Lesson 4.2
Investigating What Different Animals See
Lesson Overview

This lesson begins with a new Investigation Question: Why do different animals need different amounts of light to see well? Students view images of what nocturnal and diurnal animals see at different times of day. From these images, students observe that some animals see well in bright light, while others see well in low light. This motivates students to wonder why animals see differently in different amounts of light. Students use the Vision and Light Modeling Tool to model how two animals can see differently under the same light conditions. The class turns to the Handbook of Animal Eyes to learn more. Partners choose an animal’s eye to research and work to become experts on that eye. The purpose of this lesson is to introduce the idea that different animals need different amounts of light to see well, as well as to motivate students’ investigation of that idea.

Anchor Phenomenon: The population of Tokay geckos in a rain forest in the Philippines has decreased since the installation of new highway lights.
Investigative Phenomenon: A tarsier and a squirrel see differently in the same amount of light.

Students learn:

• Some animals see well in bright light while others see well in low light.
Researching Animal Eyes

Students choose an animal eye to research. They read about this eye in *Handbook of Animal Eyes* and record information in their notebooks.

**Instructional Guide**

1. **Introduce and set the purpose for the activity.** Refer to the Investigation Question on the board. Explain that students will research animal eyes to try to find out more about why different animals need different amounts of light to see well.

   This should help us figure out how the new highway lights could be affecting the Tokay gecko’s vision.

2. **Review information processing and focus students on receptors.**

   We noticed in the slideshow and with the Modeling Tool that some animals’ brains do not form a clear image when there is a lot of light, while other animals’ brains don’t form a clear image when there is only a little bit of light.

   What do we know so far about how the brain forms an image so an animal can see? [Light reflected off things in the environment gets to the eye and then goes to the light receptors, which send the information to the brain for processing. The brain forms an image with this information.]

3. **Introduce the jigsaw discussion activity.**

   - **Students start in a base group.** Explain that students will begin in a group of four, which will be their base group. Each group member will choose a different animal’s eyes to become an expert on.

   - **Students move to an expert pair.** Explain that when students are researching their animal, they will work with another student from a different base group who is researching that same animal. This will be student’s expert pair.

   - **In the next lesson, students will return to their base group.** Let students know that in the next lesson, students will return to their base group and report back about the animal they researched.
4. Project and introduce the notebook page. Have students turn to page 72, Researching Animal Eyes, in their notebooks. Review the directions and then focus on the directions for filling out Box 1. Explain that students only need to fill out Box 1 today; in the next lesson they will complete the other boxes based on the other animals they learn about from the rest of their base group.

5. Project Animal Eyes Research.

![Animal Eyes Research](image)

- **Animal Eyes Research**
  1. Choose an animal's eyes to research:
     - African fish-eagle eyes
     - Macaw eyes
     - Damselfish eyes
     - Screech owl eyes
     - Jumbo squid eyes
     - Tarsier eyes
  2. Facilitators:
     - Check that each group member chooses a different animal.
     - Check that group members record the name of the animal they will research in their notebooks.

- **Review the options for research.** Read the options of animals to research.

- **Review finding information efficiently.** Ask students how they could easily find the information about the animal they choose, without having to read the whole *Handbook of Animal Eyes*. [Use the Contents page.]

- **Explain the facilitator role.** Review the responsibilities of this role with students.

6. **Assign groups and facilitators.** Have students get into groups of four and assign one student from each group to be the facilitator.

7. **Students choose an animal to research.** Give students a minute to choose an animal. Circulate and assist facilitators in making sure each person in the base group has chosen a different animal. Students should record their chosen animal in Box 1 of page 73 in the notebook.

8. **Students get into expert pairs.** Help students find another student who has chosen the same animal, and have expert pairs sit next to each other.

9. **Distribute copies of *Handbook of Animal Eyes* and have students begin researching.** Distribute one copy of the reference book to each expert pair and have them find their animal. Circulate and assist pairs in their research as necessary. Remind students that they only need to complete Box 1 today.

10. **Conclude the lesson.** Remind students they will share their expertise regarding their animal with their base group in the next lesson.
Teacher Support

Rationale

**Literacy Note: Purpose of Jigsaw Discussion Activity**
The purpose of the jigsaw discussion activity is twofold. First, it provides students with the chance to build and then share expertise about a particular topic—boosting both their self confidence and oral presentation skills. Second, it allows students to discover that animals have either high-sensitivity or low-sensitivity receptors, and this affects how they see. At least one student in each group will have an animal with a different kind of receptor. By learning about a total of four different animal eyes, students will be able to use each other as resources to discover a key piece of content that will help them solve the problem of the Tokay geckos not surviving.

Instructional Suggestion

**Providing More Support: Diurnal and Nocturnal Research Options**
Though it is not specified in the instructions, you may want to instruct students to choose their animals so that each group has an equal number of diurnal and nocturnal animals to research. This may help later as students develop their understanding of high- and low-sensitivity light receptors in different types of animals. The diurnal and nocturnal animal research choices are as follows:

- African fish-eagle eyes (diurnal)—page 6
- Damselfish eyes (diurnal)—page 10
- Macaw eyes (diurnal)—page 30
- Jumbo squid eyes (nocturnal)—page 24
- Screech owl eyes (nocturnal)—page 40
- Tarsier eyes (nocturnal)—page 44

Possible Responses

**Investigation Notebook**
**Researching Animal Eyes** (pages 72–73)

Answers will vary. In this lesson, students only fill in Box 1.
Researching Animal Eyes

1. Record the name of the animal that you will research in Box 1.

2. Read the pages about your animal’s eyes in *Handbook of Animal Eyes*.

3. Circle when your animal is active and then record information about your animal from the text.

4. Listen carefully as your group members share their research. After they finish sharing, record the most important information about each animal’s eyes in Boxes 2–4.
# Researching Animal Eyes (continued)

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**Instructional Guide**

1. **Introduce and set the purpose for the activity.** Refer to the Investigation Question on the board. Explain that students will research animal eyes to try to find out more about why different animals need different amounts of light to see well.

   Esto debería ayudarnos a averiguar cómo las nuevas luces de la carretera podrían estar afectando la visión del geco tokay.

2. **Review information processing and focus students on receptors.**

   En la presentación de diapositivas y en la Herramienta para modelar notamos que los cerebros de algunos animales no forman una imagen clara cuando hay mucha luz, mientras que los cerebros de otros animales no forman una imagen clara cuando hay solo un poco de luz.

   ¿Qué sabemos hasta el momento acerca de cómo forma el cerebro una imagen para que un animal pueda ver? [La luz que se refleja de las cosas en el ambiente llega a los ojos y después va a los receptores de luz, los cuales envían la información al cerebro para que sea procesada. El cerebro forma una imagen con esta información].

3. **Introduce the jigsaw discussion activity.**

   - **Students start in a base group.** Explain that students will begin in a group of four, which will be their base group. Each group member will choose a different animal’s eyes to become an expert on.

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5. **Project Animal Eyes Research.**

   ![Investigación de los ojos de animales](image)

   **Investigación de los ojos de animales**
   
   **1. Elige los ojos de un animal para investigar:**
   - Ojos de águila pescadora africana
   - Ojos de guacamaya
   - Ojos de pez damisela
   - Ojos de tecomte chillón
   - Ojos de calamar gigante
   - Ojos de tarsero

   **2. Facilitadores/as:**
   - Revisen que cada integrante del grupo elija un animal diferente.
   - Revisen que los integrantes del grupo apunten el nombre del animal que investigarán en sus cuadernos.

   - **Review the options for research.** Read the options of animals to research.
   - **Review finding information efficiently.** Ask students how they could easily find the information about the animal they choose, without having to read the whole *Handbook of Animal Eyes.* [Use the Contents page.]
   - **Explain the facilitator role.** Review the responsibilities of this role with students.

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Possible Responses

Investigation Notebook
Researching Animal Eyes (pages 72–73)

Answers will vary. In this lesson, students only fill in Box 1.
Investigar ojos de animales

1. En el cuadro 1, apunta el nombre del animal que investigarás.

2. Lee las páginas acerca de los ojos de tu animal en el Manual de ojos de animales.

3. Encierra en un círculo cuándo está activo tu animal. Luego apunta información del texto acerca de tu animal.

4. Escucha con atención mientras los miembros de tu grupo comparten sus hallazgos. Después de que terminen de compartir, apunta la información más importante acerca de los ojos de cada animal en los cuadros 2 al 4.
Investigar ojos de animales (continuación)

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