Soundproof Package
Lesson Plan

Amount of time Demo takes: 5-6 mins.
Try this at home!

Materials
- Identical small containers (ex. film canisters) (7)
- Beans
- Identical one quart containers with lids (2)
- Large bag of cotton balls
- Bubble wrap
- Tissue paper
- Quilt batting
- Styrofoam packing peanuts
- Foil
- Felt
- Paper towels
- Ziploc bags to hold materials

Set-up Instructions
1. Demo needs a full table to operate.
2. Make sure that each small container is properly labeled “Noise Maker” and that they each contain the same amount of beans.
3. Place the bags of materials, the noise makers, and the larger containers all on the table. Leave all extra materials in the bin.

SAFETY!
- Keep small parts away from small children.

Lesson’s Big Idea
- Noise can be an unwanted sound. Engineers design products and materials to protect the human ear from loud noises.
- Various materials dampen sound with different effectiveness. Which ones/what combinations will work best in this instance?

Instructional Procedure
1. Split the students into two groups - give each group a noise maker and a
large container.

2. Tell them that they will have two minutes to come up with the best way to soundproof their noise maker and apply that method.

3. After they have finished, shake each one next to your ear and declare a winner (the one whose sound you hear least).

4. If desired, have them try again to make improvements to their design.

5. Compare again and announce the final winner. Have the students take apart their containers and separate the materials back into their correct containers.

6. Have a discussion with the students about why we need to soundproof things, what works best with soundproofing, and what could have made the demo better (i.e. more materials, different materials).

**Background Information**

- Think of a wine glass or a tuning fork. When you strike them they reverberate, causing sound, which can be stopped by holding onto the glass. You may feel it vibrate slightly before the sound stops. This is because you have dampened the noise. The same idea applies here - the various materials that you wrap around the noise maker are able to dampen the noise (some better than others).

**Example Solutions**

1. First place 20 cotton balls around the noise maker. Then wrap 2 full sheets of paper towel around the cotton balls. Finally put the bundle in the large container and fill in all empty space with more cotton balls. Please keep in mind that it is extremely hard to make the noise maker completely silent.

2. Wrap noise maker in four full sheet pieces of felt and place in container.

**Assessment/sample questions you can ask**

1. What is the purpose of soundproofing?
2. When is it necessary to soundproof things?
3. What kinds of materials work best to soundproof? Why?

**Conclusion**

- Big Idea: Soundproofing materials can protect our hearing.

**Clean Up**

- Recycle as many materials as possible. Place them back into their bags for
use at another time.

- Clean up between demos if needed. When completely finished gather all materials listed for this demo and make sure everything is accounted for. If something was used up, broken, or damaged, let someone know so it can get replaced or fixed.

**References**

  - [http://familyengineering.org/](http://familyengineering.org/)
- Sound Dampening, etc.: [http://www.soundproofing101.com/soundproofing_2.htm](http://www.soundproofing101.com/soundproofing_2.htm)

**Next Generation Science Standards**

- K-5
  - 1-PS4-1
  - 4-PS3-2
- 6-8
  - MS-PS4-2
- 9-12
  - HS-PS4