

stem4math

Time Goes By



Name:

.....

Class:

.....

School:

.....

Date:

.....



Engage

Did people from ancient cultures measure time ? Did they do it like us?

Write down the ideas you consider are the most important about time measurement.



Investigate

Find out **how a sundial works** and how it can be built. Ask yourselves questions like What parts does it have? What do we use each one for? Do we need to place it in a particular location for it to work correctly?

Write down the ideas you consider are the most important about sundials.



Plan

Plan how to make a scaled map of the playground. Write down the materials that you will need, discuss with your team the scale that you think you should use and reach an agreement among all teams. Then, write down the size of the paper that you should use.

What reusable materials you can find at home or at school can be helpful to create a sundial? Write down a list of materials and assign each one to a member of the team who will be responsible for bringing it to class.



Create

Design and create with your partners a sundial.



Conclude

After locating the position of your sundial on the playground map and after collecting the information about the different moments of measurement, which conclusions do you have about the gnomon's shadows (length and angle in each moment)? Which orientation is the most appropriate for a sundial?



Investigate

[Exploring latitude and longitude with shadows]

1) Go online to <http://planetcalc.com/1875/>

2) Introduce your approximate location (mygeoposition.com) and the time you took it for the measurement that is closer to noon.

3) The length that you measured was _____ and the calculator shows _____.

If there is a discrepancy between both measurements, give a reasonable explanation of why this is the case:

4) Find two near locations where you made the measurements (<500km) and write down the locations and the obtained lengths.

Location:_____ Length:_____

Location:_____ Length:_____

Give a reasonable explanation for the data that you have obtained compared to your location:

5) Do as above with two locations far from you (>2000km).

Location:_____ Length:_____

Location:_____ Length:_____

Give a reasonable explanation for the data that you have obtained compared to your location:

6) Find two locations very far from you (>10.000km) where the length is similar to the one you have obtained in your location.

Location:_____ Length:_____

Location:_____ Length:_____

Give a reasonable explanation for the data that you have obtained compared to your location:

7) Explain the strategy you have followed to find all locations in questions 4, 5 and 6 (if any):

8) Compare your noon's measurement with the one you have that is the farthest away from it.

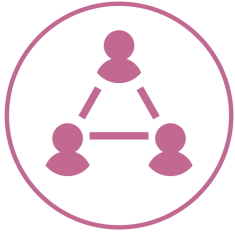
The length at noon was _____ and the other one was _____ (A).

Give a reasonable explanation of why the above data make sense:

9) Find a location with a latitude similar to yours, but such that the obtained measurement equals your answer above (marked as A). Fill the gaps in the following sentences with the obtained results:

In my location, at _____ hours, the length was _____ (A), which is the same value as in (location) _____ at (time) _____.

Give a reasonable explanation of why the above data make sense:



Report

What have you learned? Why it's important? What was the hardest? What else would you like to learn about this topic? Agree with your group to elaborate a brief presentation with all the obtained conclusions and record it. (Make it short and simple, so that you can record it in one take of less than two minutes).
