



Measurements Informal Units 2

1.3.8

Word Wall: measurement, measure, capacity, object, difference, the same as, not the same as, equal, unequal, container,

Introduction

Students will compare measurements of area and capacity using a variety of uniform informal objects, discussing and sharing their findings.

Resources

- Assorted standard and non-standard materials for measuring, such as counters, unifix cubes, pop sticks, plastic milk bottle caps or envelopes.
- Different sized cups, caps and same sized ice-cream containers.

Time / Classroom Organisation

Each part of the activity process may be introduced in a whole or small group format. Students work in pairs. Allow 20 minutes for each part of the activity. Come together for discussion and reflection at the end and review the findings about measurement.

Australian Curriculum---Year One

Measure and compare the lengths and capacities of pairs of objects using uniform informal units (ACMMG019)

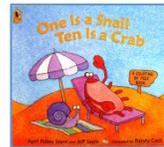
Proficiency Strand:

Reasoning – explaining direct and indirect comparisons of length using uniform informal units.



Activity Process--- Area

- Provide a variety of materials including counters, blocks, unifix blocks, envelopes, bottle tops, sticky notes, pop sticks and small shapes.
- Provide student with a list of objects that you would like to cover; that is, measure the **area**. This could include table tops; pin boards; picture books; tissue box; scrap book.
- Working in pairs, students select one type of measuring unit and an object to be measured. They first estimate, then cover the area of the object, and then count the number of units used. Record the responses.



Object	Unit of measure	Our Guess	Our Measure
Picture book	Post-it notes	8	About 9 and 3 halves

- Students repeat the activity measuring two other objects and record the responses.
- Ask students the following questions:
 - Why are some objects better than others for covering?
 - What can we do about the gaps?
 - What can we do with the part left over?
 - How could we determine which object has the biggest area? Can we compare an object measured with two different units?

Support discussion around gaps and overlaps; and the importance of using the same units of measurement to compare the size of objects.

Source: Board of Studies NSW, Mathematics K---6 Units of work. p 70 http://k6.boardofstudies.nsw.edu.au/files/maths/maths_k6_ws.pdf



Activity Process---

- The teacher collects cups of different shapes and sizes and ice-cream containers of the same size. Each pair of students has a different sized cup and an ice cream container.
- Students are asked to estimate how many cups of water will fill the ice cream container and record this.



- Fill the ice cream container with water using repeated full cups and record how many cups it took to fill the container.



SIZE OF CUP	OUR GUESSES	HOW MANY?
small	14	10
medium	4	6 and a half
large	4	4 and a half

- Come together to reflect on the results. Ask the following questions:
 - Why did we all get different numbers of cups?
 - Whose container needed the most number of full cups to fill the container?
 - Whose cup needed the least number of full cups to fill the container?
 - Can you explain your findings?
 - Does this container have the same capacity as that one?

Source: Board of Studies NSW, Mathematics K-6 Units of work. p 74 http://k6.boardofstudies.nsw.edu.au/files/maths/maths_k6_ws.pdf



Catholic Education
Diocese of Cairns

Learning with Faith and Vision

Variations & Extensions

1. Table tops

Resources: Student desks/tables, units for measurement

In small groups, students select an informal unit and calculate the area of the top of their desk/table. Students are provided with a variety of materials to use as informal units, for example: paper plates, sheets of paper/cardboard. The teacher takes digital photographs of student methods, particularly where students are overlapping units, leaving gaps, or not starting or finishing at the edge of the desk. Photographs are displayed for discussion. Possible questions include:

- *What interesting things do you notice about the way groups measured the top of the desk?*
- *Did each group measure the whole area?*
- *If two groups used the same item to cover the desk, why might they have different answers?*



Source: Board of Studies NSW, Mathematics K---6 Units of work. p 70

http://k6.boardofstudies.nsw.edu.au/files/maths/maths_k6_ws.pdf

2. Order, order

Resources: tumbler and a variety of containers, for example: jug, teapot, water bottle, tray, cake: Using the same unit of measure fill a variety of containers and record the results. Order objects from greatest volume to least volume.

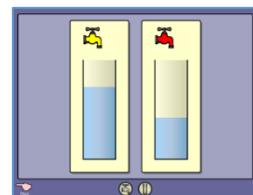
Object	How many cups?
jug	
teapot	
water bottle	
tray	
cake tin	

Source: Linthorne, C. & Serenc, M. 2005. *Jigsaw Maths Teacher Resource Book 1*. Firefly Press: Buderim. p151

Digital Resources

<http://www.ideal---resources.com.au>

Capacity: use language of more or less to compare quantities.



<http://au.ixl.com/math/year-1/compare-size-mass-and-capacity>

Review comparative language of mass and capacity.

Contexts for Learning

Play:

Water Play --- Provide an assortment of containers of different sizes and shapes. Ask students to guess, then use a plastic cup to check how many cups of water will fill each container. Use coloured water to make this a more exciting activity. You may



need a funnel to fill some containers. Sort the containers from those with the greatest capacity to those with the least capacity.

Source: Linthorne, C. & Serenc, M. 2005. *Jigsaw Maths Teacher Resource Book 1*. Firefly Press: Buderim. p151

Investigation:

With the water play, set the challenge for the students:

- Find a container that holds exactly 5 cups of water
- How many cups of water can you pour from the shampoo bottle?
- Find two different shaped containers that hold exactly the same amount of water.

Real life experience:

Students go on a leaf hunt and find a variety of different sized leaves. Ask students to order the leaves from smallest to biggest. Measure the area of the leaf using a uniform measure, for example: unifix blocks. Compare and discuss the results.

Routines and Transitions:

Story time – Read *Shoes from Grandpa*. by Mem Fox. Discuss how we know what size shoes to buy.

Assessment

Observe students as they complete the Variation tasks. Do students explain why they need to measure using:

- Uniform units of measure
- No gaps and overlaps
- Use language of more, less, same to compare capacity and big, little, large, small to compare area.

Achievement Standard: order objects based on lengths and capacities using informal units

Background Reading

Students need to internalise the following ideas if they are to fully understand how 'measuring' works.

- We can use numbers to describe the size of a thing by selecting a unit and counting how many repeats of the unit it takes to match the thing as closely as possible
- A unit is itself a quantity; that is, it is the mass of the marble that is the unit, not the marble itself.
- The size of something doesn't change when you use a different---sized unit to measure it, but the number of units taken to match it may change.
- We can say which of two things is bigger by comparing how many of the same unit match each.

These ideas develop more slowly than is often recognised. Having developed these ideas, however, students can see *why*:

- We should generally use the same unit repeatedly to measure an object
- When comparing two things, the same unit should be chosen for each.

Year three NAPLAN Numeracy test links

Measurement – area

Measurement – volume and capacity

Links to Related MAGs

P.2.8 – Comparative Measurement

1.1.7 – Measurement --- informal units 1

2.1.9 – Measurement --- 1



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