

<b>Science</b>	<b>SCI.V.4.1</b>	<b>Grade: 6</b>
<b><u>Strand V:</u> Using Scientific Knowledge in Earth Science</b>		
<b><u>Standard 4:</u> Galaxy and Universe - All students will compare and contrast our planet and sun to other planets and star systems</b>		
<b><u>Benchmark 1:</u> Compare the earth to other planets and moons in terms of supporting life.</b>		
<p><b>Constructing and Reflecting:</b></p> <p><b>SCI.I.1.1</b> - Generate scientific questions about the world based on observation.</p> <p><b>SCI.I.1.2</b> - Design and conduct scientific investigations.</p> <p><b>SCI.I.1.5</b> - Use sources of information in support of scientific investigations.</p> <p><b>SCI.II.1.1</b> - Evaluate the strengths and weaknesses of claims, arguments, or data.</p> <p><b>SCI.II.1.2</b> - Describe limitations in personal knowledge.</p> <p><b>SCI.II.1.4</b> - Describe the advantages and risks of new technologies.</p> <p><b>SCI.II.1.5</b> - Describe the advantages and risks of new technologies.</p> <p><b>SCI.II.1.6</b> - Recognize the contributions made in science by cultures and individuals of diverse backgrounds.</p>		
<p><b>Vocabulary / Key Concepts</b></p> <p>Surface conditions:</p> <ul style="list-style-type: none"> <li>• gravity</li> <li>• atmospheres</li> <li>• temperatures</li> </ul> <p>Relative distances; relative sizes Sun produces light and heat for each planet.</p> <p>Molecules necessary to support life:</p> <ul style="list-style-type: none"> <li>• water</li> <li>• oxygen</li> <li>• nitrogen</li> <li>• carbon</li> </ul> <p>See Cell processes (SCI.III.1.MS.2).</p> <p>See Photosynthesis (SCI.III.2.MS.3).</p> <p>See Light needed for Energy (SCI.III.5.MS.2).</p>	<p><b>Context</b></p> <ul style="list-style-type: none"> <li>• examples of local and extreme outdoor conditions on earth vs. conditions on other planets</li> <li>• exploration of planets and their satellites</li> </ul>	

## Knowledge and Skills

The Earth is the only planet in the solar system that is known to support life as we know it. Scientists have drawn this conclusion based on comparing data from other planets to data from Earth.

Some of these factors are:

- temperature and pressure conditions
- surface features
- gravitational pull
- the position in the solar system
- ability of the atmosphere to screen ultraviolet radiation
- proper concentration of carbon dioxide. Mars has too little; Venus has too much

Students will:

- Compare the atmospheric, surface, and temperature conditions, along with the position of earth in relation to other planets in the solar system.

Resources (continued from column on the right)

### Videoconferences Available

For more information, see

[www.remc11.k12.mi.us/dl](http://www.remc11.k12.mi.us/dl) or call Janine Lim 471-7725x101 or email [jlum@remc11.k12.mi.us](mailto:jlum@remc11.k12.mi.us)

### V.4.MS.1

*Space and the Solar System* from NASA Glenn Research Center

### 6<sup>th</sup> Grade Science Curriculum

#### Technology Resources

V.4.MS.1 Compare the earth to other planets and moons in terms of supporting life REMC

Materials: Thematic Units using Technology Unit 1: Space, Order #090526

## Resources

### Coloma Resources

Discover the Wonder Chapter 1 pp.B5-B13  
The Power Plant Unit

### Other Resources

- [Science Education Gateway](#) – LOTS of lessons in Space Science
- Scope Unit – [Solar System, Galaxy and Universe](#)
- The Exploratorium – [The Observatory](#) – astronomy resources
- Michigan Teacher Network [Resources](#)
- [NASA education](#) – LOTS of great info!
- Exploratorium – [Saturn – Jewel of the Solar System](#) – activities and images from the *Cassini-Huygens* spacecraft. Excellent!
- [Center for Educational Resources \(CERES\) Project](#) – TONS of astronomy materials for teachers – from NASA and Montana State Univ.
- [Earth and Sky Radio show](#) – online – EXCELLENT site with lots of teaching materials and info corresponding to the daily radio show.
- [The Nine Planets](#) – Multimedia tour of the solar system – Nice!
- *Moon Phases Teaching Unit*, available at [www.jcisid.org](http://www.jcisid.org), Instructional Services, Math and Science
- [NSTA Teacher Resources](#) – Space Science
- Bill Nye: Outer Space, Planets, Space Exploration, Sun, Moon
- Science Explosion: Space Science
- “Starry Night: Backyard” astronomy software

## Instruction

### **Focus Question: What conditions do living things need to exist on other planets?**

Students will brainstorm conditions necessary for life on Earth (water, oxygen, suitable temperatures, presence of ozone, proper amount of greenhouse gases like carbon dioxide and water vapor etc.) Students will list characteristics and traits that allow organisms to sustain life on Earth.

Using a variety of sources, students in small groups will select a planet (other than Earth), conduct research, and gather factual information about that planet, including its atmosphere, surface features, gravitational pull, and temperature conditions. These sources may include data collected from Galileo, Voyager, and other NASA space probes.

Using gathered information on the planets, each small group will create an illustration of an alien creature that has adapted to the conditions found on their selected planet, such as an alien drawn with space suit to adapt to the gases and extremely hot temperatures of Venus. Students will write and present a report describing their alien and its adaptations in relation to the planet's conditions.

## Assessment

Students are given the following scenario:

*Your parents are shipping you to another planet. List the planet on which you wish to live, what supplies you will need to survive on this planet and explain why you need these supplies.*

### **Assessment II**

Small groups will build a form or a model of an alien from another planet found in our solar system. They will use their research information to determine which characteristics the alien must have to adapt to their planet's atmosphere, surface features, gravitational pull, and temperature conditions.

Each group will present its design to the class and support their design with research information.

(Give students rubric before activity.)

### **Scoring Rubric**

#### **Criteria: Model of alien adaptations:**

**Apprentice** - Uses model to explain relationships of a single planet condition to the characteristics of the alien.

**Basic** - Uses model to explain relationships of two or three planet conditions to the characteristics of the alien.

**Meets** - Uses model to explain relationships of all four planet conditions to the characteristics of the alien.

**Exceeds** - Uses model to explain relationships of all four planet conditions to the characteristics of the alien. The illustration is colored with background effects.

#### **Criteria: Quality of model**

**Apprentice** - Builds a poor model.

**Basic** - Builds an average model.

**Meets** - Builds an above average model.

**Exceeds** - Builds an excellent model.

**Teacher Notes:**

- The earth is the third planet from the sun in a system that includes the moon, the sun, eight other planets and their moons, and smaller objects, such as asteroids and comets. The sun, an average star, is the central and largest body in the solar system.
- Most objects in the solar system are in regular and predictable motion. Those motions explain such phenomena as the day, the year, phases of the moon, and eclipses.
- Gravity is the force that keeps planets in orbit around the sun and governs the rest of the motion in the solar system. Gravity alone holds us to the earth's surface.
- The sun is the major source of energy for phenomena on the earth's surface, such as growth of plants, winds, ocean currents, and the water cycle. Seasons result from variations in the amount of the sun's energy hitting the surface, due to the tilt of the earth's rotation on its axis and the length of the day.

**Focus Questions**

- How does the Earth compare to other planets for supporting life?