Beyond the Images

Read closely, then restate key scientific ideas accurately.

ELA.12.R.3.2 "Paraphrase content from grade-level texts."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline one sentence in each paragraph that states a central idea. In the margin, write a 10 to 15 word paraphrase of each underlined sentence using your own wording.

A Telescope Built for Infrared

1 NASA launched the James Webb Space Telescope on December 25, 2021, from French Guiana aboard an Ariane 5 rocket. Unlike the Hubble Space Telescope, Webb was designed chiefly to observe infrared light, which can reveal objects hidden by dust and stretched by the universe's expansion. Its 6.5-meter primary mirror had to fold inside the rocket's fairing, then unfold after launch. Webb traveled about 1.5 million kilometers from Earth to a gravitationally balanced region called the second Lagrange point, or L2. From there, the telescope can keep Earth, the Moon, and the Sun on the same side of its protective sunshield.

2 During its first months in space, Webb completed a sequence of deployments that could not be repaired by astronauts. Engineers unfolded its sunshield, a five-layer barrier about the size of a tennis court, to block heat and light from the Sun. They also aligned the mirror's 18 hexagonal segments so that they functioned as one precise surface. The observatory then cooled to extremely low temperatures, allowing its instruments to detect faint infrared signals. In July 2022, NASA released Webb's first full-color images and spectra, including views of distant galaxies, a stellar nursery, and an exoplanet atmosphere.

3 Webb's location and design give it advantages, but they also impose limits. The telescope cannot be serviced in the way Hubble was, because L2 is far beyond the orbit reached by crewed repair missions. Its sunshield must remain pointed toward the Sun, so Webb observes targets during planned viewing windows rather than turning freely in every direction. Scientists use the telescope to investigate subjects ranging from planets in our solar system to early galaxies. They do not treat a striking image as proof by itself. To draw conclusions about an object's composition, temperature, or motion, researchers compare measurements from Webb's instruments with models and observations from other telescopes.

2 ANSWER WITH EVIDENCE

Use the passage

1. Paraphrase the passage's explanation of why Webb observes infrared light.

2. In one sentence, paraphrase why Webb's first months in space required careful deployments.

3. Paraphrase how the observatory's low temperature affects its instruments.

4. Paraphrase how scientists use evidence to make conclusions from Webb's observations.

3 YOUR TURN

Your own words

Write a 60 to 75 word paraphrase of the third paragraph. State both a limit on Webb and how scientists reach conclusions. Use your own sentence structure, and do not quote more than three consecutive words from the passage.

ANSWER KEY

Beyond the Images

GRADE 12 · ELA.12.R.3.2

PART 1 · READ AND MARK

Underline one sentence in each paragraph that states a central idea. In the margin, write a 10 to 15 word paraphrase of each underlined sentence using your own wording. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Paraphrase the passage's explanation of why Webb observes infrared light.	**Webb detects infrared light, helping scientists study dust-obscured objects and light lengthened as the universe expands.**
2	In one sentence, paraphrase why Webb's first months in space required careful deployments.	**Because astronauts could not fix Webb in space, engineers had to successfully unfold and align its essential parts remotely.**
3	Paraphrase how the observatory's low temperature affects its instruments.	**Cooling the observatory lets its instruments pick up weak infrared signals.**
4	Paraphrase how scientists use evidence to make conclusions from Webb's observations.	**Scientists combine Webb measurements with models and data from other telescopes instead of relying on an image alone.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Although Webb gathers valuable information, its distant position prevents astronaut repairs. The telescope must also keep its shield facing the Sun, which restricts when it can study particular places. Researchers investigate nearby worlds and ancient galaxies with its data. However, they test interpretations about materials, heat, and movement by combining instrument readings with scientific models and findings collected by additional observatories.

Accept accurate restatements that preserve the passage's meaning without copying its phrasing. For the open response, require 60 to 75 words, a Webb limitation, and an explanation that conclusions depend on multiple sources of evidence.