

Applying with understanding:

create pictographs and tally marks

describe real objects and events by attributes

PYP 2

Constructing meaning:

understand that sets can be organized by one or more attributes

understand that information about themselves and their surroundings can be collected and recorded in different ways

understand the concept of chance in daily events (impossible, less likely, maybe, most likely, certain).

Transferring meaning into symbols:

collect and represent data in different types of graphs, for example, tally marks, bar graphs

represent the relationship between objects in sets using tree, Venn and Carroll diagrams

express the chance of an event happening using words or phrases (impossible, less likely, maybe, most likely, certain).

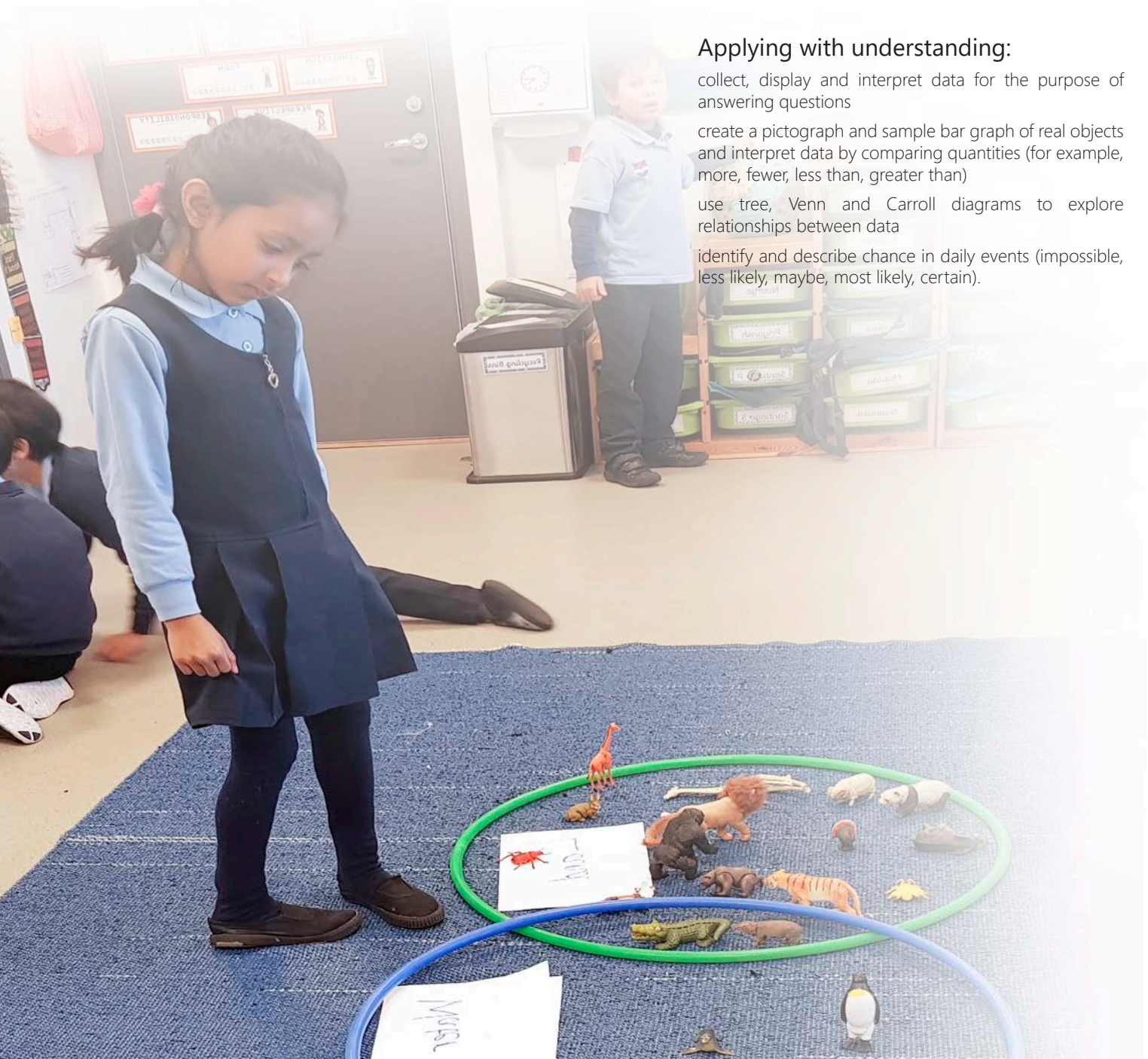
Applying with understanding:

collect, display and interpret data for the purpose of answering questions

create a pictograph and sample bar graph of real objects and interpret data by comparing quantities (for example, more, fewer, less than, greater than)

use tree, Venn and Carroll diagrams to explore relationships between data

identify and describe chance in daily events (impossible, less likely, maybe, most likely, certain).



Data Handling

PYP 3

Constructing meaning:

understand that data can be collected, displayed and interpreted using simple graphs, for example, bar graphs,

understand that scale can represent different quantities in graphs

understand that information about themselves and their surroundings can be collected and recorded in different ways

Transferring meaning into symbols:

collect and represent data in different types of graphs, for example, tally marks, bar graphs

represent the relationship between objects in sets using tree, Venn and Carroll diagrams

identify, read and interpret range and scale on graphs

Applying with understanding:

design a survey and systematically collect, organize and display data in pictographs and bar graphs

create a pictograph and sample bar graph of real objects and interpret data by comparing quantities (for example, more, fewer, less than, greater than)

use tree, Venn and Carroll diagrams to explore relationships between data

PYP 4

Constructing meaning:

understand that data can be collected, displayed and interpreted

using simple graphs, for example, bar graphs, line graphs

understand that one of the purposes of a database is to answer questions and solve problems

Transferring meaning into symbols:

collect, display and interpret data

using simple graphs, for example, bar graphs, line graphs

identify, read and interpret range and cale on graphs

Applying with understanding:

design a survey and systematically collect, organize and display data in

pictographs and bar graphs

select appropriate graph form(s) to display data

interpret range and scale on graphs

Data Handling

PYP 5

Constructing meaning:

understand that data can be collected, displayed and interpreted using simple graphs, for example, bar graphs, line graphs

understand that scale can represent different quantities in graphs

understand that probability is based on experimental events.

understand that different types of graphs have special purposes.

understand that the mode, median, mean and range can summarize a set of data.

Transferring meaning into symbols:

collect, display and interpret data using simple graphs, for example, bar graphs, line graphs

identify, read and interpret range and scale on graphs

collect, display and interpret data in pie charts and line graphs.

identify, describe and explain the range, mode, median and mean in a set of data.

set up a spreadsheet using simple formulae to manipulate data and to create graphs

Applying with understanding:

select appropriate graph form(s) to display data

interpret range and scale on graphs

design a survey and systematically collect, record, organize and display the data in a bar graph, pie chart, line graph.

identify, describe and explain the range, mode, median and mean in a set of data.

PYP 6

Constructing meaning:

understand that different types of graphs have special purposes.

understand that the mode, median, mean and range can summarize a set of data.

understand that probability can be expressed in scale (0-1) or percent (0% -100%)

understand the difference between experimental and theoretical probability.

Transferring meaning into symbols:

collect, display and interpret data in pie charts and line graphs.

identify, describe and explain the range, mode, median and mean in a set of data.

set up a spreadsheet using simple formulae to manipulate data and to create graphs.

express probabilities using scale 0-1 or 0% -100%

Applying with understanding:

design a survey and systematically collect, record, organize and display the data in a bar graph, pie chart, line graph.

identify, describe and explain the range, mode, median and mean in a set of data.

create and manipulate an electronic database for their own purposes.

determine the theoretical probability of an event and explain why it might differ from experimental probability.

Shape and Space

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The following pages detail the skills your child will learn to fulfill the phases.

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Maybe they are learning English and are unsure of the maths vocabulary; maybe they have been in a school with a different currciulum; maybe they are not ready to learn or need time to consolidate and deepen their understanding before moving on.

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Phase 1 Conceptual understandings

Shapes can be described and organized ccording to their properties.

Objects in our immediate environment have a position in space that can be described according to a point of reference.

Phase 2 Conceptual understandings

Shapes are classified and named according to their properties.

Some shapes are made up of parts that repeat in some way.

Specific vocabulary can be used to describe an object's position in space.

Phase 3 Conceptual understandings

Changing the position of a shape does not alter its properties.

Shapes can be transformed in different ways.

Geometric shapes and vocabulary are useful for representing and describing objects and events in real world situations.

Phase 4 Conceptual understandings

Manipulation of shape and space takes place for a particular purpose.

Consolidating what we know of geometric concepts allows us to make sense of and interact with our world.

Geometric tools and methods can be used to solve problems relating to shape and space.

Shape and Space

PYP 1

Constructing meaning:

understand that 2D and 3D shapes have characteristics that can be described and compared

understand that common language

can be used to describe position and direction, for example, inside, outside, above, below, next to, behind, in front of, up, down.

Transferring meaning into symbols:

sort, describe and label 2D and 3D shapes

analyse and describe the relationships between 2D and 3D shapes

create and describe symmetrical patterns

identify lines of reflective symmetry

Applying with understanding:

analyse and use what they know about 3D shapes to describe and work with 2D shapes

recognize and explain simple symmetrical designs in the environment

PYP 2

Constructing meaning:

understand that 2D and 3D shapes have characteristics that can be described and compared.

understand the common language used to describe shapes.

understand that 2D and 3D shapes can be created by putting together and/or taking apart other shapes.

understand that geometric shapes are useful for representing real-world situations.

understand that directions can be used to describe pathways, regions, positions and boundaries of their immediate environment.

Transferring meaning into symbols:

sort, describe and compare 3D shapes.

analyse and describe the relationships between 2D and 3D shapes.

identify lines of reflective symmetry.

represent ideas about the real world using geometric vocabulary and symbols, for example, through oral description, drawing, modelling, labelling.

interpret and create simple directions of their immediate environment.

Applying with understanding:

analyse and use what they know about the most common 3D shapes to describe and work with 2D shapes.

apply knowledge of symmetry to problem-solving situations.

interpret and use simple directions of their immediate environment.

use tree, Venn and Carroll diagrams to explore relationships between data

identify and describe chance in daily events (impossible, less likely, maybe, most likely, certain).

Shape and Space

PYP 3

Constructing meaning:

understand that there are relationships among and between 2D and 3D shapes

understand that 2D and 3D shapes can be created by putting together and/or taking apart other shapes

understand that examples of symmetry and transformations can be found in their immediate environment

understand that directions can be used to describe pathways, regions, positions and boundaries of their immediate environment.

understand the common language used to describe shapes

Transferring meaning into symbols:

sort, describe and label 2D and 3D shapes

analyse and describe the relationships between 2D and 3D shapes

identify lines of reflective symmetry

interpret and create simple directions, describing paths, regions, positions and boundaries of their immediate environment.

analyse angles by comparing and describing rotations: whole turn; half turn; quarter turn; north, south, east and west on a compass

Applying with understanding:

analyse and use what they know about 3D shapes to describe and work with 2D shapes

apply knowledge of symmetry to problem-solving situations

interpret and use simple directions, describing paths, regions, positions and boundaries of their immediate environment.

PYP 4

Constructing meaning:

understand the properties of regular and irregular polygons

understand that directions for location can be represented by coordinates on a grid

Transferring meaning into symbols:

sort, describe and model regular and irregular polygons

analyse angles by comparing and describing rotations: whole turn; half turn; quarter turn; north, south, east and west on a compass

locate features on a grid using coordinates

Applying with understanding:

analyse and describe 2D and 3D shapes, including regular and irregular polygons, using geometrical vocabulary

recognize and explain symmetrical patterns, including tessellation, in the environment

Shape and Space

PYP 5

Constructing meaning:

understand congruent or similar shapes

understand that lines and axes of reflective and rotational symmetry assist with the construction of shapes

understand an angle as a measure of rotation

understand that directions for location can be represented by coordinates on a grid

understand that visualization of shape and space is a strategy for solving problems.

Understand the common language used to describe shapes

Understand the properties of regular and irregular polyhedral.

Understand that 2D representations of 3D objects can be used to visualise and solve problems.

Transferring meaning into symbols:

describe and model congruency and similarity in 2D shapes

analyse angles by comparing and describing rotations: whole turn; half turn; quarter turn; north, south, east and west on a compass

locate features on a grid using coordinates

describe and/or represent mental images of objects, patterns, and paths.

draw 2D shapes using given dimensions and angles.

describe lines and angles using geometric vocabulary.

create and model how a 2D net converts into a 3D shape and vice versa.

Applying with understanding:

identify, describe and model congruency and similarity in 2D shapes

recognize and explain symmetrical patterns, including tessellation, in the environment

use geometric vocabulary when describing shape and space in mathematical situations and beyond.

use 2D representations of 3D objects to visualise and solve problems, for example using drawings or models.

PYP 6

Constructing meaning:

understand the common language used to describe shapes

understand the properties of regular and irregular polyhedral.

understand the properties of circles

understand how scale (ratios) is used to enlarge and reduce shapes.

understand systems for describing position and direction.

understand that 2D representations of 3D objects can be used to visualise and solve problems.

understand that geometric ideas and relationships can be used to solve problems in other areas of mathematics and in real life.

Transferring meaning into symbols:

draw 2D shapes using given dimensions and angles.

analyse, describe, classify and visualise 2D (including circles, triangles and quadrilaterals) and 3D shapes, using geometric vocabulary.

describe lines and angles using geometric vocabulary.

identify and use the language and notation of bearing to describe position and direction.

identify and use scale (ratios) to enlarge and reduce shapes.

create and model how a 2D net converts into a 3D shape and vice versa.

explore the use of geometric ideas and relationships to solve problems in other areas of mathematics.

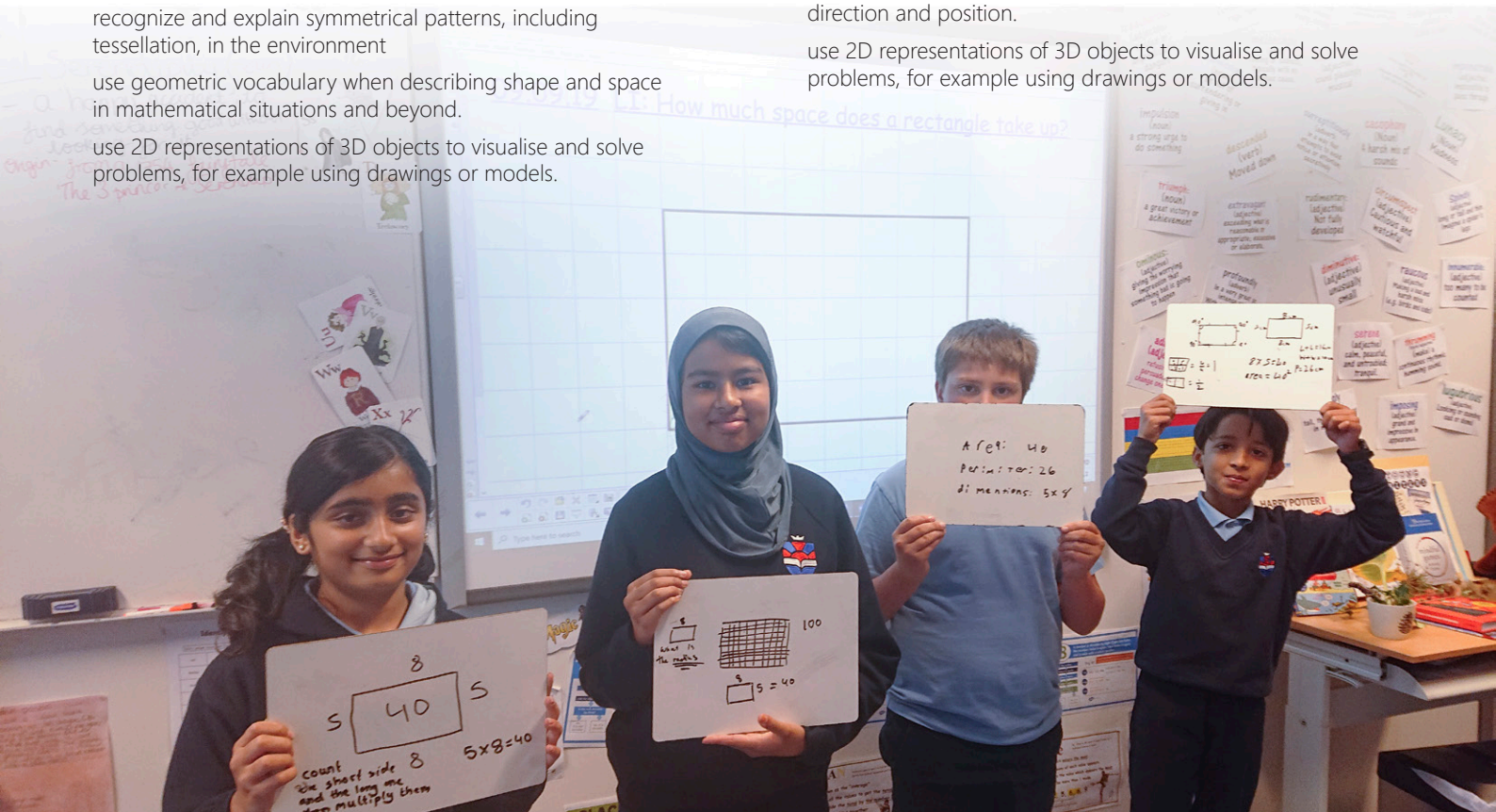
Applying with understanding:

use geometric vocabulary when describing shape and space in mathematical situations and beyond.

use scale (ratios) to enlarge and reduce shapes.

apply the language and notation of bearing to describe direction and position.

use 2D representations of 3D objects to visualise and solve problems, for example using drawings or models.



Measurement

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Phase 1 Conceptual understandings - PYP1

Measurement involves comparing objects and events.

Objects have attributes that can be measured using nonstandard units.

Events can be ordered and sequenced.

Phase 2 Conceptual understandings - PYP 1, 2 and 3

Standard units allow us to have a common language to identify, compare, order and sequence objects and events.

We use tools to measure the attributes of objects and events.

Estimation allows us to measure with different levels of accuracy.

Phase 3 Conceptual understandings PYP 3, 4 and 5

Objects and events have attributes that can be easured using appropriate tools.

Relationships exist between standard units that measure the same attributes.

Phase 4 Conceptual understandings PYP 5 and 6

Accuracy of measurements depends on the situation and the precision of the tool.

Conversion of units and measurements allows us to make sense of the world we live in.

A range of procedures exists to measure different attributes of objects and events.

Measurement

PYP 1

Constructing meaning:

understand the use of standard units to measure, for example, length, mass, money, time, temperature

understand that tools can be used to measure

understand that time is measured using universal units of measure, for example, years, months, days, hours, minutes

Transferring meaning into symbols:

estimate and measure objects using standard units of measurement: length, mass, capacity, money

identify, describe and sequence events in their daily routine, for example, before, after, bedtime, story time, today, tomorrow

read and write the time to the hour, half hour

Applying with understanding:

use standard units of measurement to solve problems in real-life situations involving length, mass, capacity, money

use measures of time to assist with problem solving in real-life situations

PYP 2

Constructing meaning:

understand the use of standard units to measure, for example, length, mass, money, time, temperature

understand that tools can be used to measure

understand that calendars can be used to determine the date, and to identify and sequence days of the week and months of the year

understand that time is measured using universal units of measure, for example, years, months, days, hours, minutes and seconds.

Transferring meaning into symbols:

estimate and measure objects using standard units of measurement: length, mass, capacity, money and temperature

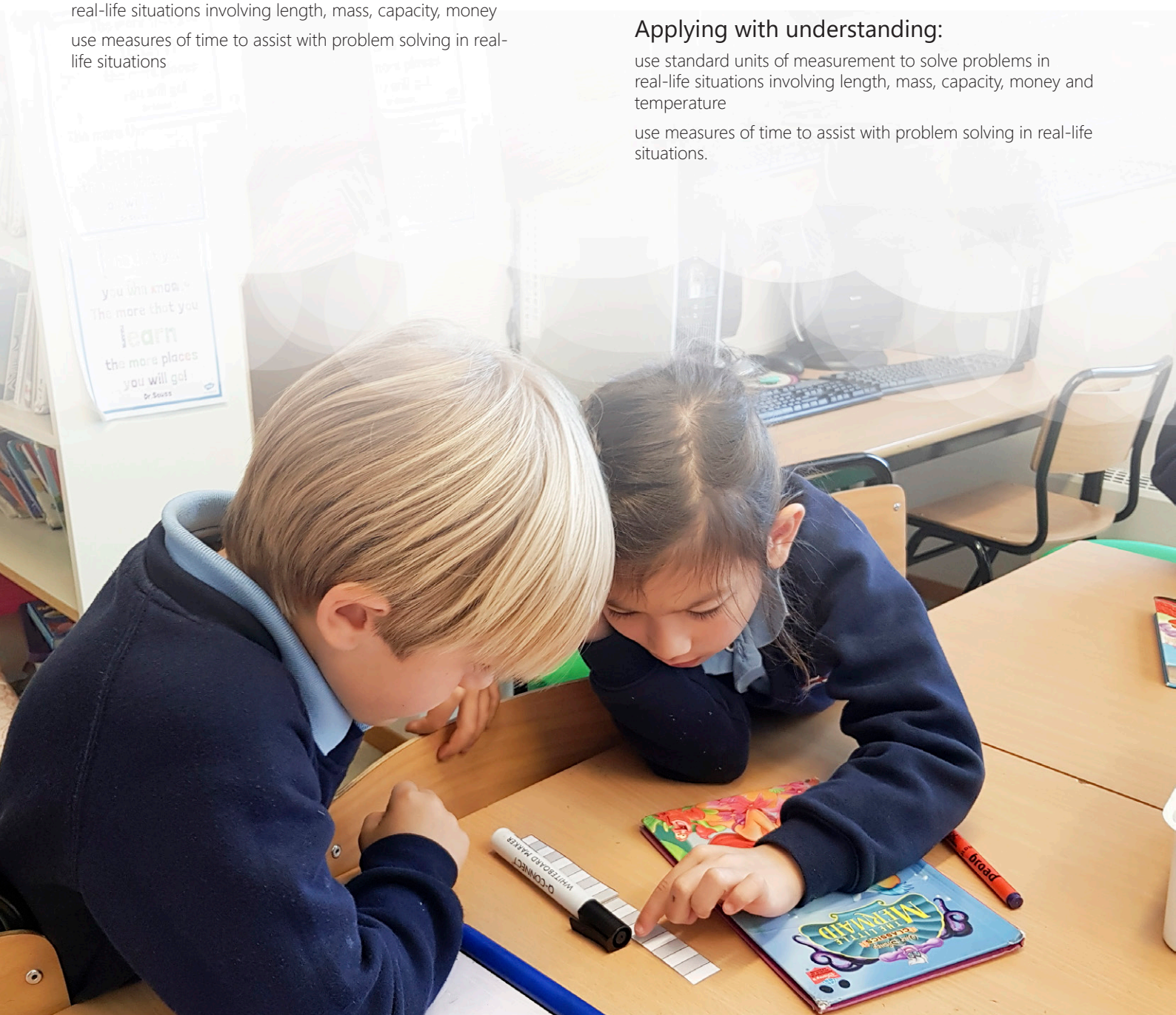
read and write the time to the hour, half hour and quarter hour

estimate and compare lengths of time: second, minute, hour, day, week and month.

Applying with understanding:

use standard units of measurement to solve problems in real-life situations involving length, mass, capacity, money and temperature

use measures of time to assist with problem solving in real-life situations.



Measurement

PYP 3

Constructing meaning:

understand the use of standard units to measure, for example, length, mass, money, time, temperature

understand that tools can be used to measure

understand that calendars can be used to determine the date, and to identify and sequence days of the week and months of the year

understand that time is measured using universal units of measure, for example, years, months, days, hours, minutes and seconds.

understand the use of standard units to measure perimeter

understand relationships between units, for example, metres, centimetres and millimetres

Transferring meaning into symbols:

estimate and measure objects using standard units of measurement: length, mass, capacity, money and temperature

read and write the time to the hour, half hour and quarter hour

estimate and compare lengths of time: second, minute, hour, day, week and month.

estimate and measure using standard units of measurement: perimeter

read and write digital and analogue time on 12-hour and 24-hour clocks.

Applying with understanding:

use standard units of measurement to solve problems in real-life situations involving length, mass, capacity, money and temperature

use measures of time to assist with problem solving in real-life situations.

use standard units of measurement to solve problems in real-life situations involving perimeter

use timelines in units of inquiry and other real-life situations.

PYP 4

Constructing meaning:

understand the use of standard units to measure perimeter, area

understand that measures can fall between numbers on a measurement scale, for example, 3½ kg, between 4 cm and 5 cm

understand relationships between

units, for example, metres, centimetres and millimetres

Transferring meaning into symbols:

estimate and measure using standard units of measurement: perimeter, area and volume

read and write digital and analogue time on 12-hour and 24-hour clocks.

read and write digital and analogue 12-hour and 24-hour clocks.

Applying with understanding:

use standard units of measurement to solve problems in real-life situations involving perimeter, area and volume

select appropriate tools and units of measurement

use timelines in units of inquiry and other real-life situations.

Measurement

PYP 5

Constructing meaning:

understand that measures can fall between numbers on a measurement scale, for example, 3½ kg, between 4 cm and 5 cm

understand relationships between units, for example, metres, centimetres and millimetres

understand an angle as a measure of rotation.

understand procedures for finding area, perimeter and volume (including area of parallelograms and triangles)

understand the relationships between area and perimeter, between area and volume

Transferring meaning into symbols:

estimate and measure using standard units of measurement: perimeter, area and volume

read and write digital and analogue time on 12-hour and 24-hour clocks.

Applying with understanding:

use standard units of measurement to solve problems in real-life situations involving perimeter, area and volume

select appropriate tools and units of measurement

use timelines in units of inquiry and other real-life situations.

select and use appropriate units of measurement and tools to solve problems in real-life situations.

use decimal and fraction notation in measurement, for example, 3.2cm, 1.47kg, 1½ miles

use timetables and schedules (12 hour and 24 hour clocks) in real-life situations

PYP 6

Constructing meaning:

understand procedures for finding area, perimeter and volume (including area of parallelograms and triangles)

understand the relationships between area and perimeter, between area and volume, and between volume and capacity.

understand unit conversions within measurement systems (metric or customary). Including Time

Transferring meaning into symbols:

develop and describe formulae for finding perimeter, area and volume.

use decimal and fraction notation in measurement, for example, 3.2cm, 1.47kg, 1½ miles

read and interpret scales on a range of measuring instruments

estimate, measure and construct angles in degrees using a protractor.

recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.

carry out simple unit conversions within a measurement system (metric or customary).

Applying with understanding:

select and use appropriate units of measurement and tools to solve problems in real-life situations.

determine and justify the level of accuracy required to solve real-life problems involving measurement.

use decimal and fraction notation in measurement, for example, 3.2cm, 1.47kg, 1½ miles

use timetables and schedules (12 hour and 24 hour clocks) in real-life situations.

determine times worldwide (time zones).


Tree: 84cm
M:50
E:65
R:85
C:50
Rock: 112
E:100
R:112
M:112
C:100

BRITISH INTERNATIONAL SCHOOLS OF STAVANGER

This document has been created by the staff at The British International School at Gausel, an IB World School, for use in the Primary years Programme.

The Maths Scope and Sequence document was used for reference. Use of these IB materials from the Programme Resource Centre is for use within the school community for the purposes of implementing and running the IB programme at the school.