# Lesson 3: Rotation of the Earth

## Objective:

Students will understand why the sun rises in the east and sets in the west and how the Earth’s rotation impacts the light we see in the sky.

Adapted from the California Academy of Sciences, <https://www.calacademy.org/educators/lesson-plans/kinesthetic-astronomy-earths-rotation>

## NGSS:

1-ESS1.A Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted.

1-ESS1.B Seasonal patterns of sunrise and sunset can be observed, described, and predicted.

## Essential Questions:

1. Why does the sun rise in the east and set in the west?
2. What causes day and night?

## Materials:

* A “sun”—a heat source or large light source such as a halogen work lamp
* Boat rope—Place the floor a safe distance from the halogen working lamp. This will serve as a tactile marker for the students to stay a safe distance from the working lamp or heat source.
* A flat map of North and South America on one sheet and Asia and Australia on a separate sheet. This may be created tactually by printing the map on capsulated paper and running it through an activation machine, or you can make use of smaller tactile diagrams found in the World Maps book from the American Printing House for the Blind: <https://www.aph.org/product/world-maps>.

## Directions:

1. Provide maps to all of the students and have them pin or tape the North and South America map to the front of their shirt. Ask them to get help from a fellow student to tape or pin Asia and Australia on their back. Tell students that they are now Earth.
2. Have students identify where the Earth’s features are on their bodies such as the equator [belly], North Pole [head], home [Northern Hemisphere, North America] and what continent is opposite of North America [Asia].
3. *Note*. In what direction? Along which latitudinal and/or longitudinal lines? Be clear—an astute student may debate this.
4. Ask students to place themselves along the rope. Be sure that all students can still feel the heat or see the light source. You can tell them that the rope is there for safety and they are not to cross the line created with the rope.
5. Ask students which way is east and which is west? [East is to the left, west is to the right.]
6. Ask students how the sun appears in the sky. Where does it rise and set? [Rises in the east, sets in the west.]
7. Have students directly face the heat/light source with their toes touching the rope. What would we see in the sky? [Sun.] Would it be daytime or nighttime for us? [Daytime.] Now, turn your body to the right until your back is toward the sun. What just happened? [The sun set.]
8. Have students directly face away from the sun. Do North and South America have sunlight? [No.] What would we see in the sky? [Stars.] What would the people in Asia and Australia see in their sky? [The sun.]
9. Now, have students turn their bodies so that they face the sun source in that same direction. What does this represent? [The rising sun.]
10. Talk to students about the difference between day and night and sunrise and sunset. You can practice this multiple times until students fully understand the concepts presented in the lesson.
11. Be sure to ask students the following questions to wrap up:

* How long does it take the Earth to fully rotate? [Twenty-four hours.]
* Do people in Asia/Australia see the same sun as we do in North America? [Yes].
* Challenge question: If it is Monday evening in North America, what day is it in Asia? [Tuesday.] Ask students why Asia is “a day ahead,” based on what they have learned in this lesson.

## Extension Activity:

Based upon their understanding of the Earth’s rotation, challenge students to explain time differences. Why is it still light in California in the evening at 8:00 EDT when it is dark in New York?