Name _____ Date _____ Class _____

Enrichment **LESSON 2**

Arctic Thaw

Carbon dioxide and methane are two greenhouse gases. These gases absorb energy from the Sun that would normally be reflected into space. Many scientists believe that increasing the concentration of carbon dioxide and methane in the atmosphere results in increased temperatures on Earth—global warming.

Siberian Peat Bogs

Human activities have been blamed for increasing these greenhouse gases in the atmosphere. However, a new source of greenhouse gases has recently been discovered in northern Russia—Siberian peat bogs.

Massive Siberian peat bogs began forming after the last ice age about 12,000 years ago. The Siberian peat bogs contain methane gas, which is trapped in the permafrost. Permafrost is a permanently frozen layer of Earth that exists in extremely cold parts of the world. Methane forms when organic matter, such as dead plants, remains in a wet environment, such as water-saturated soils or at the bottom of a lake. Bacteria decompose the organic material in the oxygen-poor environment. Methane gas is produced in the digestion process. Because of the frigid temperatures, the methane gas is trapped in the permafrost.

A Carbon Reservoir

In the past, the peat bogs have absorbed carbon dioxide. Peat moss is a collection of various species of mosses that grow in bogs. When the mosses are actively growing, they absorb carbon dioxide from the atmosphere for photosynthesis. The carbon dioxide is converted to methane during decomposition. Then the methane becomes trapped in the permafrost. The bogs become carbon sinks, or reservoirs. The bogs have been storing carbon for about 12,000 years.

Thawing Bogs

Today there appears to be a change in this process—the permafrost is melting at an accelerated rate. When the permafrost melts, methane escapes into the atmosphere. The peat bogs will shift from absorbing carbon dioxide in large quantities to releasing methane in large quantities. Scientists are concerned that increasing amounts of methane and carbon dioxide in the atmosphere will increase global warming. However, the impact of the thawing bogs on the environment is unclear. Further research is needed before the full effects of the thawing can be determined.

Applying Critical-Thinking Skills

Directions: *Respond to each statement.*

1. **Describe** why the frozen peat bogs are a carbon reservoir.
2. **Explain** why the melting permafrost in the Siberian peat bogs might increase global warming.