

Background

In this unit you learned about several different structures, technologies, and devices that apply the properties of waves and sound. Some applications minimize the effects of waves to keep bridges and large buildings stable. Others use the properties of waves and sound in medical applications, such as ultrasound technology, or to produce sound, such as musical instruments. Many future applications will use the properties of waves and sound in new and innovative ways.

{20} Task

Your task is to design and construct a device that uses several concepts related to waves and/or sound, is safe, and meets one of the following criteria:

- The device demonstrates characteristics of waves or sound in an innovative way. The demonstration(s) can involve different types of waves as well as the properties of waves (for example, wavelength, frequency, and amplitude). Concepts such as wave speed, the Doppler effect, standing waves, and resonance could also be included. The device could serve as a teaching aid for a physics class.
- The device performs a task using the properties of waves and/or sound, for example, moving an object, triggering an event or series of events, keeping time, or creating sound or music.
- The device is visually appealing, creative piece of kinetic art that involves in its operation the properties of waves and/or sound. The art may or may not produce pleasant sounds, but it must demonstrate several properties of waves and/or sound.

Equipment & Materials

Many different materials can be used for this task. Keep it simple, cheap, and safe.

Procedure

- As a group decide which device you will construct.
- Draw a simple sketch of the device that clearly shows how it will look or work and which properties of waves and/or sound the device will apply.
- Keep the materials and size of the device reasonable. The device should fit comfortably on a student desk.
- Prepare a report or summary of your design for approval by your teacher. In your summary, describe in detail the physics principles you are using and the expected performance of your device based on those principles.
- {5}** Create a construction log of how the device was constructed, making note of any design changes or difficulties. Include diagrams/photos in your log when necessary.
- {5}** Demonstrate the device in the classroom, and be prepared to answer questions about how it applies the physics principles related to waves and/or sound.

Analyze & Evaluate

- {5}** Which physics principles related to waves and/or sound does your device apply?
- {5}** How did your group test and improve your device?
- {5}** Describe in detail how your device works.
- {5}** How have the design and construction of your device improved your understanding of the physics principles related to waves and/or sound?
- {5}** What would you do differently if you built another device for a similar task?

Submission

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| ① | Device, Log, & Demonstration (one/group) | /30 | |
| ② | Report (one/person) | /30 | + {5} for spelling & grammar |

TOTAL	/60
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