



# Nutty Balloon Noisemaker

Suggested Grades: 3–8

## Activity Overview

In this activity, you will see how sound waves can be focused to increase the volume of a noise.

**Time: 10 minutes**

### Materials:

- Balloon
- Hexagonal metal nut
- Other small objects (optional)

## STEPS

1. Sound is created when molecules vibrate (move back and forth). For example, if you hit a drum with a drumstick, the head of the drum vibrates and creates the noise you hear. Likewise, if you tap a blown up balloon, the balloon vibrates and a noise is created.
2. Begin by placing the hexagonal metal nut inside the balloon as shown in Figure 1.
3. Blow up the balloon and tie the end to keep the air from escaping (see Figure 3). If you shake the balloon, you will be able to hear the nut hitting against the balloon.

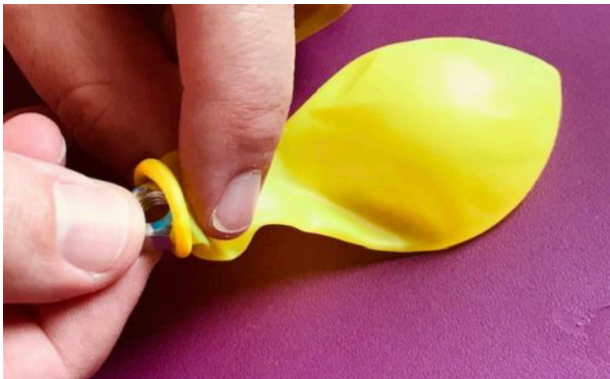


Figure 1. Place the metal nut inside the balloon.

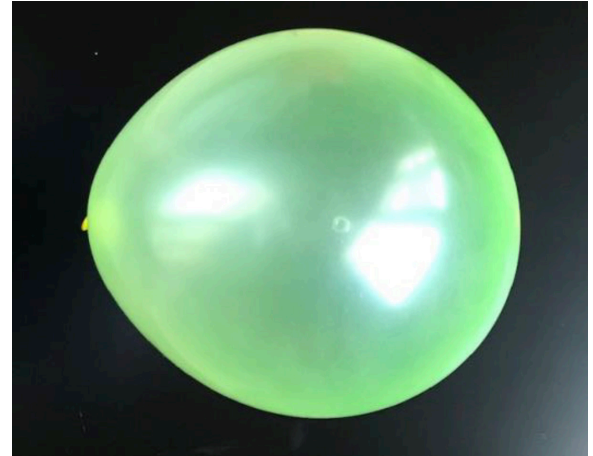


Figure 2. Inflated balloon with the nut inside.



4. Hold the balloon by the end as shown in Figure 3. Then, move the balloon in a continuous circular motion so that the nut rolls around the balloon.

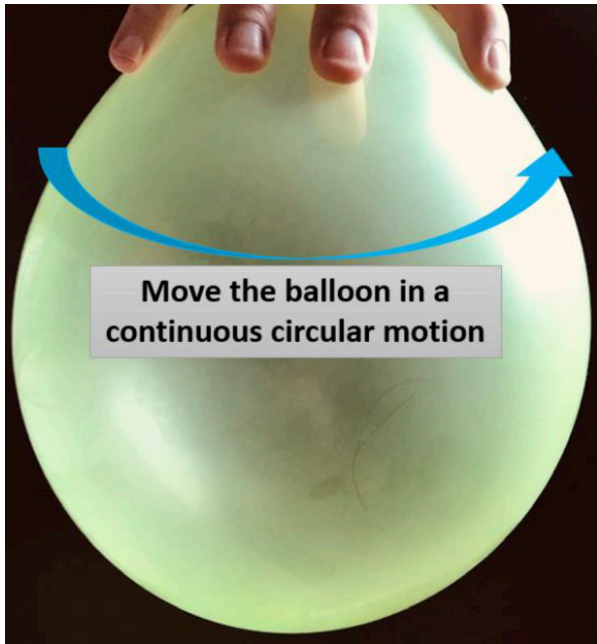


Figure 3. Move the balloon in a continuous circular motion so the nut moves around inside the balloon.

It might take a few tries getting the movement correct. You will know you are doing it correctly when you can hear a whirring noise.

5. Experiment by moving the balloon faster and slower. How does the noise change?
6. You can also try doing this experiment with other objects inside the balloon instead of the nut. Some suggestions are shown in Figure 4.

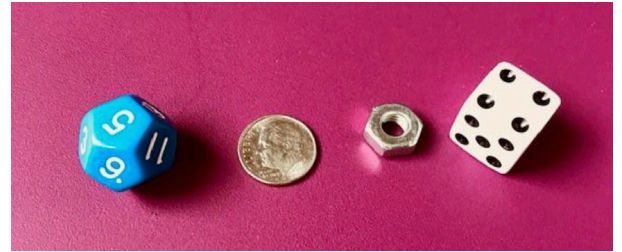


Figure 4. Try other items such as a coin or a die.

# Background Information

**Why does NASA study sound?** One of NASA's missions is to help make aircraft safer, more efficient, and more environmentally friendly. Part of making them more environmentally friendly is addressing the noise they make. The noise can impact people and animals, so NASA is working to reduce aircraft noise.

One example is the X-59 (QueSST), an airplane that flies faster than the speed of sound, or supersonic, but is much quieter than previous supersonic airplanes. In the past, supersonic flight created sonic booms (extremely loud noises that can damage property and affect people and animals). The X-59 creates a series of much quieter sonic thumps instead. The goal of the X-59 program is to demonstrate that quiet supersonic flight is possible which will hopefully lead to the easing of restrictions against supersonic flight over land.

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