



Self-Paced Refraction Lab

Materials

- Google Slides
- Pear Deck
- Google Classroom
- Students need a pencil/pen, clear glass cup, and water

Standards

- When light shines on an object, it is reflected, absorbed, or transmitted through the object, depending on the object's material and the frequency (color) of the light. (MS-PS4-2)
- The path that light travels can be traced as straight lines, except when it hits a surface between different transparent materials (e.g., air and water, air and glass) obliquely where the light path bends. (MS-PS4-2)
- A wave model of light is useful for explaining brightness, color, and the frequency-dependent bending of light at a surface between media. (MS-PS4-2)

Procedure

- Review relevant concepts with students about the behavior of light waves using a Google Slides Presentation, Screencastify recording, or Google Meet meeting.
- Create a blank Google Slides presentation and give it an appropriate title.
- Open up the Pear Deck add-on within Google Slides.
- Navigate to the Science Templates found within the Pear Deck Template Gallery.
- Add each of the following templates to your presentation in the following order: Self-Paced Lab Report title slide, Lab Overview, Objective, Hypothesis, Materials, Procedure, Observations, Conclusions, and finally Claim-Evidence-Reasoning.
- Include background information and lab instructions in a separate document to students.
- Click Start Lesson at the top of the Pear Deck Add on within Google Slides



- Choose “Student-Paced” to have students complete the lab independently on their own time.
- Share the link or code with students via Google Classroom.
- When the deadline you have given to students has passed, end the session.
- Open <https://app.peardeck.com/home/sessions> to review student responses.
- Engage the class in a review and discussion through a text-based discussion in a learning platform like Google Classroom, or a live Google Meet session.

Extension Activity

- Have students try this experiment again using different liquids other than water to see if their observations and explanations still hold true.
- Advanced students may be able to calculate the amount of bending that the light ray does when encountering the glass and water.