

## ACTIVITY 3: TRACKING SEASONAL CHANGES IN SUNLIGHT



The purpose of this activity is to help students understand how the amount of daily sunlight changes throughout the year in the Great Lakes region.

### Materials:

- Access to weather databased such as: [timeanddate.com/astronomy/usa](http://timeanddate.com/astronomy/usa)
- Graph paper\* or graphing software (e.g., Excel, Google Sheets)
- Paper, ruler, pencil; alternatively, chart paper or large whiteboard and markers

First, inform students that they will investigate and graph the average daily minutes of sunlight per week over the course of a year in a city in the Great Lakes region. They will then work with their partner(s) to analyze seasonal variations in sunlight duration and explore how these variations impact energy availability for solar technologies.

Then, have them partner up in groups of up to 4 students and select a city in the Great Lakes region to obtain data for. Alternatively, you can assign each group a different city or provide options from which to choose. Make sure there are cities at different latitudes so that you can discuss how that affects the sunlight later on.

Next, have them partner up and obtain the supplies needed for the activity and then begin recording data from the online database. You may wish to review the calculations for how they will obtain the average daily minutes of sunlight per week, since the databases typically provide the total minutes of daylight by day for each month.

**\*Teaching Tip:** If your students are less experienced with graphing, you can graph an example city together first.

Provide them the data table to write their calculations and record their data. Alternatively, if they are using digital tools (e.g., a spreadsheet) you can show them how to use a formula to calculate the average of the data and have them enter the data directly from the source online database into their spreadsheet.

Be sure to monitor their data collection, calculations, and graphing to ensure you're providing support where needed based on the level of experience and math abilities of your learners.

Last, facilitate a class discussion that allows each group to see the other groups' graphs. First have them compare and make connections between their graphs and those of other groups. Discuss the significance of the graph's shape and encourage comparisons between groups' data. How does the available sunlight throughout the year impact the ability for that city to harness solar power?

Be sure to focus on the maximum, minimum, slope, and cyclical pattern shown on the graphs. Encourage students to connect what they see on the graphs to the physical implications of the graph for the region of the Great Lakes from which their data comes. In other words, how does what happens in the graph correspond to physical reality during different points in the year?

### Discussion Extensions

Depending on the ability and experience of your students with graphing, you could consider additional discussion questions, such as:

1. Why does the slope of the graph change?
2. Why does the graph not start at zero?
3. How does the amount of sunlight relate to the latitude of the city?
4. What would the graph look like if we plotted multiple consecutive years of data side by side?

*\*Note: you can use the data table and graph handouts for this activity available at the end of this lesson*