Changing Sky Models

Read the evidence behind two views of the solar system.

E.5.8B.4 "Obtain information and analyze how our understanding of the solar system has evolved over time (e.g., Earth-centered model of Aristotle and Ptolemy compared to the Sun-centered model of Copernicus and Galileo)."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB As you read, underline observations and circle explanations of those observations. Write 1 beside the Earth-centered model and 2 beside the Sun-centered model to track how ideas changed.

What Made Mars Move Backward?

1. Imagine watching Mars on clear nights. Most nights, it seems to move one way against the stars, but sometimes it appears to slip backward. Long ago, Aristotle taught that Earth stayed still at the center while the Sun, planets, and stars moved around it. This seemed sensible because the ground felt still and the sky appeared to turn. Later, Ptolemy used small circles within larger paths to explain Mars's strange motion.

2. In 1543, Nicolaus Copernicus published a different model. He placed the Sun near the center, with Earth and other planets traveling around it. Earth also spins, making the Sun seem to cross our sky each day. In this model, Mars seems to move backward when faster-moving Earth passes it. Copernicus did not invent the idea that Earth moves, but his detailed model challenged the older Earth-centered one.

3. Decades later, Galileo used a telescope to collect new clues. He saw four small moons changing positions around Jupiter, so not everything in the sky went around Earth. He also saw Venus change shape from a thin crescent to a nearly full disk. Ptolemy's model could not account for all those shapes, but a model with Venus circling the Sun could. Observations helped scientists test and improve their models.

2 ANSWER WITH EVIDENCE

Use the passage

1. Why might the Earth-centered model have seemed sensible to people watching the sky long ago?

2. How did Copernicus explain the Sun's daily trip across the sky differently from the Earth-centered model?

3. How did Ptolemy and Copernicus explain Mars's apparent backward motion in different ways?

4. How did Galileo's observations of Venus help scientists compare Ptolemy's model with a model in which Venus circles the Sun?

3 YOUR TURN

Your own words

Imagine you are Galileo watching Jupiter through a telescope on several nights. Write four diary sentences that describe what you see, explain which Earth-centered claim it challenges, suggest how to change that claim, and name one observation you would seek next.

ANSWER KEY

Changing Sky Models

GRADE 5 · E.5.8B.4

PART 1 · READ AND MARK

As you read, underline observations and circle explanations of those observations. Write 1 beside the Earth-centered model and 2 beside the Sun-centered model to track how ideas changed. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Why might the Earth-centered model have seemed sensible to people watching the sky long ago?	**The ground felt still, while the sky appeared to turn.**
2	How did Copernicus explain the Sun's daily trip across the sky differently from the Earth-centered model?	**In the Earth-centered model, the Sun moved around a still Earth. Copernicus said Earth spins, making the Sun appear to cross the sky.**
3	How did Ptolemy and Copernicus explain Mars's apparent backward motion in different ways?	**Ptolemy used small circles within larger paths. In Copernicus's model, Mars appears to move backward when faster-moving Earth passes it.**
4	How did Galileo's observations of Venus help scientists compare Ptolemy's model with a model in which Venus circles the Sun?	**Galileo saw Venus change from a thin crescent to a nearly full disk. Ptolemy's model could not explain all those shapes, but a model with Venus circling the Sun could.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

After several nights of watching Jupiter, I saw four small lights change positions around it. They seem to travel around Jupiter, which challenges the claim that everything in the sky circles Earth. I would change that claim to say that some objects circle other planets. Next, I would watch the lights on more nights to check whether they keep moving around Jupiter.

Accept answers that distinguish what people observed from how each model explained it. For the diary, students should treat Jupiter's moons as evidence against the claim that everything in the sky circles Earth, without claiming that this observation alone proves Earth circles the Sun.