

VOLUME, CAPACITY, DISPLACEMENT.

INVESTIGATIONS OVERVIEW PAGE

THIS PAGE IS A SUMMARY OF THE INVESTIGATIONS THAT STUDENTS MAY ENGAGE IN TO DEEPEN THEIR RELATIONAL UNDERSTANDING.

INVESTIGATIONS WITH INSTRUCTIONS TO STUDENTS FOLLOW ON SUBSEQUENT PAGES.

- In small groups, children select a milk or juice container that is about 2 litres. They make a measuring device by repeatedly pouring in volumes of water, for example, yogurt containers of water, marking and labelling the units of measurement. They measure the capacity of a container using the measuring device, record the volume and capacity and the unit of measurement. **Reflection:** How can we use a measuring device to measure the capacity of containers?
- Children use their measuring device to measure, compare and order the capacities of containers, explaining that A has a smaller capacity than B, B has a smaller capacity than C, so A also has a smaller capacity than C. **Reflection:** How can we use a measuring device to measure, compare and order the capacity of containers?
- Children select cubes to make models. They make models using the cubes, measure the volume of the model, record the model and the volume of the model in cubes. **Reflection:** How can we measure the volume of models?
- Children select cubes to make 3 models. They measure the volume of each model. They place the models in order of volume. They explain that A has a smaller volume than B, B has a smaller volume than C, so A also has a smaller volume than C. **Reflection:** How can we measure, compare and order the volume of models?
- Children make models using the cubes. They measure the volume of the model, record the model and the volume of the model in cubes. Children rearrange the cubes to make a different model using the same number of cubes. They identify the models have the same volume. **Reflection:** How can different models have the same volume?
- Children select solid objects with curved surfaces that will sink. They partially fill a transparent container with water and mark the water level. They predict what will happen to the water level when the object is placed in it. They place the solid object into the water and mark the water level with the object in it. They explain that the object displaced some water. **Reflection:** How can objects displace water?
- In pairs, children each use cubes to make a model. They swap models and each work out the volume of their partner's model. They compare the models, explaining which has a larger volume and which has a smaller volume. They each record both models and their volumes. **Reflection:** How can we measure, compare and order the volume of models?
- In groups of 3, children each use cubes to make a model. They swap models and each work out the volume of one of their partner's model. They compare the models, and place them order of volume, explaining that if the volume of model A is larger than the volume of model B, and the volume of model B is larger than the volume of model C, then the volume of model A is also larger than the volume of model C. They each record all three models and their volumes. **Reflection:** How can we measure, compare and order the volume of 3 or more models?
- In groups of 3, children use the same number of cubes to each make a model. They swap models and each work out the volume of one of their partner's model. They compare the models, identifying that different models can have the same volume. They each record all three models and their volumes. **Reflection:** How can different models have the same volume?

- In pairs, children select cards to make a single-digit number or teen number. They make multiple models by arranging and rearranging the corresponding number of cubes. They record each model and its volume. They discuss whether the volume of model changes when the cubes are rearranged. **Reflection: How can different models have the same volume?**
- In pairs, children each construct a solid object out of plasticine. They predict which object will displace more water. They take turns to place their objects into a container of water, marking both the before and after water levels. They discuss which object displaced more water, explaining it was the object with the larger volume. Both children record the transparent container and water level, each object in the water and the new water level. **Reflection: How can objects displace water?**
- In groups of 3, children each construct a solid object out of plasticine. They predict which object will displace the most water and which object will displace the least water. They take turns to place their objects into a container of water, marking both the before and after water levels. They discuss the amounts of water each object displaced and place the objects in order of volume, explaining that if the volume of object A is larger than the volume of object B, and the volume of object B is larger than the volume of object C, then the volume of object A is also larger than the volume of object C. They each record all three objects in the container of water, and the amount of water they displaced. **Reflection: How can we measure, compare and order the volume of 3 or more models using displacement?**
- In groups of 2, children construct a solid object out of plasticine. They place it in a transparent container of water, marking the amount of water displaced. They reconstruct the same plasticine into a different shape. They again place it in a transparent container of water, marking the amount of water displaced. They again reconstruct the same plasticine into a different shape. They again place it in a transparent container of water, marking the amount of water displaced. They identify that the volume of the plasticine didn't change by changing its shape. They each record all three objects and their volumes. **Reflection: How can different-shaped objects have the same volume?**

Volume, Capacity, Displacement.

Select a milk or juice or smaller container.

Make a measuring device by repeatedly pouring in volumes of water, marking and labelling the units of measurement.

Measure the capacity of a container using the measuring device.

Record the volume and capacity and the unit of measurement.

Reflection: How can we use a measuring device to measure the capacity of containers?

Volume, Capacity, Displacement.

Use your measuring device to measure the capacity of 3 containers.

Record the capacity of each container and the unit of measurement.

Place the containers in order of capacity, from smallest capacity to largest capacity.

Is the first container's capacity smaller than the second container's capacity?

Is the second container's capacity smaller than the third container's capacity?

So is the first container's capacity also smaller than the third container's capacity?

Is the third container's capacity larger than the second container's capacity?

Is the second container's capacity larger than the first container's capacity?

So is the third container's capacity also larger than the first container's capacity?

Reflection: How can we use a measuring device to measure, compare and order the capacity of containers?

Volume, Capacity, Displacement.

Select cubes.

Make a model using the cubes

Measure the volume of the model.

Record the model.

Record the volume of the model in cubes.

Reflection: How can we measure the volume of models?

Volume, Capacity, Displacement.

Select cubes.

Make 3 models using a different number of cubes

Measure the volume of each model.

Place the models in order of volume, from smallest volume to largest volume.

Is the first model's volume smaller than the second model's volume?

Is the second model's volume smaller than the third model's volume?

So is the first model's volume also smaller than the third model's volume?

Is the third model's volume larger than the second model's volume?

Is the second model's volume larger than the first model's volume?

So is the third model's volume also larger than the first model's volume?

Reflection: How can we measure, compare and order the volume of models?

Volume, Capacity, Displacement.

Make models using cubes.

Measure the volume of the model.

Record the model and the volume of the model in cubes.

Rearrange the cubes to make a different model using the same number of cubes.

Measure the volume of the model.

Record the model and the volume of the model in cubes.

Do the models have the same volume?

Reflection: How can different models have the same volume?

Volume, Capacity, Displacement.

Select a solid object with curved surfaces that will sink.

Partially fill a transparent container with water.

Mark the water level.

Predict what will happen to the water level when the object is placed in it.

Place the solid object into the water.

Mark the water level with the object in it.

How did the object displace some water?

Reflection: How can objects displace water?

Volume, Capacity, Displacement.

Sit with a friend.

Use cubes to each make a model.

Swap models and work out the volume of one of your friend's model.

Compare the models, and place them order of volume.

Each record both models and their volumes.

Reflection: How can we measure, compare and order the volume of models?

Volume, Capacity, Displacement.

Sit with 2 friends.

Use cubes to each make a model.

Swap models and work out the volume of one of your friend's model.

Compare the models, and place them order of volume, from smallest volume to largest volume.

Is the first model's volume smaller than the second model's volume?

Is the second model's volume smaller than the third model's volume?

So is the first model's volume also smaller than the third model's volume?

Is the third model's volume larger than the second model's volume?

Is the second model's volume larger than the first model's volume?

So is the third model's volume also larger than the first model's volume?

Each record all 3 models and their volumes.

Reflection: How can we measure, compare and order the volume of 3 or more models?

Volume, Capacity, Displacement.

Sit with 2 friends.

Use the same number of cubes to each make a model.

Swap models and work out the volume of one of your friend's model.

Compare the models, identifying that different models can have the same volume.

Each record all three models and their volumes.

Reflection: How can different models have the same volume?

Volume, Capacity, Displacement.

Sit with a friend.

Select cards to make a single-digit number or teen number.

Make multiple models by arranging and rearranging the corresponding number of cubes.

Record each model and its volume.

Discuss whether the volume of model changes when the cubes are rearranged.

Reflection: How can different models have the same volume?

Volume, Capacity, Displacement.

Sit with a friend.

Each construct a solid object out of plasticine.

Predict which object will displace more water.

Take turns to place your object into a container of water, marking both the before and after water levels.

Which object displaced more water?

Did the object with the larger volume displace more water?

Record the container and water level, each object in the water and the new water level.

Reflection: How can objects displace water?

Volume, Capacity, Displacement.

Sit with 2 friends.

Each of you construct a solid object out of plasticine.

Predict which object will displace the most water and which object will displace the least water.

Take turns to place your objects into a container of water, marking both the before and after water levels.

Place the objects in order of volume, from smallest volume to largest volume.

Is the first object's volume smaller than the second object's volume?

Is the second object's volume smaller than the third object's volume?

So is the first object's volume also smaller than the third object's volume?

Is the third object's volume larger than the second object's volume?

Is the second object's volume larger than the first object's volume?

So is the third object's volume also larger than the first object's volume?

Each record all 3 objects and their volumes.

Reflection: How can we measure, compare and order the volume of 3 or more models using displacement?

Volume, Capacity, Displacement.

Construct a solid object out of modelling clay or plasticine, for example,



Place it in a transparent container of water and mark the new level of the water.

Change the shape of the modelling clay or plasticine, for example,



Again place it in a transparent container of water and mark the new level of the water.

Again change the shape of the modelling clay or plasticine, for example,

Again place it in a transparent container of water and mark the new level of the water.



Did the volume of the plasticine change by changing its shape?

Record all three objects and their volumes.

Reflection: How can different-shaped objects have the same volume?