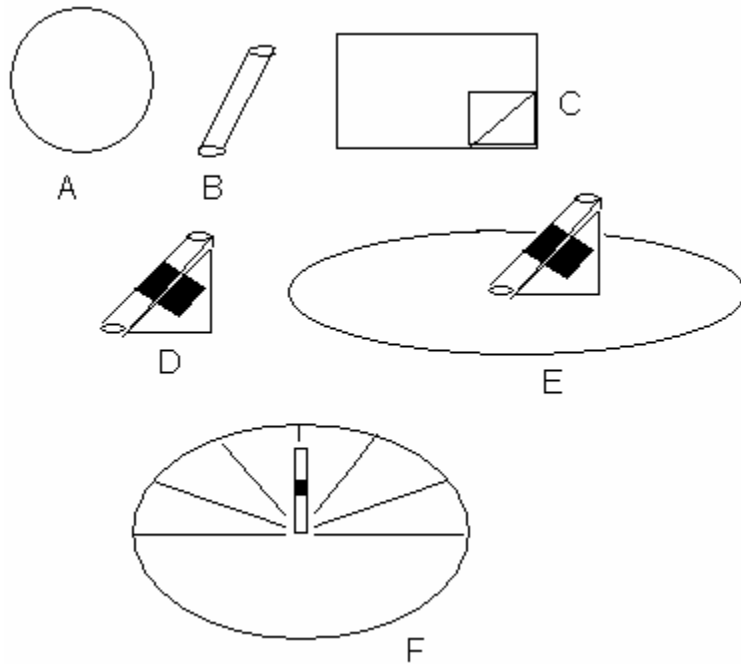


Sundial Procedure



During Class:

- Engage students by having someone tell what time it is using the classroom clock (or that student's own watch if the classroom clock is not working)? Ask students how they know that time quoted is correct? Whatever response the students give (e.g., I set my watch by the time on the radio or t.v.), ask how they know that source is correct. Ask students for the an ultimate source of time that we can rely on a being correct? If no one responses "the sun", ask how people in ancient times told time. Discuss with students how accurate they thing a "low tech" sundial is compared to their "high tech" cell phones and digital watches.
- Have student create a low sundial and see the accuracy for themselves
- Give each student the following procedure:
 - o Using a ruler, cut a 1" segment of the coffee stirrer. (figure B)
 - o Using a rule, cut a 1" x 1" square from the index card (figure C)
 - o Cut the resulting 1" square along the diagonal obtaining an right triangle
 - o Attach the 1" coffee stirrer to the diagonal of the right triangle (figure D) with a piece of tape
 - o Mark the center point of the plate with a large dot (using a pen or pencil)
 - o Using a ruler draw a straight line through the center of one paper plate
 - o Label the left endpoint of the line 6am and label the right endpoint of the lit endpoint of the line 6pm. (Discuss why the dial starts and 6am and ends at 6pm.)
 - o Using a ruler, draw a new line perpendicular to the first line going through the center point -- resulting in two right angles whose vertex is the center point (Discuss why the end point of the new line should be 12pm).

- Using a protractor, divide the two resulting right angles into 15 degree angles (similar to figure F) and label with the appropriate hour
 - Attach gnomon along 12pm line (as in figure F). Discuss the reason for this placement.
- Have student try to tell time with sundial. Discuss why it doesn't work (e.g., the effect of the position of the light bulbs in classroom, the need to face due-north).
- Have students use compass to test the sundial accuracy outside of class on a sunny day?
- Follow-up with a discussion of the costs and benefits low technology vs. high technology solutions to telling time (the need for battery vs. the need need for a clear sunny day) and other everyday needs.