

How to “Dial” Back Time and Reduce Our Dependence on Technology

Twitter:

Knowing how to make and read accurate sundials can help our society rid itself of its dependence on some forms of technology.

Summary:

In this day and age our society has become completely dependent on technology. Telling time is just one example, from digital clocks requiring electricity to simple hand-watches containing several gears. This service project aims at educating kids from grades 1–12 on how to make a device out of simple materials that can display the time of day. Two lesson plans have been prepared, one aimed at teaching elementary school children and the other for high-school children. These lesson plans would aid teachers in giving a one class-period lecture on how to create an accurate sundial. A simple brochure was also created to help teach the students basic history and facts about the sundial.

Reason for the service project:

As stated before, our society has become extremely dependent on technology. If the power were to go out in our homes, we would not even be able to tell what time it was. This would be a big problem if we needed to get to work or school and had no other way of telling time without the use of electronic gadgets. Yet, telling the time can be as simple as taking a step outside.

Sundials have been used for millennia to tell its user the time of day. Skeptics will say that sundials cannot compete with watches and clocks in terms of accuracy. While sundials cannot provide the time second by second, when created correctly, they can be very accurate timepieces year round. Teaching our children this one simple technique can help start to diminish our dependence on technology and help our society get a little more in touch with nature.

Implementing a plan

As a certified teacher and sundial expert, I will be offering my sundial workshop to all elementary schools and high schools interested. Any interested schools would simply set up a date for a one time sundial class session. The lesson would be conducted by myself with the help of the teacher when it came

time for the students to create their own sundial. The lesson plan can be structured for both grade levels. The elementary children would receive a very brief lesson about what a sundial is and how it works. Under my direction, the class would then proceed to create their own sundial out of provided materials. The lesson for the high school students would obviously be more in depth. A brief history about sundials would be given along with a more detailed lesson on how to create a sundial that can accurately tell the time (use of angles, latitude lines, true north etc.).

LET'S MAKE A

SUNDIAL

LESSON PLAN

Grade Levels: 1–5

Objectives:

The Students will:

- 1. create a simple sundial to make a primitive clock.**
- 2. Learn basic information about a sundial (history, how does it work)**

Materials Needed:

- markers, paper plates, washable paints,
- straws, tape, compass

Vocabulary References:

- Axis, earth's rotation, shadow, magnetic north, true north

Procedures:

1. History of the sundial:
 - a. Very brief for the elementary students (first sundial found in ancient Egypt etc). Information found in brochure.
2. Review concepts:
 - a. what is the Earth's axis?
 - Earth's axis is an imaginary line the the Earth rotates around
 - b. using the shadow
 - By observing the movement of the shadow we can see how the Earth is rotating around its axis because the sun is moving through the sky.

3. Making the sundials (you will need a sunny day so a clear shadow can be seen)
- Decorate paper plates with washable light-colored paints.
 - Find the center of paper plate and mark with a dot.
 - Make 3 cuts in one end of straw. Flare out the cut portion of the straw and tape to plate.
 - Make a tick mark at the edge of the plate to designate North; line this mark up with magnetic north.
 - Every hour, mark where the shadow of the straw.
 - Face the sundial toward magnetic north (use the compass to determine magnetic north).

3. Questions for students to think about...

1. What did you observe?
2. Which direction did the shadow move? Why?
3. When was the shadow the longest and where was the sun at that time?
4. Did the sun move across the southern sky or northern sky? Why?

How to make a Sundial

Grade level: 9-12

Objective

This lesson plan will guide a high school teacher in teaching their students about the history of a sundial. It will also explain how accurate sundials are and give step by step instructions on how to create one.

- 1. Create a simple sundial to make an accurate clock.**
 - 2. Create a sundial to observe the Earth's rotation around the sun.**
 - 3. Create a sundial to observe the Earth's rotation about its axis.**
-

Materials

- Notebooks and pens
 - Balsa wood, exacto knives, protractor
 - Glue, markers, compass, and a map with latitude and longitude lines.
-

Vocabulary references

Axis, Earth's rotation, latitude, longitude, magnetic north, true north

Procedures

- 1. Review (with decent depth) the history and use of the sundial. All history information found in the brochure.**
- 2. Review concepts:**
 - latitude lines run from east to west across the Earth
 - longitude lines run north to south
 - what is the difference between magnetic north and true north
 - Magnetic north: The area in at which the Earth's magnetic field lines converge and pass through the earth.
 - True north: The point at the North pole about which the Earth rotates on its axis.
- 3. Accuracy of a sundial:**
 - What should the degree of the gnomon be?

- How many time markings should there be?
- How do you find out the latitude of your location?
 - The degree of both the gnomon and the degree between the time marking are the same.
 - There should be the same number of markings as there are on a normal clock: 12.
 - In order to make an accurate sundial, the degree used must be the degree of the latitude at the location of the sundial.
 - This can be easily determined by looking at a globe with latitude lines and finding the latitude line that runs through your town.
- 4.** Making the sundials (you will need a sunny day so a clear shadow can be seen)
 - The desired angle of the gnomon will be measured with the protractor and cut out of the balsa wood with an exacto knife.
 - The protractor will then be used to draw the markings on a large circular piece of balsa wood.
 - Attach the gnomon to the circular balsa wood with glue.
 - The sundial then must be placed with the front of the gnomon facing magnetic north (which can be determined using the compass).

Editorial

In today's modern society the dependance on technology has become almost complete. We can no longer even tell time without the use of complex watches and clocks with all of their various gears and electrical circuits. Gone are the days when we could simply gaze up at the moon to determine the approximate day of the month. Gone are the days when the position of the sun in the sky was used to determine the approximate time of day.

And perhaps these archaic practices are no longer used for good reason. After all, in our society "approximations" are hardly acceptable. Not all of these old practices, however, should be forgotten. Some of them, as a matter of fact, have become more accurate as our civilization has progressed. Time-telling via a sundial is one of those practices that has gained much from the knowledge we have accrued about our Earth's rotation. Preserving the practice and teaching it as we teach other subjects can help to keep a small element of our society from being totally dependent on technology.