1. What is our purpose?

1a) To inquire into the following:

- transdisciplinary theme

Not applicable

- **central idea**

Using standard units enables us to calculate and measure time, area and capacity

Class: Grade: 3 **Age group**: 7,8

School: Tokyo International School **School code:** 7244

Title: Measurement

Teacher(s): Jared and Sarah

Date:

Proposed duration: **number of hours over number of week**

1b) Summative assessment task(s):
What are the possible ways of assessing students' understanding of the central idea? What evidence, including student-initiated actions, will we look for?

Meeting (CCSS G3)

- **A1:** Tell and write time to the nearest minute and measure time intervals in minutes.
- **A2:** Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and litres (l).
- **C5 :**Identify (e.g. indicate and/ describe) the area of regular two dimensional shapes e.g."this flat surface is the area"
- **C6:** Measure areas by counting unit squares (square cm, square m, and other square units e.g. square feet).
- **C7:** Calculate the area of a rectangle whole-number side lengths using arrays, repeated addition and multiplication showing the appropriate working-out
- **C7a:** Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths.
- **C7b:** Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real world problems, and represent whole-number products as rectangular areas in mathematical reasoning.
- **C7c**: Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and b + c is the sum of a × b and a × c.
- **C7d:** Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts to solve real world problems.
- **D8**: Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.

2. What do we want to learn?

What are the key concepts (form, function, causation, change, connection, perspective, responsibility, reflection) to be emphasized within this inquiry? form, function, reflection

Mathematical (related) concepts: time, unit, relationship, communication, measuring tool, quantity, range, mass volume, capacity, size, measurement, observation, precision, accuracy, area, attribute, two dimensional, shape, square unit, repeated addition, multiplication, rectangle, length, height, width, decomposition, irregular-shape, regular-shape, relationship, perimeter, polygon

What lines of inquiry will define the scope of the inquiry into the central idea?
All lines of inquiry: Measuring tools are often only appropriate for measuring quantities within a certain range **(A2)** The approximate size of an object to be measured determines the size of the unit of measurement chosen **(A2)** Careful observation, control and attention to precision increases accuracy when measuring **(B4)**

1.Ways of measuring and calculating time efficiently:
Many clock times can be communicated in more than one way.**(A1)** Time can be expressed using different units that are related to each other. **(A1)**

2.Ways of measuring area:
Area is an attribute to describe the surface of two dimensional shapes **(C5a)** A square with side length 1 unit, called "a unit square," is said to have "one square unit" of area, and can be used to measure area. **(C6)** A plane figure which can be covered without gaps or overlaps by *n* unit squares is said to have an area of *n* square units. **(C6)** We can use repeated addition and multiplication to calculate the area of a rectangle **(C7)**The area of a rectangle can be found by multiplying its length/height by its width **(C7b)**
Decomposing a given shape into smaller shapes, then finding and adding the respective areas, is sometimes an appropriate strategy for calculating area.**(C7c)** The area of some irregular shapes can be found by breaking apart the original shape into other regular shapes for which the areas can be found. **(C7d)**

3.Ways of measuring perimeter:
The perimeter is the total distance around a two-dimensional shape **(D8)** Relationships exist between the perimeter and area of a polygon **(D8)** Different shapes can have the same perimeter. **(D8)T**he attributes and rules of given polygons can be utilized to calculate their perimeter and area (**C7b, D8**)

4.Ways of measuring volumes and masses of objects:
The approximate mass/volume/capacity of an object to be measured determines the size of the unit of measurement chosen **(A2)**

What teacher questions/provocations will drive these inquiries?
1.How can we accurately measure time in minutes?
2.How can we accurately measure area? What is the area of this shape? How might we find out? What are different ways to find the area of a shape? Why do we need to measure the area of a shape?
3. Why do we need to measure the perimeter of a shape? How might we calculate the perimeter?
4.Which measuring tool is most appropriate? What strategies can we use to guess and to calculate the weight and capacity of objects?

3. How might we know what we have learned?

This column should be used in conjunction with "How best might we learn?"

What are the possible ways of assessing students' prior knowledge and skills? What evidence will we look for?

What are the possible ways of assessing student learning in the context of the lines of inquiry? What evidence will we look for?

1.Ways of measuring and calculating time efficiently:
See I can statements in stage 4

2.Ways of measuring area:
See I can statements in stage 4

3.Ways of measuring perimeter:
See I can statements in stage 4

4.Ways of measuring volumes and masses of objects:
See I can statements in stage 4

4. How best might we learn?

What are the learning experiences suggested by the teacher and/or students to encourage the students to engage with the inquiries and address the driving questions?

Teacher Questions: 1. How can we accurately measure time in minutes?

Students will understand that...	Learning experiences:	Learning outcomes:
Many clock times can be communicated in more than one way **(A1)** Time can be expressed using different units that are related to each other. **(A1)** Careful observation, control and attention to precision increases accuracy when measuring **(B4)**		I can tell and write time to the nearest minute. (1) I can measure time intervals in minutes.(1) I can add and subtract intervals of time using minutes.(1) I can solve time problems by adding or subtracting minutes on a number line. (1)

4. How best might we learn? (continued)

Teacher Questions: 2. How can we accurately measure area? What is the area of this shape? How might we find out? What are different ways to find the area of a shape? Why do we need to measure the area of a shape?

Students will understand that ...	Learning experiences:	Learning outcomes:
Area is an attribute to describe the surface of two dimensional shapes **(C5a)** A square with side length 1 unit, called "a unit square," is said to have "one square unit" of area, and can be used to measure area. **(C6)** A plane figure which can be covered without gaps or overlaps by *n* unit squares is said to have an area of *n* square units. **(C6)** We can use repeated addition and multiplication to calculate the area of a rectangle **(C7)** The area of a rectangle can be found by multiplying its length/height by its width **(C7b)** Decomposing a given shape into smaller shapes, then finding and adding the respective areas, is sometimes an appropriate strategy for calculating area.**(C7c)** The area of some irregular shapes can be found by breaking apart the original shape into other regular shapes for which the areas can be found. **(C7d)** Measuring tools are often only appropriate for measuring quantities within a certain range **(A2)** The approximate size of an object to be measured determines the size of the unit of measurement chosen **(A2)** Careful observation, control and attention to precision increases accuracy when measuring **(B4)**		I can use a unit square to measure area. (5a) I can use unit squares to measure the area of a plane figure. (5b) I can measure the area by counting unit squares. (6) I can find the area of a rectangle by using tiles. (7a) I can find the area of a rectangle by multiplying the length and the width. (7a) I can compare the area using tiles to the area found by multiplication. (7a) I can find the area of a rectangle in real world situations. (7b) I can find rectangles with a given area to solve real world problems. (7b) I can find the area of a rectangle using tiles when the rectangle is divided into two rectangles (7c) I can find the area of a rectangle that is divided into two rectangles by adding the area of both rectangles. (7c) I can show how this is an example of the distributive property. (7c) I can find the area of a large rectangle by dividing it into smaller rectangles and adding their areas. (7d) 2 I can determine how two rectangles can have the same perimeters and different areas. (8)

Teacher Questions: 3. What is perimeter and how might we calculate the perimeter? Why do we need to measure the perimeter of a shape?

Students will understand that ...	Learning experiences:	Learning outcomes:
The perimeter is the total distance around a two-dimensional shape **(D8)** Relationships exist between the perimeter and area of a polygon **(D8)** Different shapes can have the same perimeter. **(D8)** The attributes and rules of given polygons can be utilized to calculate their perimeter and area (**C7b, D8)** Measuring tools are often only appropriate for measuring quantities within a certain range **(A2)** The approximate size of an object to be measured determines the size of the unit of measurement chosen **(A2)** Careful observation, control and attention to precision increases accuracy when measuring **(B4)**		I can find the perimeter of an shape given side lengths. (8) I can find the perimeter of a shape with an unknown side length. (8) I can determine how two rectangles can have the same perimeters and different areas. (8)

Teacher Questions: 4. What strategies can we use to guess and to calculate the weight and capacity of objects? Which measuring tool is most appropriate?

Students will understand that ...	Learning experiences:	Learning outcomes:
The approximate mass/volume/capacity of an object to be measured determines the size of the unit of measurement chosen **(A2)** Measuring tools are often only appropriate for measuring quantities within a certain range **(A2)** The approximate size of an object to be measured determines the size of the unit of measurement chosen **(A2)** Careful observation, control and attention to precision increases accuracy when measuring **(B4)**		I can measure liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). (2) I can estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). (2) I can use drawings to solve one step word problems involving grams and kilograms. (2) I can use drawings to solve one step word problems involving milliliters and liters. (2) I can measure to the centimetre. (4)

		I can measure to the half centimetre (4)

What opportunities will occur for transdisciplinary skills development and for the development of the attributes of the learner profile?

5. What resources need to be gathered?

What people, places, audio-visual materials, related literature, music, art, computer software, etc, will be available?

How will the classroom environment, local environment, and/or the community be used to facilitate the inquiry?

Reflecting on the inquiry

6. To what extent did we achieve our purpose?

Assess the outcome of the inquiry by providing evidence of students' understanding of the central idea. The reflections of all teachers involved in the planning and teaching of the inquiry should be included.

How you could improve on the assessment task(s) so that you would have a more accurate picture of each student's understanding of the central idea.

What was the evidence that connections were made between the central idea and the transdisciplinary theme?

7. To what extent did we include the elements of the PYP?

What were the learning experiences that enabled students to:

- develop an understanding of the concepts identified in "What do we want to learn?"
- demonstrate the learning and application of particular transdisciplinary skills?
- develop particular attributes of the learner profile and/or attitudes?

In each case, explain your selection.

8. What student-initiated inquiries arose from the learning?

Record a range of student-initiated inquiries and student questions and highlight any that were incorporated into the teaching and learning.

At this point teachers should go back to box 2 "What do we want to learn?" and highlight the teacher questions/provocations that were most effective in driving the inquiries.

What student-initiated actions arose from the learning?

Record student-initiated actions taken by individuals or groups showing their ability to reflect, to choose and to act.

9. Teacher notes