

TEACHER GUIDE

THROUGH MY LENS

KEY TERMS

- Perspective
- Prior knowledge

KEY SKILLS

- Activating prior knowledge
- Communicating our science understanding
- Considering peers' perspectives

GRADE LEVEL

Middle and high school

EVIDENCE-BASED PRACTICES

- Building relevance and authenticity for NGSS
- Culturally relevant pedagogy

ESTIMATED TIME

One 45-minute class period (flexible)

MATERIALS

- Class set of "Through My Lens" worksheet and "Lab Goggles Template" (print both)
- Materials for students to design their lab goggles (e.g., colored pencils, magazines or newspapers, markers, glue sticks, scissors, etc.)

SUMMARY

Students bring different beliefs, experiences, ideas, and interests to science class. These individual perspectives impact how every student sees and interacts with science. At the same time, connecting science content to students' daily lives can boost engagement, belonging, and relevance. Like other strategies for activating prior knowledge, this activity builds on reflection and communication. First, students will design "lab goggles" to symbolize the "lens" through which they see a topic: in other words, what prior knowledge or personal perspectives do they bring? Next, students will share their lab goggles design with their peers, prompting them to consider the "lens" others look through. Finally, students will reflect on what they have learned about themselves and others. We recommend using this activity at the beginning of a course or unit (see table on page 3 for examples); however, it can also be used throughout the year as a formative assessment (see page 6).

LEARNING OBJECTIVES

By the end of this activity, students will be able to:

1. Communicate (visually, orally, and written) their prior knowledge or perspectives related to a science topic
2. Consider the perspectives of their peers

This activity can be used to support any content standards - the goal is to help students reflect on their prior knowledge and apply it to their learning.

PRIOR KNOWLEDGE

None needed. However, we recommend you establish expectations or guidelines for students on what to share, depending on your goals.

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BACKGROUND INFORMATION

Let's start with a scenario:

*Imagine you are teaching a lesson about food webs in a forest ecosystem. Before the lesson, you ask students to picture a forest and the organisms within it - from the producers to top predators. Jayden, who grew up in Colorado, sees a montane ecosystem with aspen trees, willows, berries, spiders, rabbits, elk, foxes, bears, and mountain lions. Lily, who is from Florida, sees something different. She thinks of a mangrove forest with algae, mangrove trees, crabs, snails, snakes, egrets, alligators, and Florida panthers. Next, you ask students to think about how environmental changes and human activities might influence the interactions in these food webs. Drawing on what they know from science class and their experiences outside of school, Jayden and Lily both wonder about natural hazards, development, and recreation. Although Jayden and Lily picture different kinds of forests, they have similar thoughts on what may influence food webs. Despite having different **perspectives** overall, both students share relevant ideas on the science topic during a class discussion.*

Asking Jayden and Lily to *share their perspectives with each other* elevates the activity in this scenario from **prior knowledge activation** to **culturally relevant pedagogy**. Culturally relevant pedagogy helps students see the relevance of what they are learning, honors the knowledge they bring, and creates opportunities for them to learn from their peers. As teachers, we know these practices support content learning and help students feel welcome in our classrooms while cultivating community. This activity builds on these evidence-based practices and offers a structured exercise specific to science class.

MATERIAL PREPARATION

Activity Overview

In this activity, students will:

1. Think about a major science topic and identify what they know, believe, or perceive
2. Design "lab goggles" to represent how they see the topic (their science understanding)
3. Share their design and hear about their peers' perspectives
4. Reflect on what they learned about themselves and others

Because this activity is designed to activate prior knowledge and help you get to know your students, we recommend using it at the beginning of a new semester or unit. However, you can circle back to this activity or use it in different ways to help students reflect on their science understanding over time - see [Extensions](#) and [Assessments](#) on page 6 for ideas.

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Activity Setup

Prior to class, make paper copies of the “Through My Lens” worksheet and the “Lab Goggles Template.” Gather supplies for students to decorate their “lab goggles” such as colored pencils, magazines or newspapers (for images and symbols), markers, glue sticks, scissors, etc.

Before class, decide the topic you want students to reflect on. For example, if it’s the beginning of the year, you might choose the Nature of Science, while at the beginning of a new unit you might choose a more focused topic like Energy and Matter. The following table provides example guiding questions you can pose to students in Step 1 (see worksheet). We suggest you use just one or two questions for this activity because the goal is to help students activate their prior knowledge. You can also create your own questions or even have students contribute questions before the activity.

Topic	Example Guiding Questions
Nature of Science/ Scientific Process	• How are scientific discoveries made? • How do we know what’s “true” in science? • What does it take to be a scientist? • What is something science hasn’t yet answered? • Where does science show up in your life?
Subject-specific (e.g., Biology, Chemistry, Geology, Physics)	• How does [subject] impact your daily life? • What is a problem in our world that [subject] could help answer? • What are some questions you have that could be explained by [subject]?
Unifying Ideas and Systems Thinking (e.g., energy and matter, levels of organization, structure and function)	• How does weather impact your everyday life and/or community? • What is sustainability, and why does it matter? • What makes us who we are? Our families or our environment? • What is an important environmental issue to you, and why? • Where does the energy that powers your cell phone come from, and how do you use it?

Activity Instructions

1. Introduce the activity to students. For example: *"Today, we are going to explore your perspective of [science topic] and how you view it 'through your lens.' We will work through the activity together as a class."*
2. Hand out the "Through My Lens" worksheet to students, which includes instructions for Steps 1-4. Do not hand out the "Lab Goggles Template" yet.
3. Read the **Instructions** at the top of the worksheet: *"This activity is about you - what you know, what you believe, and how you see the world - so be open to sharing and learning from each other."*
4. **Student Worksheet Step 1 (~5 minutes):** ask students to reflect on one to two guiding questions (see table on page 3). In the space provided on the worksheet, have students write what they know, believe, or perceive. Emphasize that there is no "right" answer - this is just a brainstorming exercise. Students can write in full sentences, jot down their ideas as bullet points, or sketch out their thoughts.
5. **Student Worksheet Step 2 (~20 minutes):** hand out the "Lab Goggles Template." The goggles symbolize students' perspectives: how they see a science topic and the connections they make to it. Remind students of the expectations listed in Step 2 of the worksheet:
 - They need to include at least 5 different examples. For example, if they are thinking of how chemistry impacts their lives, they could mention cosmetics, food, medicine, etc.
 - They need to include a mix of text and visuals.
 - Emphasize that *the goggles should communicate their science understanding.*

This activity invites students to share about themselves and learn from their peers. Remind students of your class norms or expectations before starting the activity: for example, that they share openly, listen respectfully, and consider thoughtfully.

Then, have students start decorating their goggles. Depending on your students and time allotted for this activity, let them get creative! For example, they can make their goggles 3D, glue on magazine cut-outs, put them on a different background, etc.

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6. **Student Worksheet Step 3 - Part A (~2 minutes):** before students present their lab goggles design in small groups (2-3 students), ask them to prepare what they want to say by reflecting on the following questions:

- *What do you know about the science topic / guiding question?*
- *How does the science topic relate to your everyday life - especially outside of school? Reflect on your beliefs, experiences, hobbies, and interests.*

7. **Student Worksheet Step 3 - Part B (~8 minutes):** remind students that the goal of this step is to share their science understanding and learn from their peers. Groups should ensure each student gets an equal time to speak - they can designate a timekeeper if needed. Now, have students present their designs in small groups.

8. **Student Worksheet Step 4 (~10 minutes):** wrap up this activity by asking students to respond to the three reflection questions in Step 4 on their worksheet. Ask students to write in 2-3 complete sentences per question. Again, remind students there are no right or wrong answers so long as they answer honestly and give details.

- *In what ways was your perspective similar to or different from your peers' perspectives?*
- *What is one thing you learned about yourself from this activity?*
- *What would you like to learn about this topic in the future?*

9. At the end of the activity, collect the student worksheet and lab goggles (remind students to write their names on their goggles before they turn them in).

Depending on your classroom culture, consider grouping students ahead of time or let them choose their groups.

We acknowledge some students may be uncomfortable speaking about themselves with their peers. You can reduce this apprehension by providing sentence starters or modeling what they can share out - for example, "I remember in science class last year, we talked about... I found this really interesting..."

If your classroom setup allows, display the lab goggles throughout your room where other students can see them.

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EXTENSIONS

- Throughout a unit or term, periodically ask students to revisit this activity and reflect on how their perspective has changed or stayed the same and why. Use guiding questions such as: *What new connections have you made? Have any connections changed? What class activities have supported or expanded your perspective, and why?*
 - For quick formative assessments, lead class discussions or assign quick writes.
- After a lesson or unit, have students communicate science to a particular audience using either our **Scicomm Organizer** or **Just Roll With It** activity. Before designing their science communication, ask students to think about the science content “through the lens” of this audience - what personal experience or prior knowledge might they draw on? Students can use the lab goggles template from this activity as a graphic organizer to brainstorm ideas.

ASSESSMENTS

- For a more integrated application of this activity, have students include it in a science class portfolio. As students complete different assignments, prompt them to make connections to show learning over time. If possible, have students share the portfolio at teacher-parent conferences or as an end of semester assignment. *This may align with competency-based grading systems.*



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STUDENT WORKSHEET

NAME: _____

CLASS PERIOD: _____

THROUGH MY LENS WORKSHEET

Instructions: Follow your teacher's directions to complete the four steps. This activity is about *you* - what you know, what you believe, and how you see the world - so be open to sharing and learning from each other!

STEP 1. Brainstorm

Your teacher gave you one or more questions to think about. **In the space below**, record what comes to mind as you reflect on them. This is just about what you already know, believe, or perceive - there are no right answers, so don't worry about having a "perfect" response! You can write in full sentences, jot down ideas as bullet points, or sketch out your thoughts. You can list answers separately or group them together.

Wait for your teacher before moving on.

STEP 2. Design

Now it's time to design your lab goggles! The goggles symbolize your perspective, or how you see a science topic and the connections you make to it. Your design must include:

- ☐ At least **5 different examples** showing what the science topic means to you or how it connects to your beliefs, experiences, and knowledge. Use your list from Step 1 to help you get started!
- ☐ A mix of text (words, phrases, quotes) and visuals (drawings and symbols) that represent these different examples.

Be creative, but remember the goal is to communicate your response to the question(s) your teacher gave you. As you decorate, use the materials your teacher gives you and consider how the colors, words, phrases, or symbols you use communicate what you know or believe.

Wait for your teacher before moving on.

STUDENT WORKSHEET

STEP 3. Reflect and Share

Next, you will present your lab goggles design in small groups. Reflect on the two questions below to prepare what you want to say:

- *What do you know about the science topic?*
- *How does the science topic relate to your everyday life - especially outside of school? Reflect on your beliefs, experiences, hobbies, and interests.*

Keep in mind that the goal of this step is to share your science understanding and learn from your peers. Make sure everyone gets an equal amount of time to speak (for example, if there are 4 people in your group and your teacher gives you 8 minutes, each person should get about 2 minutes. Designate one person as a timekeeper if you need to!).

Wait for your teacher before moving on.

STEP 4. Learn

Let's tie Steps 1-3 together: you reflected on your understanding of a science topic, shared your perspective, and heard from your peers. You're now more aware of how your experience and knowledge shape your understanding. You've also learned something new about how your peers see the same topic!

Respond to the questions below to record what you learned. For each question, write in 2-3 complete sentences. There are no right or wrong answers so long as you answer honestly and give details.

- *In what ways was your perspective similar to or different from your peers' perspectives?*
- *What is one thing you learned about yourself from this activity?*
- *What would you like to learn about this topic in the future?*

LAB GOGGLES TEMPLATE

Instructions: cut along the outside border to create the lab goggles shape. Then, decorate your lab goggles using the provided materials. Write your name somewhere on the frame!

