Science
Unit 2
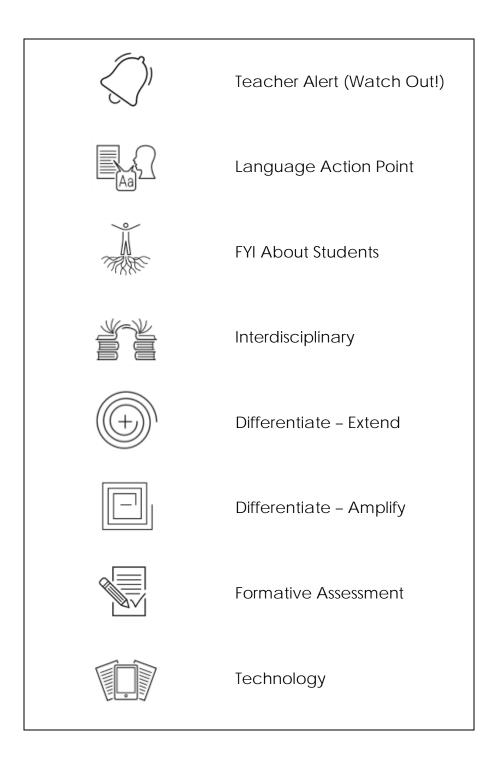*Plant Growth*

- Where does the energy in our food come from?
- Why do we experiment in science?

Sample Lesson Plans

Sample Lesson Plan Icons

	Teacher Alert (Watch Out!)
	Language Action Point
	FYI About Students
	Interdisciplinary
	Differentiate – Extend
	Differentiate – Amplify
	Formative Assessment
	Technology

Plant Growth
Lesson 6: Kinesthetic Experience: See-Think-Wonder: Seed Germination

The purpose of this lesson is to explore the conditions needed for seeds for germination. Students will set up a seed germination demonstration and predict what will happen to seeds over time.

Note: Seeds will need at least a couple of days to germinate, which is why students begin the germination in this lesson, then learn more about seed characteristics in Lesson 7.

ESSENTIAL QUESTION(S)	Where does the energy in our food come from? Why do we experiment in science?
GUIDING QUESTION	Why are seeds important for plant growth?

DAILY QUESTION	What are the conditions needed for a seed to grow into a plant?
CONTENT TARGETS	I can identify the conditions needed for seeds to grow. (R.2)
LANGUAGE TARGETS	I can use if-then statements to discuss cause-and-effect factors in plant growth. **Cause-Effect:** *If the seed has _____, it will grow.* *If the seed does not have _____, it will not grow.*
VOCABULARY	<u>**environment:**</u> environment, sunlight/light, soil, water, moisture temperature, conditions, air, shade <u>**seed growth:**</u> compete/competition, dormant*/dormancy* <u>**scientific observation:**</u> data, procedure
MATERIALS	Seed Germination Demonstration Handout Materials for seed germination^: soil, clear plastic bags, paper towels, mung bean seeds (one set per student) Science Journal^ "Time Lapse Video Germination of Seed"^ (https://www.youtube.com/watch?v=E__rbDzNOZI) Exit Ticket^

^Not provided in lesson materials.

GENERAL NOTES

In this lesson, students will set up seeds to germinate in plastic bags. This will introduce the concept of germination as the beginning of plant growth, and provide a hands-on opportunity for students to grow plants. Students will also record the conditions that seeds need in order to begin germination, and understand that without these conditions, seeds will not germinate.

Prepare an **Exit Ticket** in advance of class. **Exit Tickets** should connect to lesson question and targets. For example, give a description of a student trying to plant a seed. He/she plants the seed in soil, waters it every day, and leaves it near the open window, where the cold air comes in. Ask the students to explain if this seed will likely germinate or not.

This lesson is designed for two class periods.

OPENING

WARM-UP:
- **Think-pair-share:** Why are plants important?
- Have student write their responses in their in **Science Journals**. Students can use their home languages.

CONNECT:
- Review why plants are so important, as learned in prior set.
- Elicit student ideas about where plants come from and accept ideas (e.g., they come from the dirt, the earth, from seeds). Then, hold up a **mung bean seed** and explain that all plants start from inside a seed like this.
- Explain to students that they will grow their own plants, starting from seeds.
- Draw on student experiences with growing plants. Ask: "What helps them to grow (in the house, in the yard, in the field)?"
- Introduce the seed germination experiment. Explain to students that they will use the seed germination experiment to better understand the *conditions*, or the *environment*, in which seeds need to grow into plants.
- Draw attention to targets.

Draw on your students' experiences when appropriate, and allow students to share their general knowledge they might have about growing plants. All students will share an experience growing plants from seeds in this set of lessons.

WORK TIME

PREPARE:
- Use gestures and examples for a **think-pair-share**: Can a seed (e.g., sunflower seed, sesame seed) grow into a plant in a cabinet? Why or why not?
- Students share their experiences about seed growth and ideas about why seeds don't grow when left in cupboards.

- List student responses on board. Elicit: Seeds need **water**, **sunlight/light**, **air**, and the correct **temperature** to grow; seeds don't grow if there is too much **shade**, if there are too many seeds they may have to **compete** to survive, etc.

> Students may not list temperature as a condition needed for seeds to grow. If they do not, that is OK, and you can alert students to this in the next section of the lesson.

Make sure to connect words to cognates, where applicable. For example, *dormancy* and *dormido.* Do not assume students will know what this means conceptually, even if they can name the cognate.

INTERACT:

- State the purpose of the seed germination experiment: to determine the **conditions** of the **environment** necessary for seeds to grow. Use everyday language to explain this: "What do seeds need to grow into a plant?"
- Using one set of the **materials for seed germination, <u>model</u>** how to set up the seed germination experiment, making note of the **conditions** listed in the "Prepare" section needed for seeds to grow (**water, moisture, air, temperature**).

> If questions come up during the setup of the experiment that lend themselves to further discussion of experimentation, this should be the opportunity to introduce the concept of variables and experimental design.

Ask students to consider why some seeds may not germinate even with favorable conditions and bring up the terms *dormant/dormancy*. However, this may be too advanced for many students, so don't let this derail your main point about seeds needing sun and water.

- Distribute the remaining sets of the **materials for seed germination** to each student along with the **Seed Germination Demonstration Handout**. Have students set up their seed germination experiment, and document the materials and steps, or **procedure**, on page 1 of the handout (the "Materials" and "Procedure" sections).

> Students will revisit these handouts in Lessons 9 and 10, so make sure students keep them stored in a folder or that you collect them at the end of each class.

Use the model to scaffold the writing that students will need to do in the next part of the lesson. **Model** each step, and ask students to describe what you are doing. Chart key words students can use this as a word bank when they write.

- As a class, complete the "Data Collection, Part 1" section of the **Seed Germination Demonstration Handout**.
- Instruct students to draw and label the setup of their seed germination in the "Setup Drawing" section of the **Seed Germination Demonstration Handout**. Students can use home language.
- Ask students where the seeds should be placed for optimal germination and why.
- Explain how students will make observations on their seeds over the next few days.
- Remind students how to make a prediction. Ask students to record in their **Science Journals** their predictions about what they will observe a) tomorrow, b) in three days, and c) in one week.

After students set up their seed germination experiments, ask: "What would happen if you put the seeds with wet paper towel in a refrigerator? On a heater? Does the season matter? What might be another condition that seeds need to grow?" Use gestures to support student understanding.

EXTEND:

- Do a **<u>whole-class viewing</u>** of the seed germination video **"Time Lapse Video Germination of Seed."**

- Gather students in small groups. Ask students to identify the resources seen in the video that are needed for seeds to germinate.
  - *If the seed has _____, it will grow.*
  - *If the seed does not have _____, it will not grow.*
- Ask: "What did you notice about how the seeds grow?" Some questions for discussion include:
  - What happens first?
  - How does the seed look after time passes?
  - Do all seeds grow at the same rate?
  - Where do you think the seed gets the energy it needs to grow?
- Share and record responses on board.

CLOSING

REVIEW TARGETS:
- Draw student attention to targets.
- Invite students to show their comfort level with lesson target using protocol **fist-to-five**.
- Explain that targets will be revisited when we observe our seeds later on in the week.

ASSESS:
- Have students complete the **Exit Ticket**.
- Remind students to check and observe their seeds every day this week.

Assess if students are able to draw and label their experimental setup and predict what will happen to their seeds after a few days.

Plant Growth
Lesson 7: Oral: Seed Physical Characteristics

*The purpose of this lesson is to explore seeds found in common breakfast foods and complete a **see-think-wonder** about how and why seeds are different.*

ESSENTIAL QUESTION(S)	Where does the energy in our food come from? Why do we experiment in science?
GUIDING QUESTION	Why are seeds important for plant growth?

DAILY QUESTION	How are seeds different? Why are they different?
CONTENT TARGETS	I can explain why seeds have different physical characteristics to help them germinate. (NGSS CC6)
LANGUAGE TARGETS	I can describe how seeds travel and the importance for dispersal. **Describe: _____, _____, and _____** help seeds travel. *It is important for seeds to travel because _____.*
VOCABULARY	**scientific observation:** explore, make an observation **seed growth:** compete/competition **seed characteristics:** internal* (inside), external* (outside), mature, Immature, dispersal*/disperse*, travel, transport
MATERIALS	Conditions for Seed Growth Exploration Kits^ Seeds of common foods (approximately 5-8 seeds per group)^ Slideshow: Seed Dispersal Umbrella^ Science Journals^

^Not provided in lesson materials.

GENERAL NOTES

In this lesson, students will explore different seeds found in breakfast foods to understand that seeds differ in physical characteristics. These differences are critical to helping a seed travel and reaching optimal growing conditions.

This lesson is designed for two class periods.

> Seeds can be messy. Choose seeds that are most convenient for your class. Some seeds can be attached to fruits, others can be on their own. For other foods, you may want students to open them up and find the seeds. Try to bring in a variety for students to look at.

OPENING

WARM-UP:
- **Think-pair-share:** What seeds are found in breakfast foods, and what conditions are needed for them to grow?
- Students complete the handout **Conditions for Seed Growth**. Have students: 1) circle all seeds shown in image; 2) list conditions needed for seed to grow; and 3) name all seeds that they can in English or home language.

CONNECT:
- Identify the seeds that are found in the image from worksheet **Conditions for Seed Growth**.
- Remind students that we eat lots of seeds every day, and that all food that comes from plants (grains, fruits, vegetables) derive from seeds, some of which are processed (e.g., peanut butter, hummus).
- Ask students why seeds are important. Responses may include: they are a source of food, energy, and nutrition, and all plants grow from seeds.
- Remind students that in order for plants to grow from seeds, they need certain conditions (i.e., sunlight, water, specific temperature, nutrients).
- Ask: "How do seeds get these conditions? They can't walk, move, or *travel* on their own, so how can they 'find' the right environment? How do they get what they need to grow into plants?" This last question will be revisited throughout this lesson.

> Recast questions with academic language into everyday language, still targeting the same concept. This ensures that more students can access the ideas embedded in the question.

WORK TIME

PREPARE:
- Arrange students in groups. Explain that they will be observing seeds from different foods.

- In addition to any loose seeds that you provide, provide each group with a few fruits or seeded foods (some cut in halves), that allow students to see the seeds and where they are located.
- Introduce the terms *internal (inside)* and *external (outside)* to help describe seed location.
- Some examples may include a strawberry, apple, snap pea, sunflower, peach, corn, walnut, pomegranate, banana, pepper, or cherry tomato. See here for more examples: https://en.wikipedia.org/wiki/List_of_edible_seeds.
- Instruct students to complete a **see-think-wonder** on the seeds they observe. Introduce the terms *explore* and *make an observation*.

This activity can encourage more discussion and questions as to why seeds are located and arranged as they are. It is important to direct students to THINK about why plants have seeds and why they have different properties. These properties (e.g., hardness, location, number, color, size) are all for good reasons (e.g., protection, attractiveness to animals), and they help seeds get dispersed and find optimal conditions for growth (as learned in Lesson 6), an important takeaway of this lesson.

Use the daily questions to guide the **see-think-wonder**. Instead of leaving responses totally open, draw student attention to the questions they are trying to answer through the **STW**.

> Build on the observation language begun in Unit 1. Students can describe size, color, shape, and add location using internal and external. For example: Apple seeds are small and internal; avocado seeds are big and internal.

- In the "See" column, students record HOW seeds are different. In the "Think" column, push students to record WHY they think these are different.
- **Model** one example response for each column to show students how it's done.
- Allow ample time for students to *explore* seeds.
- Encourage students to share responses and record questions on board or chart paper.

> Draw on your students' experiences when appropriate, and allow students to share stories about seeds that are important in their culture.

INTERACT:
Demonstration of Competition for Resources
- Inform students that we will be coming back to their questions about why and how seeds differ.
- Demonstrate the concept of *competition* for resources with your students. Using an **umbrella**, act out as if you were a tree, big and firmly planted in the ground. Introduce to students that the **umbrella** is the tree's canopy (branches and leaves).
- Ask: "What would happen if the seeds dropped from the branches and fell directly underneath the canopy? Would they have enough conditions/resources in order to germinate?"
- Discuss with students why the seeds would be competing with the tree for sunlight, water, and nutrients. Ask: "Who is more likely to 'win'?" (The tree's roots are larger and longer, so they can find more water; leaves are larger so they can get more sunlight.)
- Ask students what seeds need to do if there are too many in one place (i.e., if there is too much *competition* for resources). Elicit student responses.

> If students are stuck, scaffold their thinking by asking what people (or animals) can do if there is too much competition for resources. Elicit that people can move, and how they move—walk, swim, fly, etc. Ask students how seeds can move.

Seed Dispersal Slide Show
- Tell students that since seeds have to **compete** with other plants to get the conditions needed to germinate, they must **travel** or **disperse**. Introduce the terms **dispersal/disperse** and **transport**.

> Students may know the term *dispersal* in regard to humans. Maybe you can ask students to share dispersal stories that illustrate this concept more concretely.

- **Think-pair-share:** Show students image of palm tree from slide 1 of the **Slideshow: Seed Dispersal**, and ask them to think about the picture.
- Ask: "Why are there no trees under it? Why is the palm tree bending?"
- Remind students that in order to meet conditions for germination, seeds must **disperse**.
- Show students image of the coconut seed on slide 2, and ask: "How might this seed **disperse**? How does it **travel**?"
- Continue with the slide show, and have students infer from the pictures how the seeds might **disperse** or **travel**.
- Ask: "Why are seeds different?" Responses should include that seeds have different physical characteristics depending on how they **travel** or **disperse**.

Connect this to structures and functions in unit 1 with body parts and the five senses. Reinforce the foundational concept in science that organisms have parts (structures) that have different jobs (functions) to ensure survival.

> This is a good place to introduce intelligent design in nature, and evolution, if there is time. Seeds must germinate in order to survive. Therefore, they have evolved to be able to disperse through wind, water, or animals in order to disperse and be able to germinate.

- Ask students to explain how seeds travel and why it is important.
  - ○ _____, _____, and _____ help seeds travel.
  - ○ *It is important for seeds to travel because _____.*

Provide the second sentence starter here, but do not expect students can complete it in English. The goal here is to express understanding of how travel gives greater access to resources needed to grow.

EXTEND:
- **Think-pair-share** options:
  - ○ Why else are seeds important?
  - ○ Why is it important for animals to eat seeds or the fruits that contain seeds?
  - ○ Can you give an example of an animal that helps to **disperse** seeds?

CLOSING

REVIEW TARGETS:
- Draw student attention to targets.
- Ask students to elaborate on why seeds are different.
- Explain how seed characteristics are important for germination.

ASSESS:

- Complete **dry erase board huddle** for the daily questions: *How are seeds different? Why are they different?*
- Use **equity sticks** to assess individual student understanding following the group task.
- Remind students to use the **see-think-wonder** about the seeds (created during the "Work Time: Prepare" section) as a resource.

Plant Growth
Lesson 8: Reading/Representing: Seed Stages of Growth

*Stages and processes are foundational to understanding science. The purpose of this lesson is for students to learn about the different stages of seed growth and describe the order in which these stages occur under growing conditions. The class will create an **LEA** on the stages of seed growth and the conditions needed for seed growth.*

ESSENTIAL QUESTION(S)	Where does our food come from? Why do we experiment in science?
GUIDING QUESTION	Why are seeds important for plant growth?

DAILY QUESTION	What are the stages of seed growth?
CONTENT TARGETS	I can describe seeds according to the stage of growth. (R.2)
LANGUAGE TARGETS	I can sequence the stages of seed growth. **Sequence:** *At first, a seed grows _____.* *After that, a seed grows _____.* *Later/Eventually, a seed grows _____.* *Finally/Ultimately/Lastly, a seed grows _____.*
VOCABULARY	**seed growth:** grow/growth, seed germination, stored food, roots, sprouts, seed coat, stems, shoots, seedling, leaf/leaves
MATERIALS	Steps of Seed Germination Exit Ticket^ Science Journals^

^Not provided in lesson materials.

GENERAL NOTES

In this lesson, students will create an **LEA** based on Lessons 6 and Lesson 7. The **LEA** will cover the conditions needed for seed germination, the stages of seed growth, and seed dispersal.

This lesson is designed for one class period.

If you want to release more responsibility to your students, consider assigning each group a different part of the **LEA** (different types of seeds, stages of growth, conditions for growth) to generate, then share with the class. Adapt the steps of the lesson as needed.

OPENING

WARM-UP:
● **Think-pair-share:** How does a seed germinate? What happens? What did you learn?
● Students use the vocabulary from Lesson 6 to identify the conditions needed for *seed germination* to take place.

> If any of the seeds have sprouted by now, students should take a look at them during this activity.

CONNECT:
● Review Lessons 6 and 7, reminding students that although there are a variety of seeds, all seeds need most of the same things to *grow*, and they all *grow* in the same stages. Make the connection between conditions and *growth*.
● Explain that today students will create a text about the conditions seeds need to *grow* or *sprout,* and the stages of *seed* growth, or *germination*.
● Draw attention to targets.

WORK TIME

PREPARE:
● Distribute copies of the **Steps of Seed Germination** worksheet to student pairs.
● Working in home-language pairs, students describe the steps of *seed germination*.
● After a few minutes, have students share with the class (in English) the steps they just described.
● Point to parts of plant, and have students **chorally read/name** that part in a sentence. For example: Teacher asks: "What's this?" Students respond: "That's a root."
● Have student pairs return to their worksheets and write as much as they can about one picture.
● Students share their writing with the class. Write their responses on the board to use later as part of the **LEA**.
● Incorporate the language frames and sequence words by linking together the various descriptions:

○ *At first, a seed grows _____.*
○ *After that, a seed grows _____.*
○ *Later/Eventually, a seed grows _____.*
○ *Finally/Ultimately/Lastly, a seed grows _____.*

> Students mime seed growth (squatting like a ball, sticking a leg out, raising an arm, starting to stand, standing, raising both arms).

When discussing the order of seed germination, ask students what conditions are allowing the seed to germinate (e.g., softening and dissolving of seed coat, exposure to sunlight for leaves to begin to make food, presence of water in soil for roots to uptake).

INTERACT:
- State the purpose for creating the **LEA**: to create a text for students to show understanding of the conditions seeds need to *grow* and the stages of *growth* for seeds.
- Ask a student to identify the conditions needed for *seed germination*, as discussed in the Warm-Up.
- Guide the class in the creation of an LEA text that addresses the conditions and order in which seeds *grow*.
- Encourage students to include the key vocabulary terms that describe the physical description of conditions needed and the stages of *growth*.
- Read the LEA text using **echo read**, then **choral read**, then **partner fluency read**.

> You will be building on the content and vocabulary introduced in Lessons 6 and 7, so it is important to bring ideas from both of those lessons into the **LEA**.

EXTEND:
- Guide students to include information about the diversity of seeds they observed during Lesson 7. Students can include illustrations to accompany the text, which highlight the differences among seeds, based on their observations, including illustrations to accompany the text.
- **Think-pair-share** options:
    ○ What new questions do you have about seed conditions and stages of seed *growth*?
    ○ While most seeds need the same conditions and go through the same stages, there are some differences in rate of seed *growth*. What might cause the differences in rate of *growth*?

CLOSING

REVIEW TARGETS:
- Draw student attention to targets.
- Have students record the language targets in their **Science Journals**.

ASSESS:

- Have students complete an **Exit Ticket** based on either the content or language target (or both).
- Remind students to use their **Science Journals** and the class LEA as resources.

Plant Growth

Lesson 9: Writing: Seed Germination Data Collection

The purpose of this lesson is to begin to observe seed germination, collect data on seed germination, and create a data table and bar graph to represent the data.

ESSENTIAL QUESTION(S)	Where does the energy in our food come from? Why do we experiment in science?
GUIDING QUESTION	Why are seeds important for plant growth?

DAILY QUESTION	How do we represent how many seeds germinated? Why did some seeds not germinate?
CONTENT TARGETS	I can record observations and represent the findings in a data table and bar graph.
LANGUAGE TARGETS	I can interpret a bar graph about seed germination. **Interpret:** _____ *of my seeds germinated.* _____ *of my seeds did not germinate.* _____ *of our class seeds germinated.* _____ *of our class seeds did not germinate.* *The data show most of our seeds [did/did not] germinate.* *One reason some seeds did not germinate is _____.*
VOCABULARY	<u>scientific observation:</u> data table, bar graph, interpret* summary/summarize, results
MATERIALS	Seed Germination Demonstration Handout (provided in Set 2, Lesson 6) Exit Ticket^ Science Journals^

^Not provided in lesson materials.

GENERAL NOTES

In this lesson, students will collect data from the seed germinations they set up in Lesson 6. They will observe their seeds and count the number of seeds that germinated individually and for the entire class. This information will be organized into a data table and then a bar graph. Students will summarize and interpret the data they collect.

Prepare an **Exit Ticket** before class. It should connect to the lesson question and targets. For example, have students analyze and interpret a different table and graph on seed germination.

This lesson is designed for 1 class period.

OPENING

WARM-UP:
- Ask one student to mime seed germination. Others in class chorally call out the stages during the demo.
- **Think-pair-share:** Remind students that they haven't looked at their seeds in three days. Ask students to illustrate/draw what they think has happened. Instruct students to explain their drawing, using notes and vocabulary from their **Science Journals** to discuss what they think has happened to the seeds.

CONNECT:
- Ask students to look back at their drawings of the seed germination set up on page 2 ("Setup Drawing") of their **Seed Germination Demonstration Handouts** from Lesson 6.
- Review what the class did to the seeds in Lesson 6.
- Draw attention to today's targets focusing on data collection and analysis of seed germination.

WORK TIME

PREPARE:
- Look at seeds and record observations of seeds on page 3 of the **Seed Germination Demonstration Handout** (the first *data table* in the "Data Collection, Part 2: Individual Data" section).
- Draw and label observations, noting the number of seeds that germinated, the number of seeds that did not germinate, and the parts of the seed that grew.
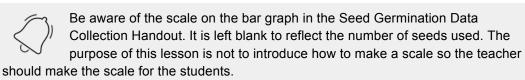
INTERACT:
- State the purpose for recording data: to quantify how many seeds germinated and how many did not.

- **Model** how to collect data by counting the number of seeds that germinated and the number of seeds that did not germinate.
- Ask students to record their own data about the number of seeds that germinated and the number of seeds that did not germinate on page 3 on the **Seed Germination Demonstration Handout** (the second *data table* in the "Data Collection Part 2: Individual Data" section).
- Ask each student to report out his/her data to the class using the language targets, and write it on the board. Make sure that students record all class data on page 4 of their **Seed Germination Demonstration Handouts** (in the "Data Collection, Part 2: Class Data" section). Add up the totals yourself and have students fill in this number at the bottom of their own *data tables*.
    - ○ _____ *of my seeds germinated.*
    - ○ _____ *of my seeds did not germinate.*
- **Model** how to *summarize* the class data into a new *data table* by taking the totals and creating a new, separate table with them.
- Instruct students to record the *summary* of the class data on page 5 of their **Seed Germination Demonstration Handout** (in the "Bar Graph: Summary of Class Data" section)**.**
- **Model** how to create a *bar graph* from the *summary* of class data.
- Instruct students to individually create the *bar graph* for the *summary* of the class data on page 5 of their handouts (in the "Bar Graph: Seed Germination Bar Graph" section).

Be aware of the scale on the bar graph in the Seed Germination Data Collection Handout. It is left blank to reflect the number of seeds used. The purpose of this lesson is not to introduce how to make a scale so the teacher should make the scale for the students.

- Have students orally explain the compiled/*summarized* data using the language frames:
    - ○ _____ *of our class seeds germinated.*
    - ○ _____ *of our class seeds did not germinate.*
    - ○ *The data show that most of our seeds [did/did not] germinate.*
    - ○ *One reason some seeds did not germinate is _____.*
- Students record this in their **Science Journals**.

In order for some students to complete the language frames, you may need to remind them of the resources that seeds <u>do</u> need to grow (e.g., light, water). Then add the phrase "not enough."

EXTEND:

- If the class set up experiments to look at different variables, guide students to compare *results*.

- If the class did not set up such experiments, guide students to identify possible ways to experiment with seed germination.
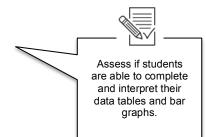
CLOSING

REVIEW TARGETS:

- Review content and language targets of the lesson with the class.
- Ask students to self-assess their comfort and ability in performing the daily targets using the protocol **traffic lights**.

ASSESS:

- Have students complete an **Exit Ticket**.

> Assess if students are able to complete and interpret their data tables and bar graphs.

Plant Growth

Lesson 10: Reviewing/Assessing Skills: Life Cycle of Plants

The purpose of this lesson is to read a text, From Seed to Plant, *using **read-retell** to further develop student understanding of how a plant grows from a seed.*

ESSENTIAL QUESTION(S)	Where does the energy in our food come from? Why do we experiment in science?
GUIDING QUESTION	Why are seeds important for plant growth?

DAILY QUESTION	How do seeds grow into plants?
CONTENT TARGETS	I can identify the stages in the lifecycle of a plant.
LANGUAGE TARGETS	I can describe/explain how a seed grows into a plant. I can use key vocabulary and compound sentences. **Describe:** _____ *needs to happen in order for* _____. **Cause-Effect:** *If the seed has* _____*, it will grow. If the seed does not have* _____*, it will not grow.*
VOCABULARY	<u>seed growth</u>: life cycle
MATERIALS	See Germination Demonstration Handout (provided in Set 2, Lesson 6) Central Text: *From Seed to Plant* by Gail Gibbons^ Science Journals^

^Not provided in lesson materials.

GENERAL NOTES

In this lesson, students read an academic text that describes the steps a seed takes to grow into a plant. Students will use this academic text to explain how a seed grows and the conditions it needs to grow.

This lesson is designed for 1 class period.

OPENING

WARM-UP:
● Have students take out their **Seed Germination Demonstration Handouts** (provided in Lesson 6 and worked on again in Lesson 9)**.** Have students interpret the "Seed Germination Bar Graph" section on page 5.
● Discuss student interpretations with the class.

> Ask students to display this information in the form of a data table if that would be helpful for students to interpret.

CONNECT:
● Review what has been learned this week about the importance of seeds and the conditions seeds need to grow into a plant.
● Explain that today students will read an informational text and use academic language to explain how seeds grow into a plant.
● Draw attention to targets.

WORK TIME

PREPARE:
● **Think-pair-share:** What season do you think is best to plant seeds? Why? Why do you think it is not a good idea to plant seeds in fall and winter? (In the U.S., most seeds germinate in the spring.)
  ○ Elicit: I think seeds germinate best in Spring because …

> Many students come from countries with two seasons: rainy and dry. Tap into possible background knowledge by asking students when farmers plant seeds in their country and why.

> Students new to the country usually do not know about the four seasons and likely have not experienced a northeast winter before. Scaffold understanding of seasons by first eliciting names of months, then by asking which months are hot/cold in New York. Then label seasons with months.

● As students share ideas, guide them to consider the conditions for seed germination and how these conditions change in nature during different seasons. Introduce the term *life cycle*. Discuss why the seasons might play a role in a seed's *life cycle,* from seed to plant.

INTERACT:
Preview Reading

- State the purpose for reading: to reinforce and make meaning of academic language related to seed germination.
- Give students a few minutes to preview the book *From Seed to Plant*.

Read-Retell

- Follow the **read-retell** protocol for the following pages.
- Pages 1-4, 11-12: Guide students to discuss the importance of seeds, their function, and where they develop in a plant.
- Pages 13-17: Guide students to think about the ways seeds disperse and travel, and why this is important for seed germination (e.g., competition with parent and other plants for resources for growth, such as light and water).
- Pages 18-19: Ask students to share their own experiences growing plants from seeds in their country.
  - Who grows seeds?
  - Where are they grown?
  - What types of seeds are grown?
- Pages 20-27: Guide students to think about the stages a seed undergoes in order to develop into a plant. Ask students to connect this part of the reading to the Warm-Up question about why seeds grow best in spring. Direct them to think about the conditions needed for a seed to begin germination (e.g., temperature, moisture, access to water and nutrients), and the importance of the stored food it has.

> Ask students to brainstorm other ways seeds are dispersed (by nature, animals, or humans.

EXTEND:

- Ask students to refer back to their **see-think-wonder** about breakfast seeds from Lesson 7 to see if the text has answered any of their questions.
- Ask students to write down any new questions they have about seeds that were not answered by the text.
- Share these responses with the class.

CLOSING

REVIEW TARGETS:

- Draw student attention to targets.
- Invite students to show their comfort level with lesson target using protocol **fist-to-five**.

ASSESS:

- **Circulate and monitor** during the **read-retell** to assess if students understand text.

> Assess if students are able to report the resources inside and outside the seed that is needed for a seed to germinate.