

This startup segment will allow students to begin the data collection of weather and moon phases. This segment will have students begin the process of collecting and analyzing weather data in order to predict the weather for their local area. Students will also begin collecting and recording observations of the moon phases to recognize the repeating pattern.

| Student Science Performance         |  |  |
|-------------------------------------|--|--|
| Grade: Fourth                       | Title                                  |  |
| Topic: Earth Science: Weather/Space | Weather & Moon Phases: Collecting Data |  |
|                                     | through the Year                       |  |

#### **Performance Expectation for GSE:**

# S4E4. Obtain, evaluate, and communicate information to predict weather events and infer weather patterns using weather charts/maps and collected weather data.

a. Construct an explanation of how weather instruments (thermometer, rain gauge, barometer, wind vane, and anemometer) are used in gathering weather data and making forecasts.

c. Ask questions and use observations of cloud types (cirrus, stratus, and cumulus) and data of weather conditions to predict weather events.

# S4E2. Obtain, evaluate, and communicate information to model the effects of the position and motion of the Earth and the moon in relation to the sun as observed from the Earth.

b. Develop a model based on observations to describe the repeating pattern of the phases of the moon (new, crescent, quarter, gibbous, and full).

### **Performance Expectations for Instruction:**

Students will

- Get an introduction to the theme of the year: Life on the International Space Station and Its Mission.
- Collect, record, and analyze data on cloud observations.
- Collect, record, and analyze data using weather instruments.
- Collect, record, and analyze data on moon phase observations.
- Use the data throughout the year as students become familiar with patterns and cause and effect relationships.

#### Materials

Weather instruments for data collection and/or access to a computer for data collection. Journal or chart for data collection. Calendar or journal for recording moon phase information.

Students will continuously obtain, evaluate, and communicate information. This is not a linear process. Students will communicate through writing and discussions to allow for formative assessment. This benefits the teacher, student, and whole group to guide instruction to clarify misconceptions or extend content.

| Engaging Learners   | Obtaining, Communicating, and Evaluating                                       |
|---|--|
|   | <b>Phenomenon:</b> International Space Station The audio portion of this video |
|   | uses a mechanized voice that is sometimes difficult to understand. The         |
|   | script is found here: Script for the video of the International Space Station  |
|   | You can show any portion of the video and read the script or have it           |
|   | available for questions.   |
|   | Have students read the following reading selection: What is the International  |
|   | Space Station?   |
| Explain that the year is based on the work of the astronauts on the |  |
|   | International Space Station and their life in microgravity conditions. This    |
|   | is the theme of each of the year's segments.                                   |



|                                       | This introduction will give students time to think about questions they have,  |
|---------------------------------------|--|
| Exploring                             | <ul> <li>what they want to know, and the possibilities of the future of space travel.</li> <li><i>Obtaining</i></li> <li>Weather is an ongoing disciplinary core idea and is integrated throughout the year when "teachable moments" of weather events occur both locally, worldwide and on a daily basis to aid students in predicting the forecast for tomorrow. Introducing so many new ideas takes time so getting students familiar with weather language and terms will help when they are working with maps and understanding weather relationships.</li> </ul> |
| <i>Explaining</i><br>Finalizing Model | Obtaining, evaluating, communicating<br>Part 1 and 2: CloudsThe science of forecasting the weather takes careful observation and time to<br>recognize patterns. Begin students with observing clouds for a period of<br>time. Have them notice the clouds and the weather associated with those<br>  |



|   | Cloud Identification Chart  |  |
|---|---|--|
|   | A good resource is the <i>Take a Cloud Walk</i> booklet by Jane Kirkland,   |  |
|   | talkawalk.com. It is a free download: <u>Take a Cloud Walk</u> .  |  |
| <i>Elaborating</i><br>Applying Model to<br>Solve a Problems | Students will also begin making observations of the <b>moon</b> nightly and recording this information in a calendar. As the weeks progress, discuss noticeable patterns. Models of the phases are developed and explanations of how these phases occur are after several months of recording to see patterns. Show students a sample lunar calendar of what will happen in upcoming year. Lunar Calendar for United States |  |
|   | Ask: How do we know what the phase of the moon is without having seen it? Is this the same for all over the world? Explain.   |  |
|   | Blank Calendar for Moon Phases  |  |
| Evaluation  | Assessment of Student Learning  |  |
|   | Rotating student teams can check calendars and charts to make sure  |  |
|   | everyone is up to date with their recording and drawing. Provide them with  |  |
|   | a checklist for ease in checking and let you know of any problems.  |  |
|   | Allowing students to see other student's data can help them in revising their work.   |  |
| SEP, CCC, DCI   | Science Essentials  |  |
| Science and<br>Engineering Practices                        | • Asking questions and constructing an explanation about weather instruments and function   |  |
|   | • Analyzing and interpreting data from charts, maps, and weather instruments  |  |
|   | • Constructing explanations about weather and weather patterns.   |  |
|   | <ul> <li>Obtaining, evaluating, and communicating information to predict<br/>weather events and infer weather patterns</li> </ul>   |  |
|   | -   |  |
| Crossoutting Concents                                       | <ul><li>Developing and using models</li><li>Patterns</li></ul>  |  |
| Crosscutting Concepts                                       |   |  |
|   | <ul> <li>Cause and Effect</li> <li>Systems and System Models</li> </ul>   |  |
| Disciplinary Core Ideas                                     | <ul> <li>Systems and System Models</li> <li>ESS2.D: WEATHER AND CLIMATE</li> </ul>  |  |
| Disciplinary Cole lucas                                     | ESS2.D: WEATHER AND CLIMATE     Cloud formations  |  |
|   | <ul> <li>Cloud formations</li> <li>Weather instruments</li> </ul>   |  |
|   |   |  |
|   | ESS1.B: EARTH AND THE SOLAR SYSTEM  |  |
|   | Moon phases   |  |