DFW Earth Day 2026

Lesson Plan Information

Name: Quiet Quest - How Sound Travels

Grades: 4-12

Topic: Students will learn about sound and how airports use smart design to reduce community noise. Students will attempt to soundproof their cardboard house and test it using a sound meter during a controlled noise challenge.

Time: 30-45 mins.

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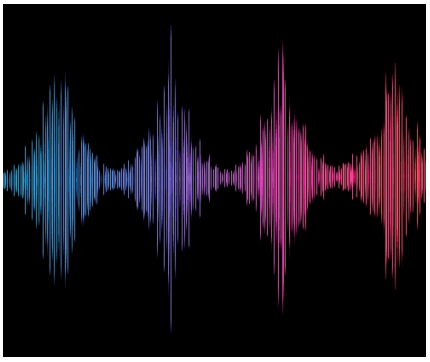
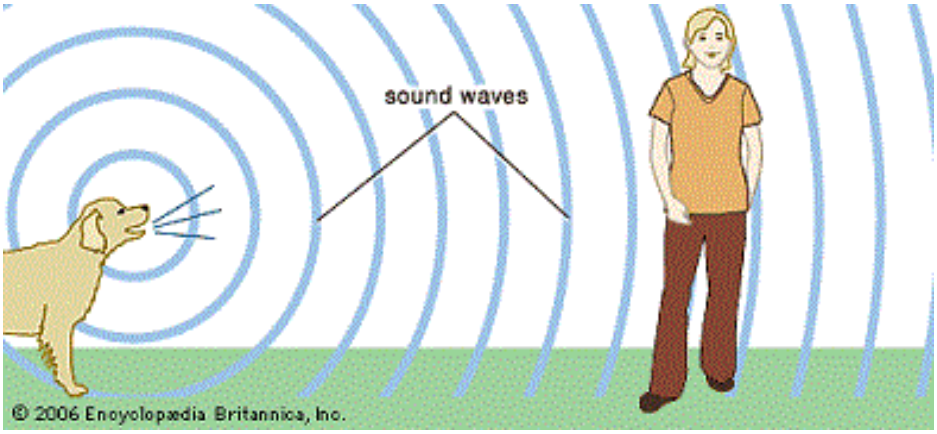
Introduction:

Have you ever heard an airplane fly overhead and noticed how loud it can be? Airports work hard to reduce the amount of noise that reaches nearby neighborhoods but noise is still a constant presence. From departing and arriving aircraft, construction equipment and passenger activity, airports generate sound from many different sources.



But what exactly is sound? **Sound** is a form of energy created by vibrations. When an object vibrates, it causes surrounding particles to move, creating sound waves that travel through different mediums such as air, water and solid materials like walls. Without a medium to travel through, sound doesn't exist. That's why space is quiet.

The strength of these vibrations determines how loud a sound is, and different materials can absorb, block or reflect sound as it travels. This is why you can hear sounds underwater, through walls or while speaking to a friend nearby.



The amount of noise we perceive depends on several factors that affect how sound moves. Distance plays a major role since sound spreads out and becomes quieter the farther it travels. Materials between the source and the listener can absorb or block

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sound, reducing how loud it may seem. Weather conditions such as wind, temperature and humidity can also influence how sound travels and may carry noise farther than expected. In addition, the layout of buildings and the shape of the land can reflect or contain sound, changing how noise is experienced in different locations.

In the past, airport noise was much louder than it is today. Older aircraft engines were less efficient and produced higher noise levels during takeoff and landing. Over time, advances in aircraft technology have led to quieter engines, improved aerodynamics and better operating procedures. Airlines now fly newer, quieter aircraft, and airports work closely with them to follow noise-reducing flight paths. As a result, even though air travel has increased, the amount of noise reaching surrounding communities has continued to decrease.

DFW Airport has also made noise reduction a priority. Since opening in 1974, DFW has carefully considered how sound would affect nearby communities. The airport was designed with large buffer zones, strategic runway placement and thoughtful land-use planning to help reduce noise before it reaches neighborhoods. Today, DFW continues to monitor aircraft noise and look for ways to minimize its impact through planning, research and operational improvements. The airport's Noise Management department works closely with surrounding cities, sharing information and keeping communities informed about potential changes in noise exposure.

By looking at the science behind sound and the efforts made by airports like DFW, it becomes easier to see how thoughtful planning and decision-making can make a difference. The following demonstration will guide you through the next steps, helping you apply this information, better understand how noise is measured, managed and reduced.

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Key Terms:

Sound – Vibrations that travel through air or another medium and can be heard.

Noise – Starts as a sound, especially one that is loud or unpleasant or that causes disturbance.

Decibel (dB) – Unit used to measure sound intensity.

Sound Meter – Instrument that measures sound in decibels (dB) – quantifying loudness in a standardized way.

Sound Insulation – Materials or structures that reduce the amount of sound that passes through.

Absorption – A material takes in sound energy and reduces its intensity.

Reflection – Sound bounces off a surface.

Vibration – Back-and-forth motion that creates sound.

Noise Mitigation – Steps taken to reduce unwanted sound.

Community Noise Impact – Sound from airports affects neighborhoods.

Airport Design Strategies – Techniques such as insulation, barriers and building orientation used to reduce noise exposure.

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Materials:

Kit will include:

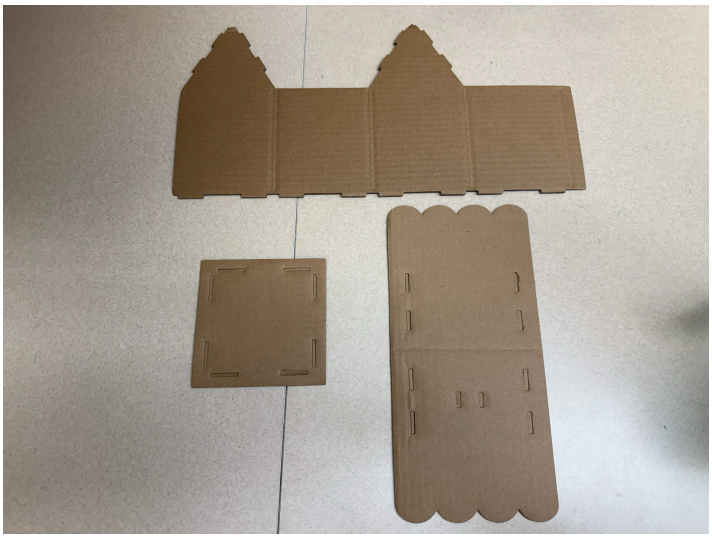
- Cardboard house
- Sound meter with batteries
- Cotton balls
- Foil
- Honeycomb packing paper
- Sponges
- Microfiber towels
- Glue
- Double-sided tape
- Party horn

Not included in the kit:

- Staples/staplers (if needed)

Procedure:

1. Divide the class into five equal groups.
2. Distribute a complete cardboard house set to each group.



3. Place the additional materials in the middle of the classroom.
4. Unwrap the batteries provided and insert them into the sound meter.
5. Punch out the proliferated holes in the cardboard provided.

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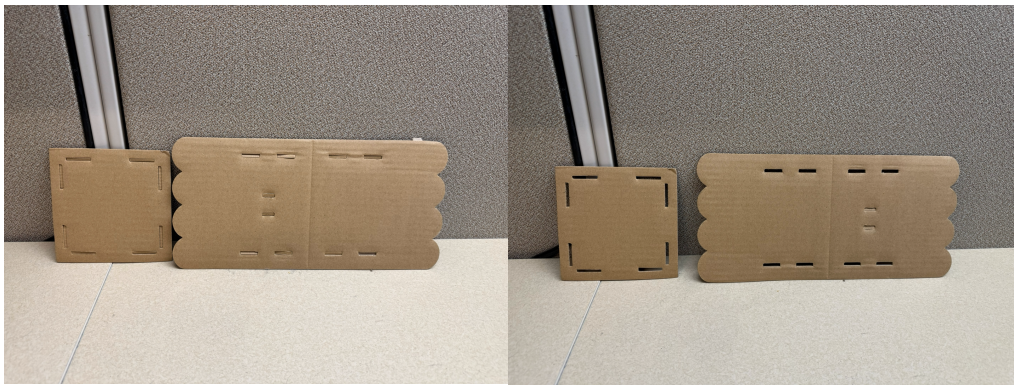
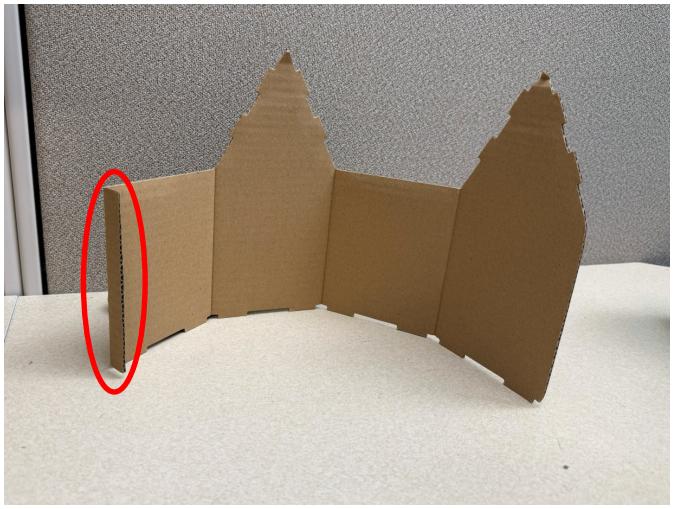


6. Fold the house wall cardboard sheet and apply tape inside to hold the structure together.



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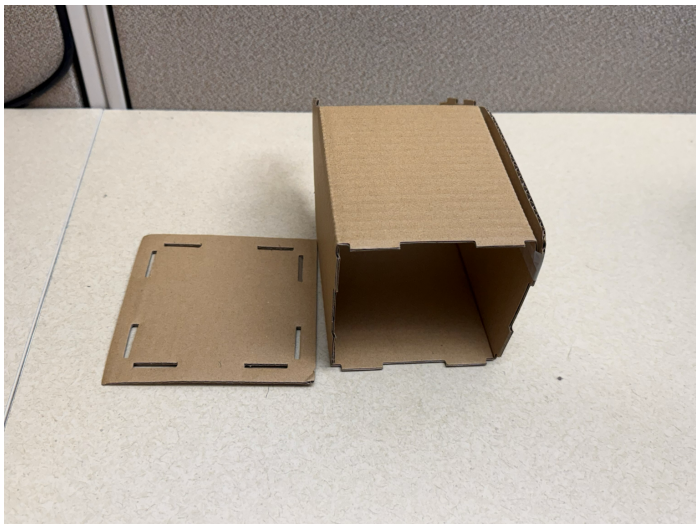
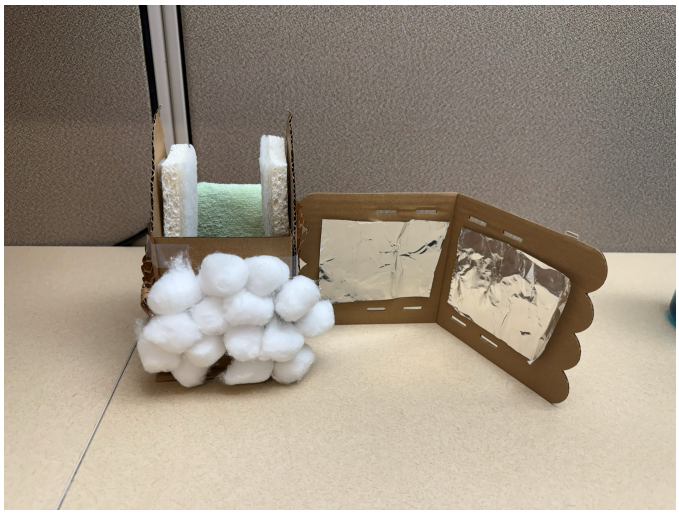
7. Connect the walls to the base through the created holes.



8. Fold roof for use.
9. Give students 15 minutes to use the materials provided to create their best attempt to soundproof their home.
    a. Make sure there is enough space inside the home to insert the sound meter.



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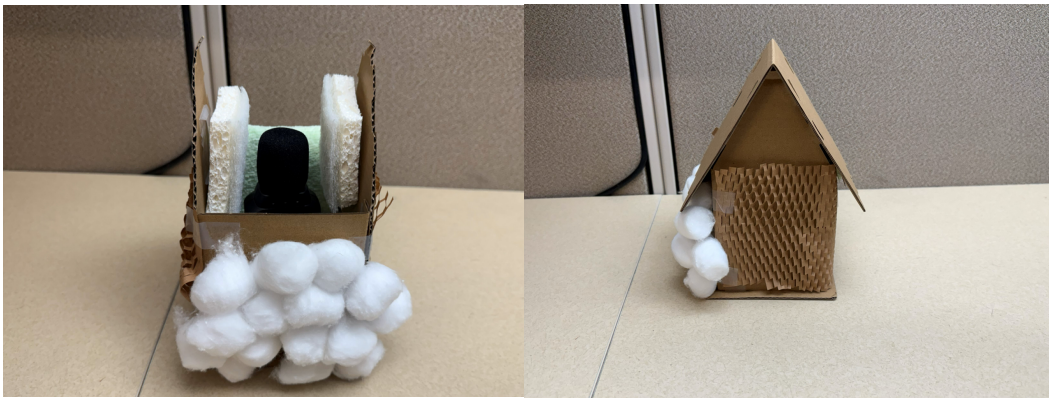
10. Turn on the sound meter with the red button and press the range button.

11. Insert the sound meter inside the house and attach the roof.



12. Provide party horns to three students and have them blow the horns at the same time.
13. Remove the roof and check the maximum dB reading.
14. Record the maximum dB reading and repeat with the remaining groups.
15. The group with the lowest score wins.

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16. Conclude with a class discussion. Based on their houses, which materials did students think soundproofed the house was the best and why? If they could do the activity again, what would they do differently? What features, in their own living spaces, seem to absorb sound well and which do not? Finally, if they were running an airport, what steps would they take to reduce the noise experienced by nearby neighbors?

Key Takeaways:

After completing this activity students will:

- Understand that sound is a vibration that can be blocked or absorbed.
- See how material choice and design affect sound transmission.
- Observe how real-world environmental challenges are solved through thoughtful design.

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