

## Light & Shadows – Sundial

Does the size of a shadow change throughout the day?

### Materials:

- Chalk or rocks
- Stick
- Playdough

**Procedure:** (Remember to have your parent's permission and have them watch and help you.)

- Find a sunny spot.
- Put the stick in the ground. If it is a sidewalk, put the stick in the playdough and to hold it upright.
- Throughout the day, place a rock, or mark with chalk for each hour indicating where the shadow falls at that time. (You may have to do this over a couple of days before your sundial is complete.)
- When you want to tell the time, just look for the shadow.
- You may find it hard to be very precise but with a bit of practice, you can tell time to the nearest 15 minutes.



### What's Happening:

A sundial has a pointer, a gnomon (pronounced 'nom on') and the gnomon casts a shadow when the sun shines follows a predictable path through the day. The path can be marked with hours to tell the time. But the shadow cast by the gnomon of a sundial tells the time for the exact position of the sundial so the hour lines on a sundial need to be adjusted so the shadow tells the time for its time zone instead of its exact position.

The time is set in large areas, called a time zone (A Canadian invention), is the same for everyone in this area. We reside in the Mountain Time zone and Canada is so large we have 6 time zones. Also see 'How Do Sundials Work?' <http://www.sundialsoc.org.uk/HDSW.php>

*Note:* Observation, prediction and communication are all very important science skills. This activity helps to develop them.

### Extension:

Did you notice that when the sun was highest in the sky (midday) it cast the shortest shadow. The length of the shadow is also affected by the seasons. Which has longer shadows Winter or Summer? Why?

The length of the shadow depends on the length of the gnomon. The shadow moves about 1/3 of the length of the gnomon an hour. The Eiffel Tower is 300 metres high so the tip of its shadow's ground speed is about 1.5 metres per minute. What is causing the shadow to move? See: <http://www.liverpoolmuseus.org.uk/kids/games-quizzes/sun/san5.html>.

This activity is based on our Light & Shadows and Sky Science kits. The source for this lab may be found at: <http://www.nwf.org/kids/family-fun/crafts/sundial.aspx>. Our teaching kits (described on our website) are loaned out FREE to provide classroom teachers and parents of home schooled children an opportunity to explore Science in interesting ways. Please consider volunteering as a classroom guest speaker or offer your business as a field trip location.

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