

EARTH'S ENERGY BALANCE

Performance Standard 17B.G

Using a world surface temperature regions map, describe the spatial pattern of world temperatures and explain how the pattern of world temperatures is affected by the relationship of the Earth to the Sun accordingly:

- *Knowledge:* identify the surface temperature patterns from the Equator to the Poles;
- *Reasoning:* explain how temperature patterns are affected by the relationship of the Earth to the Sun; and
- *Communication:* write a summary that is well-organized, well-focused and well-detailed; express all ideas in a way that provides evidence of knowledge and reasoning processes.

Procedures

1. *In order to analyze and explain characteristics and interactions of the Earth's physical systems (17B),* students should experience sufficient learning opportunities to develop the following:
 - Explain how Earth-Sun relationships affect Earth's energy balance (e.g., heating of soil and water at different seasons of the year, differential heating at different latitudes).
2. Have students review and discuss the assessment task and how the rubric will be used to evaluate their work.
3. Students should know how to read thematic maps and legends. They should have studied Earth-Sun relationships enough to understand how the angle of the Sun's rays affects surface temperatures at different latitudes. For example, they should understand the effect of a permanently tilted axis and know that the angle of the Sun's rays change from season to season as the Earth revolves around the Sun, which affects temperatures on Earth.
4. Have students study the Surface Temperature Regions map included with this assessment item.
5. Have students write a paragraph describing the surface temperature pattern from the Equator to the Poles.
6. Have students write a second paragraph explaining the pattern of temperatures on Earth. Be sure to discuss the relationship of the Earth to the Sun in your explanation.
7. Evaluate each student's work using the Social Science Rubric as follows and add the scores to determine the performance level:
 - *Knowledge:* the identification of surface temperature patterns from the Equator to the Poles is complete and accurate.
 - *Reasoning:* the explanation of the pattern of temperatures on Earth that are affected by the relationship of the Earth to the Sun is logical and well-reasoned.
 - *Communication:* the writing is well-organized, well-focused and well-detailed; the knowledge and reasoning were completely and effectively communicated.

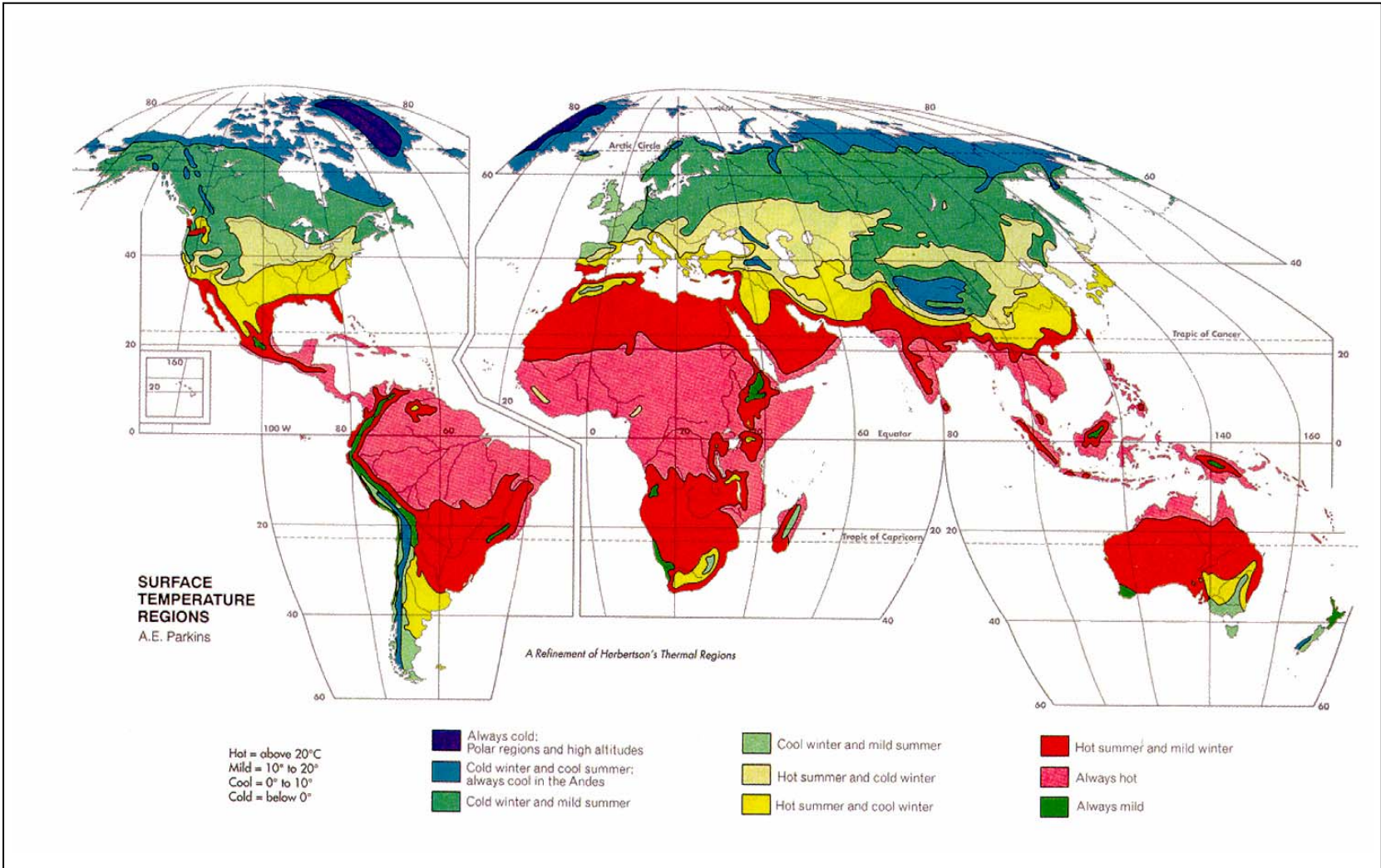
Examples of Student Work follow

Time Requirements

- One 25 minute time period

Resources

- The World Surface Temperature Regions map included with this assessment item.
- Writing pen or pencil
- Writing pad
- Social Science Rubric



I believe that closer the country is to the equator the hotter it is. The farther away your country is from the middle of the earth the colder. Antarctica is freezing Africa that is in between the tropics is hot or very warm. In between the poles and the Tropics is mild weather.

When the Earth orbits the sun some places at certain times are warmer than in others. For example Asia ~~is~~ is located between the tropics and the North pole. At one time in the year Asia is "closer" or more directly facing the sun making it warmer. Other times they're farther away and are much colder.

The surface temperature pattern from the Equator to the Poles can be described simply. Near the Equator, or in the Tropics, temperatures are always hot or mostly hot all year long. As you get closer to the Poles, the average temperatures start dropping. Finally, when you get into the Arctic and Antarctic circles, temperatures are cool to cold all year long.

The temperatures are like that because of the amount of direct sunlight those areas get. Due to the Earth's axis, regions at or near the Equator get the most sunlight. As you go north and south of those areas, the sun's rays spread out and cause less direct sunlight as you go farther north and farther south. The Earth's temperatures all depend on its relationship to the Sun.