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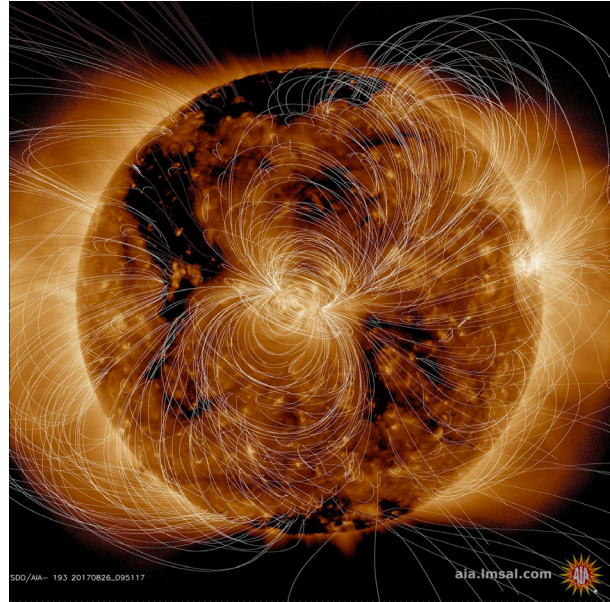
How Computers Help Scientists See the Sun in New Ways

(1)   Scientists use many tools to help them understand more about the sun. One of the most important tools is computers. Computers can create pictures of the sun using the information scientists have gathered from space missions.

NASA's Solar Dynamics Observatory (SDO) scientists used computers to create a view of the sun's magnetic field. Credit: Credit: NASA/GSFC/Solar Dynamics Observatory

(2)   Sometimes, scientists use computers to help them create a picture of some part of the sun. For example, solar scientists at NASA, who are experts who study the sun, used computers to produce a picture of the magnetic fields on the sun. The energy from these magnetic fields causes explosions. This leads to solar weather, or the changes near Earth caused by the sun's explosions. Solar weather affects the satellites around Earth. These satellites help people gather and share information. Knowing more about how solar weather works can help keep the satellites working well.

(3)   Scientists also use computers to help them know other changes that are likely to happen in space. For example, in 2017, many people across the United States were able to see a total solar eclipse. What happens in a total solar eclipse? If the sun, moon, and Earth are lined up, the moon can block the view of the sun from Earth for a couple of minutes. When this happens, people on Earth can see the sun's corona— the bright, glowing gases around the sun.

(4)   Using computers, scientists were able to predict what people would see as they viewed the sun's corona during the total eclipse. They shared pictures of the waves

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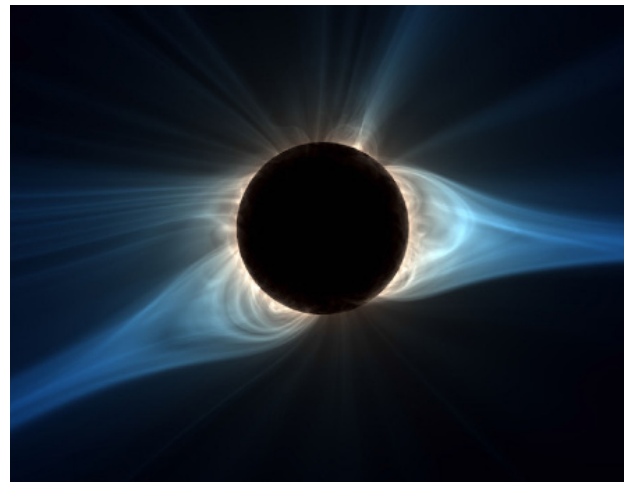Play + practice online at: reading.amplify.com
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How Computers Help Scientists See the Sun in New Ways (continued)

of glowing gases that dance around the sun. The gases do not make an even ring around the sun. Instead, these gases go further out in some areas. They look a little like flower petals.

(5)   The computer work was finished about a week before the total eclipse happened. The scientists were nervous. Would the real eclipse match their prediction?

(6)   Scientists compared photographs of the eclipse with the pictures produced by their computer work. They could see where they had been right. They could also see new details. This event gave them a chance to test their work. The scientists could see how well they could create pictures of parts of the sun they cannot usually see.

(7)   In the summer of 2018, NASA sent a spacecraft called the Parker Space Probe to gather new information about the sun. The scientists will connect the information in their computers with the new things they learn from Parker. As Parker sends reports back to scientists on Earth, they will be able to add this information to their computers. This way, scientists can create even more detailed pictures of the sun.

Predictive Science Inc. developed a numerical model that simulated what the corona would look like during the total solar eclipse. The image on the left was created from many photographs taken on the day of the total eclipse. The image on the right is the computer's prediction. Credits: Predictive Science Inc./Miloslav Druckmüller, Peter Aniol, Shadia Habbal/NASA Goddard, Joy Ng

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How Computers Help Scientists See the Sun in New Ways: Questions

1. Refer to the passage, "How Computers Help Scientists See the Sun in New Ways." Identify one reason computers are useful when studying the sun. *Choose the best answer.*

    a. Computers can help produce pictures of the sun.

    b. Computers are relatively easy to use.

    c. Computers create solar weather.

    d. Computers can be sent into space

2. Refer to the passage, "How Computers Help Scientists See the Sun in New Ways." After reading the passage, select two reasons the author gives for why computers are used to study changes in space. *In the boxes, write the letters for the correct sentences.*

Reasons
☐   ☐

    a. Computers can help scientists see new details.

    b. Computers are used to predict what will happen on the moon.

    c. Computers can help scientists predict what will be visible during a solar eclipse.

    d. Computers help scientists reduce their nervousness.

    e. Computers are used to predict the weather.

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How Computers Help Scientists See the Sun in New Ways: Questions (continued)

3. Refer to the passage, "How Computers Help Scientists See the Sun in New Ways." What conclusion can be drawn from the photos of the solar eclipse and the model created by a computer? *Choose the best answer.*

    a. The Parker Space Probe was not successful in its attempt to take photos of the sun.

    b. Scientists should find other ways to study the sun besides using computers.

    c. The computer's prediction of how the solar eclipse would look and how the solar eclipse actually looked are almost exactly the same.

    d. The computer was not successful in predicting what the solar eclipse would look like.

4. Refer to the caption underneath the second set of photos in the passage, "How Computers Help Scientists See the Sun in New Ways." Use context clues to determine the meaning of "simulated." *Choose the best answer.*

    a. presented

    b. interpreted

    c. made to look like

    d. created naturally

Directions: Ask your child to read the passage carefully. Then, answer the questions at the end of the passage. After your child finishes, walk through his/her correct/incorrect answers using the Answer Key.

Direcciones: Pídale a su hijo o hija/estudiante que lea el pasaje cuidadosamente. Y que luego responda las preguntas al final del pasaje. Después de que su hijo o hija/estudiante termine, repase sus respuestas correctas/incorrectas usando la Clave de respuestas.

How Computers Help Scientists See the Sun in New Ways: Questions

1. Refer to the passage, "How Computers Help Scientists See the Sun in New Ways." Identify one reason computers are useful when studying the sun. *Choose the best answer.*

Correct Answer: (a) Computers can help produce pictures of the sun.

Explanation: The correct answer is "Computers can help produce pictures of the sun." In the passage, the author lists several reasons that scientists use computers to study the sun. One reason is because computers help scientists create pictures of the sun so that scientists understand the sun better.

If your child/student answers the question incorrectly, try the following question prompts/hints:

Hint 1: Reread the passage. What reasons does the author give for scientists using computers?

Hint 2: How do computers help scientists understand the magnetic fields on the sun?

Directions: Ask your child to read the passage carefully. Then, answer the questions at the end of the passage. After your child finishes, walk through his/her correct/incorrect answers using the Answer Key.

Direcciones: Pídale a su hijo o hija/estudiante que lea el pasaje cuidadosamente. Y que luego responda las preguntas al final del pasaje. Después de que su hijo o hija/estudiante termine, repase sus respuestas correctas/incorrectas usando la Clave de respuestas.

How Computers Help Scientists See the Sun in New Ways: Questions

2. Refer to the passage, "How Computers Help Scientists See the Sun in New Ways." After reading the passage, select two reasons the author gives for why computers are used to study changes in space. *In the boxes, write the letters for the correct sentences.*

Reasons
☐ ☐

Correct Answer:
(a) Computers can help scientists see new details.
(c) Computers can help scientists predict what will be visible during a solar eclipse.

Explanation: Both of these answers correctly articulate information found in the passage in paragraphs 3–6. Computers help scientists identify what we will likely be able to see during a solar eclipse, and computers help scientists identify previously unknown details about the sun.

If your child/student answers the question incorrectly, try the following question prompts/hints:

Hint 1: Reread paragraphs 3–6. What evidence is provided for the use of computers?
Hint 2: Remember to look for specific reasons scientists use computers to study the changes in space and not just for reasons why scientists use computers to study the sun.

Directions: Ask your child to read the passage carefully. Then, answer the questions at the end of the passage. After your child finishes, walk through his/her correct/incorrect answers using the Answer Key.

Direcciones: Pídale a su hijo o hija/estudiante que lea el pasaje cuidadosamente. Y que luego responda las preguntas al final del pasaje. Después de que su hijo o hija/estudiante termine, repase sus respuestas correctas/incorrectas usando la Clave de respuestas.

How Computers Help Scientists See the Sun in New Ways: Questions (continued)

3. Refer to the passage, "How Computers Help Scientists See the Sun in New Ways." What conclusion can be drawn from the photos of the solar eclipse and the model created by a computer? *Choose the best answer.*

Correct Answer: (c) The computer's prediction of how the solar eclipse would look and how the solar eclipse actually looked are almost exactly the same

Explanation: The correct answer is "The computer's prediction of how the solar eclipse would look and how the solar eclipse actually looked are almost exactly the same."

If your child/student answers the question incorrectly, try the following question prompts/hints:

Hint 1: Take a look at the photos. How are they alike? How are they different?

Hint 2: Read the caption below the photos. Which statement supports both ideas from the photos?

Directions: Ask your child to read the passage carefully. Then, answer the questions at the end of the passage. After your child finishes, walk through his/her correct/incorrect answers using the Answer Key.

Direcciones: Pídale a su hijo o hija/estudiante que lea el pasaje cuidadosamente. Y que luego responda las preguntas al final del pasaje. Después de que su hijo o hija/estudiante termine, repase sus respuestas correctas/incorrectas usando la Clave de respuestas.

How Computers Help Scientists See the Sun in New Ways:

4. Refer to the caption underneath the second set of photos in the passage, "How Computers Help Scientists See the Sun in New Ways." Use context clues to determine the meaning of "simulated." *Choose the best answer.*

Correct Answer: (c) made to look like

Explanation: The correct answer is "made to look like."

If your child/student answers the question incorrectly, try the following question prompts/hints:

Hint 1: Reread the caption and compare the photos. How are they alike or different?

Hint 2: Reread paragraph 6. How does it relate to the photos and the caption?

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Changing a Life

(1)   Navneet gripped the metal pole in front of her as the bus lurched forward and rolled down the block toward its next stop. She stared absently at the safety information and route maps plastered to the walls, thinking about what she wanted to do once she got home from school. She thankfully had no homework today, which left her afternoon wide open. Anything could happen, and since the bus always took forever to get anywhere, she had plenty of time to think.

(2)   At the next stop, Navneet watched as a woman carrying a baby boarded the bus—or tried to. The woman balanced the baby in one arm while she fished through her purse for change. She looked worried, then searched her pockets.

(3)   "The fare, ma'am?" the bus driver asked in tired voice.

(4)   "I don't have it," the woman said with a frown.

(5)   Navneet had some loose change in her backpack, which she pulled out and counted quickly. It was just enough to help the woman. She knew how annoying it was to wait for the bus to come in the first place, but then to not have enough for the bus fare would mean waiting even longer. Navneet trotted up to the front of the bus. "Here, I have some extra coins," she said and dropped the change into the box.

(6)   "Thank you so much," the woman said to Navneet as she sat down. "You don't know how much this means to me."

(7)   Navneet smiled but didn't see what the big deal was. It was only a few coins for the bus fare. Everyone forgot their fare once in a while.

(8)   Over the next couple weeks, Navneet barely thought of that moment on the bus. Then, on her ride home from school one day, she saw the same woman board,

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Changing a Life (continued)

this time without her baby. The woman immediately recognized her and sat across from her. "You really helped me that day."

(9) "I did?"

(10) "Yes. You see, I had to drop my daughter off at my sister's house so I could go to a job interview. I had to be on that bus to get there in time and then go to the interview."

(11) "The buses here are so slow."

(12) "They are. And I would've missed the job interview completely if you hadn't helped me."

(13) "Did you get the job?"

(14) The woman smiled. "I did. Now I can save money for a car so I don't have to worry about the bus schedule anymore."

(15) Navneet leaned back in her seat, amazed that such a simple action had changed this woman's life. It didn't seem that important at the time, but it clearly meant everything.

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Changing a Life: Questions

1. Refer to the passage "Changing a Life." Read the dictionary entry for *plaster*. Which definition of *plaster* is used in the word <u>plastered</u> in paragraph 1? *Underline one definition from the excerpt below.*

   > **plast-er** *verb*
   > 1. to put a bandage on.
   > 2. to completely cover a surface.
   > *noun*
   > 3. material used on walls.
   > 4. a bandage

2. Refer to the passage "Changing a Life." Which sentence **best** explains why this passage is a story, and not a play? *Choose the **best** answer.*

   a. It is written in paragraph form.
   b. It describes a setting.
   c. It does not rhyme.
   d. It includes dialogue.

3. Refer to the passage "Changing a Life." What is the theme of this story? *Choose the **best** answer.*

   a. Never depend on the kindness of others.
   b. It's not always easy to know the right thing to do.
   c. Always have your bus fare.
   d. A little kindness can go a long way.

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Changing a Life: Questions (continued)

4. Refer to the passage "Changing a Life." Which description from the passage **best** shows Navneet's kindness? *Choose the **best** answer.*

a. "She stared absently at the safety information and route maps."

b. "Navneet had some loose change in her backpack, which she pulled out and counted quickly."

c. "At the next stop, Navneet watched as a woman carrying a baby boarded the bus."

d. "Over the next couple weeks, Navneet barely thought of that moment on the bus."

Directions: Ask your child to read the passage carefully. Then, answer the questions at the end of the passage. After your child finishes, walk through his/her correct/incorrect answers using the Answer Key.

Direcciones: Pídale a su hijo o hija/estudiante que lea el pasaje cuidadosamente. Y que luego responda las preguntas al final del pasaje. Después de que su hijo o hija/estudiante termine, repase sus respuestas correctas/incorrectas usando la Clave de respuestas.

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1.   Refer to the passage "Changing a Life." Read the dictionary entry for *plaster*. Which definition of *plaster* is used in the word <u>plastered</u> in paragraph 1? *Underline one definition from the excerpt below.*

Correct Answer: (2) to completely cover a surface.

Explanation: The correct answer is "2. to completely cover a surface." The safety information and route maps completely covered the walls of the bus.

If your child/student answers the question incorrectly, try the following question prompts/hints:

Hint 1: What part of speech is plastered in paragraph 1? Which answer choice follows the same part of speech?

Hint 2: Safety information and route maps are plastered on the walls of the bus. What does this tell you about the word's meaning?

2.   Refer to the passage "Changing a Life." Which sentence **best** explains why this passage is a story, and not a play? *Choose the **best** answer.*

Correct Answer: (a) It is written in paragraph form.

Explanation: The correct answer is "It is written in paragraph form." Stories are written in paragraphs. Plays are written in lines of dialogue and description.

If your child/student answers the question incorrectly, try the following question prompts/hints:

Directions: Ask your child to read the passage carefully. Then, answer the questions at the end of the passage. After your child finishes, walk through his/her correct/incorrect answers using the Answer Key.

Direcciones: Pídale a su hijo o hija/estudiante que lea el pasaje cuidadosamente. Y que luego responda las preguntas al final del pasaje. Después de que su hijo o hija/estudiante termine, repase sus respuestas correctas/incorrectas usando la Clave de respuestas.

Hint 1: What is the format, or style, of how a story is written? What is the format of how a play is written?
Hint 2: How is a play different from a story?

3.   Refer to the passage "Changing a Life." What is the theme of this story? *Choose the **best** answer.*

Correct Answer: (d) A little kindness can go a long way.

Explanation: The correct answer is "A little kindness can go a long way."

If your child/student answers the question incorrectly, try the following question prompts/hints:
Hint 1: What does Navneet do for the woman?
Hint 2: How did Navneet's kindness help the woman?

4.   Refer to the passage "Changing a Life." Which description from the passage **best** shows Navneet's kindness? *Choose the **best** answer.*

Correct Answer: (b) "Navneet had some loose change in her backpack, which she pulled out and counted quickly."

Explanation: The correct answer is "Navneet had some loose change in her backpack, which she pulled out and counted quickly."

If your child/student answers the question incorrectly, try the following question prompts/hints:
Hint 1: What does Navneet do for the woman?
Hint 2: Which action shows that Navneet is a kind person?

Activity