About the Released Items

The AzM2 Released Items provides details about the items, student response types, correct responses, and related scoring considerations for released AzM2 test items.

Within this guide, each item is presented with the following information:

- Domain
- Cluster
- Content Standard
- Depth of Knowledge (DOK)
- Static presentation of the item
- Static presentation of student response field (when appropriate)
- Answer key, rubric or exemplar
- Applicable score point(s) for each item
- Option rationales (when applicable)

The items included in this guide are representative of the kinds of items that students can expect to experience when taking the computer-based test for AzM2 Grade 6 ELA-Reading.
Out of This World: Deep Space Observation
by Kathiann M. Kowalski

1 Some of America’s greatest man-made marvels are literally out of this world. Space-based telescopes and ground-based observatories don’t just provide awesome views of the stars, planets, and distant galaxies. They’re expanding our knowledge and understanding of the universe.

2 “NASA’s space telescopes are really tools for answering some of the most exciting questions that people have ever asked,” says Paul Hertz, astrophysics division director for the National Aeronautics and Space Administration (NASA). Those questions include: How did the universe begin? How did the stars and planets come to be? Are there planets around other stars? And might those planets hold life?

3 The Hubble Space Telescope “might be the most well-known and well-loved scientific experiment ever built,” Hertz notes. Launched in 1990, the telescope celebrated its 25th anniversary in 2015.

The Hubble Space Telescope makes one orbit around Earth every 95 minutes.

4 Costs up through its 1990 launch were around $2.5 billion, and five subsequent repair missions brought the figure up to around $10 billion by 2010. Although it is expensive, Hubble’s legacy is a wealth of scientific information.
For example, scientists using Hubble have shown that expansion of the universe is accelerating, because of a force scientists now call dark energy. Hubble helped scientists show that 95 percent of the universe is composed of dark energy or dark matter—something other than the atoms we understand. Hubble has also measured atmospheres of planets around other stars.

And then there are the photos. “Hubble has given us some of the most vivid pictures of our very beautiful universe and helped those of us who spend our lives here on the ground feel that we can soar through space like the astronauts and see the universe in all its grandeur,” Hertz says.

But no one telescope can show everything, just as no one tool can do every job. Thus, there are multiple space-based telescopes. Another space telescope, the Chandra X-ray Observatory, detects X-rays in hot and other regions of space. It was launched in 1999 and flies in an elliptical orbit that reaches much higher than Hubble’s orbit. Its pictures are helping scientists locate and study high-energy phenomena, such as areas around black holes, remnants of supernovas, and million-degree gas found in clusters of galaxies.

“One question everybody has been asking for thousands of years is, Are we alone?” Hertz says. Launched in 2009, the Kepler Space Telescope’s four-year mission was to find planets beyond our solar system. Hubble and other telescopes can’t detect such planets because stars near them are too bright. The Kepler telescope used a different strategy. It basically “stared at 150,000 stars for four straight years without ‘blinking,’” Hertz says. “It was looking to see if a planet around any of those stars would pass between us and the star and block out a very tiny fraction of that star’s light—as small as one-millionth of the light.”
Using that strategy, Kepler found thousands of stars with planets. “Because of Kepler, we now know that probably almost every star in the night sky has planets around it,” Hertz notes. Kepler could not hold its position much beyond the planned four years. But it earned a bonus mission, known as K2. As it changes position, Kepler has been able to capture things such as flares on stars, black holes swallowing asteroids, and even pulsing on the surface of the planet Neptune.

NASA’s next big telescope launch in 2018 will be beyond cool—it will be frigid! Working at 40 degrees above absolute zero, it will detect infrared light from far away. “The James Webb Space Telescope will be able to detect the very first galaxies and the very first stars that arose after the Big Bang and that are at the edges of the visible universe,” explains Hertz.

Ground-based telescopes are marvels as well. “It’s always cheaper to build a telescope on the ground than to put one into space,” notes Hertz. For instance, the Pan-STARRS-1 telescope atop Haleakala on Maui, Hawaii, is the first of four such telescopes. It was designed primarily to detect hazardous objects in space, and it began operating in late 2008 with the world’s largest digital camera. Its images have 1.4 billion pixels each. Most cellphone cameras, in contrast, have fewer than 10 million pixels. A second telescope, Pan-STARRS-2, should soon operate nearby.

“Pan-STARRS, among other things, is looking at large pieces of the sky, looking for new asteroids and other things that are changing,” explains Hertz. “The more of the sky you can see at a time, the more things you can discover.” The Large Synoptic Survey Telescope in the next decade will be even more sensitive.
13 Plans also call for NASA’s space-based Wide-Field Infrared Survey Telescope, or WFIRST, to have a large camera. It will be “100 times larger than the Hubble camera,” notes Hertz. “Every time we take a picture with the WFIRST, it will be like putting 100 pictures with Hubble together.” WFIRST images should help scientists understand more about dark energy and planets outside our solar system.

14 Telescopes in space and on the ground represent amazing feats of engineering. Mankind’s curiosity about space has sparked an effort to build things that allow us to see and experience that vast frontier. Together, these tools give us amazing views and help us understand how our universe works.

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Item(s)

<table>
<thead>
<tr>
<th>Domain</th>
<th>Cluster</th>
<th>Content Standard</th>
<th>DOK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading for Informational Text</td>
<td>Key Ideas and Details</td>
<td>RI.6.2</td>
<td>2</td>
</tr>
</tbody>
</table>

Select **three** sentences that should be included in a summary of the passage.

- [ ] Telescopes are much more powerful than the cameras used in everyday devices.
- [ ] Photographs from telescopes help people experience what astronauts see in deep space.
- [✓] The photographs that telescopes take have led to remarkable discoveries beyond our world.
- [ ] Telescopes often need to be repaired and improved upon in order to successfully complete many missions.
- [✓] The use of telescopes has helped researchers understand some of the most complex mysteries in the universe.
- [✓] Scientists work to build more refined telescopes in order to collect increasingly detailed information about space.

(1 Point)

Option Rationales

**Choice A:** This sentence gives a detail that helps the reader understand the power of telescopes, but it is not essential for understanding the passage.

**Choice B:** This sentence gives an important detail about how telescopes help people relate to a study of space, but it is not central for understanding the passage.
Choice C: Key – This sentence outlines the cause-and-effect outcomes presented in paragraphs 7–9 and should be included in a summary.

Choice D: While this detail is an interesting fact about the Hubble’s history, it is a minor detail for understanding the key points of the passage.

Choice E: Key – This sentence captures the author’s main idea as she introduces the passage in paragraphs 1–2. It should be included in a summary.

Choice F: Key – This sentence expresses the important takeaway of paragraphs 11–13 and should be included in a summary.
### Part A
Which claim about telescopes is made by the author and supported by evidence in the passage?

A. Telescopes show scientists how energy makes the universe expand.
B. The telescopes that are sent into space are designed to look for other life forms.
C. Telescopes that are being constructed on the ground can gather a broader view of space.
D. The amount of time it takes telescopes to collect data makes it hard for scientists to complete their studies.

### Part B
How does the author use evidence to support the claim in Part A?

A. She explains just how much of the universe is made up of dark matter.
B. She lists the capabilities of the cameras in current and future Maui telescopes.
C. She details the long journey of the Chandra telescope and its resulting discoveries.
D. She describes the curiosity that leads people to wonder about what exists on other planets.

(1 Point)

**Option Rationales**

**Part A**

**Choice A**: A weaker version of this claim is mentioned in paragraph 5, but that paragraph merely states that dark matter is related to the expansion of the universe rather than explaining how that occurs.

**Choice B**: This claim represents only a portion of what the author shows as the purpose of telescopes sent into space, and it is only marginally supported with evidence.
**Choice C : Key** – A claim in the passage is that ground telescopes being built and coming online will have larger roles and advanced capabilities in gathering larger batches of data about bigger portions of space.

**Choice D :** While the author states that some telescopes have missions lasting years, it is a misinterpretation of the text to claim that the rate of data collection impedes scientists’ work.

**Part B**

**Choice A:** Though this evidence is presented in paragraphs 5–9 to give an example of something scientists have shown through Hubble, it does not support the specific claim in Part A.

**Choice B: Key** – In paragraphs 11–12, the author supports her claim about ground telescopes by explaining what they will do and how much larger their roles will be in research tasks.

**Choice C:** While the information in paragraphs 7–9 shows that telescopes operate for years at a time, it does not support the specific claim in Part A.

**Choice D:** Though this evidence is given at the beginning of the passage as a part of what telescopes do, it does not support the specific claim in Part A.
How does paragraph 11 develop the author’s ideas about ground-based telescopes?

- It compares ground-based telescopes with more familiar technology, illustrating the powerful capabilities of the telescopes.

- It describes ground-based telescopes as cheaper to maintain and repair, suggesting the reason scientists should focus on using them.

- It lists plans for building more advanced ground-based telescopes, showing that the public supports improving the technology used to study space.

- It explains how ground-based telescopes have shifted from looking for hazardous materials to observing asteroids, proving that space has become less dangerous.

(1 Point) Student selected the correct option.

Option Rationales

**Choice A:** Key – The paragraph places the capabilities of the ground-based telescopes in a relatable context by comparing their cameras to those of cellphones, and describes how much ground-based telescopes can contribute as a result of being so powerful.

**Choice B:** The paragraph does state that it is cheaper to build ground-based telescopes, but does not speak to maintenance and repairs or use this information to suggest scientists focus on this kind of telescope instead of investing in space telescopes.

**Choice C:** While the paragraph does mention two other telescopes that will be built, it does not discuss public opinion on or support for such technology.

**Choice D:** While the paragraph does mention that these telescopes were originally intended to be used to detect hazards in space and mentions that
some new ones will also look for asteroids, it does not suggest that their role has actually shifted or that space has become safer over time.
Read this sentence from the passage.

“Hubble has given us some of the most vivid pictures of our very beautiful universe and helped those of us who spend our lives here on the ground feel that we can soar through space like the astronauts and see the universe in all its grandeur,’ Hertz says.” (paragraph 6)

What word can replace vivid as it is used in the sentence?

- A. costly
- B. detailed
- C. familiar
- D. large

(1 Point) Student selected the correct option.

Option Rationales

**Choice A**: Although the passage mentions the high cost of building and maintaining space telescopes, the discussion of these photographs centers around how detailed they are, not how much they cost.

**Choice B**: Key - The photos Hubble has taken are so detailed, and vivid, that they allow people on the ground to imagine what it is like in space.

**Choice C**: While it would make sense that many people would be aware of photographs taken by Hubble, the word “vivid” does not relate to how well known the pictures are, but how detailed they are.

**Choice D**: While a superficial reading of the passage may support the idea that the photographs from Hubble are larger than some others, the context of
this sentence does not support this and shows that “vivid” does not merely refer to size.
This question has two parts. First, answer Part A. Then, answer Part B.

**Part A**
What is the author’s purpose in the passage?

- A: to explain how telescopes used for space observation are created
- B: to explain how researchers use telescopes to discover new planets
- C: to explain how certain types of matter were discovered in deep space
- D: to explain how new inventions have provided more knowledge about space

**Part B**
How does the author develop her purpose?

- A: by describing how Hubble was able to locate dark energy
- B: by describing several specific discoveries made using telescopes
- C: by describing how scientists go about constructing a new telescope
- D: by describing what further research needs to be done to confirm recent discoveries

(1 Point)

**Option Rationales**

**Part A**
**Choice A:** Although the passage talks about telescopes, it does not go into detail about their creation.

**Choice B:** Although researchers do use telescopes to discover new planets, that is not the purpose of this passage.

**Choice C:** Although the passage mentions the existence of phenomena like asteroids and dark matter, this is not the purpose of the passage.
Choice D: Key – The purpose of the passage is to explain how telescopes and ground observatories allow humans to gain more knowledge about space.

Part B
Choice A: While the author does mention Hubble and its importance in understanding the presence of dark matter, she does not describe how Hubble was able to locate the dark energy itself.

Choice B: Key – The author explains the importance of several telescopes and how they have led to specific discoveries about space, answering many questions people have about the universe.

Choice C: Although the author mentions new telescopes to come, she does not describe the construction of a telescope or use that information to develop her purpose.

Choice D: While the author mentions that further research will be done, she does not suggest that it is related to the newly discovered planets.