
# Gold Seal Lesson

| *Author(s):* | | | *Lesson Title:* | | | |
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| *David Nohara* | | | *Sunrise, Sunset* | | | |
| *Grade Span* | | | *ICLE Application Model* | | | |
| *K-4* | *5-8* | *9-12* | *A* | *B* | *C* | *D* |
| *XX* | | | | | | *XX* |

**Instructional Focus:**

**Basic Concepts and Knowledge**
Students develop an understanding of scientific concepts using facts, theories, principles, and models.

**Performance Task**

Most students know that temperature changes throughout the year according to the month and many recognize that sunrise and sunset (and thus hours of daylight) do as well, but they may not have a clear sense of what these patterns are (especially with hours of sunlight) or the reasons for them. In this exercise, students attempt to predict changes in temperature and hours of daylight, based either on their experience or knowledge of scientific facts.

1. Tell the student yesterday's high and low temperatures and the times the sun set and rose.
2. Have the students write down what they think the data was for the same date (3rd, 16th, etc.) for each of the preceding twelve months. If they have learned about graphing, have them plot the data. Ask them to give their reasoning.
3. Using an almanac or a weather-related website (such as www.wunderground.com), have them look up the actual data and put it on the same plot as their predictions. You may wish to prepare a data chart yourself to simplify the process.
4. Have them write a few sentences about how their predictions compared with the actual data, and whether their reasoning was supported by the data.
5. Use the findings to generate a discussion about the effect the changing tilt of the earth's axis has upon hours of daylight and temperature.

As a possible follow-up activity, have students do the same exercise for another city in the Southern Hemisphere or close to the Arctic Circle. Before they make their predictions, make sure they have a chance to locate the city on a globe.

**ICLE Essential Skills**

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| Understand how and why the rotation and revolution of the earth around the sun affects the length of night and day, the changing of seasons, and weather patterns. (s 1) |
| Exhibit good data management skills by collecting, organizing, and graphing data. (s 19) |
| Understand that because of the tilt of the earth's axis, sunlight and heat are more intense on one part of the earth during its one-year revolution around the sun; the change in the amount of heat produces the seasons. (s 27) |
| Know and apply the principles of scientific inquiry. (Implicit in this statement are the processes of prediction, estimation, developing hypotheses, drawing conclusions, evaluation, and following ethical principles and professional procedures.) (s 114) |

**Scoring Guide:**

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| Predictions and rationale<br>3 Points | • Predictions are complete: high and low temperatures and sunrise and sunset times for a twelve month period<br>• Predictions reflect obvious thought, either about past experience or about related scientific concepts students may have learned<br>• If using a plot, students format and label plot appropriately and plot data correctly |
| Looking up actual data<br>3 Points | • New data entered are complete<br>• If using a plot, student correctly plots and labels new data |
| Reflection<br>4 Points | Students identify gaps in knowledge, incorrect assumptions, or cases where their thinking was in the right direction, but their predictions were either too conservative or too extreme |

**Keywords**

| English Language Arts | Mathematics | Science |
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| **Reading** | **Algebra** | **Earth Science**<br>**Earth**<br>**Earth rotation**<br>**Meteorology**<br>**Scientific inquiry**<br>**Seasons**<br>**Sun** |
| **Writing** | **Geometry** | **Life Science** |
| **Communications** | **Statistics** | **Chemistry** |
| **Literature** | **Calculus** | **Physics** |
| **Other** | **Trigonometry** | **Other** |
| | **Other** | |