SESSION

Young Inventors

FOCUS QUESTION

How can a young person become an inventor?

NOTICE AND WONDER

Look at the titles and images of the texts you will read in this lesson. What do you notice? What do you wonder? Discuss your ideas with a partner.

WHAT TRAITS DOES AN INVENTOR NEED?

How could the traits below help someone become an inventor? Discuss your ideas with a partner. Then add two more traits that inventors need.





Gitanjali Rao: Steps Toward Success

by Amanda Baker



©Curriculum Associates, LLC Copying is not permitted.

LESSON 8 | Young Inventors 135

Downloaded by A. Gaines at OAK GROVE CENTRAL ELEM SCHOOL. This resource expires on 6/30/2024.

Gitanjali Rao: Steps Toward Success

by Amanda Baker

- Gitanjali Rao saw a problem, and she wanted to solve it so she could help people. But solving it wasn't easy.
- 2 In 2016, the news was full of stories about unsafe drinking water in Flint, Michigan. The water had too much lead in it. Lead is a metal, and in water it is invisible and tasteless. When people drink water that contains lead, they can become very sick. Gitanjali was 11 years old at the time. She thought about how scary it must be to have polluted water coming out of your home faucet.
- 3 Test kits could detect lead in water. But they took too long to give results, and often those results were wrong. Gitanjali wondered if she could make a better test kit.
- 4 One day, Gitanjali read a news story about how tiny tubes were being used to test for poison in the air. Scientists would cover these tubes with a chemical that **attracted** a poison. When poison stuck to the chemical, it changed the way electricity flowed through the tubes. Scientists checking the electric flow could then see how much poison was in the air. Gitanjali wondered if she could detect lead in water this way, too.

attracted = pulled to itself

SESSION

READ

Stop & Discuss

What was the problem with the water? How did Gitanjali think she could help?

Explain the problem. Then underline a sentence that describes how she thought she could help.

UNIT 2 | Technology

136

©Curriculum Associates, LLC Copying is not permitted.

LESSON 8

An early version of



Gitanjali Rao working on her lead test kit design

- 5 Gitanjali found a chemical that could attract lead. She got some tubes. But she couldn't test her idea at home. She needed a lab with the right equipment. She wrote to large labs about her idea, but they didn't write back.
- 6 Finally, Gitanjali realized she did not need help from a fancy lab. She emailed a chemistry teacher at her local high school. The school didn't have a big lab, but its lab had everything she needed.
- 7 The chemistry teacher agreed to help. They started by testing clean water. Next, they added tiny scoops of lead. They weren't successful right away, but after many, many **attempts**, they finally got Gitanjali's lead detector to work.
- 8 Gitanjali wasn't finished yet. Next, she made a phone app so anyone using her kit could see the results instantly on their phones. She entered her idea in a big national competition. And she won, becoming the youngest-ever winner of the Discovery 3M Young Scientist Challenge.
- Gitanjali has continued to explore new ideas.
 "Don't be afraid to fail," she has said, "because that's just another step toward success."



attempts = efforts to try and do something

Stop & Discuss

What does Gitanjali mean when she says failure is a "step toward success"?

Explain what she means using evidence from the text.

Summarize a Text

PRACTICE

- To **summarize** means to briefly retell what you read in your own words.
- A **summary** includes the main idea and key details from the text.
- The **main idea** of a text is the author's big idea about a topic.
- Key details are pieces of information that support the main idea.

Reread/Think

ESSION

Reread "Gitanjali Rao: Steps Toward Success." Then work with a partner to write the main idea and key details from the text in the graphic organizer below.



LESSON 8

Talk

Use the details in your graphic organizer and the questions below to tell a summary of the text.

- Who is Gitanjali Rao?
- Paragraphs 1–4: What problem did Gitanjali Rao hear about? What kind of invention did she think could help?
- Paragraphs 5–7: What did she try? What happened?
- Paragraphs 8 and 9: What happened? What did she learn?



Write

Write a summary of "Gitanjali Rao: Steps Toward Success." Use the main idea and key details from your graphic organizer to describe the problem and what Gitanjali Rao did to help.



6 6 6

WRITING CHECKLIST

 \Box I included the



- 1 Brooke Martin loved her dogs, Kayla and Zoey. And Kayla and Zoey loved Brooke. In fact, Brooke and her dogs really missed each other whenever they were apart. Brooke thought about how sometimes she and her friends and family would check in with each other using video chats. Brooke wondered if she could check in with her dogs that way, too. And that's what started 12-year-old Brooke on her path to becoming an inventor. She thought of a clever way for pet owners and their pets to stay connected using technology.
- 2 Working in a garage with her dad, Brooke built a new device. A small stand held a phone or tablet, which automatically turned on whenever the owner called home. The device let owners and their pets see and hear each other so pet owners could "chat" with their pets.
- To make the connection between pets and people even better, the machine also held treats. Owners could push a button on their phones to dispense a snack to their pet at home no matter where they were calling from.
 Brooke's machine made sure pets were safe from eating too many treats and getting sick. It was also designed to stop pets from getting into the snacks on their own.

Brooke Martin and her dog Kayla

dispense = give out in small amounts

Stop & Discuss

How did Brooke's love for her dogs lead to her first invention?

Use evidence from the text to explain your ideas.

LESSON 8

Paws-ible

4 At first, Brooke shared her invention with family and friends. But then she started entering contests and going to meetings where inventors shared their ideas. People were interested in this young inventor who loved her dogs. Reporters wrote articles about Brooke. She was even invited to appear on a TV show where judges decide whether to give money to inventors to help them make and sell their product. Brooke



didn't win any money, but that didn't stop her! She started her own company and sold her invention around the world.

- 5 Then Brooke thought of a way to build on her idea to solve another problem. She thought about her grandmother, whose health problems made it difficult for her to use a phone or tablet. Brooke realized that with a few small changes, her original invention could help people!
- 6 Here's how Brooke's new invention worked. Caregivers would call a loved one who might need help with medications. The call would automatically connect them for a video chat to check in with each other. The dispenser would help people take medicine at the right time and in the right amount. Brooke, who was 15 years old by then, had come up with her second big invention.

Beorn the dog with Brooke Martin's invention that combines video chat with a dog treat dispenser

Stop & Discuss

How did Brooke's first invention lead to her second invention? Explain your ideas using evidence from the text.

©Curriculum Associates, LLC Copying is not permitted.

LESSON 8 Young Inventors 141



Brooke Martin with her invention at the Global Pet Expo

Stop & Discuss

RFAD

According to the text, what helps a person become an inventor?

Explain your ideas using evidence from the text.

___ can help a person become an inventor.

An inventor needs

- 7 Brooke went to college, where she studied engineering, which is the science of planning and building structures, machines, and systems. Engineers love to solve problems, so engineering was a good fit for an inventor. Brooke also learned how technology can help people better connect with each other.
- Brooke Martin is proof that young people can be inventors. Maybe you'd like to be an inventor, too. Are you curious and willing to put in the effort? Great! All you need, then, is a problem to solve and a creative way to solve it.



Summarize a Text

PRACTICE

- A summary is brief because it only includes key details and leaves out less important details.
- Not all details are key details. A detail is less important if it is *not* necessary for understanding the text.

Reread/Think

ESSION

Reread "Anything Is Paws-ible." Write the main idea and key details from the text in the chart below.



©Curriculum Associates, LLC Copying is not permitted.

SESSION PRACTICE Talk Review the details in your graphic organizer and discuss them. Then use the main idea and key details to tell a summary of the text. Which details do you need to understand the main idea? • Did you include any details that are not important? Did you leave out any important details that should be added? I think/do not think this is an important detail because The main thing to know about Brooke Martin is . A key detail about her first/ second invention is ___. 666666 Write Write a summary of "Anything Is Paws-ible." Include the main WRITING CHECKLIST idea and key details. ☐ I included the main idea of the text. ☐ I included key details and left out unimportant details. ☐ Someone who has never heard of **Brooke Martin could** read my summary and understand who she is and what she did. □ I used correct spelling, punctuation, and capitalization.



with a Challenge by Lynda Jones

- 1 Twelve-year-old Shubham Banerjee loved a challenge, and he loved helping others. One day in 2014 he wondered, *How do people who are blind read?* After doing some research, Shubham learned that many people who are blind or have low vision read Braille, a system of raised dots that represent letters and symbols. To read Braille, people pass their fingers along each arrangement of dots, moving from left to right and **identifying** each letter as they go.
- 2 In his research, Shubham learned something else. Braille printers, which connect to a computer, are very expensive. They can cost from \$2,000 to \$5,000. If someone could build a less expensive Braille printer, he thought, people everywhere could more easily buy this assistive technology.
- Shubham got to work. With the help of his family, he bought a high-tech set of LEGO[®] bricks. This kit included motors, sensors, and a computer. The kit cost less than \$400, much less than the most affordable Braille printer!

Shubham Banerjee, founder and chief executive officer of Braigo Labs, Inc., with his Braille printer made of LEGO® bricks

LESSON 8

identifying = telling what something is

sensors = pieces of equipment that detect changes in heat, light, sound, or motion prototype = the first model
of an invention that tests if
it will work

RFAD

SESSION

- 4 Building the printer wasn't easy. Shubham spent many late nights at the kitchen table learning about robotics, writing computer code, and making the prototype work.
- 5 Shubham built and took apart seven prototypes until he built one that correctly printed the raised Braille dots. It also weighed only a few pounds. He called his invention "BRAIGO," a combination of *Braille* and *LEGO*[®], and entered it into his seventh-grade science fair. BRAIGO was a hit at the fair. Later, Shubham's invention caught the attention of a major technology company, which helped fund his future work.
- 6 In 2014, Shubham started his own company, Braigo Labs, and began working with others to improve the printer. Henry Wedler, a chemist who was born blind, wanted to help. Wedler had read about Shubham's invention and contacted the teen to find out how the amazing printer worked. Now, Wedler is an advisor at Braigo Labs.
- 7 Shubham and his team are still perfecting BRAIGO. He hopes to have an affordable product available soon for people all over the world who are blind and have low vision.



Shubham Banerjee working on his Braille printer at home

LEGO® is a trademark of the LEGO Group of companies, which does not sponsor or endorse this content.



Respond to Text

Reread/Think

Reread "Toying with a Challenge." Choose the best response to each question.

- 1. Which sentence **best** describes the main idea of the whole article?
 - **A.** Shubham Banerjee loved helping others and wanted to learn more about how people who are blind read.
 - **B.** Shubham Banerjee solved a problem by making an affordable Braille printer out of LEGO[®] bricks.
 - **C.** Shubham Banerjee bought a set of LEGO[®] bricks with motors and sensors that cost less than \$400.
 - **D.** Shubham Banerjee built seven different prototypes before he made one that worked correctly.
- 2. Read the sentence from paragraph 6.

Now, Wedler is an **advisor** at Braigo Labs.

What is the meaning of the word advisor?

- A. someone who thinks of inventions
- B. someone who builds machines
- C. someone who reads Braille
- D. someone who offers help
- 3. Which detail would be **most** important to include in a summary of the text?
 - A. Shubham was in seventh grade.
 - B. Shubham started a company called Braigo Labs.
 - C. Shubham's invention weighed only a few pounds.
 - **D.** Shubham worked with a team of scientists.

PRACTICE

Reread/Think

- 4. How was Shubham's printer an improvement over other printers?
 - A. It was easier to use.
 - B. It was less expensive.
 - **C.** It printed more quickly.
 - **D.** It did not require a computer.

Write

ESSION

Write a summary of "Toying with a Challenge." Include the main idea and key details.

idea of the text. ☐ I included key details that support the main idea. ☐ Someone who has never heard of Shubham Banerjee could read my summary and understand who he is and what he did. I used complete sentences. ☐ I used correct spelling, punctuation, and capitalization.

000000000000

WRITING CHECKLIST

☐ I included the main



Respond to the Focus Question

How can a young person become an inventor?

Reread/Think

With your **team**, reread the beginning of "Toying with a Challenge." What problem did Shubham Banerjee want to solve? How did he solve it?

With a **partner**, reread the beginning of "Gitanjali Rao: Steps Toward Success." What problem did Gitanjali Rao want to solve? How did she solve it?

On your own, reread the beginning of "Anything Is Paws-ible." What problem did Brooke Martin want to solve? How did she solve it?

Talk

As a team, discuss the process each young inventor followed.

- What was similar about their creative ideas? What was different?
- What steps did they take to develop, test, and build their inventions?



Write

Imagine your own idea for an invention that will solve a problem. Describe the steps you could take to develop, test, and build the invention.

©Curriculum Associates, LLC Copying is not permitted.