

## Shadows and the Rotation of the Earth

### Part 1. Observation of shadows during a day

In this activity, you will observe and record how the shadows changes throughout the day. Record your data below.

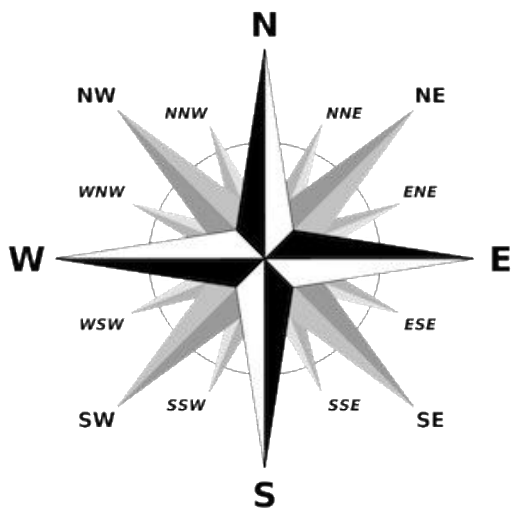
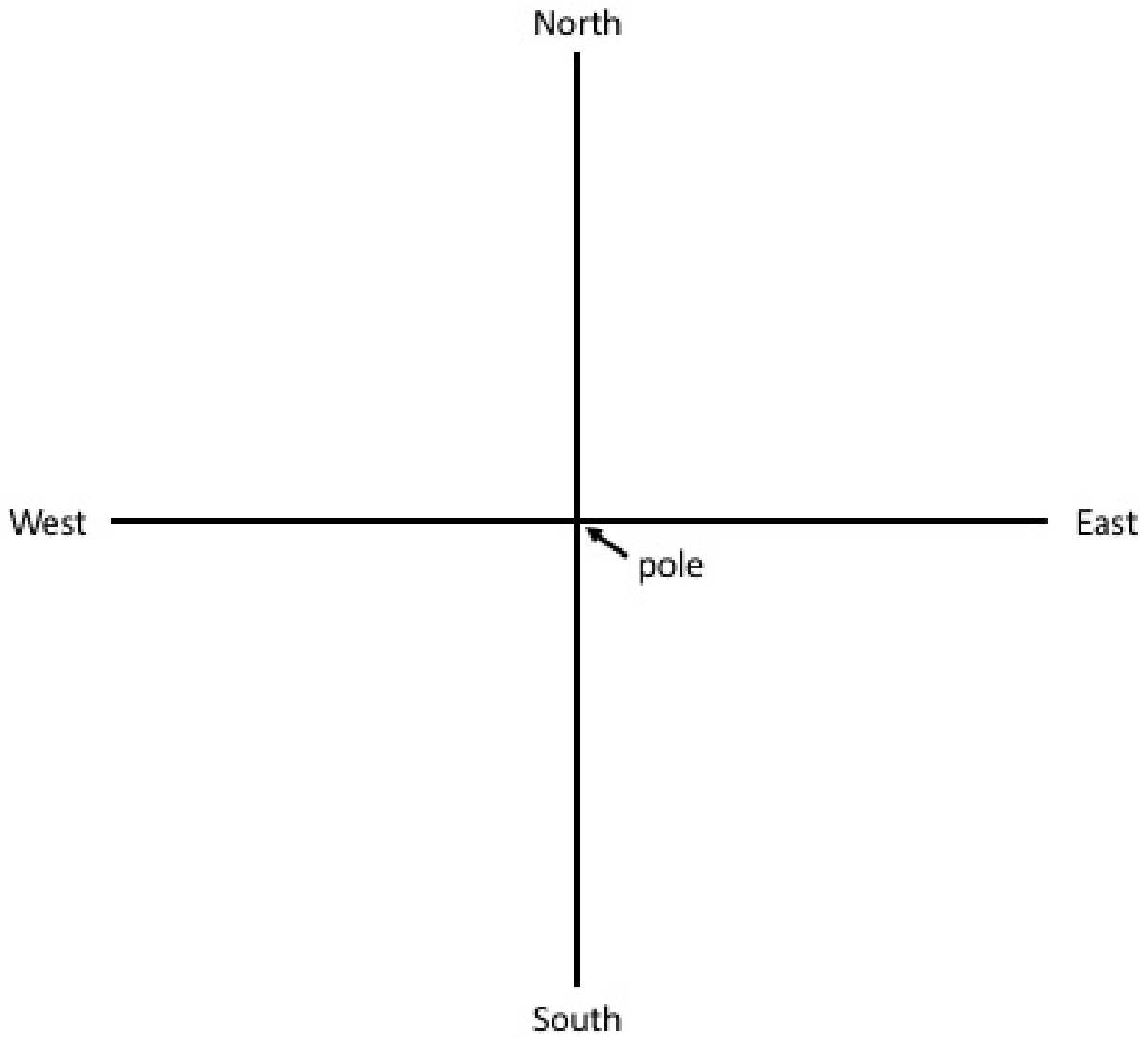
Record shadow data in table below and on the diagram on the next page.

Time am/pm	Military Time	Length of Shadow (cm)	Direction of Shadow

Is there a pattern to the change in direction of the shadow during the day? Describe.

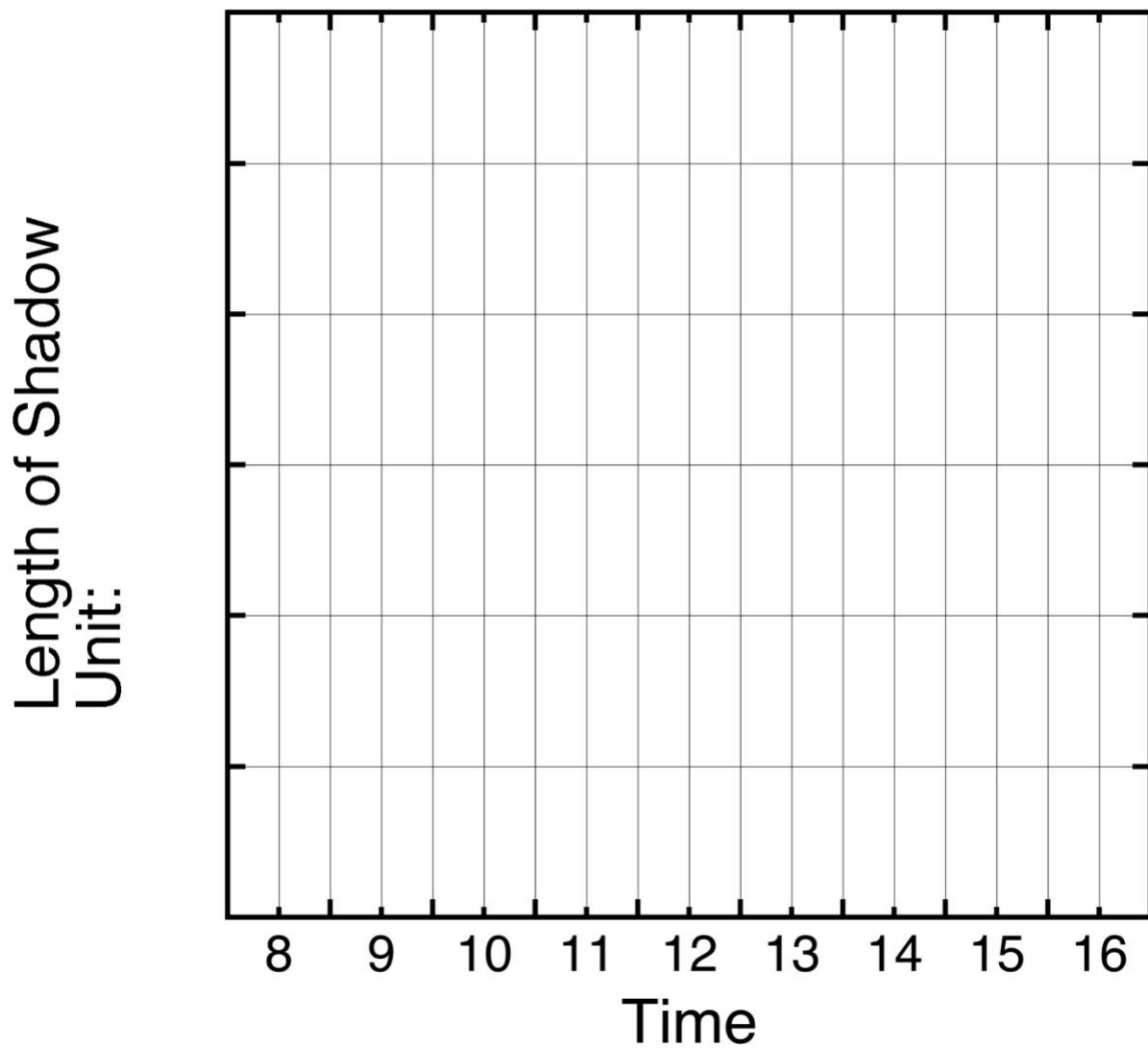
Is there a pattern to the change in the length of the shadow during the day? Describe.

Draw the relative length and direction of the shadows produced by the meter stick.



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Bar Chart. Plot the length of the shadows as a function of time.



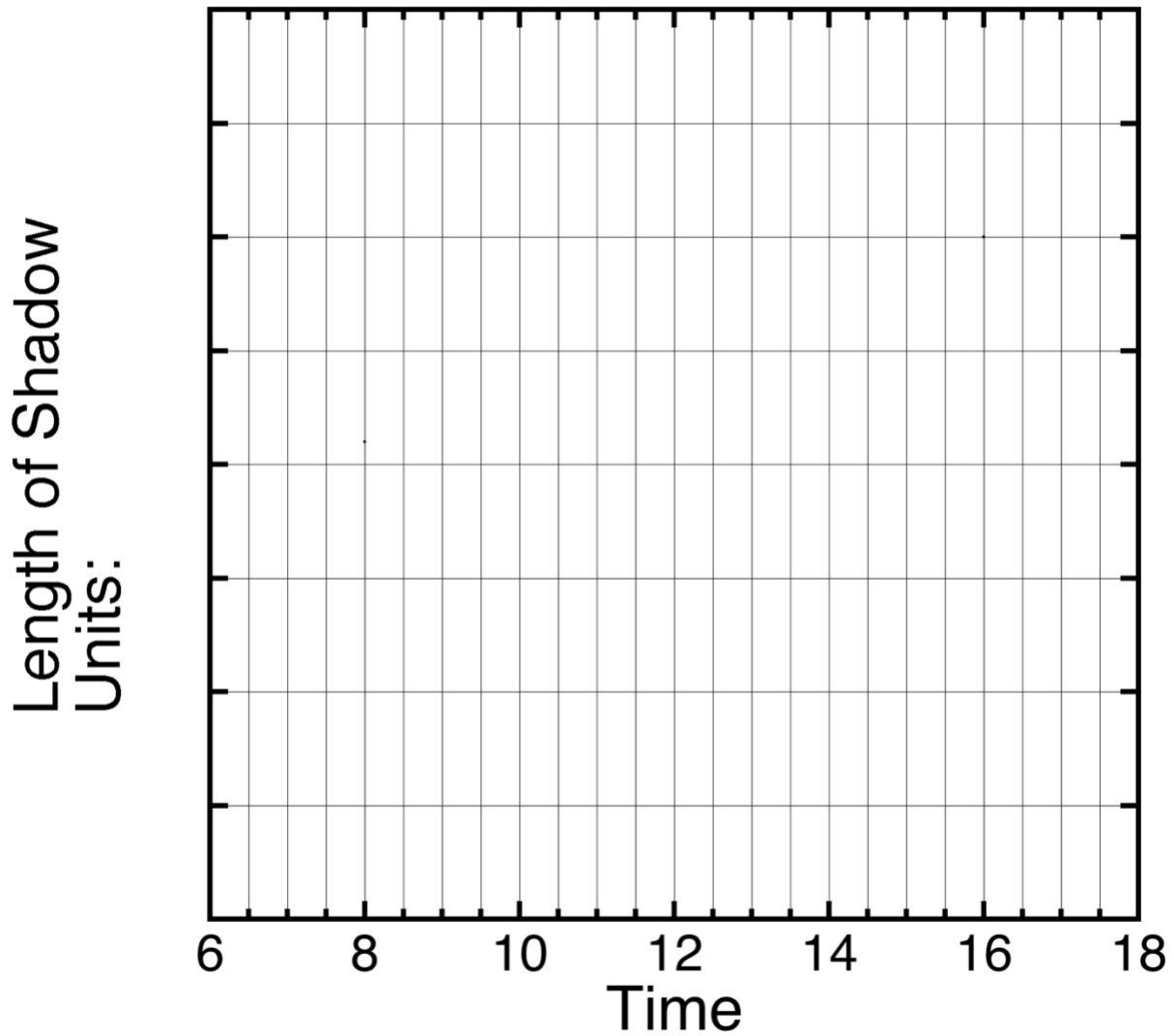
At what time are the shadows shortest?

At what time are the shadows longest?

When the shadows are short, the Sun is high/low (circle one) in the sky.

When the shadows are long, the Sun is high/low (circle one) in the sky

X-Y Plot. Plot the length of the shadows as a function of time.



At what time are the shadows shortest?

At what time are the shadows longest?

When the shadows are short, the Sun is high/low (circle one) in the sky.

When the shadows are long, the Sun is high/low (circle one) in the sky

## Part 2: Modeling shadows

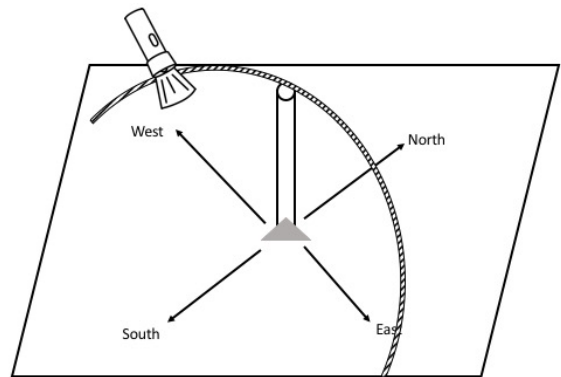
In this activity, you will create a model to explain the patterns observed for shadows in Part 1.

### Materials

- Modeling clay
- Short “test” pencil
- Compass
- Large sheet of paper
- Flashlight

### Instructions

- Put a small piece of modeling clay in the middle of the sheet of paper and insert a short pencil into the clay to model the meter stick in Part 1.
- Use a compass to determine the cardinal directions and draw them on the sheet of paper.
- Use the flashlight to represent the Sun and move the light in an arc to duplicate the patterns of shadows observed in Part 1.



### Questions

The Sun rises in the \_\_\_\_\_ (compass direction) in the morning and sets in the \_\_\_\_\_ (compass direction) in the evening.

In the morning, the shadows are long/short (circle one) and point to the \_\_\_\_\_ (compass direction).

In the evening, the shadows are long/short (circle one) and point to the \_\_\_\_\_ (compass direction).

Review your data in Part 1. Do the shadows generally point to the North or to the South?

In your model, simulate the path of the Sun so that the shadows point in the same direction. Was the Sun ever directly overhead in Part 1?

As the Sun moves across the sky, was it generally closer to the northern or southern horizon?