

# TRACKING TIME WITH A SUNDIAL

Make some simple sundials



People first learned about time by watching the sun rise and set. From this knowledge, they developed a way to tell time based on how the sun rose and how it set. They noticed that objects would cast unique shadows based on where the sun was located. The shadow cast by a tree, a rock, or even their own body was long early in the morning and grew shorter and shorter until it almost disappeared when the Sun was in the middle of the day. They also would have noticed that the shadow grew longer again, on the other side of the tree, as night came. They could plan their days based on the shadows.

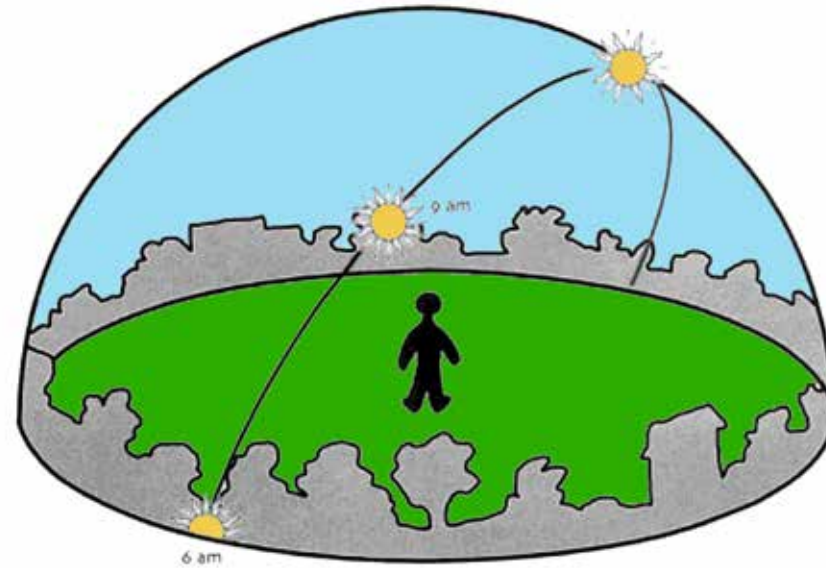
Sundials are the oldest known devices that are used to measure time. As the sun moves from east to west, the shadows formed predict the time of the day.

The Egyptians were the first to use sundials. They used a stick or pillar called the gnomon. It is a word that comes from ancient Greek and means "indicator." Time was calculated depending on the length of the shadow.

A sundial is a device that uses the position of the sun to reflect the time. An upright stick, called a gnomon, is positioned to cast a shadow onto a pre-marked sundial face. As the sun moves across the sky, the shadow also moves. The concept can be easily demonstrated in your backyard with a very basic sundial built with a stick and a handful of small stones.

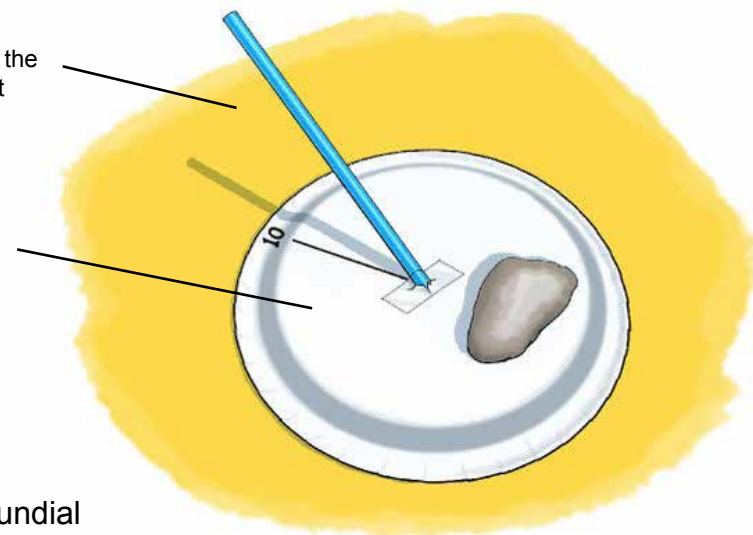
Eventually man discovered that slanting the gnomon and aiming it North made a more accurate sundial. The angle makes up for the tilt of the Earth, and the hour marks remained the same all year long. After this discovery, people were able to construct sundials that were better at keeping accurate time.

When the sun is at its highest point of the day, or midday, the shadow is the shortest. When the sun is lower, in the afternoon, the shadow is the longest. It is important to keep in mind that the sun's height is also affected by the seasons.

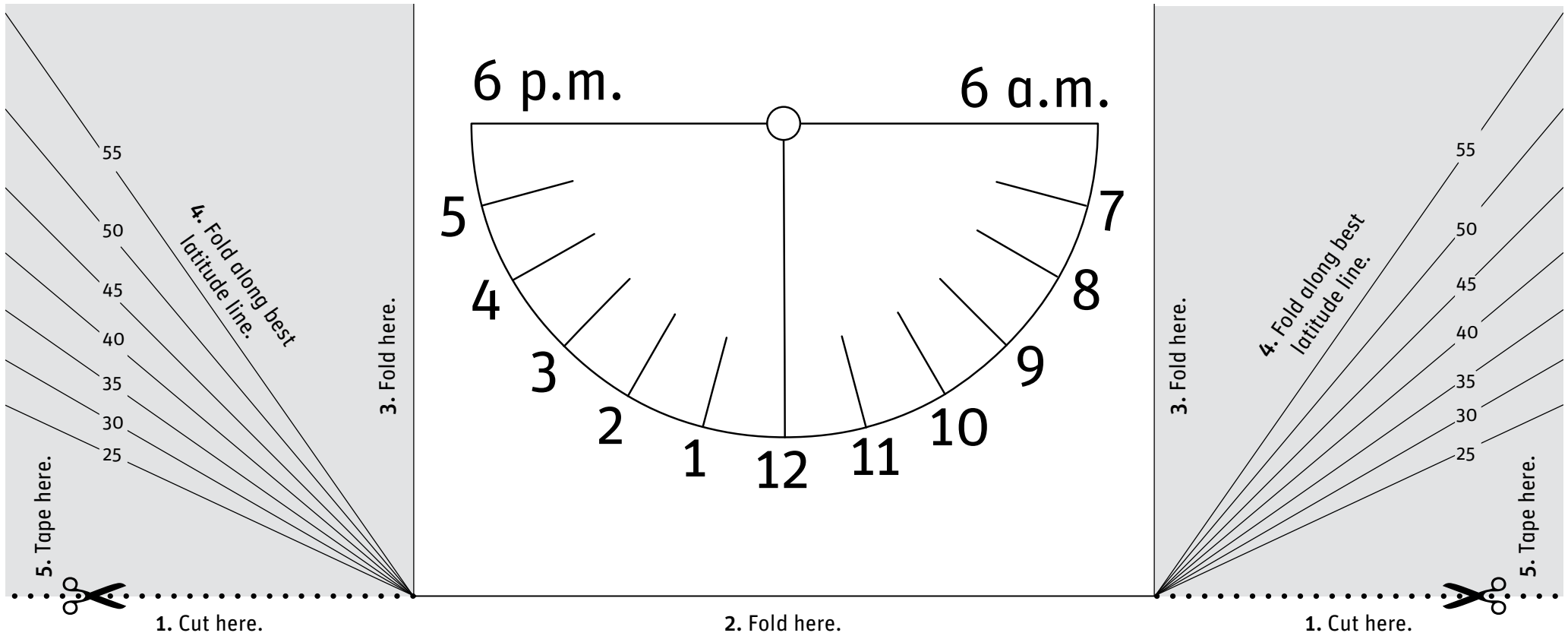


Center gromon - gromon is lending and pointing towards the position of the north star - not magnetic north

Paper plate marking are placed on the plate by observation over a day. marking each hour position as shadow falls on it.



Basic sundial



## Northern Hemisphere Sundial

1. Cut in from edge of paper along dotted lines. Stop at solid lines.
2. Fold along solid horizontal line with line on outside. Crease, then open flat again.
3. Fold along solid vertical lines with lines on outside. Crease, then open flat again.
4. Select the latitude line closest to your latitude. Fold with line outside, crease, and fold again with line on inside.
5. Tape the paper together as shown at right.
6. Insert a sharp pencil point-first through the small circle at top center. Remove pencil and reinsert it with the eraser first.
7. If needed for stability or durability, tape the whole thing to a sheet of cardboard.
8. Turn the sundial so the pencil points due north, towards north star (true north) not magnetic north as determined a compass.
9. If you can't find north, orient the sundial so that it agrees with your clock. (Subtract one hour from the clock time if you're on daylight-saving time.)

# Print off a sundial based on where you live

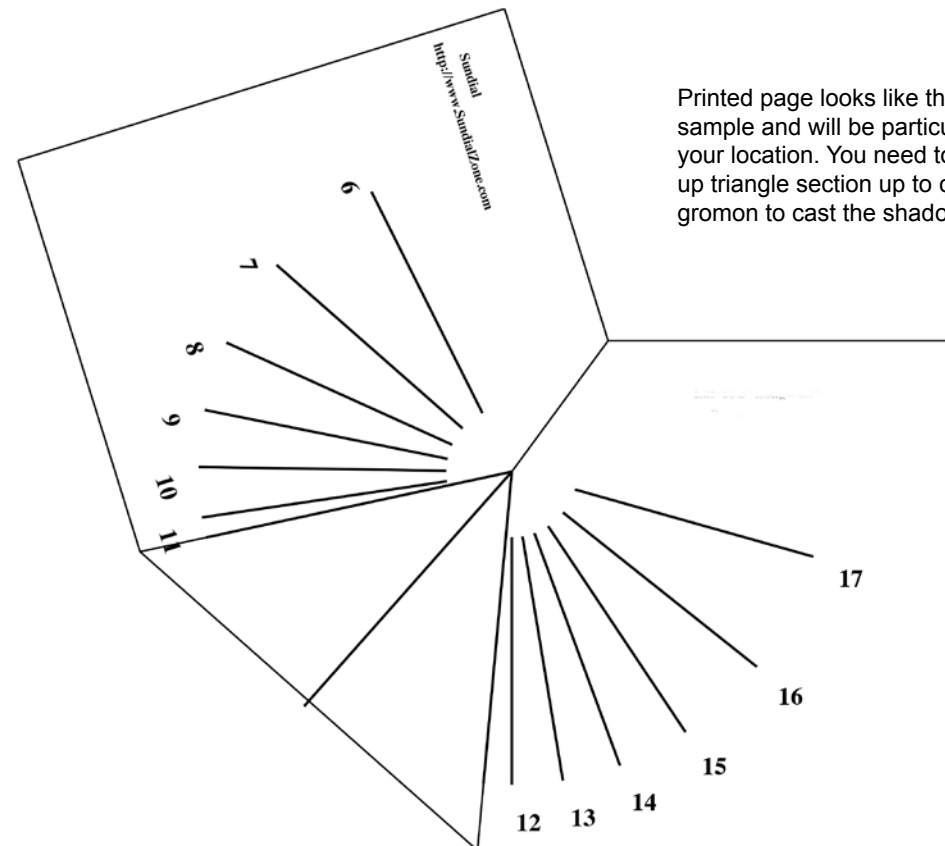
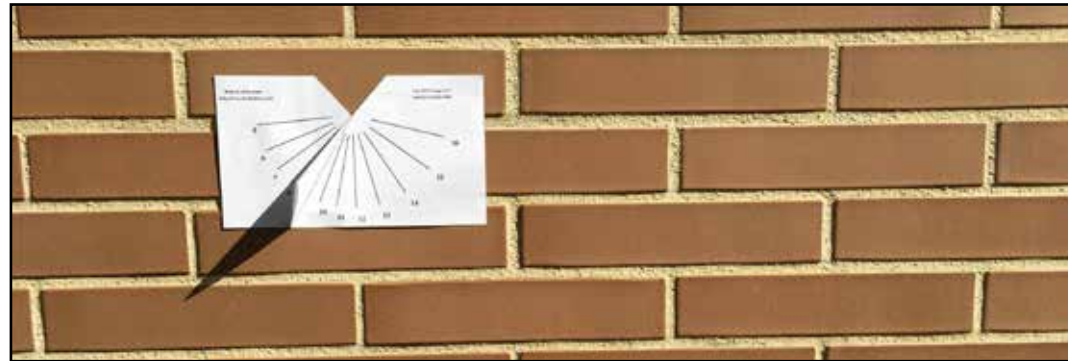
Visit this website

<https://www.sundialzone.com/en/sundial.php>

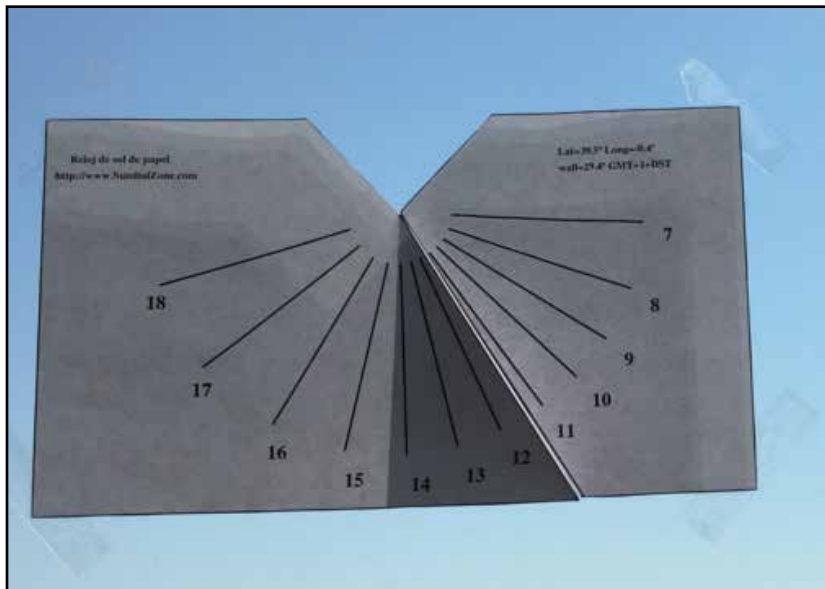
The site is simple to use - first select the type of sundial you want, you can choose between two types - wall mounted and window mounted. Next click 'make a sundial' button and it will present a page with a google map - enter your address - it will zoom to your location. 'Click' on your house and it will present a small square showing the sides of a box a,b,c,d,. Select the side where your window is and it will create a printable sundial.

Click on the PDF option.

It will then generate a printable page that you fold down and paste on your window and watch it work.



Printed page looks like this sample and will be particular to your location. You need to fold up triangle section up to create gnomon to cast the shadow.



# Capuchin Sundial

The Capuchin sundial is a portable sundial. It is named after the Capuchin monks, who belonged to a branch of the Order of Franciscans. They wore a hood, that resembled the face of the sundial.

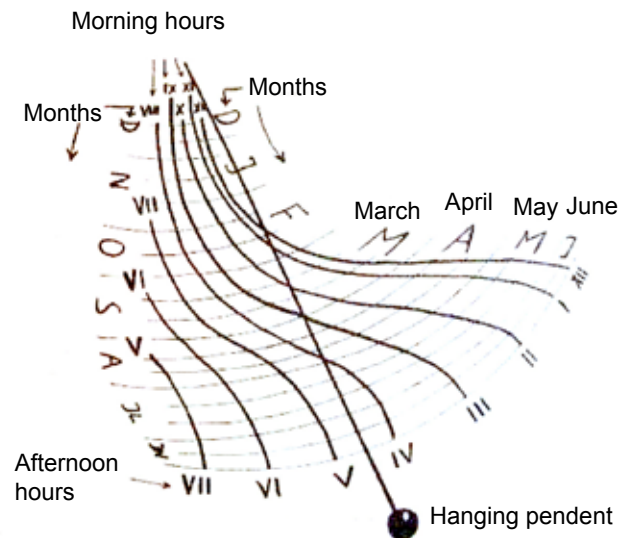
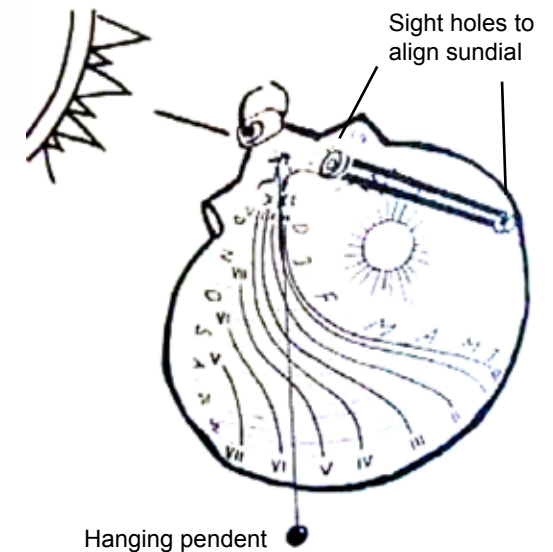
This type of sundial was popular with pilgrims and travelers as they traveled across Europe. Once the sun path ways are transcribed on the item such as a shell it becomes an ancient timepiece.

The bronze coloured sundial shown uses the same principle but uses a small pin to act as the gromon. The hanging string is positioned according to the scale around its slot to match the months of the year so it is accurate to the cycle of the sun.

The shell sundial has two small sighting holes which are lined up to the sun. The small thread with pearl or weight then falls into position and indicates the time.

So once the basic principle is understood the sun dial can be created on any item.

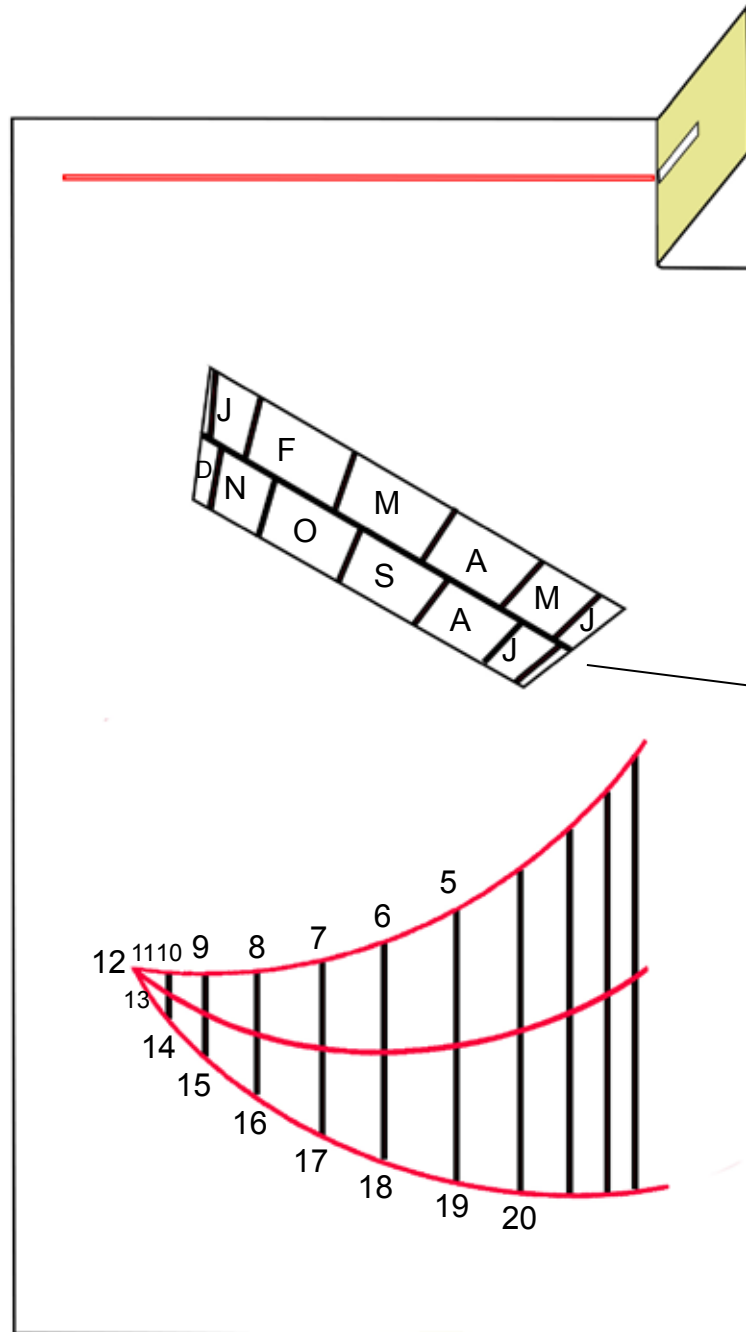
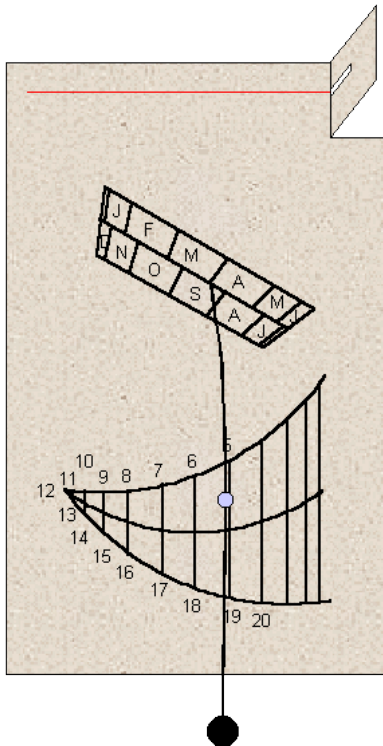
On the next page is the basic layout of the sun dial. This can be printed off and used as a paper sundial but it really is better glued onto a stiff board.



# Using the Sundial

Calibrate the sundial by moving the thread to current date. Then align the thread with the tip of the "hood" and move the pearl to the tip ("Twelve noon").

Hold your sundial vertically and let the sun shine through the slot. Incline the sundial until the sun beam is parallel to the line across the upper part. The thread will now indicate the plumb line, if you take care that it does not touch the dial. The pearl will indicate the time of the day. This example shows the time as a five in the morning in the or a quarter to seven in the evening in the afternoon. Unfortunately, you have to keep track of, if it is a.m. or p.m. yourself.



Cut out a small slot. This slot is pointed at the sun so that it casts a shadow down the red line

The letter grid indicates months of the year

A slot is cut along the center diagonal line. This is the slot through which the thread is passed. A knot or button on the back will prevent the thread falling through the slot

Time of the day curve