

Teacher Notes

Rationale

Mathematics investigations open students' minds to the possibility of multiple approaches, multiple outcomes and multiple solutions. When linked to the world in which they live, open-ended investigations can help students see the relevance of mathematics within their lives. They also provide wonderful opportunities for differentiation, enabling students to feel confident and successful as they engage with tasks at their own individual level.

Overview

This mathematics investigation requires students to apply their knowledge and understanding of measuring time to a real-world situation.

Objective

To measure one minute of time using an informal unit (sand).

Duration

Approximately one 60 minute lesson

Prior Learning

Before commencing the investigation, students should be familiar with the following concepts:

- one minute as a standard unit of measuring time
- the importance of using consistent units of measurement when making comparisons.

Differentiation: Supporting Students

Support less confident students in their learning by allowing them to conduct the investigation with the support of a more capable peer, or in a small group with teacher assistance.

Differentiation: Extending Students

Add an additional level of complexity to challenge more capable students. Encourage them to create a column graph of their results from the investigation and present this data to the class.

Monitoring Student Understanding

Due to the open-ended nature of this investigation, students' responses will vary significantly. For this reason, no answer sheet has been provided. Teachers must therefore check that each student has completed the investigation according to the task requirements.





The Scenario

Every morning and night, your little brother times himself brushing his teeth using a sand timer. He must keep brushing until all the sand runs through the timer. The sand timer lasts for one minute.

This morning, your brother knocked over the sand timer and it smashed into pieces!

Your mother has asked you to make a new sand timer for your little brother. You must use a small plastic container to make your timer. The timer must run for as close to one minute as possible.

The Task

Create a sand timer using sand and a small plastic container.

Test and modify your timer until it runs for one minute (or as close to one minute as possible!)

You have three chances to perfect your sand timer!

Procedure

1. Bring in a small plastic container from home (a yoghurt container or similar would be perfect).
2. Carefully poke a hole in the bottom of the container. Think about how large you need the hole to be.
3. Fill the plastic cup with the amount of sand you wish to use.
4. Start the stopwatch as you pour the sand into your timer.
5. Stop the stopwatch once all of the sand has emptied out of your timer.
6. Record the time into the table provided.
7. Make adjustments to your timer and repeat the process.
8. Compare your results with your class mates.

The Materials

- a small plastic container (to act as the timer)
- a plastic cup or similar (for pouring the sand into your timer)
- a small bucket (for catching the sand)
- sand
- a stopwatch

Name _____

Date _____

Collecting and Recording Data

You have three chances to make the sand run through your timer in exactly one minute.

After each attempt, you may wish to make adjustments to your timer e.g. making the hole at the bottom of the container bigger or smaller, adding more sand, using less sand.

In the table below, record the amount of time it takes for the sand to run through your timer during each attempt. Record any adjustments you make before trying again!

	Time Taken (mins and secs)	Adjustments Made to Timer
Attempt 1		
Attempt 2		
Attempt 3		

In the box below, draw a diagram which shows the adjustments made to your timer during the investigation.



Name _____

Date _____

Reflection

1. Did you enjoy working on this investigation? Give reasons to explain your answer.

2. What did you find challenging when creating your sand timer? How did you overcome these challenges?

3. Describe the adjustments that you made to your timer during the investigation. Why were these adjustments necessary?

4. Circle the statement that best suits how you feel about measuring time after completing this investigation.

- a) I feel very confident measuring time.
- b) My understanding of measuring time is improving.
- c) I still need some help when measuring time.

