

# Elementary Mathematics Methods

## Video Guide Sheet

### Measurement

#### Focus

- Weight

#### Concepts To Think About

- Three effective ways to explore these and other attributes:
  1. Perceptual comparison: What do you think?
  2. Direct comparison: How do the object compare to each other?
  3. Indirect comparison: How can a third medium inform you about how the objects compare to each other?

#### Vocabulary

- Weight – the measurement of the pull of gravity on an object.

#### Tools

- objects to explore, pan balance, weight scale

#### Process

- Weight is the measurement of the pull of gravity on an object.
- For perceptual comparison simply feel the two objects and ask questions such as
  - Does one object feel heavier than the other object?
  - Does one object feel lighter than the other object?
- For direct comparison use a pan balance.
  - There are three options for a pan balance:
    - The objects weigh the same and the pan balance will show balance.
    - The object on the left pan weighs more than the object on the right pan and so the right pan will rise higher.
    - The object on the right pan weighs more than the object on the left pan and so the left pan will rise higher.
  - Note that though one object appears in size to be heavier than the other, it is actually lighter than the other object.
- For indirect comparison, the learner uses a weight scale.
- To use a weight scale, the learner places one object and notes its weight.
- Then the learner places the other object and notes its weight.
- The learner now can compare the actual weights of the object and instead of comparing the objects directly, compares the objects indirectly by using the noted weight measurements.

#### Try Another Example

- Choose two objects; begin with a perceptual comparison of the objects. Then use a pan balance to directly compare the two objects. Finally, use a weight scale as a form of indirect comparison of the two objects.

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### Measurement

#### Focus

- Capacity

#### Concepts To Think About

- Three effective ways to explore these and other attributes:
  1. Perceptual comparison: What do you think?
  2. Direct comparison: How do the object compare to each other?
  3. Indirect comparison: How can a third medium inform you about how the objects compare to each other?

#### Vocabulary

- Capacity – the measurement of the amount of substance a container can hold.

#### Tools

- filler, bowl, containers, measurement cup

#### Process

- Capacity is the measurement of the amount of substance a container can hold.
- Capacity can be explored with the three types of comparison as well.
- For perceptual comparison, observe the two containers and ask questions such as
  - Does one container hold more than the other?
  - Is one container smaller than the other?
  - Which container holds more?
  - Which container holds less?
- For direct comparison, fill one container and attempt to pour it into the other container.
  - There are three options for the result of this attempt.
- For indirect comparison, a third medium is need. This medium is most often a graduated cylinder or a measuring cup.
  - To compare the containers indirectly, the learner is filling one container and then using the measuring cup to obtain a capacity measurement.
  - Then the learner uses the measuring cup to obtain the capacity measurement of the second container.
  - Now the noted measurements can be compared to determine which container held the most or the least or if they held the same amount.

#### Try Another Example

- Choose two containers; begin with a perceptual comparison of the containers. Then directly compare the two containers. Finally, use a third medium as a form of indirect comparison of the two containers.

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## Video Guide Sheet

### Measurement

#### Focus

- Length

#### Concepts To Think About

- Three effective ways to explore these and other attributes:
  1. Perceptual comparison: What do you think?
  2. Direct comparison: How do the object compare to each other?
  3. Indirect comparison: How can a third medium inform you about how the objects compare to each other?

#### Vocabulary

- Length – the measurement of distance from one point to another in one dimension.

#### Tools

- ruler, unifix cubes, phone set, fraction rod

#### Process

- Length is the measurement of distance from one point to another in one dimension.
- For perceptual comparison place the objects side by side.
- The unifix cubes represent arbitrary or non-standard units. Almost any item can be used as an arbitrary or non-standard unit and when one uses such units, expect to estimate or approximate measurements for direct comparison.
- The ruler with inches represents standard units. Standard units are agreed upon units that are standard across the measurement system. To make the indirect comparison, the learner is showing both arbitrary and standard unit comparisons.

#### Try Another Example

- Choose two objects; begin with a perceptual comparison of the objects. Then directly compare the two objects using an arbitrary or non-standard unit. Finally, use a third medium as a form of indirect comparison of the two objects.

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## Video Guide Sheet

### Measurement

#### Focus

- Comparison of Capacity & Volume in the Metric System

#### Concepts To Think About

- The cubic decimeter in volume, a dry measure, is equivalent to the liter in capacity, a liquid measure.
- The liter as the volume of a cubic decimeter.

#### Vocabulary

- Capacity – the measurement of the amount of substance a container can hold.

#### Tools

- cubic decimeter cube, cubic decimeter container, graduated cylinder, water

#### Process

- A decimeter is 10 centimeters.
- A cubic decimeter is the measurement of a cube that measures a width of 10 centimeters, a length of 10 centimeters and a height of 10 centimeters.
- Hence a cubic decimeter has a volume of 1000 cubic centimeters as demonstrated in this model.
- The capacity of the cubic decimeter, as a container, can also be explored by using this model.
- Note the measurement for the water that is in the graduated cylinder: 1000 milliliters that is 1 liter.
- The cubic decimeter in volume, a dry measure, is equivalent to the liter in capacity, a liquid measure.
- This provides the case for also defining the liter as the volume of a cubic decimeter.