Changing Sky Ideas

Trace how evidence and tools reshaped solar-system models.

6.2.d "the understanding of the solar system has developed over time."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the observations or tools that provided evidence, and number 1, 2, and 3 beside three changes in scientists' explanations of the solar system.

Models Under Revision

1. People once used their eyes and simple tools to study the sky. In ancient Greece, many thinkers proposed that Earth stood still at the center while the Sun, Moon, planets, and stars moved around it. This geocentric model matched what people seemed to see each day. It also helped predict some motions, but it could not explain every change in a planet's path easily. A model is an evidence-based explanation that scientists test and revise.

2. In the 1500s, Nicolaus Copernicus argued that Earth and the other planets travel around the Sun. His heliocentric model gave a simpler explanation for some planet motions. Later, Galileo Galilei used a telescope to observe moons orbiting Jupiter and phases of Venus. These observations showed that not everything orbited Earth. Galileo's evidence did not prove every detail of Copernicus's model, but it gave scientists a reason to question the older explanation and gather more observations before accepting a new model.

3. Scientists continued to improve the Sun-centered model. Johannes Kepler used careful measurements of Mars to show that planets move in oval-shaped paths, called ellipses, rather than perfect circles. Isaac Newton later explained that gravity affects the motion of planets and moons. Modern spacecraft, powerful telescopes, and computer calculations have added much more evidence. Scientists still test ideas about the solar system because new tools can reveal details that earlier observers could not detect with their tools.

2 ANSWER WITH EVIDENCE

Use the passage

1. Why did the geocentric model seem reasonable to many people, and what was one limit of that model?

2. What two telescope observations did Galileo make, and how did they challenge the older model?

3. How did Kepler change an earlier explanation of planet motion?

4. What do the examples of Galileo, Kepler, and modern scientists show about how scientific understanding develops?

3 YOUR TURN

Your own words

Imagine that a new spacecraft finds a small object beyond Neptune moving in a way that a current computer model did not predict. Write 3 to 4 sentences explaining what scientists should do next, how repeated evidence could affect the model, and why one observation is not enough.

ANSWER KEY

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GRADE 6 · 6.2.d

PART 1 · READ AND MARK

Underline the observations or tools that provided evidence, and number 1, 2, and 3 beside three changes in scientists' explanations of the solar system. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Why did the geocentric model seem reasonable to many people, and what was one limit of that model?	**It matched the daily appearance of objects moving across the sky, but it could not easily explain every change in a planet's path.**
2	What two telescope observations did Galileo make, and how did they challenge the older model?	**He observed moons orbiting Jupiter and phases of Venus. The observations showed that not everything orbited Earth.**
3	How did Kepler change an earlier explanation of planet motion?	**Using measurements of Mars, Kepler showed that planets move in ellipses rather than perfect circles.**
4	What do the examples of Galileo, Kepler, and modern scientists show about how scientific understanding develops?	**Scientists use new observations and tools to test ideas. When evidence reveals a problem or new detail, they can revise explanations and models.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Scientists should check the spacecraft data and ask other instruments to make more observations. They should compare the object's motion with predictions from the current model. If repeated evidence disagrees, they can revise the model to explain the new motion. They should not change the model after one observation because a measurement could contain an error.

Accept equivalent explanations that connect observations or tools to testing and revising models. For Your Turn, accept logical next steps that include checking evidence, repeated observations, and a possible model revision.