



How is the Popping Noise Produced When You Pop a Balloon?

This Experiment is Provided as a Free Service to Home Educators
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The Backyard Scientist

The following experiment from the Backyard Scientist was developed expressly for use in newsletters serving home educators. This experiment is NOT contained in the award-winning *Backyard Scientist* books and science kits. As in the *Backyard Scientist* books, it is designed to be simple, fun, and of course to teach an important scientific concept.

NOTE: This can get a little messy, so it makes a good outdoor project

Gather the following supplies:

4 or more small balloons
large water-filled pail (5 gallon works well)
Access to tap water
ruler or meter stick (wood or hard plastic)
rubber band
hard-cover book
paper and pencil
pin (be careful not stick yourself or anyone else)

Begin experimenting.

1. Fill two balloons with air and tie off the neck of the balloons.
2. Fill two balloons with tap water.
3. With the pin, pop one of the air-filled balloons.
4. Submerge the second air-filled balloon in the pail of water and pop it using the same pin as above.
5. Hold one of the water-filled balloons over the pail and pop it using the same pin.
6. Place the second water-filled balloon in the pail and pop it.

Can you answer the following questions based on your observations?

1. Did the tearing of the balloon's rubber make the noise?
2. Did the rapid shrinking of the balloon's size make the noise?
3. Did the air rushing out of the balloon make the noise?
4. Is there something else that may have made the noise?
5. Will an air-filled balloon always make a popping noise when it breaks?
6. Why was there only a "glub" when the air-filled balloon was popped under water?
7. Use questions 1 through 5 for the water-filled balloons.
8. When an air-filled balloon breaks, what happens to the air that was under pressure inside the balloon?
9. Why was there so little (or no) noise when you popped the water-filled balloon?

Backyard Scientist explanation to the experiment.

The noise produced when the first balloon was popped was caused by the air under pressure in the balloon rushing out of the hole. The air rushing out also caused the latex rubber of the balloon wall to vibrate, but we could probably not hear that. Once the air was no longer under pressure in the balloon and entered the outside air, the air molecules slowed rapidly and just became part of the environment.

We did not hear a pop when the air-filled balloon was popped under water. That is because the escaping air under pressure in the balloon was rapidly slowed by the more dense water molecules. We may have heard a "glub" sound and we probably saw bubbles in the water and may have heard one or more pop at the surface.

Neither of the water-filled balloons produced sounds when they were popped. The water in the balloons was not under pressure, so it just flowed out as water normally flows and did not produce a popping sound.

The above experiment demonstrates Newton's First Law, "objects that are at rest (not moving) tend to stay at rest and objects that are not at rest (are moving) tend to not stay at rest.

Use your Internet skills to research more about Newton and his laws of physics.

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About the author. Jane Hoffman, the Backyard Scientist, is the internationally known author of the award-winning *Backyard Scientist* hands on science books and science kits. The nine science books and three kits will excite, motivate and instruct any student. Also available from the Backyard Scientist is the "Parent Guide to Teaching Science." This work covering grades K -12 helps parents insure they are teaching the science subjects and materials their students should be learning by grade level. Her newest book, *A Science Wonderland for the Very Young* targets children ages 2-7 years. In addition to writing and developing these exciting materials, Jane is a sought-after speaker at Home School and other educational conferences nationwide where she makes science come alive. Everyone leaves her sessions better informed as well as motivated and enthused to apply the concepts they learned. Hoffman's teacher inservice workshops for teachers are rated the best available by teachers and administrators. She has been serving the homeschool and educational markets with quality materials nearly 25 years. For a free brochure, send a self-addressed, stamped (\$.60) envelope to: Backyard Scientist, PO Box 16966, Irvine, CA 92623 or visit her on the Worldwide Web at: www.backyardscientist.com