OVERVIEW

Young Inventors

FOCUS QUESTION

How can a young person become an inventor?

About the Lesson

OBJECTIVES

Content Objectives

- Identify the main idea and key details of a text.
- Summarize a text using the main idea and key details.
- Understand that every invention begins with an idea about how to do something better.

Language Objectives

- Negotiate the importance of details with a partner to determine which ideas to include in a summary.
- Record the main idea and key details of a text in a graphic organizer and use it to write a summary.
- Compare the processes of three inventors.

ACADEMIC TALK

See **Glossary of Terms** on pp. 478–485.

summarize, summary, main idea, key detail

Build Knowledge

Lesson texts build knowledge about:

- How an 11-year-old found a solution for contaminated water
- How a 12-year-old created a device for connecting people and their pets
- How a 12-year-old invented an affordable Braille printer

Plan Student Scaffolds

- Use **i-Ready data** to guide grouping and choose strategic scaffolds.
- Use **Teacher Toolbox** resources as needed to address related skills:
  - —Share key ideas in a summary
  - —Sequence ideas to summarize
- Partner students of varying language-proficiency levels to **Buddy Read** the texts in Sessions 1 and 3 so one student can provide language support to the other. **EL**
- Preview texts and activities to anticipate barriers to engagement, access, and expression. Modify based on needs.

Use Protocols That Meet the Needs of All Students

In order to increase engagement and validate cultural and linguistic behaviors, specific protocols are included in the lesson. To further customize activities for your students, consider optional protocols listed on pp. A46–A51.

PROTOCOL	SESSION	VALIDATES
Stand and Share	1–5	spontaneity, movement, connectedness
Silent Appointment	1, 4	social interaction, nonverbal expression
Pick a Stick	2, 4	spontaneity
Thumbs-Up, Thumbs-Down	4	connectedness, multiple perspectives
Team-Pair-Solo	6	multiple ways to show focus, shared responsibility
Merry-Go-Round Share	6	multiple ways to show focus, connectedness

LEARNING PROGRESSION | Summarize a Text

Students build on this skill:
RI.3.2 Recount the key details and explain how they support the main idea.

Students learn this skill:
RI.4.2 Summarize the text.

Students prepare for this skill:
RI.5.2 Summarize the text.

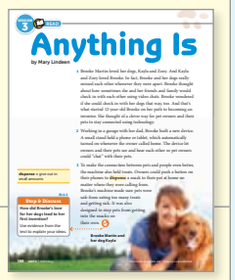
Students review and practice:
- **RI.4.1** Make inferences
- **RI.4.3** Analyze a scientific/technical text
- **RI.4.4** Determine word meanings

LESSON PLANNING GUIDE

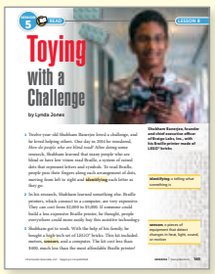
TEXT 1: Gitanjali Rao: Steps Toward Success • SCIENCE ARTICLE

			TEXT AT-A-GLANCE	ENGLISH LEARNER SUPPORT (EL)
SESSION 1	SCAFFOLD READING		**Concepts/Background** • the unsafe drinking water problem in Flint, Michigan • the dangers of lead in drinking water • how water quality is tested • creating a phone app • the Discovery 3M Young Scientist Challenge **Language** • **Vocabulary:** *lead (metal), polluted, test kit, detect, (test) tubes, chemical, lab, chemistry, detector, competition* • **Informal Language:** *fancy lab, app*	**Reading** • Explore content vocabulary, Sketch **Speaking/Reading** • Make connections
SESSION 2	PRACTICE THE FOCUS STANDARD • Formative Assessment			**Speaking/Reading** • Leverage home language **Writing** • Use sentence frames

TEXT 2: Anything Is Paws-ible • TECHNOLOGY ARTICLE

SESSION 3	SCAFFOLD READING		**Concepts/Background** • the special relationship between pet owners and their pets • using an invention as a springboard for another • the need for the correct dispensing of food to pets and medicine to people • how inventors can gain publicity and network **Language** • **Vocabulary:** *video chats, technology, device, product, caregivers, loved one, medications, automatically, dispenser* • **Informal Language:** *paws-ible, check in with, "chat" with their pets, a good fit* • **Descriptive Language:** *on her path to*	**Speaking/Reading** • Activate prior knowledge, Leverage home language, Determine meaning from context **Reading** • Sketch
SESSION 4	PRACTICE THE FOCUS STANDARD • Formative Assessment			**Speaking/Writing** • Rephrase ideas, Collaborate with a partner **Writing** • Use sentence frames

TEXT 3: Toying with a Challenge • TECHNOLOGY ARTICLE

SESSION 5	INDEPENDENT READING AND PRACTICE • Formative Assessment		**Concepts/Background** • how Braille helps people who are blind or have low vision • why people who are visually impaired need affordable Braille printers • LEGO® bricks • how robotics, computer code, and prototypes are used in technological inventions **Language** • **Vocabulary:** *toying (with), Braille, assistive technology, robotics, computer code, fund, advisor, perfecting* • **Idioms:** *caught the attention* • **Informal Language:** *got to work, high-tech, a hit at the fair*	**Speaking** • Activate prior knowledge **Speaking/Reading** • Interpret idioms **Listening/Reading** • Read aloud questions and answers **Writing** • Use word bank

KNOWLEDGE BUILDING

SESSION 6	RESPOND TO THE FOCUS QUESTION • *How can a young person become an inventor?*	• Integrate information from the lesson texts • Collaborative discussion • Short response	**Writing** • Sketch, Use word bank

Before Teaching the Lesson

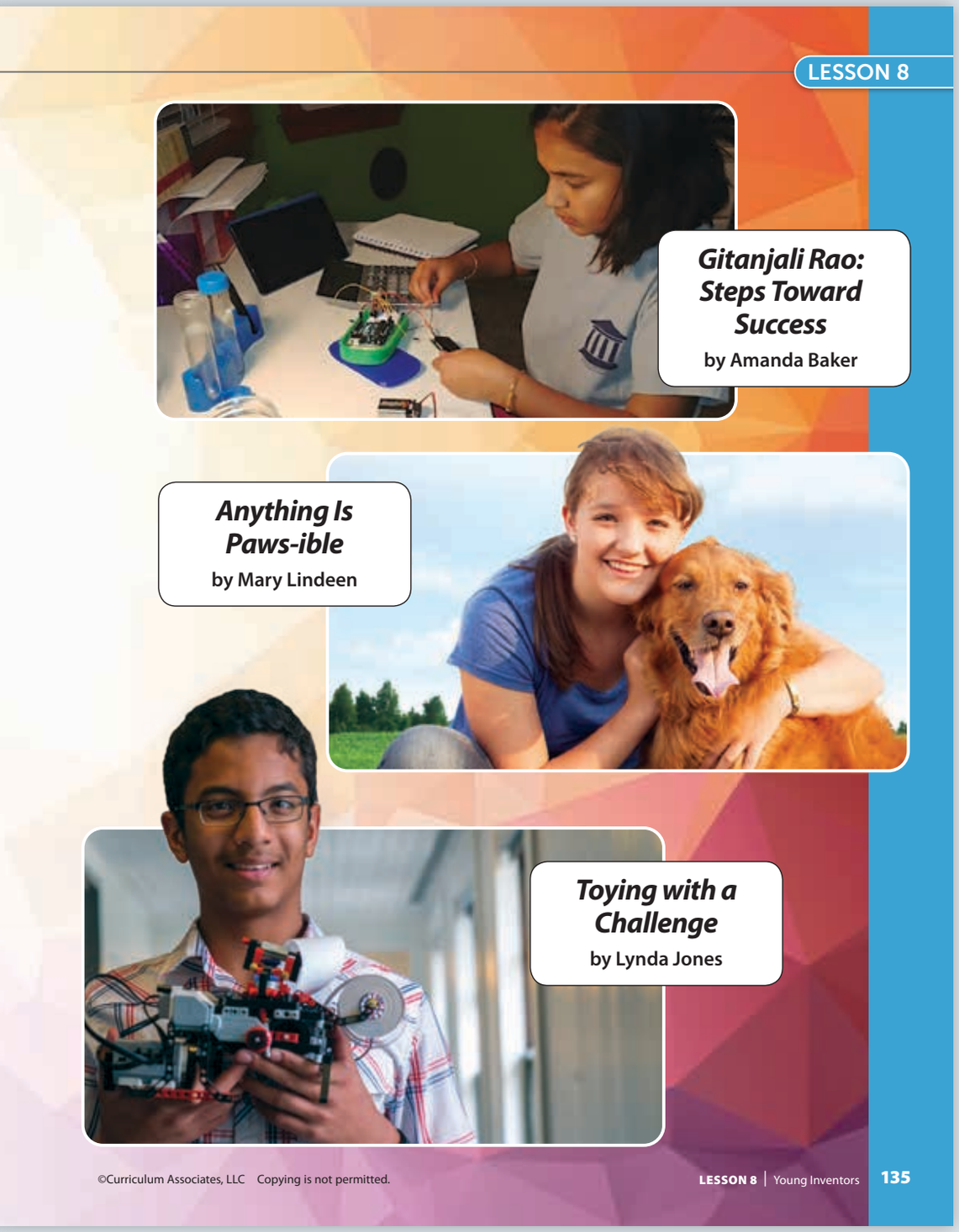
Preview the texts in advance of teaching the lesson. Plan scaffolds to use as needed before reading.

- **Gitanjali Rao: Steps Toward Success** In 2014, the city leaders of Flint, MI, decided to save money by getting water for the city from the Flint River. The residents of Flint noticed that the water from the new supply was not clean, and it smelled. People began to get sick from the polluted water. The residents said that city leaders cared more about money than the health of the residents, many of whom were Black or poor. The residents fought back and demanded clean water. They wrote letters to city leaders and used the media to let the whole country know about the problem. They got help from state and federal governments. The water source was changed back, but the water was still polluted, and people were still getting sick. Finally, after years of fighting, the people of Flint got clean water. Many city leaders were fired, and some were arrested.
- Consuming lead can cause heart, kidney, and nerve damage, delayed development, mental impairment, behavioral issues, and hearing problems in children. As an alternate means of representation, show students a short video on the effects of lead exposure.
- **Toying with a Challenge** Louis Braille invented a system of writing by and for the blind using raised dots. His system was based on a French military code that enabled soldiers to communicate in the dark. Braille, who had been blind since he was 3, invented his system in 1824 when he was 15.

Talk About the Topic

BUILD STUDENTS' INTEREST

1
- Introduce the lesson topic and Focus Question. Tell students they will read, talk, and write about young inventors.
- Have students **Turn and Talk** about inventors and inventions they know about.
- Invite students to use their home language in their conversation. EL
- Invite volunteers to **Stand and Share** their knowledge of inventors and inventions.



2

- Ask students to complete Notice and Wonder with a partner.
- Introduce the focus standard. **Say,** *After reading each text, you'll practice using the main idea and key details to summarize what you've read.*

3 **INTRODUCE ESSENTIAL CONCEPTS**

- Use **Silent Appointment** to have students find partners and complete What Traits Does an Inventor Need?
- Remind students that *traits* are qualities that describe what a person is like.
- Guide students to think about the meaning of each word and how it's related to inventors and inventing.
- Use **LISTEN FOR** to monitor understanding. Use Use **Help & Go** scaffolds as needed.
- **LISTEN FOR** Students understand that inventors need to think creatively and keep trying in order to make new inventions.

HELP & GO: Vocabulary

- Have students look inside the word *creativity* and use the base word to understand its meaning. Have students brainstorm a list of other words with the base word *create*. Discuss how suffixes such as *-ive, -ion,* and *-ity* change the part of speech.
- Have students share their definitions of *persistence*. Clarify that *to persist* means "to keep trying."
- Encourage students to rephrase their partners' ideas to confirm understanding. **EL**

- Invite volunteers to **Stand and Share** their ideas about how different traits could help people become inventors. Record traits that students add.
- Have students add any unfamiliar words and phrases to their word journals.

1 Support Reading

- Set a purpose for reading. **Say,** *You will read to learn about a young inventor's idea for helping others solve a problem.*
- Have students read paragraphs 1–4. Have them circle unknown words and mark confusing parts with a question mark.
- Use **CHECK INs** and related **Help & Go** scaffolds as needed to support understanding of the text. Monitor based on annotations, observation, and your knowledge of students.
- **CHECK IN** Students understand the meaning of *lead, tubes,* and *detect*.

HELP & GO: Vocabulary

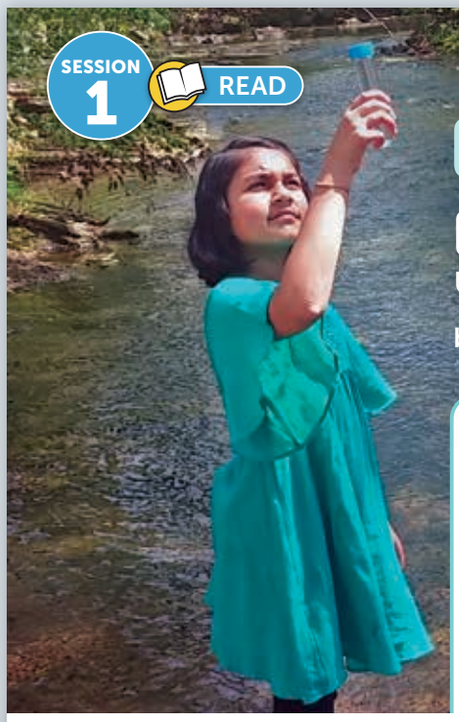
- Have students look around the word *lead* to decide which usage applies in this text.
- Discuss the different meanings and pronunciations of the word *lead*. **EL**
- **Ask,** *What are some examples of tubes? cardboard tubes, pool noodles, pastas* Have students explain how tubes were used to test for poison.
- Consider having students make a sketch of the test described in paragraph 4. **EL**
- **Ask,** *What is another word you could use in place of* detect *in paragraph 4? find, identify*

2 Stop & Discuss

- Have students **Turn and Talk** to complete the **Stop & Discuss**.
- **LISTEN FOR** Students understand that the water had lead in it and Gitanjali wanted to make a faster, more accurate lead test kit.

HELP & GO: Comprehension

- Have students reread paragraphs 2 and 3. **Ask,** *Why is lead in the water bad? It makes people sick. What was wrong with the lead test kits? They were slow and not always right. What did Gitanjali wonder? if she could make a better test Why? A fast, accurate test could warn people about unsafe water.*



Gitanjali Rao: Steps Toward Success

by Amanda Baker

1

1 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

2 RI.4.3

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.

Gitanjali Rao working on her lead test kit design

LESSON 8

3

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.

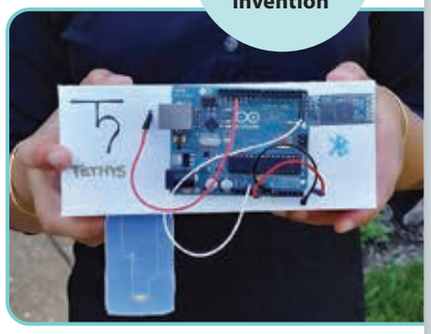
6 Finally, Gitanjali realized she did not need help from a fancy lab. She emailed a chemistry teacher at her local high school. The school didn't have a big lab, but its lab had everything she needed.

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.

9 Gitanjali has continued to explore new ideas. "Don't be afraid to fail," she has said, "because that's just another step toward success."

An early version of Gitanjali's invention



attempts = efforts to try and do something

4

RI.4.1

Stop & Discuss

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

Explain what she means using evidence from the text.

3 Support Reading

- Have students read paragraphs 5–9.
- **CHECK IN** Students understand *lab, chemistry, detector,* and *competition*.

HELP & GO: Vocabulary

- **Say,** Lab *is a short form of the word* laboratory. *What do you think scientists study in a chemistry lab? chemicals*
- Have students look inside the word to find the root word and suffix in *detect/or.* (find + something that) Repeat for *compet/ition*. (compete + act or process of) Discuss how the suffixes change the base words from verbs into nouns.

4 Stop & Discuss

- Have students **Turn and Talk** to complete the **Stop & Discuss**.
- **LISTEN FOR** Students understand that failing helps you learn what doesn't work and leads you closer to what does.

HELP & GO: Comprehension

- Have students paraphrase the steps Gitanjali went through from idea to invention. After each step, discuss the outcome. Point out the times she failed before she succeeded.
- Have students reread the definition for the word *attempts*. **Ask,** *Why is understanding this word important for understanding this text? The text describes the attempts Gitanjali made to create her invention, and Gitanjali says that every failed attempt is really just a step on the way to success.*
- Help students analyze the last sentence and make connections to the title. **EL**

Discuss the Whole Text

Revisit the Focus Question. **Ask,** *How did Gitanjali Rao become an inventor?* Have students **Raise a Hand** to answer. Record student responses to refer to later.

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Reconnect to the Text

Have students **Raise a Hand** to recall "Gitanjali Rao: Steps Toward Success." **Ask,** *What problem did Gitanjali solve? How did she solve it?*

1 Introduce the Standard

Introduce summarizing. **Say,** *Today, you will reread "Gitanjali Rao: Steps Toward Success." Then you will summarize it, or retell in your own words the important parts of what you've read.*

2 Reread/Think

MODEL THE STANDARD Display the graphic organizer and model identifying main idea and key details. Explain that students will use the most important ideas and details to summarize the text.

- **Ask,** *What is the main thing you learned about Gitanjali Rao? If you were going to introduce her to someone and you had just one sentence to explain who she is, what would you say? She is a young inventor who used creativity and persistence to create a better way to test water for lead.* Guide students to understand that this is the main idea of the text. Invite students to help you complete the main idea section of the graphic organizer.
- Encourage students to paraphrase the main idea in their home language before filling in the graphic organizer. **EL**

GUIDE STANDARDS PRACTICE Have partners complete the graphic organizer with key details.

- **Say,** *To test whether a detail is key, ask yourself, "Does someone truly need to know this detail to understand who or what the text is about?"*
- Help students find key details in each section. **Ask,** *In paragraphs 1–4, what was the problem? What was Gitanjali's idea? In paragraphs 5–7, what did she try? In paragraphs 8 and 9, what did she learn?*
- Have students **Stand and Share** the key details they listed.

SESSION 2 PRACTICE

RI.4.2 . . . summarize the text.

1 Summarize a Text

- 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.

2 Reread/Think

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.

Main Idea
What is the most important thing you learned about Gitanjali Rao?

Gitanjali Rao solved a problem by using creativity and persistence to invent a better lead test.

Key Details (paragraphs 1–4)	Key Details (paragraphs 5–7)	Key Details (paragraphs 8 and 9)
• Heard about unsafe water with lead in Flint, MI	• Found a chemical to attract lead, needed a lab to test ideas	• Made phone app
• Lead makes people sick.	• Wrote to a lab that didn't write back	• Won national award
• Thought she could make a better test	• Asked a chemistry teacher for help	• Said failing is just a step toward success
• Inspired by a test for poison in air	• Tried many times and made a test that worked	

138 UNIT 2 | Technology
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3 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?

The main thing to know about Gitanjali Rao is ___.

The problem was ___. She thought she could help by ___.

She tried ___. Finally, she ___.

4 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.

Sample response: Gitanjali Rao is an inventor who created a fast and accurate way for people to test whether their water contains lead. She heard about lead in the water in Flint, MI, and she wanted to help. Then she read about a process scientists use to find poison in the air. She thought a similar process might work for finding lead in water. She was right! After many attempts, she finally made a fast lead test people could use with their phones. She learned that trying and failing are just steps to success.

WRITING CHECKLIST

- ☐ I included the main idea of the text.
- ☐ I included key details.
- ☐ Someone who has never heard of Gitanjali Rao could read my summary and understand who she is and what she did.
- ☐ I used correct spelling, punctuation, and capitalization.

3 Talk

- **Say,** *You should not include every detail from the text in your summary. Your main idea and key details from your organizer should be enough to explain who Gitanjali Rao is and what she did.*
- Help students synthesize the details in each section of their graphic organizers. Have partners review the key details in one section. Then challenge them to explain the most important details in one sentence. Repeat for each section of the graphic organizer.
- **LISTEN FOR** Students can explain key details in each section in a single sentence. Use **Help & Go** scaffolds as needed.

HELP & GO: Standards Practice

- Model how to synthesize key details from paragraphs 5–7 into a single sentence. **Say,** *My summary would be too long if I included every detail about chemicals, labs, and Gitanjali Rao's chemistry teacher. I'm going to step back and figure out what these details have in common: They all describe things she tried. Now I'll explain it in one sentence: Gitanjali Rao had to try many ways to find a lab and test her idea before she created a test for lead that worked.*
- Have partners try this process for each section. Challenge them to explain the key details in less than 30 words.

- Have partners use the Talk questions and sentence frames to tell a summary of the text.

4 Write

- Have students complete the Write task and use the checklist to check their work.
- Use the sentence frames from the Talk to help students guide their writing. **EL**
- Use **Pick a Stick** to have a few students share their summaries with classmates.
- Use written responses to determine whether students need additional support.

1 Support Reading

- Set a purpose for reading. **Say,** *Today, you will read to learn about another young inventor.*
- Have students read paragraphs 1–3. Have them circle unknown words and mark confusing parts with a question mark.
- **CHECK IN** Students understand the terms *video chats, technology,* and *device*.

HELP & GO: Vocabulary

- Have students share what they know about video chats. Look at both parts of the phrase *video chat* and discuss the meaning of each word. Discuss how a chat is an informal conversation. Then put the words together to understand that a video chat is a conversation on a computer, phone, or tablet where the people talking together can see each other. **EL**
- Discuss the meaning of *technology*: the use of science and engineering to do practical, useful things. Repeat for *device*: a piece of equipment that does a particular job.

2 Stop & Discuss

- Have students **Turn and Talk** to complete the **Stop & Discuss**.
- **LISTEN FOR** Students understand that Brooke and her dogs missed each other, which inspired her to think of a way she could check in with them when she wasn't home.

HELP & GO: Comprehension

- Discuss how one event leads to another. **Ask,** *How did Brooke feel about her dogs? What gave her the idea to find a way to check in with them? What did she do after she got the idea for her invention?*
- Invite students to use their home language to tell Brooke's path from idea to invention. **EL**
- Point out the quotation marks around *chat* in paragraph 2. Discuss how *chat* is being used in a slightly different way here to refer to human-to-pet communication.

SESSION 3 READ

Anything Is

by Mary Lindeen

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.

3 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.

dispense = give out in small amounts

2 RI.4.3

Stop & Discuss

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

Use evidence from the text to explain your ideas.

Brooke Martin and her dog Kayla

LESSON 8

Paws-ible

3

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.

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

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.

4

RI.4.3

Stop & Discuss

How did Brooke's first invention lead to her second invention?

Explain your ideas using evidence from the text.

3 Support Reading

- Have students read paragraphs 4–6.
- **CHECK IN** Students understand what a *product*, *caregiver*, and *loved one* are.

HELP & GO: Vocabulary

- Discuss the meaning of the word *product* as "an item that a business makes and sells." Name examples of familiar products. Then ask what Brooke's product was. Discuss why inventors would need money to make and sell their products.
- Have students reread paragraph 6. Ask students to look inside and around the terms *caregivers* and *loved one* to determine meaning.
- Have students confirm their understanding of *caregivers* and *loved one* by sharing a personal connection or example from a familiar story or TV show.

4 Stop & Discuss

- Have students pause to think about the **Stop & Discuss**, then **Turn and Talk**.
- **LISTEN FOR** Students paraphrase how Brooke built on her first idea to solve a new problem and help people.

HELP & GO: Comprehension

- Have students retell in their own words the events described in paragraph 5. Repeat for paragraph 6.
- Prompt students to make a connection between dispensing treats and dispensing medication. Discuss how that function is the same and how it is different between the two inventions.
- To confirm understanding, have students draw a sketch or flow chart to show how Brooke's second invention works. EL
- Discuss with students why a device that dispenses medications in the right amount at the right time would be useful.

5 Support Reading

- Have students read paragraphs 7 and 8.
- **CHECK IN** Students understand why Brooke chose to study engineering.

HELP & GO: Comprehension

- Review the reasons why engineering would appeal to an inventor like Brooke. **Ask,** *Why might inventors want to learn about planning and building structures, machines, and technology?*
- Discuss how the word *engineer* can be used as a noun or a verb. Have students look around the word to help decide which form of the word fits best in paragraph 7. **EL**

6 Stop & Discuss

- Have students **Turn and Talk** to complete the **Stop & Discuss**.
- **LISTEN FOR** Students understand how curiosity, effort, and a creative solution to a problem can help a person become an inventor.

HELP & GO: Comprehension

- Have students reread paragraph 8 and identify the question the author asks. Discuss the qualities described in the question.
- Talk about what it means to *put in effort*. Discuss how Brooke put effort into her inventions.
- **Ask,** *What does the author say you need to become an inventor? a problem and creative solution*
- **Ask,** *How did Brooke's attitude help her become an inventor? How did a situation inspire her? How could similar attitudes or situations help other young inventors?*

Discuss the Whole Text

Revisit the Focus Question. **Ask,** *How did Brooke become an inventor? What traits helped her?* Have students **Stand and Share** to answer. Record student responses to refer to later.

SESSION 3 READ

Brooke Martin with her invention at the Global Pet Expo

5 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.

8 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.

6 RI.4.1

Stop & Discuss

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 ___.

SESSION 4 PRACTICE RI.4.2 . . . summarize the text. LESSON 8

1 Summarize a Text

- 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.

2 Reread/Think

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

Main Idea What is the most important thing you learned about Brooke Martin?
Brooke Martin solved problems by building on inventions to create technology that keeps people connected to each other and to their pets.

Key Details (paragraphs 1–3)	Key Details (paragraphs 4–6)	Key Details (paragraphs 7 and 8)
• **She and her dogs missed each other.** • **She was inspired by video chats with friends and family.** • **She invented a way to video chat with pets and give treats.**	• **She shared her idea with other people.** • **She applied the same idea to help people like her grandmother.** • **Her new invention gave medicine instead of treats.**	• **She studied engineering to learn more about solving problems.** • **Inventors need curiosity, effort, and a problem to solve.**

Reconnect to the Text

Have students **Raise a Hand** to recall "Anything Is Paws-ible." **Ask,** *Why do you think the author chose that title?*

1 Practice the Standard

- Read the bullets aloud. Then have students **Stand and Share** their definitions of main idea and key details.
- Explain that summarizing involves sorting out important from unimportant details.

2 Reread/Think

GUIDE STANDARDS PRACTICE Display the graphic organizer and have partners discuss the main idea. Have students **Raise a Hand** to share their ideas.

- If needed, clarify that the main idea should describe how Brooke solved problems by building on inventions to create technology that keeps people connected to each other and to their pets.
- **Say,** *Key details are those you'd have to include in order to explain the main idea to someone who has never read the text. I'm going to retell the first two paragraphs in my own words. I'll include both important and unimportant details. Listen for which details are which.* Retell paragraphs 1 and 2, including unimportant details such as the names of Brooke's dogs and that she worked in a garage. Have students use **Thumbs-Up, Thumbs-Down** to identify which details are important and which are not.
- Have students complete the graphic organizer.
- Help students find key details. **Ask,** *What relationships inspired Brooke? How did she build on existing technology to create new inventions? How did she build on her first invention to solve a different problem?*
- Before partners record key details, have them rephrase details in each section and discuss which two or three are the most important. **EL**

3 Talk

- Use **Silent Appointment** to have students find a partner and share their responses.
- Have partners work together to decide which details are most important and which could be left out of a summary. Have them cross out the unimportant details.
- Have partners take turns telling a summary of the text by connecting the main idea and key details.

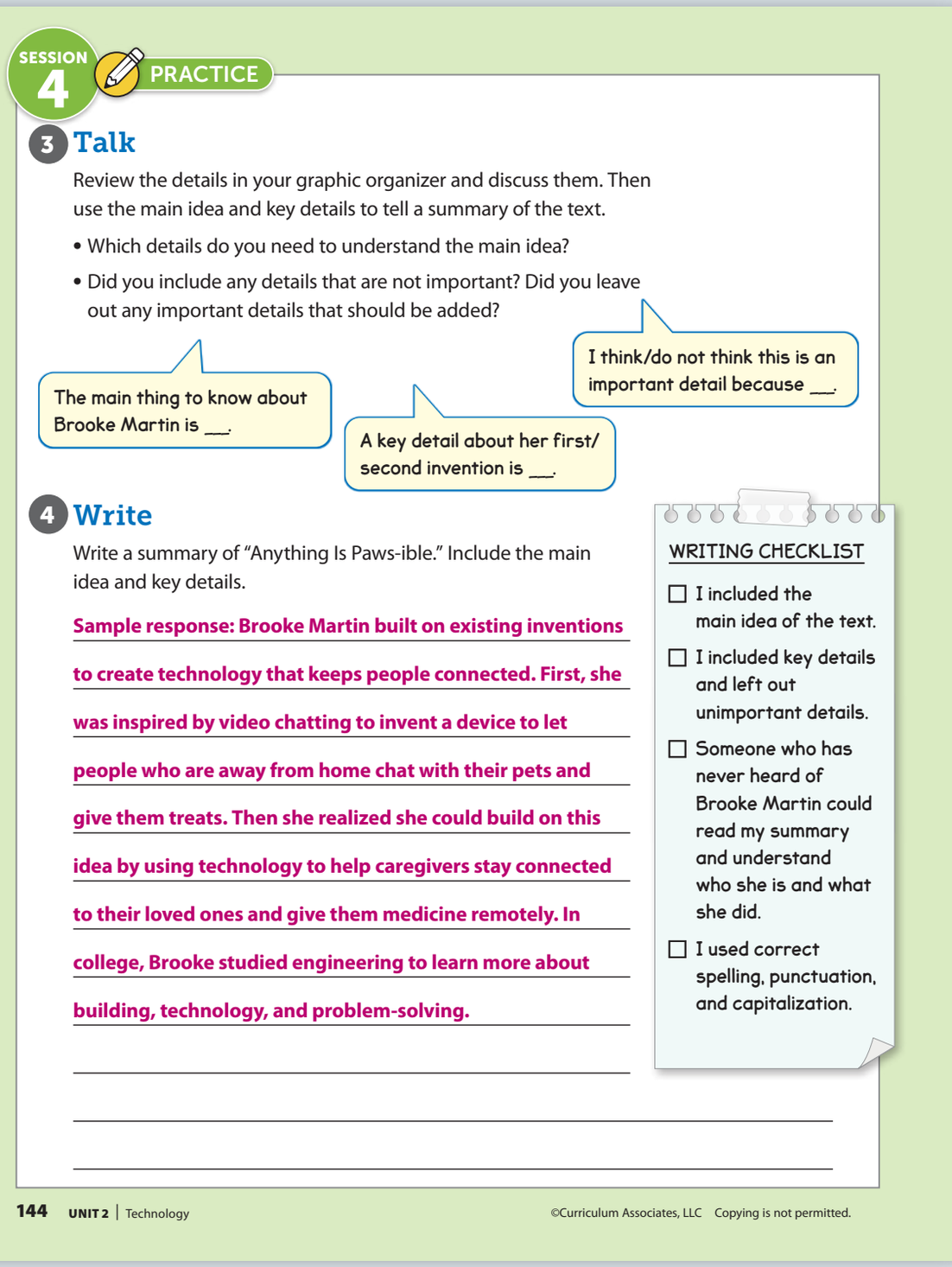
4 Write

- Have students **Raise a Hand** to explain in their own words what a summary is.
- Have students work independently to complete the writing activity.
- Consider having students complete the activity with a partner. **EL**
- **LOOK FOR** Student summaries include a main idea and important details. Use **Help & Go** scaffolds as needed.

HELP & GO: Writing

- If needed, provide sentence frames for students: *The main idea of "Anything Is Paws-ible" is ___. The first important thing to know is ___. Then ___. Finally, ___.* **EL**
- **Say,** *Use your graphic organizer to help you write. You've already found the main idea and important details. To create your summary, write that information in complete sentences as a paragraph. Add connecting words if you need them.*
- Have partners work together to revise their summaries. Challenge them to cross out unimportant details and explain how important details are connected.

- Use **Pick a Stick** to have students share their writing with their classmates.
- Use written responses to determine whether students need additional support.



SESSION 4 PRACTICE

3 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?

The main thing to know about Brooke Martin is ___.

A key detail about her first/second invention is ___.

I think/do not think this is an important detail because ___.

4 Write

Write a summary of "Anything Is Paws-ible." Include the main idea and key details.

Sample response: Brooke Martin built on existing inventions to create technology that keeps people connected. First, she was inspired by video chatting to invent a device to let people who are away from home chat with their pets and give them treats. Then she realized she could build on this idea by using technology to help caregivers stay connected to their loved ones and give them medicine remotely. In college, Brooke studied engineering to learn more about building, technology, and problem-solving.

WRITING CHECKLIST

- ☐ 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.

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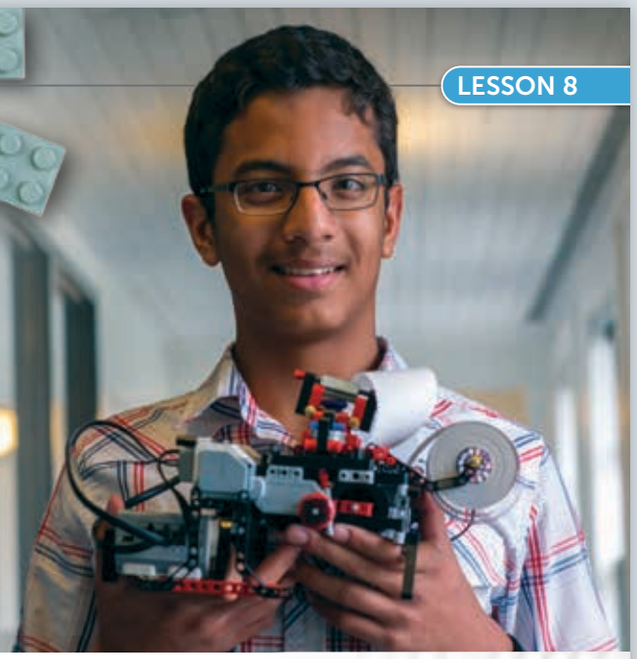
SESSION 5 READ

LESSON 8

Toying with a Challenge

by Lynda Jones



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

1

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.

3 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!

identifying = telling what something is

sensors = pieces of equipment that detect changes in heat, light, sound, or motion

Reconnect to the Texts

Display responses to the Focus Question for "Gitanjali Rao: Steps Toward Success" and "Anything Is Paws-ible." Invite students to **Raise a Hand** to make connections between the two texts.

1 Independent Reading

- Set a purpose for learning. **Say,** *Today, you will read to learn about another young inventor, and then you'll summarize what you've read.*
- Invite students to share what they know about Braille and where they have encountered it. **EL**
- If students need more support, work with them in small groups to guide reading. Use **Help & Go** scaffolds as needed.
- **CHECK IN** Students know what Braille is and that a Braille printer is an assistive technology.

HELP & GO: Vocabulary

- Have students look around the word *Braille* for help understanding what it is and how it works. **Ask,** *How is a printer that can create Braille pages helpful, or assistive, technology for people who are blind or have low vision?*
- **Ask,** *In paragraph 3, what does* Shubham got to work *mean? He began making his invention.* **EL**

- **CHECK IN** Students understand that Shubham wanted to make printers less expensive so more people could have them.

HELP & GO: Comprehension

- **Ask,** *How much do Braille printers cost? $2,000 to $5,000 How much did the LEGO® kit cost? $400*
- *What do you think Shubham is going to do with the LEGO® kit?*

2 Independent Reading

- **CHECK IN** Students understand the terms *robotics, computer code,* and *perfecting*.

HELP & GO: Vocabulary

- Have students look inside the word *robotics* to find *robot*. Discuss how robots and printers are both computer-driven machines designed to help people.
- Repeat for *computer code* (the messages that tell a computer what to do) and *perfecting* (making something perfect).

- **CHECK IN** Students understand that Shubham overcame problems to succeed with his invention.

HELP & GO: Comprehension

- Have students reread the definition for *prototype*. **Ask,** *If Shubham built seven prototypes before he made one that worked, how many different LEGO® printers did he build? At least eight, because he's still perfecting BRAIGO and so might be building more.*
- Clarify that *was a hit* means "was successful and met with approval." Ask students to think of examples of popular songs or movies that are hits. **EL**
- **Ask,** *Why does Shubham need funds from a technology company? He needs more money to buy materials and pay people to build more printers.*
- Have students reread paragraph 6. **Ask,** *How could Henry Wedler help Shubham?* Point out that Wedler is a scientist who could help Shubham with his ideas and experiments. Discuss how Wedler is blind and could give important feedback about how the printer would work from the perspective of someone who is blind.

SESSION 5 READ

2

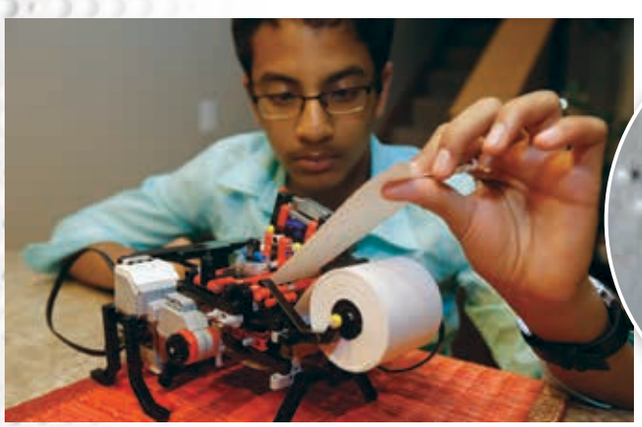
prototype = the first model of an invention that tests if it will work

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.

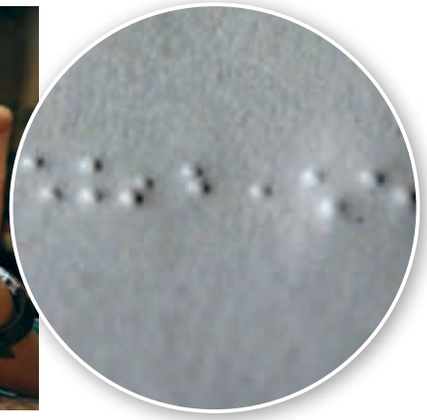
5 Shubham built and took apart seven prototypes until he built one that correctly printed the raised Braille dots. It also weighed only a few pounds. He called his invention "BRAIGO," a combination of *Braille* and *LEGO®*, and entered it into his seventh-grade science fair. BRAIGO was a hit at the fair. 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



A test printout of Braille

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SESSION 5 PRACTICE RI.4.2 . . . summarize the text. LESSON 8

Respond to Text

3 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.

3 Reread/Think

- Have students complete the Reread/Think items independently.
- Consider reading aloud questions and answer choices as needed. EL

Answer Analysis

Use the answer analysis below to review the practice items with students. Have students **Stand and Share** the answer to each question. Then review the correct answers with students.

1. The correct choice is **B**. This is the best choice because it describes how Shubham Banerjee solved a problem by creating a new invention. Choices **A**, **C**, and **D** describe key details that tell more about why and how he solved a problem, but they do not describe the problem or the invention he created to solve it. **DOK 2 | RI.4.2**

2. The correct choice is **D**. An advisor is someone who offers guidance or help. Choice **A** describes an inventor. Choice **B** describes an engineer. Choice **C** describes a person who knows how to read Braille, a skill for which there is no common name. **DOK 1 | RI.4.4**

3. The correct choice is **B**. This is the most important detail to include because it describes a significant result of Shubham's work. The other choices are not key details and therefore do not belong in a summary. **DOK 2 | RI.4.2**

4 Answer Analysis

4. The correct choice is **B**. Paragraph 2 states that some printers were between $2,000 and $5,000, a prohibitively expensive price for many people. Choice **A** is incorrect because the technology was not noted as being easier to use. Choice **C** is incorrect because the text does not discuss the speed of the printer. Choice **D** is incorrect because the mention of "computer code" in paragraph 4 implies the printer needs a computer to work. **DOK 2 | RI.4.1**

5 Write

- Have students respond independently to the Write prompt. **DOK 3 | RI.4.2**
- If students need more support, work with them in small groups to guide them through writing. Use **Help & Go** scaffolds as needed.
- If needed, provide a word bank of terms students can use in their responses: *main idea, key detail, important, unimportant.* **EL**
- **LOOK FOR** Students summarize the text in their own words by describing the main idea and presenting only key details.

HELP & GO: Writing

- Break the writing task into smaller steps. **Ask,** *What is the main idea of this text? What is one key detail from paragraphs 1–3 that supports that idea? From paragraphs 4 and 5? From paragraphs 6 and 7?*

Lesson Wrap-Up

Have students revisit the Focus Question using examples from the text. Record responses. Invite students to **Raise a Hand** to make connections between the three texts they have read.

SESSION 5 PRACTICE

4 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.

5 Write

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

Sample response: Shubham Banerjee is a young inventor who figured out how to build a less expensive Braille printer for people who are blind or have low vision. He used LEGO® bricks to build his printer because they only cost $400. He made seven prototypes before he found a way to make it work. With help from others, he started his own company to build and sell his invention, called BRAIGO, all around the world.

WRITING CHECKLIST

- ☐ I included the main 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.

SESSION 6 PUT IT TOGETHER LESSON 8

Respond to the Focus Question

How can a young person become an inventor?

1 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? **Sample responses shown.**

He wanted to make a less expensive Braille printer. He used LEGO® bricks to make an affordable Braille printer.

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?

She wanted to create a fast, accurate lead test to help people in Flint, MI. She built on a test for air, used it to test lead in water, and connected it to a phone app.

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

She wanted to stay connected to animals and people she cares about. She built on video chat technology and added a way to give treats or medicine remotely.

2 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?

All three of them ___.

___ was the only one who ___.

3 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.

Respond to the Focus Question

Read the Focus Question. Tell students that today they will answer the question using information from all three texts.

1 Reread/Think

- Use **Team-Pair-Solo** to have students analyze the inventors' solutions to problems.
- **LOOK FOR** Students can summarize the problem and solution in each text.

> **HELP & GO: Standards Practice**
>
> - Have partners use their own words to describe each inventor's problem and solution. Then challenge them to retell each problem and solution in one sentence.

2 Talk

Have teams compare the steps followed by the three young inventors. Record student responses.

3 Write

- Have students respond to the prompt.
- Encourage students to sketch their invention and prewrite about their idea. **EL**
- **LOOK FOR** Students describe a problem, solution, and steps in the design process.

> **HELP & GO: Writing**
>
> - Have partners discuss their ideas for inventions and the steps they could take to create them.
> - Provide transition words to describe steps in a process: *First, Then, Finally.* **EL**

- Use **Merry-Go-Round Share** to have students share their writing with classmates.