

## OBJECTIVES

1. To create an accurate sundial specific to the area in which it will be used.
2. To use the sundial to record the time of day.



## BACKGROUND INFORMATION

A sundial is a device that measures time by the position of the Sun. In common designs such as the horizontal sundial, the sun casts a shadow from its gnomon or style (a thin rod or a sharp, straight edge) onto a flat surface marked with lines indicating the hours of the day. As the sun moves across the sky, the shadow-edge progressively aligns with different hour-lines on the plate. Such designs rely on the style being aligned with the axis of the Earth's rotation. Hence, if such a sundial is to tell the correct time, the highest point of the gnomon must point towards true South (not the north or south magnetic pole) and the gnomon's angle with horizontal must equal the sundial's geographical latitude.

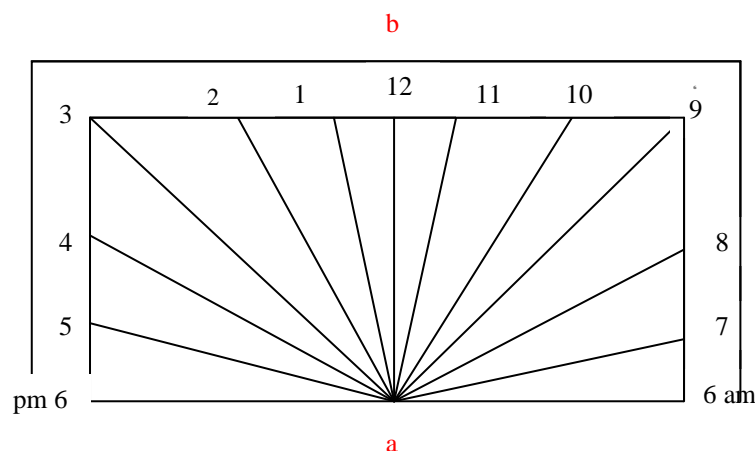
## WHAT YOU NEED

- A4 cardboard
- Protractor
- Ruler
- Scissors
- Latitude of place where sundial will be used
- Sundial Hour Line Calculator  
[http://hilaroad.com/camp/projects/sundial/sundial\\_calculator/sundial\\_calculator.htm](http://hilaroad.com/camp/projects/sundial/sundial_calculator/sundial_calculator.htm)

## WHAT TO DO

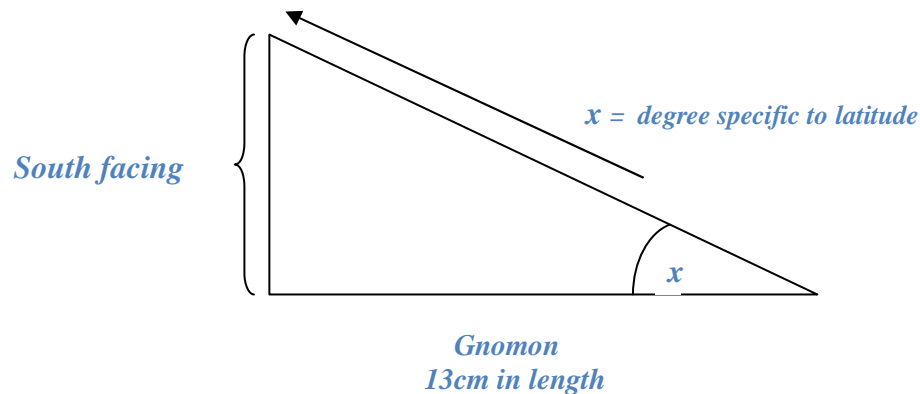
*To Make:*

1. Print a copy of the template for making a sundial onto cardboard.
2. Cut the rectangle which is the base of the sundial.
3. Using the calculator on the website.
4. Using a protractor draw the degrees on the template for each hour between 6am and 6pm. (note: reversal of hours, 6am on right hand side, for southern hemisphere)



Angles are measured from the base line (6 - 6)

5. Create a gnomon triangle, the gnomon angle needs to be specific to the latitude of the area in which the sundial is being used, eg Brisbane's latitude is  $27.4^\circ$  so the angle in the triangle would be  $27.4^\circ$  (Rockhampton  $23.3^\circ$ , Gladstone  $23.8^\circ$  and Biloela  $24^\circ$ )



6. Tape the triangle to the middle line of the sundial face (from point 'a' to b') making sure the x angle is closest to 'a'. This will create the shadow casting onto the face of the dial. To hold the gnomon vertically a small bracket can be made.

#### To Use:

7. Find a location where the sun comes in onto the table, bench or somewhere in the playground, and be exposed to sunlight from approximately 6am to 6pm.
8. Note the current time.
9. Set sundial in position by rotating the shadow of the gnomon to indicate the current time, tape to secure it.
10. As the earth rotates you can watch as the shadow progresses and indicate the time.

## QUESTIONS

1. Why is latitude important? *You need to know the latitude of where you are positioned on Earth to create the correct angle in the gnomon and the variants on the sundial. The latitude varies depending where you are on the surface of the Earth.*

## CURRICULUM CONCEPTS ADDRESSED

### Essential Learnings: Earth and Beyond

#### By the end of year 5:

- The earth, solar system and universe are dynamic systems

#### By the end of year 7:

- Interactions and changes in physical systems and environments can be explained and predicted

## RESOURCES USED TO DEVELOP THIS ACTIVITY

1. The University of California Berkeley Center for Science Education at Space Sciences Laboratory. 2001. <http://hilaroad.com/camp/projects/sundial/sundial.html> Accessed: 07.09.09 Title: Build a Sundial





