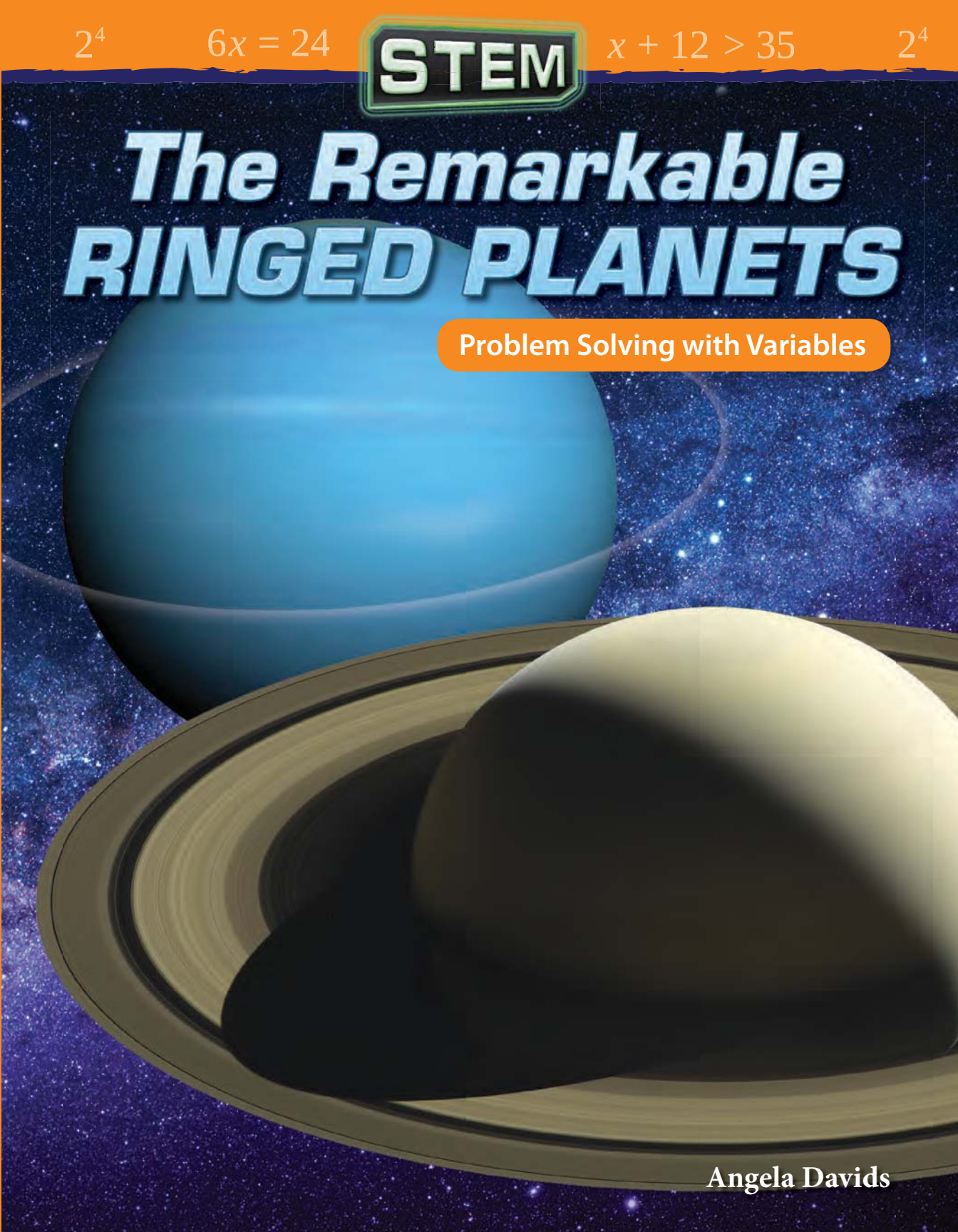
2^4 $6x = 24$ STEM $x + 12 > 35$ 2^4

The Remarkable RINGED PLANETS

Problem Solving with Variables



Angela Davids

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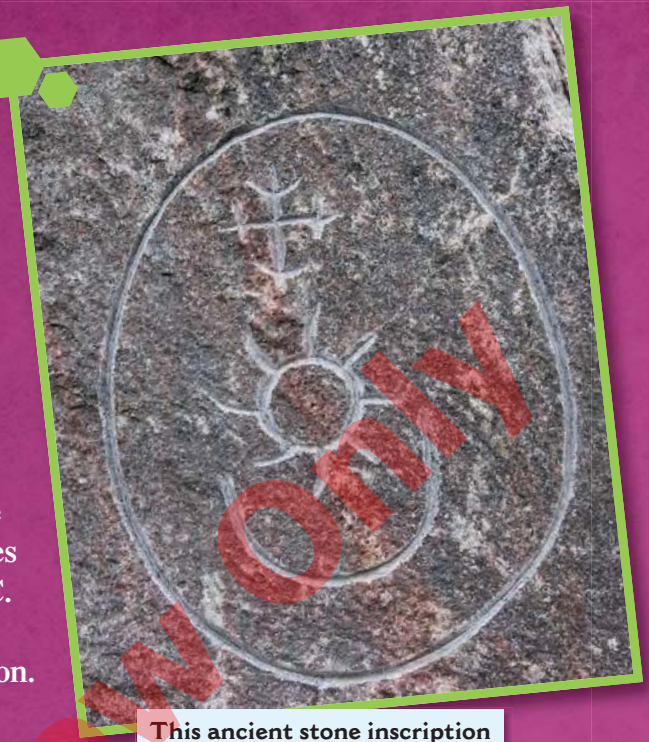
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A Universe to Discover



This ancient stone inscription shows the sun, the moon, and Venus.

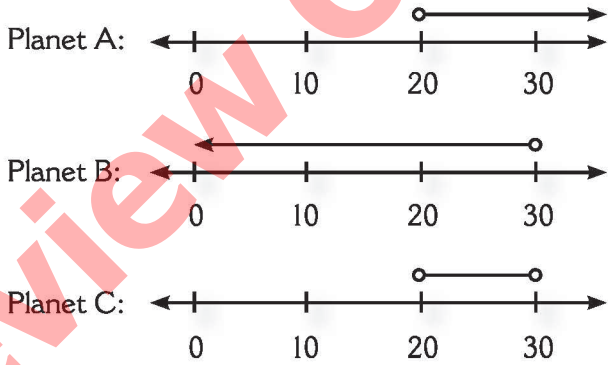
Since prehistoric times, people have looked up and wondered what is beyond Earth. What is in the night sky? How does it affect people on Earth? The fascination began early. **Archaeologists** have found carvings in stones and bones that date as far back as 32,000 BC. These carvings show that ancient people tracked changes in the moon. Throughout history, people have studied the stars and the planets to know when to plant crops or when to travel to seek food. They used stars to navigate over land and across seas. Scientists still look beyond Earth to learn more about the universe. They have learned that while Earth has only one moon, some planets have none and some have over 50. One area some scientists are now studying is the rings of the planets.

When most people think of a planet with rings, they get a clear image of Saturn in their heads. Those rings were discovered by **astronomer** Galileo Galilei in 1610. Hans Lippershey of the Netherlands is credited with the invention of the telescope in 1608; however it was Galileo who made the invention—and Saturn—famous. But there are three other planets in our solar system with rings. Imagine the amazement of astronomers and **physicists** when they saw spacecraft photos that proved there were rings around other planets. The scientists were brimming with questions. How many rings do each of these planets have? What are the rings made of? How old are the rings? Scientists got to work to find out.

Not Review Only

LET'S EXPLORE MATH

Imagine that a scientist observes three planets through a telescope. She estimates the number of moons each planet has and records her findings on number lines.



1. Write two inequalities to represent the number of moons Planets A and B have. Use m to stand for the number of moons.
2. What do you know about the number of moons Planet C has?

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Jupiter: Planet King

Jupiter is the largest planet in our solar system. Its name comes from the highest god in Roman mythology. It is easily recognized by its giant red spot. The spot is a windstorm of gases that swirl at 400 miles (644 kilometers) per hour. Astronomers first saw that famous spot by telescope in the 1600s. It took almost four hundred more years for scientists to discover Jupiter's rings. Finally, in 1979, the *Voyager 1* spacecraft was sent into space by the National Aeronautics and Space Administration (NASA). Photos from that trip showed scientists Jupiter's rings for the first time.

How Big Is Big?

Jupiter is massive! All the planets in our solar system can fit inside of it at one time. Jupiter is like a huge gumball machine that can hold more than 1,300 Earths. It measures almost 273,000 mi. (440,000 km) around at its **equator**. In comparison, Earth is 24,900 mi. (40,073 km) around. That means someone would have to travel around Earth more than 10 times to equal the distance of traveling around Jupiter once.

Jupiter is the fifth farthest planet from the sun. It is about five times farther from the sun than Earth is. As Jupiter and Earth travel around the sun, they move closer and farther away from one another. Earth and Jupiter are almost 400 million mi. (644 million km) apart when they are at their closest point during **orbit**.

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Let's Explore Math

Jupiter has the shortest day in the solar system. One day, defined as the time it takes for Jupiter to **rotate** once, is only about 10 hours. Choose all the expressions that represent the number of hours that pass on Jupiter when d days have passed.

A. $10d$

B. $24d$

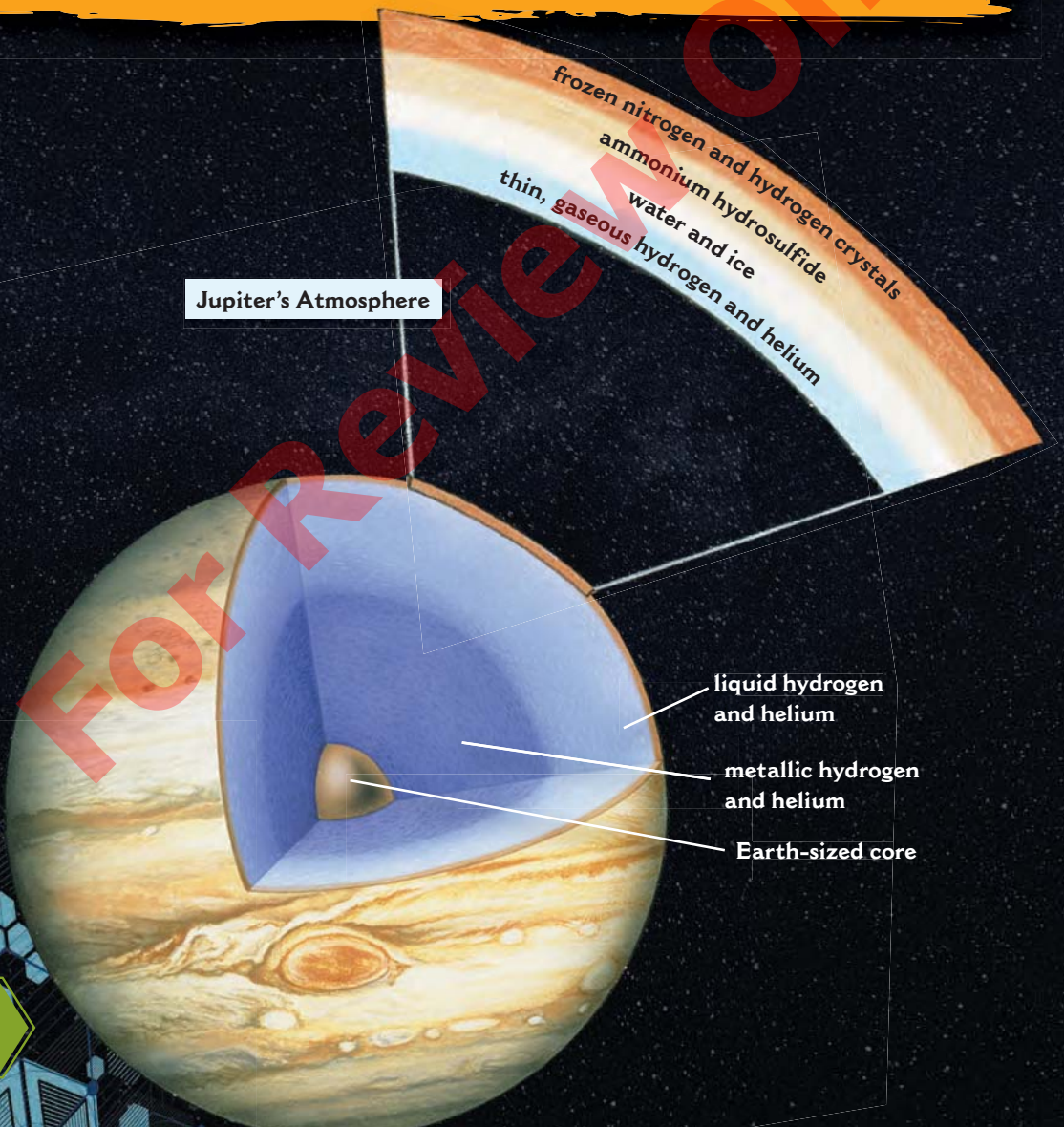
C. $\frac{d}{10}$

D. $d \times 10$

E. $5d + 5d$

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Jupiter can be called a cousin of the sun. About 4.5 billion years ago, gas and dust created a cloud that would form the sun and the rest of the solar system. The sun was made from much of this cloud, and the planets came from the leftovers. Jupiter's **atmosphere** makes up most of the planet, since Jupiter does not have a firm "ground" like Earth does. Like the sun, Jupiter is mostly made up of hydrogen, followed by helium and other gases. However, the sun is a star, not a planet. Though Jupiter is made up of the same gases as stars, it never grew large enough or hot enough to create the energy of a star.

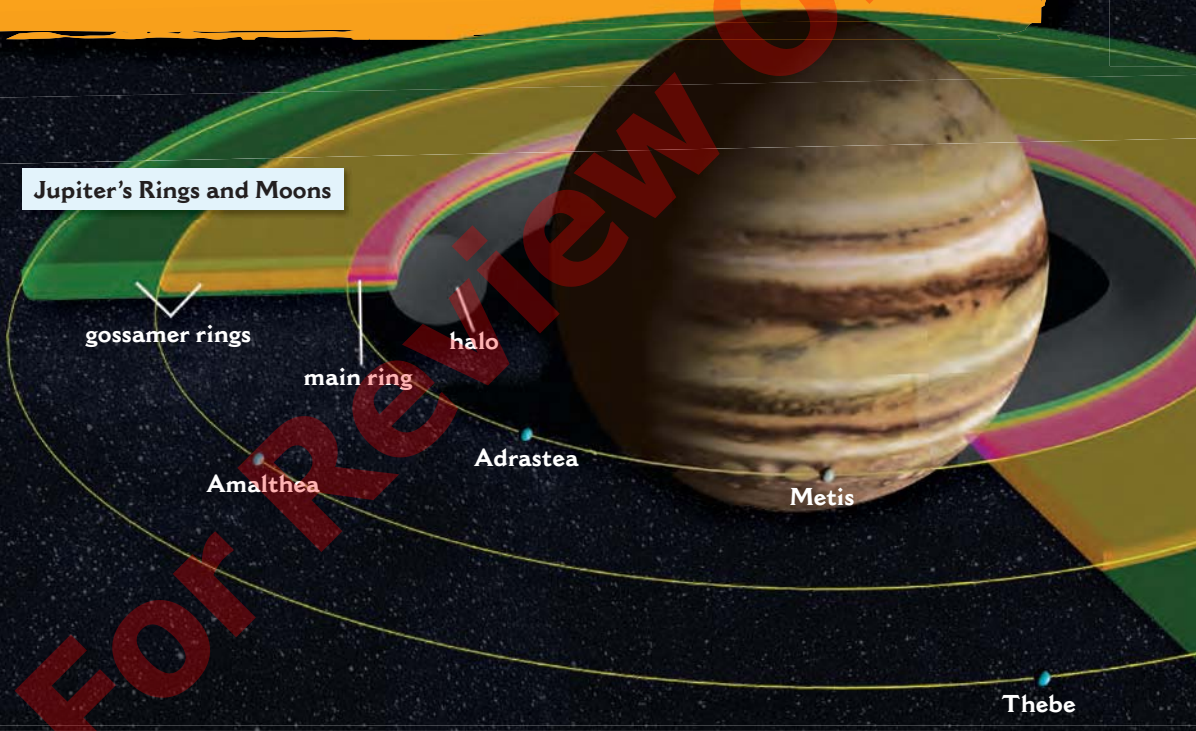


Jupiter's Atmosphere

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Surprise! It Has Rings!

NASA first launched a spacecraft to Jupiter in 1972. But, it was a 1979 photo from the *Voyager 1* spacecraft that captured Jupiter's thin rings. Everyone was shocked. The dust **particles** that form the rings appeared only when they were backlit by the sun. The *Galileo* spacecraft that orbited Jupiter from 1995 to 2003 gathered new data. It showed that **meteoroids** were colliding into Amalthea, Thebe, Adrastea, and Metis—the closest of Jupiter's 79 moons. Dust from these collisions is what created Jupiter's four rings. Scientists call the two outer rings *gossamer rings* and the thick inner ring the *halo*. The ring in between those is called the *main ring*.



Jupiter's Rings and Moons



This photo of Jupiter's rings was taken by the *Galileo* spacecraft.

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