YuMi Deadly Maths

Year 2 Teacher Resource:

MG – Which is the longest?

Prepared by the YuMi Deadly Centre
Faculty of Education, QUT

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YuMi Deadly Maths Year 2 Teacher Resource: **MG – Which is the longest?**

ACKNOWLEDGEMENT

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Year 2 Measurement and Geometry

Which is the longest?

Learning goal	Students will measure the length of selected objects using informal units and order objects from shortest to longest.
Content description	Measurement and Geometry – Using units of measurement • Compare and order several shapes and objects based on length, area, volume and capacity using appropriate uniform informal units (ACMMG037)
Big idea	Measurement – length, notion of unit
Resources	Classroom objects, straws, clipboards, pencils, books, paperclips, three different pasta shapes

Reality

Local knowledge

Tell me something in the local environment that is tall/short? How can you tell why this is tall/short? What is taller/shorter than these? Show me something in the classroom that is tall/short. What is taller/shorter than these?

Prior experience

Check that students can identify the attribute of length and use appropriate language to describe length, e.g. *Show me one of your long pencils*. *What could we do to find out the tallest/shortest student in this class?*

Kinaesthetic

Show me your two hands. Put two fingers together that are the same but are short and close the others into a fist. Repeat putting two fingers together that are long (direct comparison). *Find someone in the class whose little finger is longer/shorter than yours*. Introduce the language of comparing length: *John's little finger is longer than mine. Sam's little finger is shorter than mine*. *What can you tell me about the length of John's little finger compared with Sam's?* [Indirect comparison: John's finger is longer than Sam's because his finger was longer than mine and my finger was longer than Sam's.]

Give each student a leaf (varying lengths) for them to compare in pairs. Have students use their own leaf to measure the same objects, e.g. stick, and compare lengths again. Discuss with students how they compared lengths.

Compare objects to find shorter/longer. *Which is the longer, e.g. pen or pencil? How can you tell why this is shorter? Can you find an object shorter than this? The pen is shorter than the pencil.* (Place the ends of the objects against a common baseline, e.g. edge of the desk, to make the comparison.)

Identify sets of three objects in the classroom for groups of students to measure informally; e.g. window, classroom door, whiteboard; teacher's table, student desk, bookshelf; drink bottle, lunch box, student school bag; sink, cupboard door, refrigerator door. *How will we place the straws to find the correct measurement of the three objects in your set?* [Place them end to end leaving no gaps and no overlaps.] *What object was the longest? How many straws did it measure? What came next?* (Place objects in order of length.)

Students identify a suitable informal class unit to use, e.g. straw, paperclip, peg. Students estimate the length of the three objects in their given set using this unit. Record the estimate beside the three objects. Start at one end of the object and measure to the other end leaving no gaps and having no overlaps. Measure the length of each object, one at a time, using the informal tool. Use a combination of drawings, words and numerals to record the measurement of each object. Revise the estimates of the next object/s, if necessary. Report back to the class, e.g. *The whiteboard was 23 straws long. It was longer than the window because the window was 18 straws long. The classroom door was 8 straws across; it was the shortest.*

Abstraction

Body

Using their hand span as the informal unit, students estimate the order of the length of their desks: across (length), from top to bottom (width) and from desktop to floor (height). They measure using their hand and record the results with drawings, words and numerals. *Find something that is three hand spans long. Find something else that is the same length, shorter than, longer than your desk.*

Estimate how many steps to walk across the room. Walk heel/toe across the length of the room. Find something else that is the same length, shorter than, longer than this room. Estimate and then walk from your desk to the teacher's table. Find and describe a path that is shorter/longer than the path from your desk to the teacher's table.

Ask students to raise their hand if they think they are tall. Choose two of these students. *Who is taller?* (Ensure that students know that tall**er** means more tall than.) *How can we know who is taller? How do we compare heights to find out who is taller?*

Hand

Comparing. Directly compare lengths where **both** objects can be physically moved together for the comparison. Also compare thicknesses and widths of objects.

Directly compare lengths where **only one** of the objects can be physically moved. Compare different types of length, including thicknesses, perimeters and depth.

Indirectly compare lengths where **neither object** can be moved by using an intermediary (e.g. string, paper strips, part of own body, and so on). Compare different types of length, including thicknesses, perimeters and depth.

Individual activity using a given informal unit, e.g. paperclip: 

Consider three everyday items, e.g. felt pen, glue stick, pencil case. Predict the order of the items (shortest to longest). Making sure there are no gaps or overlays, measure the length of each item with paperclips to confirm the order. Record the order using drawings, words and numerals. Use appropriate length terms to answer the question, "How much longer?" e.g. *The pencil is one paperclip longer than the pen.* Reverse: *Find something that is six paperclips long*.

Mind

Students visualise a pencil and then measure with the eye of their mind how many paperclips would fit along the pencil. Visualise the order / which is longer/shorter, e.g. the monkey bars or the slippery slide.

Creativity

Students create an appropriate measuring tool for measuring their desk and write a statement: "My desk is ☐ long."

Mathematics

Language/ symbols

length, height, width, longer, shorter, longest, shortest, tallest, measure, estimate, compare, order, units, gaps, overlaps

Practice

1. Students collect six each of three different types of leaves/pasta. They glue the first set in a line onto a sheet leaving no gaps and measure the length with paperclips. They record the length under the leaves/pasta using drawings, words and numerals (e.g. 6 leaves are 8 paperclips long). Repeat for the other two types of leaves/pasta shapes. Conclude by recording the order from shortest to longest.
2. Students trace and cut out a template of their foot. Using this as an informal unit, they measure objects outside, e.g. a wall, width of a path, garden edge, length of a step. They then record and order the lengths. Reverse: *Find something that is 10 of your feet long.* Discuss why responses may be different [different measurements for individual feet].
3. Students were asked to measure the length of a piece of string as below:

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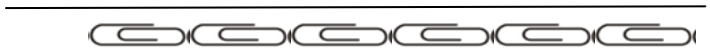
(a) John

(b) Sue



(c) Jan

(d) Sam

Which student measured correctly? Why? What was wrong with each of the others?

Connections Connect to arranging numbers in order, fractions, division.

Reflection

Validation Students check where length is used in their world, e.g. buying a new pair of shoes, checking their size at tenpin bowling, checking their height for some rides at theme parks, checking whether an art pad will fit into their school bag.

Application/ problems Provide applications and problems for students to apply to different contexts independently, e.g. Compare their height with a partner using a tool chosen by the pair of students. *Who is the taller/shorter?* Observe whether students lie down on the ground or stand against the wall. Discuss method, tool chosen and the need for a common unit.

Extension **Flexibility**. Students find many informal tools to measure and record the length of objects and are able to compare and make judgements about the results.

Reversing. Provide examples where students go from stories (*How long is the wall?*) ↔ act out (walk the wall) ↔ pictures (wall with feet marked out) ↔ language (*The wall is 20 of my footsteps long.*) ↔ symbols (wall = 20 footsteps).

Generalising. Measurement has these criteria: need for a common unit, maintaining the same unit, the starting point is always zero, starting to measure at one end, avoiding gaps and overlaps. The big idea is that **the bigger the unit, the fewer are needed; the smaller the unit, the more are needed**.

Changing parameters. Students suggest ways to make their measuring more precise.

Teacher's notes

- Ensure that students understand and employ the criteria for measurement, i.e. maintain the same unit, start at zero measuring from one end to the other, avoid gaps and overlaps.
- Students need to be taught the skill of visualising: closing their eyes and seeing pictures in their minds, making mental images; e.g. show a picture of a kookaburra, students look at it, remove the picture, students then close their eyes and see the picture in their mind; then make a mental picture of a different bird.

- Suggestions in Local Knowledge are only a guide. It is very important that examples in Reality are taken from the local environment that have significance to the local culture and come from the students' experience of their local environment.
- Useful websites for resources: www.rrr.edu.au; https://www.qcaa.qld.edu.au/3035.html
- Explicit teaching that **aligns with students' understanding** is part of every section of the RAMR cycle and has particular emphasis in the Mathematics section. The RAMR cycle is not always linear but may necessitate revisiting the previous stage/s at any given point.
- Reflection on the concept may happen at any stage of the RAMR cycle to reinforce the concept being taught. Validation, Application, and the last two parts of Extension should not be undertaken until students have mastered the mathematical concept as students need the foundation in order to be able to validate, apply, generalise and change parameters.

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