

OVERVIEW

Dancing to music is a great way to let out energy! Did you know that light and sound are also ways to express energy? Let's explore the relationship between light and sound with good vibrations by creating our own music and light show.

Need to let out physical energy? Supplement this activity by checking out a book on dance from your local library.

GRADES: 4-12

STANDARDS: NGSS 1-PS4-1

MATERIALS: Flashlight, 5 glass jars or cups, spoon, tape, paper, scissors, craft supplies, and notebook.

TERMS: A *wave* is a disturbance that transfers energy from one place to another.

Frequency is the number of waves there are per second.

Resonance is the maximum energy transfer, in the form of waves, from one object to another.

DO

LIGHT

1. Using one of the glasses, fill it with water about $\frac{3}{4}$ of the way.
2. Create a rectangular slit with tape on the front of the flashlight. See photos for help.
3. Shine the flashlight at the glass filled with water, playing with the angle until a rainbow appears.
4. Draw what you see and write down any questions and observations.



SOUND

5. Arrange the remaining glasses in a row along with the glass filled with water. Tap each glass with the spoon and write down your observations.
6. Fill each glass with different levels of water. Tap each glass again and write down your observations.

REFLECT AND APPLY

LIGHT

7. Based on your observations, what is white light made of?

8. What happens when we change the shape of the slit on the flashlight?

SOUND

9. What difference can you hear when the glass is filled with less water? More water? Equal amounts of water?
10. Create: Can you play a simple melody like Twinkle, Twinkle, Little Star? Feel free to experiment with the water levels and add more glasses if needed.

MAKER CHALLENGE

What are the other different ways we can represent light and sound? Can we build something to visualize sound? How else can we show that white light is made of different colors? Hint: Check out the learning extensions below for ideas!

With an adult's permission, email a photo of your work to inventstem@iastate.edu when you are done. We would love to see your idea!

CAREER CONNECTIONS

Entertainment engineers create mechanical and structural systems for scenic and entertainment staging, theatrical facilities, theme parks, and all kinds of performances.

To learn more about specific careers, go to <https://www.asme.org/topics-resources/content/spotlight-on-a-career-in-entertainment-engineering>

LEARNING EXTENSIONS

Want to learn more about light and sound? Check out the following links:

- <https://www.exploratorium.edu/snacks/vocal-visualizer>
- <https://www.exploratorium.edu/snacks/resonant-rings>
- <https://gosciencegirls.com/how-to-make-an-electric-newtons-disc/>

Videos:

- Newton's Light Spectrum: <https://youtu.be/--b1F6jUx44>
- Tuning Fork and Water: <https://youtu.be/VCERs0v1Ool>
- Laser + Mirror + Sound: <https://youtu.be/C-V1uXeyGmg>
- Sound Experiments: <https://youtu.be/rYrdiQckGhw>



We welcome your feedback! Please use this QR code or link to contact us. <https://form.jotform.com/isu4h/ResourceFeedback>

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