



What is time?

Time

time

55 minutes

learning outcomes

To:

- know what causes day and night
- know that it is not the same time everywhere in the world
- know what instruments- you can use to measure time
- know different units of time
- discover that it is difficult to tell the time without an instrument
- make an instrument to measure time

end product

- an hourglass for each pair of children

materials needed

- 24 small bottles (12 x 2 the same)
- 12 stopwatches
- 12 pieces of cardboard slightly larger than the mouth of the bottle
- scissors
- sticky tape
- sand

Preparation

For the activity **Make an hourglass** you will need to make sure the sand is dry. The bottles also need to be dry. Make sure the mouths of each pair of bottles are the same size. Place the materials for the hourglass (24 bottles, 12 pencils, 12 pieces of card, scissors, sticky tape, and sand) ready at the front of the classroom.



How long does a minute last? 10 min.

Ask the question: 'What is time? Can you tell what time it is without agreeing some things beforehand?' Organise the children into pairs. Explain that they are going to see how long 1 minute takes. Give child 1 a stopwatch. Child 1 gives a signal when he/she starts the stopwatch. When child 2 thinks that 1 minute has passed, he/she gives a signal and child 1 stops the stopwatch. How much time does the stopwatch show?

Explain that they are going to repeat the experiment. Now they have to think of a way to help them make a more accurate estimate of when 1 minute has passed. They could count, or draw lines. Encourage the children to try out their suggestions, then discuss how successful the experiment was. Were they able to make a better estimate the second time? What did they use to help them?

The children complete Task 1 on the worksheet. Ask why they think it is important to know how much time has passed. And why is it important to make agreements about time? Come to the conclusion that it is important that everyone uses the same definition when they refer to time. This makes sure we arrive on time for an appointment, for example. Ask the question: 'What ways of measuring time do you know?' If necessary, add the following to their ideas: stopwatch, looking at the position of the sun, or using an hourglass (egg-timer).



The children make an hourglass.

Make an hourglass 25 min.

Explain that an hourglass works by gravity pulling on the sand so that it falls downwards. Gravity pulls objects towards the centre of the Earth. This happens at a constant speed, so an hourglass is a reliable way to measure time.



Organise the children into pairs. The children examine the materials you have prepared in the front of the classroom and decide how they will use these to make their hourglass. Give each pair of children a pencil. Assist them by asking what an hourglass looks like. What is inside it? And how can this 'flow'? The children complete Task 2 on the worksheet, up to step 5.

An example of how you could make an hourglass: cut out a cardboard circle that fits exactly in the mouths of the two bottles. Make a small hole in the centre of the card. Pour some sand in one of the bottles. Put the piece of card on the mouth of the bottle, and place the second bottle upside down on the first. Stick them together at the middle using sticky tape.

Look at the drawings showing the children's ideas. Do they look like they will work? Ask the children how much sand they are going to use, how large they are planning to make the hole in the card, and how they are going to fix the bottles together. Note: the larger the hole, the less time it takes for all the sand to run through it. The more sand there is in the bottle, the more time it takes to all pass through the hole. This experiment will only work if the bottles and the sand are perfectly dry.



Once the children have created a good picture of their design, they can make their hourglass.



The children test their hourglasses to see if they work properly. The worksheet contains some tips on how they can improve their design. Now they complete step 5 of Task 2 on the worksheet. Each hourglass will take a different length of time to empty. Explain that this has to do with the size of their hole and the amount of sand they used.



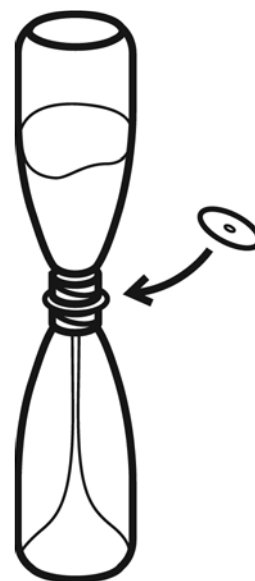
Use your hourglass 20 min.

Take the children to the playground and encourage the children to use their own hourglass to measure how long it takes them to run a certain distance. Mark a start and finish line. One child from each pair gets ready to run. The other child waits for the starting signal, and then turns over their hourglass. How long did it take for the child to cross the finish line? Could they measure it with their hourglass? Was there enough sand to measure the time? Ask the children to swap places and repeat the task. The children return to the classroom to complete Task 3 on the worksheet.

Discuss these tasks. come to the conclusion that it is difficult to measure an exact time with an hourglass. If the hourglass is only partially empty, you can only guess how much time has passed.




Good to know.

Long ago sailors used an hourglass to ring the ship's bell every hour and half hour. Doctors used a 15-second hourglass to measure their patients' pulse.





What is time?

1	How long does a minute last?
a	How many seconds are there in 1 minute?
	
b	How much time had passed when you thought 1 minute was over?
c	Why is it good that we have made agreements about time?
d	What instruments do you know for measuring time?
	You are going to make an hourglass.
2	Make an hourglass
	What do you need?
	• 2 bottles • tape
	• sand • pencil
	• card • stopwatch
	• scissors

What are you going to do?

- 1 Look at the materials and the drawing. How can you use these materials to make an hourglass? Draw it in the box below.

draw your
hourglass
HERE

- 2 Write down how you are going to use the materials and how you are going to fix them together.



3 Show your design to your teacher.

4 Did your teacher think it was a good design?

Now you are ready to make your hourglass!



5 Try out your hourglass. Turn it over. Does your hourglass work?

yes / no, because

CIRCLE
the correct
answer

6 Does your hourglass not work properly? Check the following points:

• Is the sand dry enough? **yes / no**

• Are the bottles dry enough? **yes / no**

• Is the hole in the card too big, or too small? **yes / no**

Change your hourglass if necessary.

CIRCLE
the correct
answers

7 Take the stopwatch. Turn over the hourglass and start the stopwatch.

How long does it take for all the sand to fall to the bottom?

 seconds

3 use your hourglass

a How long did your partner take to reach the finish line?



b Is it difficult to measure an exact time using an hourglass?

c Why / why not?

