The James Webb Space Telescope



Read the passage. Then answer the questions in full sentences.

Name _____ Date _____

The James Webb Space Telescope, launched on December 25, 2021, is the largest, most powerful space telescope ever built. It lets scientists look at what our universe was like about 200 million years after the Big Bang. Webb sees the universe in light that is invisible to human eyes. This light is called infrared radiation, and we can feel it as heat. Firefighters use infrared cameras to see people through the smoke of a fire. In a similar way, Webb's infrared cameras can see through dust in space, inside the clouds where stars and planets form. Infrared also helps Webb see the first galaxies, which are so far away that the expansion of the universe has shifted their light from visible to infrared.

Space telescopes use mirrors to collect and focus light, and the bigger the mirror, the more details a telescope can see. But it is very difficult to launch a giant, heavy mirror into space. So engineers gave Webb 18 smaller mirrors that fit together like a puzzle. The mirrors fold up inside the rocket, then unfold to form one large mirror in orbit. A thin layer of gold helps them reflect infrared light.

The whole telescope is as tall as a 3-story building and as long as a tennis court, so it had to fold origami-style to fit inside its rocket. Its cameras are sensitive to heat from the Sun, so Webb has a sunshield about the size of a tennis court. The temperature difference between the sun-facing side and the shaded side is more than 600 degrees Fahrenheit.

1. **What kind of light does Webb see, and why is it useful?**

2. **What does "origami-style" mean in the last paragraph? What in the sentence shows it?**

3. **Why did engineers give Webb 18 smaller mirrors instead of one large one?**

4. **Why do you think the author compares Webb's cameras to firefighters' cameras? Support your answer with details from the passage.**

Answer key

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1. What kind of light does Webb see, and why is it useful?
   Infrared light, which human eyes cannot see. It lets Webb see through the dust clouds where stars and planets form, and it lets Webb see the first galaxies.

2. What does "origami-style" mean in the last paragraph? What in the sentence shows it?
   Folded up neatly, like folded paper. The sentence says the telescope had to fold this way to fit inside its rocket.

3. Why did engineers give Webb 18 smaller mirrors instead of one large one?
   It is very difficult to launch a giant, heavy mirror into space. The smaller mirrors fold up inside the rocket and then unfold to form one large mirror.

4. Why do you think the author compares Webb's cameras to firefighters' cameras? Support your answer with details from the passage.
   Sample answer: The comparison makes a hard idea easy to picture. Readers may know that firefighters' infrared cameras see people through smoke, so they can understand how Webb's infrared cameras see through dust to the places where stars and planets form.