CRITICAL THINKING ACTIVITY:  
MODELING EARTH’S ATMOSPHERIC LAYERS

OBJECTIVE: Students will:
- make a model of Earth’s atmospheric layers;
- graph where aircraft, satellites, and spacecraft operate;
- interpret which objects operate in which layers of the atmosphere;
- infer conclusions about why the objects operate where they do in the atmospheric layers.

MATERIALS:
- 3 square foot pieces of butcher/chart paper
- Sheets of graphics for atmospheric layers
- Colored pencils or markers
- Metric ruler
- Glue

PROCEDURE:
1. Divide class into groups of 2-3 students.

2. Post the instructions below on the board or chart paper for students to refer to or hand out copies.

✓ Start with a large piece of paper. You can use legal paper or 3 sq. ft of butcher/chart paper.

✓ Draw the Earth.
- Use coloring utensils to draw an Earth at the bottom of the paper. Be sure to leave space to draw above it.
- Color the Earth blue and green to represent the continents and oceans.

✓ Draw the troposphere, which is the first layer of the atmosphere. The troposphere extends 12 km above Earth.
- Use the following scale -1 mm = 1 km. Draw a line 12 mm from the Earth’s surface.
- Label it the troposphere.
- Color it yellow.
- Draw pictures to help indicate what happens in this layer. You can add airplanes, people, weather occurrences, bad ozone.
Teacher Sheet 2

✓ Draw the **stratosphere**, which is the second layer of the atmosphere. It extends 12-50km above the Earth’s surface.
  - Measure and draw a line 50 mm from Earth’s surface.
  - Label it stratosphere.
  - Color it orange.
  - Draw or glue pictures to help indicate what happens here.

✓ Draw the **ozone layer**. This is not a main layer of the atmosphere, but plays an important role in how it works. This is also where the ozone is found, which absorbs ultraviolet radiation.

✓ The ozone is between the stratosphere and the mesosphere.
  - Its symbol is $O_3$ because it is made of three oxygen atoms.
  - Color a thin, purple line to represent the ozone.
  - Make a small section of the line dotted (----) to represent the "hole" in the ozone layer.

✓ Draw the **mesosphere**, which extends 50km-80km from the Earth’s surface.
  - Measure and draw a line 80 mm from the Earth’s surface.
  - Label this layer mesosphere. Color it red.
    - Draw pictures to help show characteristics.

✓ Draw the **ionosphere**. This is the fourth layer of the atmosphere. It extends 80km-400km from the surface.
  - Label it the ionosphere and color it pink.
  - Draw pictures to help show characteristics. The ionosphere is very hot and contains light "shows" called auroras.

✓ Beyond the ionosphere is the **exosphere**. It starts at 400km above the Earth’s surface. And extend out to outer space.
  - Color this gray and label it exosphere.
  - Draw and label a meteor entering Earth’s atmosphere.

✓ When you have completed your model.
  - Turn the paper over and draw or cut out the pictures from the hand-out **ATMOSPHERIC LAYER IMAGES**
  - You will glue each picture in its appropriate layer.
  - You do not have to use each picture but make sure each layer is sufficiently represented.

10. When students have finished their chart, they should answer the **COMPREHENSION QUESTIONS**.
ATMOSPHERIC LAYER IMAGES