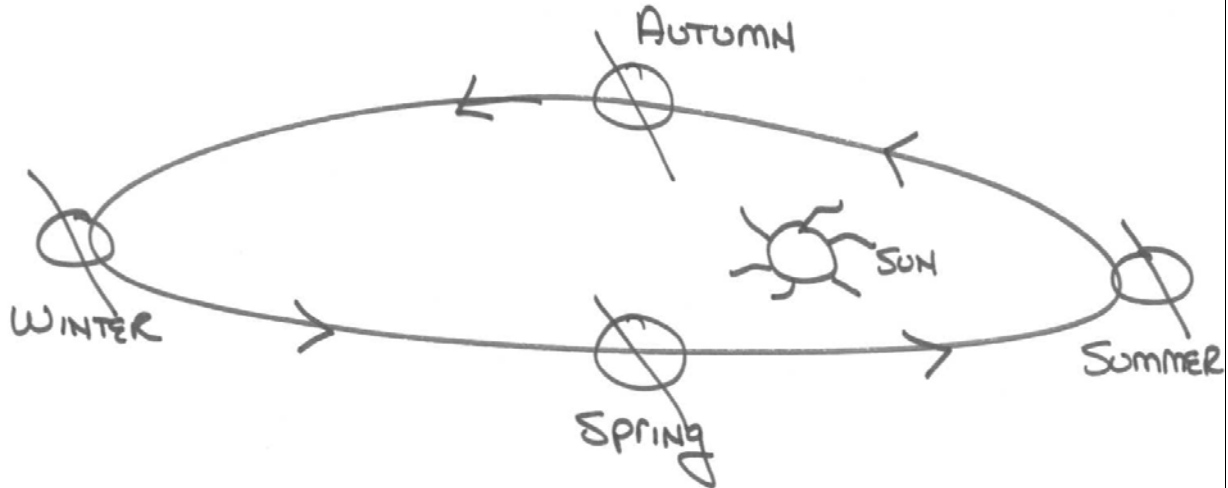


Pre- and postassessment.

Below is a student's drawing and explanation of the seasons. Read the explanation carefully and respond to the questions that follow.



Earth's orbit goes counterclockwise around the Sun. The shape of Earth's orbit is not a perfect circle, but more oblong; we call this *elliptical*. Since the Sun is not in the center of Earth's orbit, the distance between Earth and the Sun changes throughout the year. During the summer, the Sun is closer to Earth, which makes temperatures warmer. During the winter, the Sun is further from Earth, which makes temperatures colder. Earth is also tilted on its axis, which brings us a little closer to the Sun during the summer when compared to the winter. Thus, the tilt of Earth's axis also makes the seasons warmer during the summer and colder during the winter.

Answer the following questions:

1. What do you think is right or wrong about the student's diagram of the seasons?
2. What do you think is correct or incorrect about the student's explanation of the seasons?

Misconceptions evident in this drawing and explanation include the following:

- The elliptical nature of Earth's orbit is greatly exaggerated.
- Earth is not closer to the Sun in the summer (in the Northern Hemisphere).
- The tilt of Earth's axis does not bring us significantly closer to the Sun.