OVERVIEW

Invention Upgrades

FOCUS QUESTION

How do people build on others' ideas in creative new ways?

About the Lesson

OBJECTIVES

Content Objectives

- Determine the meaning of unfamiliar words in an informational text, using word parts and context clues.
- Understand how inventions such as wheels, elevators and delivery systems progress from one version to another.

Language Objectives

- Explain to a small group how word parts and context clues can be used to figure out the meaning of a word.
- Describe in writing how invention upgrades from the text are better than the earlier versions.

ACADEMIC TALK

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

context clue, word part, base word, prefix, suffix

Spanish Cognates

prefijo, sufijo

Build Knowledge

Lesson texts build knowledge about:

- How wheels have been reinvented to improve bicycles and lunar exploration
- How new elevator technology affects skyscraper designs
- How delivery systems are evolving to use drones

Plan Student Scaffolds

- Use **i-Ready data** to guide grouping and choose strategic scaffolds.
- Use **Teacher Toolbox** resources as needed to address related skills:
  - —Identify word roots
  - —Use context to find word meaning
- In Sessions 1 and 3, pair students of varying language-proficiency levels to **Buddy Read** texts so that one student may provide language support for the other. **EL**
- Preview texts and activities to anticipate barriers to access, engagement, 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
Vote with Your Feet	1	movement, multiple perspectives
Pass It On	1, 2, 4, 5	spontaneity, connectedness
Stand and Share	1–4	spontaneity, movement, connectedness
Silent Appointment	2, 4	social interaction, nonverbal expression
Merry-Go-Round Share	2, 4	multiple ways to show focus, connectedness
Team-Pair-Solo-Team	6	multiple ways to show focus, shared responsibility

LEARNING PROGRESSION | Determine Word Meanings

Students build on this skill:
RI.3.4 Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 3 topic or subject area.

Students learn this skill:
RI.4.4 Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area.

Students prepare for this skill:
RI.5.4 Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 5 topic or subject area.

Students review and practice:

- **RI.4.1** Make inferences
- **RI.4.3** Analyze a scientific text

LESSON PLANNING GUIDE

TEXT 1: Reinventing the Wheel—Twice! • TECHNOLOGY ARTICLE

			TEXT AT-A-GLANCE	ENGLISH LEARNER SUPPORT (EL)
SESSION 1	SCAFFOLD READING		**Concepts/Background** • learning to ride a bicycle • exploration of the moon • beanbag chairs • numerical reference: –208°F to 250°F (–133°C to 121°C) **Language** • **Vocabulary:** *upgrade, wobble, motorized disk, upright, lunar rover, uneven surface, mesh, extreme temperatures, boulders, jolting, versions*	**Reading** • Gesture, Leverage cognate knowledge
SESSION 2	PRACTICE THE FOCUS STANDARD • Formative Assessment			**Speaking/Reading** • Analyze word parts **Writing** • Use sentence frames **Speaking/Writing** • Collaborate with a partner

TEXT 2: Need a Lift? • TECHNOLOGY ARTICLE

SESSION 3	SCAFFOLD READING		**Concepts/Background** • traditional and futuristic skyscrapers • elevators and elevator components • numerical references: 200 feet per minute; 4,000 feet (1,200 meters) per minute; less than 60 seconds • magnetic forces of pushing and pulling **Language** • **Vocabulary:** *exists, technology, elevate, system, shafts, spectacular, architects* • **Figurative Language:** *allow buildings to soar*	**Reading** • Examine verb tense, Gesture **Listening/Reading** • Analyze signal words **Speaking/Reading** • Rephrase ideas
SESSION 4	PRACTICE THE FOCUS STANDARD • Formative Assessment			**Speaking/Reading** • Leverage cognate knowledge, Determine multiple meanings of words **Speaking/Writing** • Talk before writing

TEXT 3: Going the Distance • TECHNOLOGY ARTICLE

SESSION 5	INDEPENDENT READING AND PRACTICE • Formative Assessment		**Concepts/Background** • writing and sending emails • *the 1700s, 1800s,* and *1900s* as terms to reference periods of history • mail delivery modes past and present, including stagecoaches, horse-drawn carriages, and drones **Language** • **Vocabulary:** *items, local, drones, on board, flight path, computer programming, traffic jams, whiz, require, take flight* • **Idioms:** *making (good) time, take to the sky*	**Listening/Reading** • Interpret idioms, Read aloud questions and answers **Speaking/Reading** • Leverage cognate knowledge, Determine multiple meanings of words **Speaking/Writing** • Talk before writing

KNOWLEDGE BUILDING

SESSION 6	RESPOND TO THE FOCUS QUESTION • *How do people build on others' ideas in creative new ways?*	• Integrate information from the lesson texts • Collaborative discussion • Short response	**Speaking/Writing** • Collaborate with a partner

Before Teaching the Lesson

Preview the texts in advance of teaching the lesson. Plan scaffolds to use and provide background information as needed before reading each text.

- **Reinventing the Wheel—Twice!: Gyroscopes** The text discusses gyroscopes and the moon's surface. As an alternate means of representation, consider sharing a video of a gyroscope in action and/or video or images of the surface of the moon.
- **Need a Lift?: Elevators** Display pictures of skyscrapers such as the Empire State Building. Discuss multiple meanings of the word *lift*: a ride (noun), an elevator (noun, British usage), or "to raise up" (verb).
- **Going the Distance: Drones** Explain that drones were once seen as toys, but now engineers are designing them to deliver packages, survey fields of crops, study marine animals such as whales, and monitor traffic patterns in large cities.

Talk About the Topic

BUILD STUDENTS' INTEREST

1 - Introduce the lesson topic and the Focus Question. Tell students they will read, talk, and write about building on inventions.
- Explain that the phrase *build on* means "to improve or add to." **Ask,** *Why might people want to build on the ideas and inventions of others? to make them better, to solve new problems*
- Encourage students to rephrase the Focus Question in their own words. **EL**
- Use **Raise a Hand** to have students share examples of inventions.

2 - Ask students to complete Notice and Wonder with a partner.
- Use **Vote with Your Feet** to have students show which text they are most interested in reading.
- Introduce the focus standard. **Say,** *In this lesson, you will use context clues and word parts to figure out the meanings of unfamiliar words and phrases.*

SESSION 1 TALK ABOUT THE TOPIC

Invention Upgrades

1 **FOCUS QUESTION**

How do people build on others' ideas in creative new ways?

2 **NOTICE AND WONDER**

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

3 **WORD PAIRS**

Draw a line to match words with similar meanings. Then, on the lines below, write a sentence using one of the pairs of words.

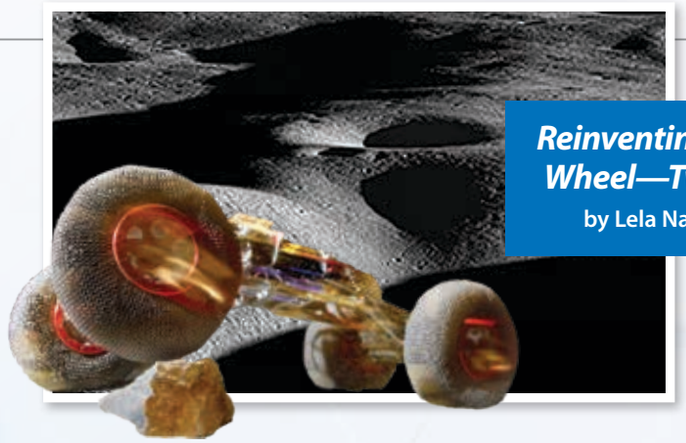
future	dream
upgrade	someday
imagine	improve

__ has a similar meaning to __.

__ thinks __. I agree/disagree because __.

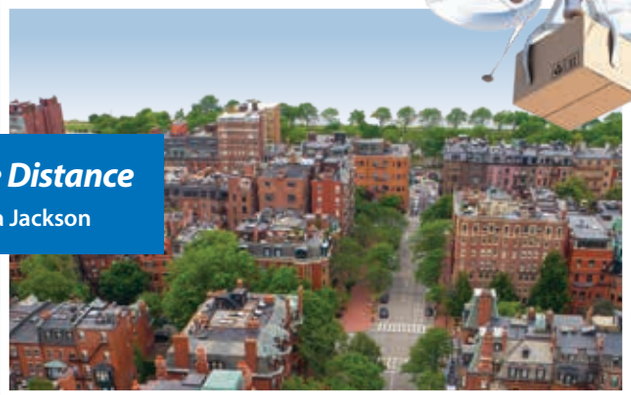
I want to improve my bicycle, so I am going to upgrade the wheels and handlebars.

LESSON 6



Reinventing the Wheel—Twice!
by Lela Nargi

Need a Lift?
by Maria Parrott-Ryan



Going the Distance
by Jessica Jackson

3 INTRODUCE ESSENTIAL CONCEPTS

- Have students continue working with partners to complete Word Pairs.
- Prompt students to use the sentence frames to discuss their ideas with their partners.
- Use **LOOK FOR** to monitor understanding. Use **Help & Go** scaffolds as needed.
- **LOOK FOR** Students correctly match word pairs.

HELP & GO: Vocabulary

- Prompt students to look inside the word to determine the meaning of *upgrade*. **Say,** *The word* grade *describes the quality of something, such as the grades students earn in school. What do you think happens when something gets an upgrade? It gets better; it gets improved.*
- Introduce additional synonyms to facilitate students' connections to the word meanings and support the matching exercise. **EL**

- Use **Pass It On** to have students share the sentences they generated.
- To promote further discussion, ask how each pair of words relates to inventing. For instance, **ask,** *Why do inventions sometimes need to get upgraded or improved? Users want technology to work better or faster; people want to use it in a new way.*

1 Support Reading

- Set a purpose for reading. **Say,** *Today you will read to learn about ways people are trying to improve wheels.*
- Have students read paragraphs 1 and 2. Have them circle unknown words and mark confusing parts with a question mark.
- Use **CHECK INs** and **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 complex and compound sentences in paragraph 1.

HELP & GO: Sentence Comprehension

- Read aloud the last sentence in paragraph 1. Have students underline the cause (*improve*) and the effect (*more fun and less falling*) and then guide them to identify the connecting word (*so*). **Say,** *The connecting word* so *shows a cause-effect relationship.*
- Point out the connecting words *but, and, in fact,* and *before.* Discuss how each shows a relationship between ideas.

2 Stop & Discuss

- Have students complete **Stop & Discuss** with a partner.
- **LOOK FOR** Students understand how the gyrowheel helps new riders stay upright.

HELP & GO: Comprehension

- **Ask,** *What problem did the college students want to solve? keeping new riders from falling What does the gyrowheel do? It keeps the wheel upright. How does this help? New riders won't fall.*
- Have students act out the words *balance* and *upright.* **EL**
- Demonstrate gyroscopic motion using a coin rolling on its edge. Explain that the motion is similar to the gyrowheel's *disk*.

SESSION 1 READ

Reinventing the Wheel– TWICE!

by Lela Nargi

1 1 Learning to ride a bicycle is exciting, but it can also seem a bit scary at first. The wheels may wobble and cause riders to lose their balance. In fact, riders may fall down a lot before they have their first smooth, successful ride. Could someone improve bicycle wheels so there would be more fun and less falling?

2 In 2004, a group of inventive college students decided to do just that. They redesigned the bicycle wheel to help new riders keep their balance. The students replaced the regular front wheel of a bicycle with their invention, called a gyrowheel. Inside the gyrowheel is a motorized disk that spins. The whirling of this round, flat piece of metal creates a strong **force** that keeps the wheel upright. So, the wheel is balanced no matter how slowly the rider is pedaling. No more falling!

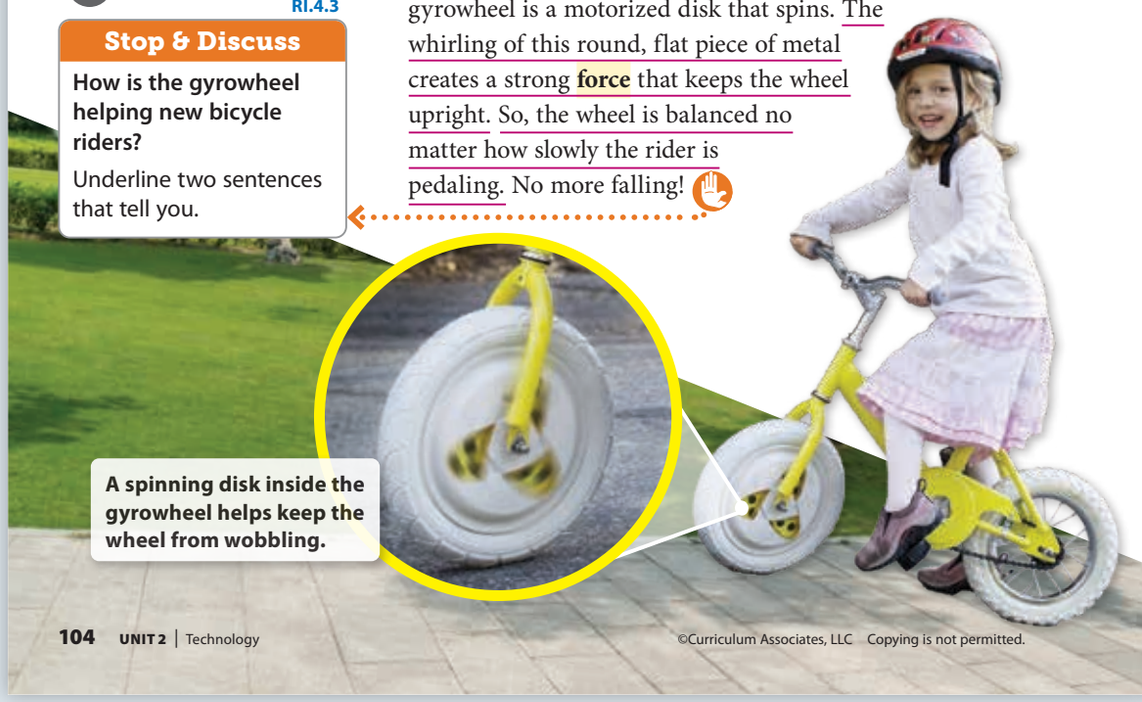
force = push or pull on an object

2 RI.4.3

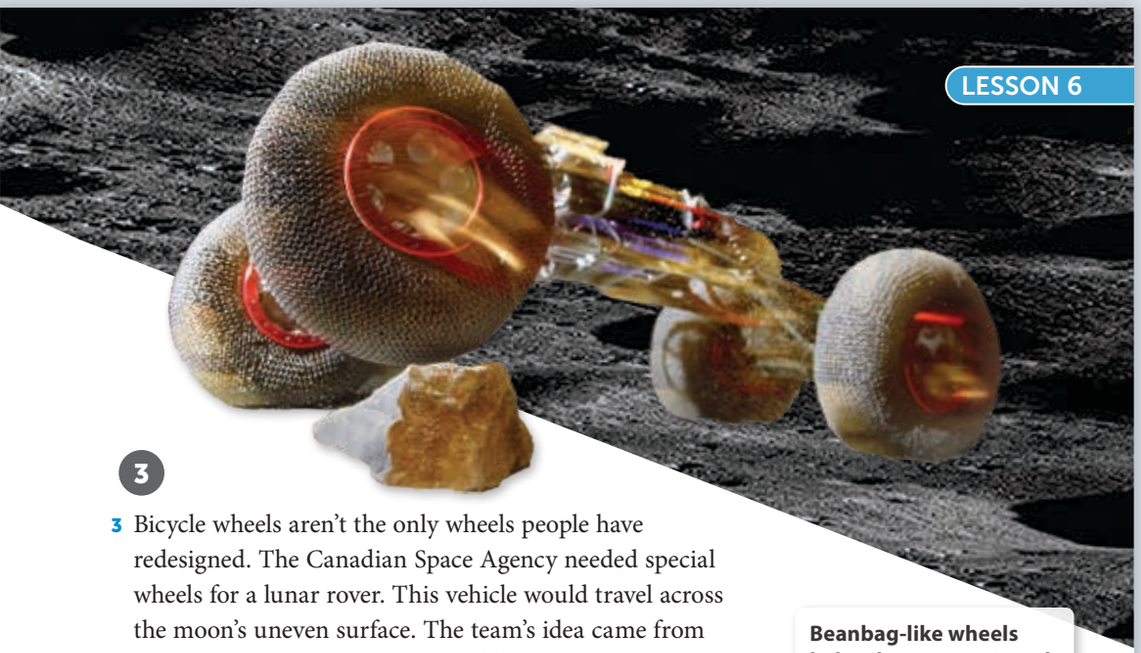
Stop & Discuss

How is the gyrowheel helping new bicycle riders?

Underline two sentences that tell you.



A spinning disk inside the gyrowheel helps keep the wheel from wobbling.



Beanbag-like wheels help a lunar rover travel over the moon's surface.

3

3 Bicycle wheels aren't the only wheels people have redesigned. The Canadian Space Agency needed special wheels for a lunar rover. This vehicle would travel across the moon's uneven surface. The team's idea came from beanbag chairs, those cloth bags filled with small, round pieces of foam.

4 The beanbag wheels the team created are made of steel mesh on the outside. This weblike material can hold up in the extreme temperatures of the moon, which swing from –208°F to 250°F (–133°C to 121°C). Small pieces of plastic fill the rover's wheels, which are soft and mushy just like beanbag chairs. This sponginess helps the wheels roll smoothly across the moon's uneven surface. It also means that the wheels can easily climb over tall boulders without jolting the equipment inside the rover. There are no bounces or bumps.

5 The wheel is a very important invention that has been redesigned many times. The very first wheel, which was probably made of stone, would never have made it to the moon or even onto a bike. It's a good thing people have continued working on new versions of the wheel. Like these teams of inventors, someday you might redesign something to solve a "wheel"—make that a *real*—problem!

4

RI.4.3

Stop & Discuss

Why does a lunar rover need special wheels?

Support your response with details from the text.

The special wheels help the lunar rover ___.

3 Support Reading

- Have students read paragraphs 3–5.
- **CHECK IN** Students understand vocabulary that describes the moon.

HELP & GO: Vocabulary

- Direct students to paragraph 3. **Ask,** *Where is a lunar rover used? on the moon What do you think* lunar *means? related to the moon*
- Revisit paragraph 4. Point out that the temperature range *–208°F to 250°F (–133°C to 121°C)* helps explain what *extreme temperatures* means. **Ask,** *What is another way to describe* extreme temperatures*? very hot or very cold*
- Have students visualize the moon's *uneven* landscape and *boulders*. **Ask,** *What is the surface of the moon like? bumpy, lots of big rocks*
- Encourage students to identify cognates of unfamiliar words in their home language. The Spanish cognates *lunar, vehículo, extremo/a,* and *temperatura* may support understanding of words in these paragraphs. **EL**

4 Stop & Discuss

- Have students **Turn and Talk** to complete the **Stop & Discuss**.
- **LISTEN FOR** Students explain why a lunar rover needs special wheels.

HELP & GO: Comprehension

- Using a cloth filled with beans or other small objects, show how a beanbag molds against an uneven surface. Discuss why this is useful.
- **Ask,** *What might happen if the rover's wheels do not hold up in the heat or cold? They might melt or snap.*

Discuss the Whole Text

- Revisit the Focus Question with the class. **Ask,** *What technology did the two groups build on? How does each upgrade build on others' ideas?*
- Have students **Stand and Share** their responses. Record responses for students to reference later.

Reconnect to the Text

Have students recall "Reinventing the Wheel—Twice!" using **Pass It On** to provide key details about the two new wheel designs. **Ask,** *What problems do the upgrades solve? What creative ideas do they use?*

1 Introduce the Standard

- Review the information at the top of the student page. **Say,** *You can use many strategies to figure out unfamiliar words. Today you will use the strategy of looking at word parts.*
- Remind students that a prefix comes at the beginning of a word, a suffix comes at the end, and a base word is the part left over after the prefixes and suffixes are taken away.
- Using **Raise a Hand**, guide students to identify the word parts in and discuss the meanings of words such as the following: *unusual, disagree, renumber, sweeten, moveable,* and *cloudless*.

2 Reread/Think

MODEL THE STANDARD Model the thinking process for finding meanings of unfamiliar words.

- **Say,** *I can break* successful *into two parts: success/ful. I know* success *means "turning out well" or "meeting a goal." The suffix* -ful *means "full of." When I put these word parts together, I can figure out that* successful *describes something that turns out well or meets the goal. When the text describes a "successful ride," it means the ride went well and the rider didn't fall.*

GUIDE STANDARDS PRACTICE Use **Silent Appointment** to have students pair up to complete the chart.

- Have students brainstorm other words with the prefix *re-* and the suffixes *-ive* and *-ness*. Explore how the word parts change the meaning.
- Guide students to find prefixes and suffixes that are cognates (*re-, -ive/-ivo/iva*). **EL**

SESSION 2 PRACTICE

RI.4.4 Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area.

1 Determine Word Meanings

- You can figure out the meanings of unfamiliar words by looking inside words for word parts.
- **Word parts** include base words, prefixes, and suffixes.

2 Reread/Think

Look at the words below from "Reinventing the Wheel—Twice!" Use word parts to figure out their meanings. Write your ideas in the chart.

Word	Word Parts	Meaning
successful (paragraph 1)	**success/ful** • -ful = full of	**met a goal**
inventive (paragraph 2)	**invent/ive** • -ive = quality or trait	**good at making new things**
redesigned (paragraph 2)	**re/design/ed** • re- = again • -ed = in the past	**planned or built again**
replaced (paragraph 2)	**re/place/ed** • re- = again • -ed = in the past	**put something back or took the place of**
sponginess (paragraph 4)	**spongi/ness** • -ness = quality or state of being	**the quality of being soft and flexible like a sponge**

LESSON 6

3 Talk

Choose one of the words from your chart. Explain how you figured out its meaning and how it helps you understand the text. Share your ideas with your group.

I figured out that ___ means ___ because ___.

___ helps me understand the text because ___.

4 Write

Describe one of the wheel upgrades featured in "Reinventing the Wheel—Twice!" Explain how the new version made the wheel better. Use at least two words from your chart in your response.

Sample response: One group developed a new wheel for a lunar rover. They showed how *inventive* they were by taking an idea from beanbag chairs. They *redesigned* the wheel by using a spongy material covered in steel webbing. The *sponginess* allowed it to travel smoothly over the moon's bumpy surface. The steel mesh kept it from breaking or melting in the extreme heat and cold on the moon.

WRITING CHECKLIST

- ☐ I correctly used at least two words from the chart in my response.
- ☐ I described one of the inventions featured in the text.
- ☐ I used complete sentences.
- ☐ I used correct spelling, punctuation, and capitalization.

3 Talk

- Use **Merry-Go-Round Share** to have students share examples from the chart with a small group.
- Circulate to assist students in reviewing the chart. Clarify word meanings as needed.
- **LISTEN FOR** Students define the terms in the chart in their own words.

HELP & GO: Standards Practice

- **Say,** *The information you learn from word parts should be changed into your own words. For instance, I learned that* successful *means "full of a quality that turns out well." But when I think about what that really means, I realize it means "turning out well or reaching a goal."*
- Guide students to evaluate their definitions for simplicity. **Say,** *Ask yourself how you can write your definitions in a simple way that will make sense to others.*

- Once students have discussed each word, encourage them to reread the parts of the text that the words come from to help them make more sense of the text.
- Invite students to add to their word journals. Encourage them to create word webs as part of their entries.

4 Write

- Have students respond to the prompt using at least two words from the chart.
- Provide sentence frames such as the following: *One group created a wheel that ___. It works better because ___.* **EL**
- Have students complete the activity as a partner writing activity. **EL**
- Use written responses to determine whether students need additional support.
- Invite a few students to share their paragraphs using **Stand and Share**.

1 Support Reading

- Set a purpose for reading. **Say,** *In this session, you will read to learn how engineers are developing new ways to reach the tops of very tall buildings.*
- 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.
- **CHECK IN** Students understand that taller buildings need new types of elevators.

HELP & GO: Background

- Activate prior knowledge about elevators. **Ask,** *What would it be like to climb 200 flights of stairs? How long would you be willing to wait for an elevator?*
- **Ask,** *Why would a skyscraper with 200 floors need amazing elevators? The trip to the top would be twice as long as the trip to the top of the Empire State Building.*
- Point out that many verbs in this text are in the future tense because the article describes what elevators will be like in the future. **EL**

2 Stop & Discuss

- Have students **Turn and Talk** to complete **Stop & Discuss** with a partner.
- **LOOK FOR** Students identify three reasons to build taller skyscrapers.

HELP & GO: Comprehension

- Point out that the question *Why?* (paragraph 3) signals that reasons will follow. **EL**
- **Ask,** *What is the first reason given after the question in paragraph 3? More floors provide more space for people. What other reasons are given? Some cities want a building everyone will know. Some builders want the challenge of building an extra-tall building.*

SESSION 3 READ

Need a Lift?

by Maria Parrott-Ryan

1 Skyscrapers of the future may not look anything like the buildings of today. In fact, they may be twice the height of any building that exists now. For example, the Empire State Building in New York City has 102 floors. A future skyscraper could have 200 floors! That skyscraper would *have* to have amazing elevators.

2 Wait. Elevators? Okay, maybe they aren't the most exciting things to imagine. But think about it: Would you want to climb the stairs to the 200th floor? Advanced elevators that use newer technology are important for planning these futuristic skyscrapers.

Stand Tall

3 Cities of the future will be a lot taller than they are today. Why? Taller buildings provide more space for people to live and work in a small area. There are other reasons, too. Some cities want **landmark** buildings that people around the world will know about. Also, some builders want the challenge of designing these super structures.

4 But builders have another challenge. They need to figure out how to move people safely and quickly to such great heights—and that's where elevators come in. The basic elevator technology that was in use a hundred years ago will not get people to the top of the newest, tallest buildings. Luckily, elevator **engineers** aren't waiting for the future to well, *elevate* elevator design. They've figured out some solutions already.

landmark = a well-known building or structure

engineers = people who design machines

2 RI.4.1

Stop & Discuss

Why do some people want to build even taller buildings than we have today?

Underline three reasons.

LESSON 6

Buildings of the future will need more advanced elevators.

3

Higher! Faster!

5 One new invention will allow buildings to soar taller than ever before. Today's elevators use steel cables, or cords. But steel is heavy, and the weight of the cables limits how high they can pull an elevator car, which is the part people ride in. One elevator company has found a solution to this problem. It has invented a cable made of a special material that is lighter and stronger than steel. The new cables can pull an elevator much higher. Now, taller skyscrapers can be built.

6 But the higher elevators go, the longer the trip. So, engineers are making elevators that go faster. Most elevators today only go about 200 feet per minute. Engineers are aiming for record-breaking speeds of 4,000 feet (about 1,200 meters) per minute. That speed would get you to the top of the world's highest building in less than 60 seconds!

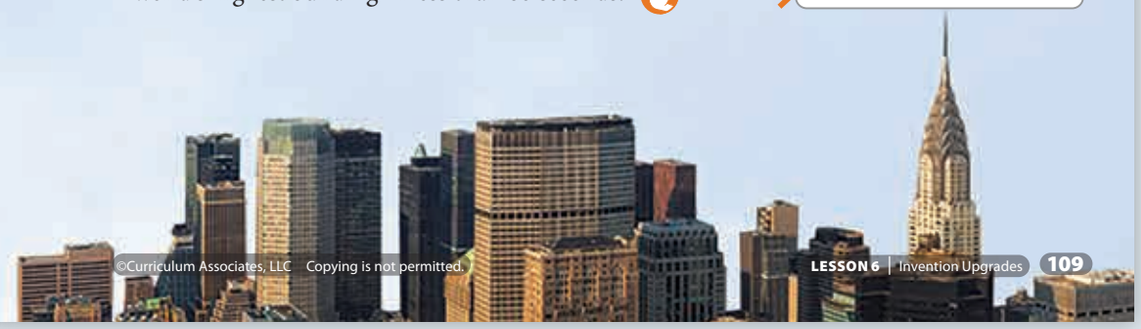
4

RI.4.1

Stop & Discuss

Why will very tall buildings of the future need new types of elevators?

Discuss your ideas with a partner.



3 Support Reading

- Have students read paragraphs 5 and 6.
- **CHECK IN** Students can identify the problem and solution described in paragraph 5.

HELP & GO: Comprehension

- **Ask,** *What material is used in today's elevator cables? steel What does the text say about steel? It is heavy. Why does it matter that steel is heavy? Its weight limits how high steel cables can lift an elevator car.*
- **Ask,** *How might new materials for elevator cables be different? They will be lighter but just as strong. How will this affect elevators? They will be able to go higher.*

4 Stop & Discuss

- Have students **Turn and Talk** to complete the **Stop & Discuss** activity with a partner.
- **LISTEN FOR** Students explain that elevators need to be able to go higher and faster so taller skyscrapers can be built.

HELP & GO: Comprehension

- Direct students to the heading "Higher! Faster!" **Ask,** *How does the heading help you answer the question? It tells me this section will be about making elevators that go higher and faster.*
- Read aloud the last sentence of paragraph 5. Point out that the word *now* signals the effect in a cause-effect relationship. Guide students to describe the cause (taller buildings) and effect (a need for faster elevators that can go higher).
- Discuss the speeds compared in paragraph 6. Guide students to relate the difference in speed to more familiar scenarios, such as the difference between walking and running or the difference between bicycling and traveling in a car.
- Have students reread the first sentence in paragraph 6. Ask a volunteer to explain the cause and effect in their own words. (Traveling a longer distance causes the elevator trip to take more time.) **EL**

5 Support Reading

- Have students read paragraphs 7 and 8.
- **CHECK IN** Students can describe how magnets could "float" cars over the track.

HELP & GO: Background

- Revisit paragraph 7. Use two small magnets to demonstrate how poles with the same charge repel each other. Guide students to connect the idea to large magnets being used to float an elevator car above a track.
- Use your hands to model an elevator track and elevator car floating above it. Push your hands apart slightly to suggest the opposing magnetic forces. **EL**

6 Stop & Discuss

- Have students **Turn and Talk** to complete the **Stop & Discuss** activity with a partner.
- **LISTEN FOR** Students describe future elevators traveling faster and moving in circles or loops.

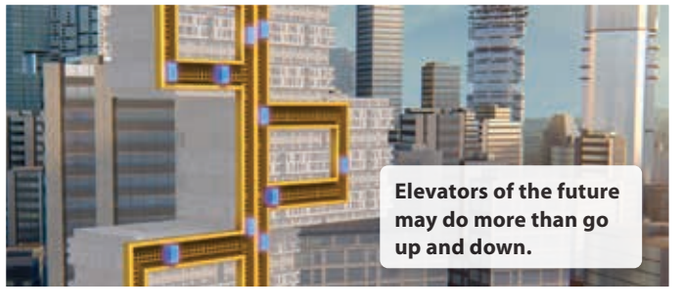
HELP & GO: Comprehension

- Revisit paragraph 7. **Ask,** *In which direction do elevators usually travel? up and down How will magnetic levitation elevators be different? They will go in all different directions.*
- Where the text uses negative terms such as *not* or *limited*, have students paraphrase the sentence to demonstrate understanding. ("Skyscrapers wouldn't have to be built straight up-and-down" could be restated as "skyscrapers could be built in new shapes.")
- Support understanding of language related to future elevators: *dream up, wildest ride.*

Discuss the Whole Text

Have students **Stand and Share** to offer responses to the prompt: *How do people build on previous technologies to imagine the elevators of the future?* Record responses for students' reference.

SESSION 3 READ



Elevators of the future may do more than go up and down.

Up, Down, and . . . Sideways?

5 7 One new elevator system doesn't use cables at all. Instead, it uses magnets to "float" cars above a track that is similar to a train track. This is called *magnetic levitation* because the magnets push against each other and lift the cars above the track. In addition to making elevators faster, this new technology offers exciting possibilities to reimagine a building's shape. These elevators would not be limited to moving up and down inside straight, narrow shafts. Instead, the new elevators could move *sideways.* Elevator shafts could be designed as loops, with multiple cars going around and around in a circle. With these new elevators, skyscrapers wouldn't have to be built straight up-and-down. Think of the spectacular shapes architects and engineers could dream up!

8 The skyscrapers of the future may reach a mile or more into the air. They may have creative new shapes. And they will likely take you on the wildest elevator ride ever!

6 RI.4.1

Stop & Discuss

How could magnetic levitation change elevators and buildings?

Discuss your ideas with a partner.

SESSION 4 PRACTICE

RI.4.4 Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area.

LESSON 6

1 Determine Word Meanings

- Figure out the meaning of an unfamiliar word by looking around the word for context clues. **Context clues** are words or phrases in a sentence or paragraph that help you understand the meaning of an unfamiliar word.
- You can use context clues, word parts, or both to figure out the meaning of a word.

2 Reread/Think

Reread "Need a Lift?" Use context clues and any word parts you know to figure out the meanings of the words below. Write your ideas in the chart.

Word	Context Clues and Word Parts	Meaning
advanced (paragraph 2)	• **"*Advanced* elevators that use newer technology. . . ."** • **advance = move forward**	**newest, using new ideas**
cables (paragraph 5)	**"cords," "*cables* can pull an elevator much higher"**	**the cords that hold and help lift an elevator car**
aiming (paragraph 6)	• **"Engineers are *aiming* for record-breaking speeds"** • **aim = goal**	**setting a goal, trying**
levitation (paragraph 7)	**"it uses magnets to 'float' cars above a track," "magnets push against each other and lift the cars above the track"**	**the process of making something float**
multiple (paragraph 7)	• **"with *multiple* cars going around and around in a circle"** • **multi- = more than one**	**many, several**

Reconnect to the Text

Have students recall "Need a Lift?" using **Pass It On** to provide key details about how people redesign elevators. **Ask,** *How is the elevator technology described in the text an improvement over most elevators we use today?*

1 Practice the Standard

Review the information at the top of the student page. **Say,** *You have already practiced using word parts to figure out unfamiliar words. Today, you will also use context clues.*

2 Reread/Think

MODEL THE STANDARD Model the thinking process for finding meanings of unfamiliar words using context clues as well as word parts.

- **Say,** *When I'm not sure what a word means, I can look around the word for context clues. Paragraph 2 mentions* advanced elevators. *I know the base word* advance *can mean "to move forward." Does that mean elevators move forward? I'll look around the word for more clues. The text says advanced elevators "use newer technology." Here,* advanced *must mean "the newest kind" of elevator.*

GUIDE STANDARDS PRACTICE Use **Silent Appointment** to have students pair up to complete the chart.

- As students revisit the text to look for context clues, encourage them to circle the word they are trying to define and then read several sentences before it, the sentence it is in, and several sentences after it. When they find context clues, have them underline them.
- Discuss the multiple meanings of the base word *aim*. **Say,** *When you aim something, you point it in a direction.* Aim *is also another word for* goal. *Which meaning do you think is related to this text?* **EL**
- Have students select two new words from this text to add to their word journals.

3 Talk

- Use **Merry-Go-Round Share** to have each student share an example from the chart with a small group. Encourage students to explain how context clues help them understand the meaning of a word. Prompt students to record any new ideas they learn from others in the charts.
- Circulate to assist students in reviewing the chart. Clarify word meanings as needed.
- Have students share information about cognates such as *multiple/múltiple*. **EL**

4 Write

- Have students use new vocabulary in writing about the elevators of the future.
- Have students use **Stronger and Clearer Each Time** to develop and refine their ideas prior to writing. **EL**
- **LOOK FOR** Students can use the new content vocabulary effectively in their writing.

HELP & GO: Writing

- Ask guiding questions such as the following: *What is magnetic levitation? How might it someday be used in elevators? What effect would this technology have on buildings and the people who use them?*
- Guide students to inventory the words in the chart to determine where they might use them in their response. For instance, **ask,** *What might you say about cables if you are writing about elevators that use magnetic levitation? I would say that elevators that use magnetic levitation don't need cables.*

- Invite a few students to share their Write paragraphs using **Stand and Share**.
- Use written responses to determine whether students need additional support.

SESSION 4 PRACTICE

3 Talk

Explain how you figured out the meaning of one of the words in your chart using word parts, context clues, or both.

The context clue ___ helped me figure out that ___.

The word part ___ helped me figure out that ___.

4 Write

Explain why engineers might one day use magnetic levitation instead of steel cables in elevators. Use at least two words from your chart in your explanation.

Sample response: As buildings become taller and taller, the elevators of today will not work. Today's steel elevator *cables* are heavy, and that limits how high they can go. To deal with this problem, some engineers are *aiming* to make elevators that use magnetic *levitation*. This will allow elevators to move more quickly and travel in new paths to greater heights.

WRITING CHECKLIST

- ☐ I used two or more words from my chart correctly.
- ☐ I explained why some engineers will use magnetic levitation instead of steel cables.
- ☐ I used complete sentences.
- ☐ I used correct spelling, punctuation, and capitalization.

SESSION 5 READ LESSON 6

GOING THE DISTANCE

by Jessica Jackson

1

1 You've finished writing an email to your friend. To send the message, you just press a button and *whoosh*, it's delivered instantly. But back in the 1700s, when the U.S. postal system was created, people communicated with one another over long distances by writing letters and sending packages. Mail carriers delivered these items in stagecoaches, or horse-drawn wagon carts. Letters and packages could take weeks to arrive.

2 Over time, mail service has progressed by getting faster and faster. For instance, with the invention of the automobile in the early 1900s, mail delivery times were cut in half! This made corresponding with friends and family easier. Soon after, airplanes began transporting mail from one part of the country to another, making even better time.

3 Today, mail carriers drive trucks to make deliveries in towns and cities. In some places, mail carriers walk from home to home, dropping off mail. Driving and walking may soon be things of the past, though. The U.S. postal system has a plan to take local mail delivery to the sky!

Reconnect to the Texts

Display responses to the Focus Question for "Reinventing the Wheel—Twice!" and "Need a Lift?" Invite students to make connections between the two texts.

1 Independent Reading

- Set a purpose for learning. **Say,** *Today you will independently read to learn about another invention upgrade. You will also figure out the meanings of new words.*
- Clarify that *going the distance* means "working hard to complete a task." **EL**
- If students need more support, work with them in small groups to guide reading. Use **Help & Go** scaffolds as needed.
- **CHECK IN** Students understand that the delivery of the mail has changed over time.

HELP & GO: Comprehension

- Unpack the long sentence that begins "But back in the 1700s" (paragraph 1), breaking it into phrases to guide comprehension of how mail was delivered in the past.
- Guide students to use context clues to determine the meaning of *items* (paragraph 1). Point out that *what* is delivered has not changed, but *how* it is delivered is different.
- Elicit the cognates *comunicación, postal, local,* and *el transporte.* **EL**

- **CHECK IN** Students understand the phrases *making even better time* and *to the sky.*

HELP & GO: Language

- **Say,** *The phrase* making good time *describes getting somewhere quickly. With that information, what do you think the phrase* making even better time *(paragraph 2) means?*
- **Ask,** *What does it mean to "take local mail delivery to the sky" (paragraph 3)? to deliver neighborhood mail with flying machines*

2 Independent Reading

- **CHECK IN** Students can explain the three steps in a drone's delivery process.

HELP & GO: Language

- Reread paragraph 4. **Ask,** *What context clue helps you figure out the meaning of* drone? *"a kind of aircraft that can deliver mail without pilots on board" What does this tell you about how this delivery process might be different? The drone does not need pilots on board, but a reader might wonder how the drone knows where to go.*
- Direct students to paragraph 5. Point out the use of the signal words *first, then,* and *finally* to help students identify the steps.

- **CHECK IN** Students can explain how the drone uses new technology.

HELP & GO: Comprehension

- Direct students to paragraph 5. **Ask,** *How does computer programming help the drone make deliveries? A person has entered the address in a computer that tells the drone how to get there.*

- **CHECK IN** Students can identify aspects of mail delivery that are easier for drones than for humans.

HELP & GO: Language

- Reread paragraph 6. **Ask,** *What are traffic jams? crowded roads filled with vehicles that cannot move at the usual speed How do drones avoid traffic jams? by moving in the air instead of on roads*
- *Whiz* is a multiple-meaning word. Have students use context clues to figure out that here it means "to move quickly." **Ask,** *What does that tell you about drones compared to mail carriers? They can travel faster.* **EL**

SESSION 5 READ

2

4 The idea is to use drones, a kind of aircraft that can deliver mail without pilots on board. With the ongoing improvement of technology, engineers are designing drones that are perfect for carrying and delivering packages. These drones have four to eight fast-spinning propellers, the long blades that lift and move them in the air. The drones also have computer **software** that guides them to the correct destination.

software = instructions used by a computer

5 So, how would the drones work? Here's the basic idea. First, an operator (the person who controls the drone) loads it with the package and sets the flight path. Because of computer programming, the drone knows the delivery address and how to get there. Then it lifts off, moving through the air. Finally, when the drone reaches the correct location, it releases the package. The drone then returns to the operator to start a new delivery.

6 Besides being a useful assistant, drones can do things that mail carriers can't. Drones can avoid traffic jams and stoplights. They can whiz to areas that are too hard to get to. And unlike the horses that pulled mail-wagon carts in the 1700s and 1800s, drones don't require rest or need breaks for food and water. Still, the U.S. postal system's drones aren't ready to take flight just yet. Engineers are still working on them, so it will be a while before this technology becomes an everyday reality in your neighborhood.

SESSION 5 PRACTICE

RI.4.4 Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area.

LESSON 6

Respond to Text

3 Reread/Think

Reread "Going the Distance." Choose the best response to each question.

1. Read this sentence from paragraph 2 of the text.

> This made **corresponding** with friends and family easier.

What does the word *corresponding* mean?

A. visiting often
B. telling stories
C. writing letters
D. working closely

2. Which context clue from paragraph 4 helps the reader understand the meaning of *propellers*?

A. "deliver mail without pilots on board"
B. "perfect for carrying and delivering packages"
C. "long blades that lift and move them in the air"
D. "computer software that guides them"

3. Read this sentence from paragraph 4 of the text.

> The drones also have computer software that guides them to the correct **destination**.

What does the word *destination* mean?

A. answer
B. end point
C. launch pad
D. package

3 Reread/Think

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

Answer Analysis

Use the answer analysis below to review the practice items with students. Have students **Raise a Hand** to share responses and to agree and build on or disagree and explain their reasoning.

1. The correct choice is **C**. In this context, the word *corresponding* means "to communicate with someone by writing letters." The paragraph is about how advances in technology improved the speed of mail delivery, so students can infer that *corresponding* refers to writing letters. The other choices reveal misreadings of context clues in text. **DOK 2 | RI.4.4**

2. The correct choice is **C**. This is the only choice that provides the in-text definition for *propeller*. **DOK 2 | RI.4.4**

3. The correct choice is **B**. The word *destination* means "a place where a journey ends." Students may have chosen *answer* (**A**) because it works with *correct* in the text. They may have chosen *launch pad* (**C**) because they mistake *destination* for where the drones leave from. They may have chosen *package* (**D**) because they confuse a drone's destination with what it carries. **DOK 2 | RI.4.4**

4 Answer Analysis

4. The correct choice is **B**. The word *reality* refers to things that actually happen, or real life. The base word *real*, the detail that engineers are still working on the drones, and the use of the word *everyday* are clues to the meaning of *reality*. The other choices reveal misreadings of context clues in the text. **DOK 2 | RI.4.4**

5 Write

- Have students respond independently to the Write prompt. **DOK 3 | RI.4.4**
- If students need more support, work with them in small groups to guide them through writing. Use **Help & Go** scaffolds as needed.
- Have students **Turn and Talk** about what they plan to write about in their response. **EL**
- **LISTEN FOR** Students can define the term *progressed* as "to improve" and can explain how mail delivery has progressed over time.

HELP & GO: Standards Practice

- **Ask,** *What context clues in paragraph 2 can help you understand the word* progressed*? over time, faster and faster How do those clues help you understand the meaning of* progressed*? I see it must be related to making something better in some way over time; in this case, that means making mail delivery faster.*

Lesson Wrap-Up

- Have students revisit the Focus Question using examples from the text. Record responses. Invite students to make connections between the three texts they have read.
- Use **Pass It On** to have students share ideas.
- Prompt students to justify their ideas using reasons and examples from the texts.
- Guide students to agree and build on the ideas of others or disagree and explain their thinking.

SESSION 5 PRACTICE

4 Reread/Think

4. Read this sentence from paragraph 6 of the text.

> Engineers are still working on them, so it will be a while before this technology becomes an everyday **reality** in your neighborhood.

What does the word *reality* mean?

A. something that scientists design
B. something that actually happens
C. something that takes a long time
D. something that is common in cities

5 Write

Read this sentence from the text.

> Over time, mail service has **progressed** by getting faster and faster.

First, define the word *progressed*. Then, describe how mail service has progressed using information from the text. Use at least three examples from the text in your response.

Sample response: The word *progressed* means "to improve." The text describes how early mail delivery by horse-drawn wagons and stagecoach took weeks or months. Over time, mail delivery has gotten much faster. The invention of automobiles sped up deliveries, and then airplanes shortened delivery times even more. Someday, drones may be able to deliver local mail even faster.

WRITING CHECKLIST

- ☐ I defined the word *progressed*.
- ☐ I described how mail delivery has progressed over time.
- ☐ I used at least three examples from the text.
- ☐ I used complete sentences.
- ☐ I used correct spelling, punctuation, and capitalization.

SESSION 6 PUT IT TOGETHER LESSON 6

Respond to the Focus Question

How do people build on others' ideas in creative new ways?

1 Reread/Think

Look back at the texts in this lesson. Choose the two invention upgrades you think are most interesting. Explain how these invention upgrades are improvements over earlier versions.

Sample response: The gyrowheel is an improvement to the bicycle wheel. A spinning disk inside the gyrowheel makes it easier for new riders to keep the bicycle upright. This upgrade will make it easier and safer for kids to learn to ride a bicycle. Another great invention upgrade are elevators that use magnetic levitation. They are an upgrade to traditional elevators that use steel cables. Magnets will help the new elevators float. Without heavy cables slowing them down, they will be able to move faster and higher than traditional elevators. They may also be able to move in directions other than just up and down.

2 Talk

With your team, brainstorm three inventions that could be upgraded. Then, with a partner, describe the invention you would like to upgrade and how you would improve it.

One invention I would like to upgrade is ___.

To make it better, I would ___.

3 Write

Create a sign advertising your new invention upgrade. In your advertisement, describe how your upgrade works and explain why it is an improvement over the existing process or technology.

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

- Have each student independently write about the two invention upgrades that interested them most.
- Prompt students to skim through the texts to identify the upgrades that are described.

2 Talk

- Using the first two parts of **Team-Pair-Solo-Team**, have students complete the Talk activities first in a small group and then with a partner.
- Use **Help & Go** scaffolds as needed.
- **LISTEN FOR** Students brainstorm existing technologies and then identify ways they could be upgraded.

HELP & GO: Academic Discussion

- Prompt students to brainstorm technologies that could be upgraded. **Ask,** *What are some inventions you use regularly? phones, cars, televisions*
- **Ask,** *How could these inventions be improved? faster, stronger, more efficient, more convenient, safer*

3 Write

- Have students respond independently to the prompt.
- Remind students to use their notes from the Talk activity to generate ideas about upgrades.
- Have students complete the activity as a partner writing activity. **EL**
- Using the last step of **Team-Pair-Solo-Team**, have students share their advertisements with their teammates.