

Thursday Science – make a sundial to investigate the movement of the Earth during the day and the way that shadows change during the day.

Sundials are instruments that use shadows from the sun's light to tell the time. As the earth rotates on its axis the sun appears to move across the sky, rising in the east in the morning and setting in the west in the evening. During the day the sun casts different shadows depending on where it is in the sky.



The earliest sundials were simply sticks in the ground whose shadows told people what the time was.

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Before you begin, make a prediction of what the shadows will look like at different times of the day, and then see if you are right. Which way will the sun appear to move? Does it matter whether you point your sundial North, South, East or West? Why/why not?

Why are sundials not always accurate or useful?

If you tried this activity again at a different time of year, would your times be in the same place? Why/why not?

# Sundial

## Materials

- stick
- rocks or chalk
- 1 cup of playdough (optional)
- watch or clock

1. Find a sunny spot in a lawn or even on a sidewalk.
2. Put the stick in the ground. If it is a sidewalk, put the stick in the playdough and use that to hold the stick upright on cement.
3. Throughout the day, place a rock, or mark with chalk for each hour indicating where the shadow falls at that time. Depending on your time, you may have to place rocks over a couple of days before your sundial is complete.

Now your sundial is ready to use. When you want to tell the time, just look for the shadow. In the picture above, the stones are used to mark each hour from 7am to 7pm. The picture was taken at 9:15 in the morning.

In the beginning, you may find it hard to be very precise. With a bit of practice, you should be able to tell time to the nearest 15 minutes, and maybe even more closely.



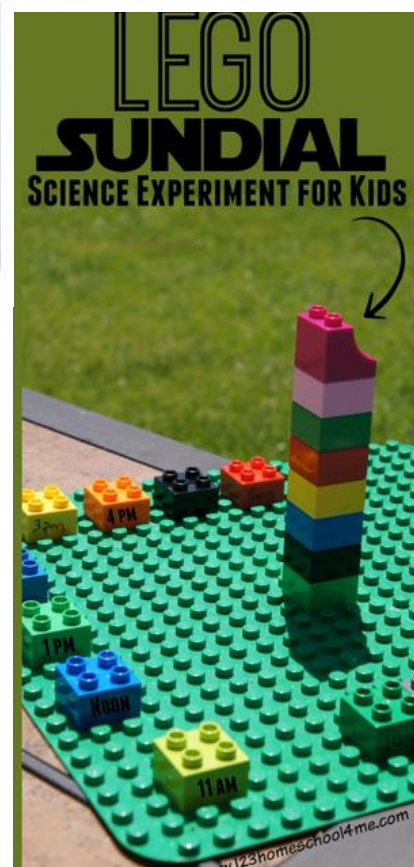
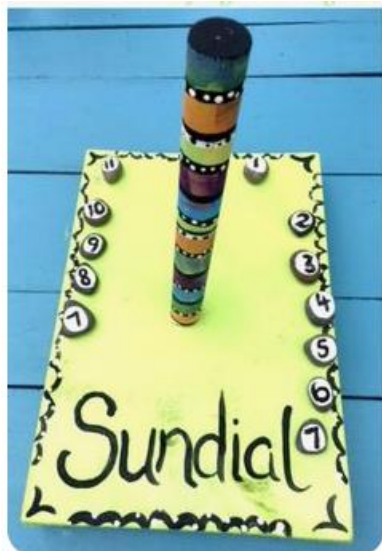
It's about 12:30 in this picture.

## Alternative

- Use chalk and a ruler to draw in the shadow lines, instead of placing rocks on the hour.



Here are some pictures of other alternative ways that you could make your sundial – get creative! How about a rainbow or sunflower themed sundial? Or one that uses the school logo?



Alternatively, you can print out a template from today's other files, and the instructions for that are here (but it's much less interesting than the ideas above!):



You will need:  
A pair of scissors  
A compass  
Some sellotape  
A craft knife  
A print-out of the two  
sundial templates



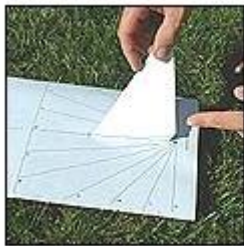
Place the main sheet on  
a hard surface and using  
the craft knife, cut down  
the line that says 'cut  
here' (ask an adult to  
help you).



Using the scissors,  
carefully cut out the  
template for the  
gnomon, the triangle  
shape.



Once you have done  
that, fold it along the  
line.



Now place the gnomon  
inside the slit of the  
sundial template. You  
must make sure the  
right-angle is at the  
bottom of the sundial  
template (see picture).





Now using the sellotape, stick the bottom of the gnomon to the base of the sundial.



The gnomon should stand up by itself, but you may need to secure it with some more sellotape at its base.



Find north with the compass - you'll need to slowly turn in a circle until the pointer points north.



Once you find north, place the sundial on a flat surface and line up the arrow on the top of the sundial so it points north. Make sure the sun is shining!

**You should now be able to tell the time!**

**You can make this sundial with different coloured paper or make it stronger by sticking the templates on to card.**