Lesson 3.3
Growing Toward the Light
Lesson Overview

Students extend their understanding that plants need light to live and grow by investigating how plants get that light. They view a video before the teacher leads a Shared Reading of a new section from *Handbook of Plants* with the purpose of identifying how plants obtain light—using their leaves. Students use a version of the Plant Growth movement routine with the grow light to act out how plants reach their leaves toward a light source. Partners explore the reference book with the purpose of identifying different kinds of leaves and then reflect on their work as scientists by reviewing the What Scientists Do chart. The lesson ends with a Shared Writing activity on why Ms. Ray’s two milkweed plants are growing differently from one another, despite both having received water. The purpose of this lesson is to help students figure out that plants use their leaves to get the light they need to live and grow and for the class to refocus on the Chapter Question by writing a shared explanation.

**Anchor Phenomenon:** There are no monarch caterpillars in the Mariposa Grove community garden since a vegetable garden was planted.

**Investigative Phenomenon:** Seeds with light grow well; seeds without light do not.

**Students learn:**

- Plants get the light they need with their leaves.
- Plants have different parts that work together to help the plant live and grow.
The teacher reads a new section of *Handbook of Plants* about how plants get the light they need to live and grow.

**Instructional Guide**

1. Display the front cover of *Handbook of Plants* and set a purpose for reading. Remind students that they have read this book on multiple occasions to learn new things about plants.

   - Scientists sometimes read books to learn about the observations that other scientists have made. They read books to gather new information to help them answer their questions.

   - Our purpose for reading *Handbook of Plants* again is to help us figure out how plants get the light they need to live and grow.

   Ask students to give you a thumbs up while you read if they hear information about a plant part that helps plants get light.

2. Turn to the Contents on page 3.

   - This is the Contents page. Why do we use a Contents page? [To find important sections of the book and to figure out where the information we are looking for is.]

   - If we want to figure out how plants get light, what kinds of things should we look for in the Contents? [Light. Plants getting light.]

   - We are going to look for a section in the book about plants getting light.

   Point to the “Getting Light” heading in the Contents and read it aloud.

3. Turn to and read aloud the “Getting Light” section on page 8.
Our purpose for reading is to figure out how plants get light. What did we hear on this page to help us answer our question?

[Leaves get the light from the sun.]

This page says *Leaves are often flat to catch a lot of light from the sun*. Why do you think being flat would catch more light than if the leaf were crumpled or curled up really small?

[There is more leaf part showing to the light.]


What did we hear on this page to help us figure out how plants get light?

[Stems hold up leaves to the light.]

5. Turn back to the diagram on page 5.

Our purpose for reading was to figure out how plants get light. What parts of a plant did we figure out help the plant get light?

[The leaves and stem that holds up the leaves.]

 Invite volunteers to point out the leaves and stem that help the plant get to light it needs to live and grow on the diagram. Then, invite a volunteer to point out the roots of the plant that help it get the water it needs.

Teacher Support

Instructional Suggestion

Literacy Note: Releasing Responsibility for Using the Reference Book

At this point in the unit, students have had multiple opportunities to engage with the content and structure of *Handbook of Plants*. Whereas previous lessons had you modeling how to use the Contents page, this lesson gives greater responsibility to students to describe why and how readers use this text feature to locate information in a given text. If you think your students are ready for even greater responsibility, you might provide partners with time at the start of this activity to browse copies of the book and use the Contents page to locate information about plants getting light. If you choose to do this, it might be helpful to read through the Contents page once with the entire class to provide your nonreaders with additional support prior to the partner task.

Background

Science Note: How Plants Get Light

In this lesson, student learn plants get the light they need using their leaves. This process, known as photosynthesis, is popularly recognized as the process by which plants use energy from the sun to ultimately produce glucose, which the plant needs to survive. Carbon dioxide and water are necessary to power this process, and oxygen is a byproduct. In order for photosynthesis to occur, a plant needs to have sufficient water. There must be carbon dioxide in the air and sunlight must make its way to the leaves. The plant’s leaves need to be green, indicating the presence of a compound called chlorophyll, which is a crucial feature in the chemical reaction that produces oxygen and glucose.
Rationale

Science Note: Photosynthesis with Kindergartners
From this activity with the reference book, students learn that plants use their leaves to get the light they need. This basic understanding of the function of plants’ leaf structures represents a simplified explanation of photosynthesis. While some students may have background knowledge about photosynthesis that they volunteer in this discussion, to avoid reinforcing misconceptions we advise against discussing photosynthesis in depth with kindergarten students.

Background

Science Note: How Do Plants Grow Toward the Light?
Students leave this unit with a high-level understanding both that plants need light and that plants’ stems lift their leaves toward the light. In other words, plants grow toward the light. This happens through a complex and interesting process called phototropism. Chemicals in plant cells that are farthest from the light react to elongate those cells, effectively angling the plant toward the light. Angling leaves toward the light ensures they absorb the most light possible.
Exploring Leaves

Partners explore different types of leaves in *Handbook of Plants*. The teacher introduces a new key concept about how plants get light.

**Instructional Guide**

1. **Set a new purpose for reading.**

   We just read a section of the *Handbook of Plants* that let us know that leaves and stems are important parts of a plant. The leaves help the plant get light and the stem pushes up the leaves closer to the light.

   Not all leaves look the same. Next, we are going to go back to *Handbook of Plants* with a new purpose—to explore what the leaves of different plants look like.

2. **Turn to the “Sunflower” section on pages 26 and 27 of *Handbook of Plants* and read it aloud.** Point to the first picture on page 27.

   I notice that the sunflower plant has wide, flat leaves. How do these leaves help the sunflower plant? [They help it get the light it needs. They catch the light.]

3. **Establish a purpose for Partner Reading.** Let students know that they will work with partners to observe the leaves of different types of plants in *Handbook of Plants*.

   You and your partner will take turns reading the pages. Take time to talk about and observe the leaves of the plant on each page you turn to.

4. **Review the Partner Reading Guidelines.** Remind students that these guidelines will help them make sense of the book as they read with their partner.

5. **Assign partners and distribute a copy of *Handbook of Plants* to each pair.** Give students time to look through the book to find different kinds of leaves. Encourage students to talk with their partners about the different leaves they observe.
6. **Debrief the leaves from the book.** Gather students back together in the discussion area. Have them bring their copies of *Handbook of Plants* with them. Invite volunteers to point out particular leaves they observed.

   We read *Handbook of Plants* with our partners for the purpose of exploring what the leaves of different plants look like. Did anyone find a plant with leaves that looked very different from the leaves of other plants?

7. **Discuss the plant as a system.** Remind students that they have been discussing how different parts of something work together, which is something scientists do.

   Earlier, you told me that the roots work together with the other parts of the plant to bring water to all the plant parts. We also shared our ideas about which plant parts we thought might help the plant get light.

   What have we learned now about which parts of a plant help it get the light it needs?  
   [The leaves and stem work together.]

   How do the stem and leaves work together?  
   [The stem holds the leaves up. The leaves get the light the plant needs.]

   Different parts of a plant have different jobs to help the plant live and grow. They all work together.

8. **Introduce the new key concept.** Post the key concept on the wall and read it aloud.

   Plants get the light they need with their leaves.

9. **Revisit the What Scientists Do chart.** Remind students they are scientists, and this chart has been helping them think about the different science skills they have been using. Point to the word *read* on the chart.

   Scientists read to help answer their questions. We read for two different purposes today: to figure out how plants get light and to explore what the leaves of different plants look like.

   Point to the word *communicate* posted on the chart.

   Scientists communicate what they have learned with other scientists. How did we communicate today?  
   [We talked with our partner and class]

   We are ready to communicate with the children in Mariposa Grove. We will share by recording what we figured out.
Teacher Support

Instructional Suggestion

Providing More Experience: Observing the Leaves of Other Plants
In this lesson, students have learned that plants use their leaves to get the light they require to live and grow well. If you kept students’ garlic and radish plants within the classroom or in a nearby location, this presents an opportunity for students to observe the leaves of plants, record them through drawing and labeling, and discuss with partners why the leaves play an integral part of the plant system. If you did not keep the garlic and radish plants, you might collect a variety of real leaves and make them available to students to explore during free time or centers. Students might sort the leaves by size, shape, or color, as well as record their observations of how the leaves compare.

Instructional Suggestion

Going Further: Mathematical Thinking
As students interact with the various plants in *Handbook of Plants*, they may think that all the plants are the same size. In order to provide a sense of scale, consider using everyday classroom objects as a way to visualize the approximate size of the plants as they exist outside the classroom. The following items are some examples that can be used to help students visualize the actual size of some of the plants shown in the reference book.

- apple—as big as an apple in your lunch
- radish—leaves are as tall as student-sized scissors
- barrel cactus—as tall as a piece of construction paper
- fully grown milkweed—as tall as a table top
- sunflower—as tall as a man

You can also have students turn to page 18 and ask them *The kapok tree is as tall as how many men?* Or, have them look at the images of garlic. Ask students *How tall did our plants grow? What can we compare them to?*

Background

Science Note: The Barrel Cactus
The barrel cactus is featured on pages 14 and 15 of *Handbook of Plants*. Upon first glance, it appears that this plant does not have leaves. This might confuse students, given their newfound conclusion that plants use their leaves to get light. As the text of the book says, *The green stem of the barrel cactus catches all the sunlight the plant needs to live and grow.* The spines on a barrel cactus are modified leaves, but they do not photosynthesize—photosynthesis takes place in the stem. Most cells in cactus spines are, in fact, dead. Spines are adapted to provide protection, water retention, or shade.

Background

Science Note: Mushrooms Are Not Plants
If students bring up mushrooms as an additional plant that does not appear to have leaves (similar to the barrel cactus), explain that mushrooms are not actually plants. Mushrooms are a fruit structure found in the fungi kingdom, a
classification that also includes molds. Unlike plants, which need water and light to grow, fungi are actually more similar to animals in that they eat food from the areas around them. Whereas animals can go out and find new food, fungi always live on top of or inside of a place where their food is and, like plants, they move by growing.
The teacher reads a new section of *Handbook of Plants* about how plants get the light they need to live and grow.

**Instructional Guide**

1. **Display the front cover of *Handbook of Plants* and set a purpose for reading.** Remind students that they have read this book on multiple occasions to learn new things about plants.

   Los científicos a veces leen libros para aprender acerca de las observaciones que han hecho otros científicos. Leen libros para reunir nueva información para ayudarles a responder sus preguntas.

   Nuestro propósito para leer el *Manual de plantas* de nuevo es ayudarnos a averiguar cómo las plantas obtienen la luz que necesitan para vivir y crecer.

   Ask students to give you a thumbs up while you read if they hear information about a plant part that helps plants get light.

2. **Turn to the Contents on page 3.**

   Esta es la página del Contenido. ¿Por qué usamos una página del Contenido? [Para encontrar secciones importantes del libro y para averiguar dónde está la información que estamos buscando].

   Si queremos averiguar cómo obtienen luz las plantas, ¿qué tipos de cosas debería buscar en el Contenido? [La luz. Las plantas obteniendo luz].

   Vamos a buscar una sección en el libro acerca de plantas obteniendo luz.

   Point to the “Getting Light” heading in the Contents and read it aloud.

3. **Turn to and read aloud the “Getting Light” section on page 8.**

¿Qué oímos en esta página para ayudarnos a averiguar cómo obtienen luz las plantas?
[Las hojas obtienen la luz del sol].

5. Turn back to the diagram on page 5.

¿Qué oímos en esta página para ayudarnos a averiguar cómo obtienen luz las plantas?
[Los tallos sostienen a las hojas hacia la luz].

Invite volunteers to point out the leaves and stem that help the plant get to light it needs to live and grow on the diagram. Then, invite a volunteer to point out the roots of the plant that help it get the water it needs.

Teacher Support

Instructional Suggestion

Literacy Note: Releasing Responsibility for Using the Reference Book
At this point in the unit, students have had multiple opportunities to engage with the content and structure of Handbook of Plants. Whereas previous lessons had you modeling how to use the Contents page, this lesson gives greater responsibility to students to describe why and how readers use this text feature to locate information in a given text. If you think your students are ready for even greater responsibility, you might provide partners with time at the start of this activity to browse copies of the book and use the Contents page to locate information about plants getting light. If you choose to do this, it might be helpful to read through the Contents page once with the entire class to provide your nonreaders with additional support prior to the partner task.

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Rationale

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Exploring Leaves

Partners explore different types of leaves in *Handbook of Plants*. The teacher introduces a new key concept about how plants get light.

**Instructional Guide**

1. **Set a new purpose for reading.**

   - Acabamos de leer una sección del *Manual de plantas* que nos dijo que las hojas y los tallos son partes importantes de una planta. Las hojas ayudan a la planta a obtener luz y el tallo empuja las hojas hacia arriba acercándolas a la luz.
   
   - No todas las hojas se ven iguales. A continuación, vamos a regresar al *Manual de plantas* con un nuevo propósito: explorar cómo son las hojas de diferentes plantas.

2. **Turn to the “Sunflower” section on pages 26 and 27 of *Handbook of Plants* and read it aloud.** Point to the first picture on page 27.

   - Noté que la planta de girasol tiene hojas anchas y planas. ¿Cómo ayudan estas hojas a la planta de girasol? [La ayudan a obtener la luz que necesita. Atrapan la luz].

3. **Establish a purpose for Partner Reading.** Let students know that they will work with partners to observe the leaves of different types of plants in *Handbook of Plants*.

   - En parejas, tomarán turnos para leer las páginas. Tomen tiempo para discutir y observar las hojas de la planta en cada página que pasen.

4. **Review the Partner Reading Guidelines.** Remind students that these guidelines will help them make sense of the book as they read with their partner.

5. **Assign partners and distribute a copy of *Handbook of Plants* to each pair.** Give students time to look through the book to find different kinds of leaves. Encourage students to talk with their partners about the different leaves they observe.
6. **Debrief the leaves from the book.** Gather students back together in the discussion area. Have them bring their copies of *Handbook of Plants* with them. Invite volunteers to point out particular leaves they observed.

Leímos el *Manual de plantas* con el propósito de explorar cómo son las hojas de diferentes plantas. ¿Alguien encontró una planta con hojas que se veían muy diferentes a las hojas de otras plantas?

7. **Discuss the plant as a system.** Remind students that they have been discussing how different parts of something work together, which is something scientists do.

Anteriormente, me dijeron que las raíces trabajan juntas con las otras partes de la planta para traer agua a todas las partes de la planta. También compartimos nuestras ideas sobre cuáles partes de la planta pensamos que podían ayudar a la planta a obtener luz.

¿Qué hemos aprendido ahora acerca de cuáles partes de una planta la ayudan a obtener la luz que necesita?

[Las hojas y el tallo trabajan juntos].

¿De qué manera trabajan juntos el tallo y las hojas?

[El tallo sostiene a las hojas. Las hojas obtienen la luz que la planta necesita].

Diferentes partes de una planta tienen diferentes trabajos para ayudar a la planta a vivir y crecer. Todas ellas trabajan juntas.

8. **Introduce the new key concept.** Post the key concept on the wall and read it aloud.

Las plantas obtienen la luz que necesitan con sus hojas.

9. **Revisit the What Scientists Do chart.** Remind students they are scientists, and this chart has been helping them think about the different science skills they have been using. Point to the word *read* on the chart.

Los científicos leen para ayudarles a responder sus preguntas. Hoy leímos con dos diferentes propósitos: para averiguar cómo obtienen luz las plantas y para explorar cómo se ven las hojas de diferentes plantas.

Point to the word *communicate* posted on the chart.

Los científicos comunican lo que han aprendido con otros científicos. ¿De qué manera nos comunicamos hoy?

[Hablamos en parejas y con la clase].

Estamos listos para comunicarnos con los niños en Mariposa Grove. Compartiremos apuntando lo que averiguamos.