

Gas Pressure – It's in the Bag!

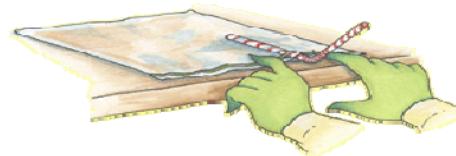
You have probably heard people talk about the pressure of a gas. One way to increase the pressure of a gas is to add more and more gas to a closed container. As more gas is added, the gas pushes harder and harder against the inside of the container. This pushing against the inside of the container is what is known as gas pressure. The more gas, the greater the push, and the more pressure. Let's see if we can use this push to lift something with air pressure.

Materials:

- Gallon sized zip closing plastic freezer bag
- Flexible plastic straw
- Book

Procedures:

1. Place the plastic bag near the edge of the table. Close the bag except for a small spot in the corner.
2. Slip a straw into the bag with the flexible end sticking out. Bend the end of the straw up as shown. Use your fingers to press down on both sides of the straw to keep air from leaking out of the bag. Now blow into the bag.



3. When the bag looks like a little pillow, take the straw out and seal the bag. Push down gently on the bag. What do you feel? As you push down on the bag, the air pressure is pushing up on your hand.



4. Let's see if we can put this pressure to work.
5. Let all the air out of the bag, and put the straw back in the bag, as before. Be sure all of the bag is sealed except for the two little places on opposite sides of the straw. Place a book on top of the bag on your desk.
6. Blow air into the bag. Use your fingers to press down on both sides of the straw to keep the air from leaking out of the bag. What happens to the book? Try lifting 2 books. How many books do you think you can lift with the power of air pressure? Try it and see!

Think about this ...

Have you ever seen a picture of an inflated air bag in a car? The way an air bag works has a lot to do with the pressure of a gas. If a car is in a head-on crash, a lot of gas blows up the air bag very quickly. The gas gives the bag enough pressure so that even though a passenger may strike the bag with a lot of force, the bag pushes back and protects the person from injury.

Try this: Inflate a zip-closing freezer bag and seal it tightly. Now seal the seal with strong tape. Lay a towel on a table and place the bag on the towel. Give the bag a gentle hit with your open hand or fist. Hit it again a bit harder. You can see that you can hit the bag with a fair amount of force and your hand will be protected from hitting the table.

Where's the Chemistry?

In "Gas Pressure- It's in the Bag", as you blow more air into the bag, the pressure increases and the amount of push on the books increases. In a similar way, the more air there is in a car's airbag, the more pressure there is. It is harder for the air bag to be pushed down, which gives the passengers more protection.



The American Chemical Society develops materials for elementary school age children to spark their interest in science and teach developmentally appropriate chemistry concepts. The *Activities for Children* collection includes hands-on activities, articles, puzzles, and games on topics related to children's everyday experiences.

The collection can be used to supplement the science curriculum, celebrate National Chemistry Week, develop Chemists Celebrate Earth Day events, invite children to give science a try at a large event, or to explore just for fun at home.

Find more activities, articles, puzzles and games at www.acs.org/kids.

Safety Tips

This activity is intended for elementary school children under the direct supervision of an adult. The American Chemical Society cannot be responsible for any accidents or injuries that may result from conducting the activities without proper supervision, from not specifically following directions, or from ignoring the cautions contained in the text.

Always:

- Work with an adult.
- Read and follow all directions for the activity.
- Read all warning labels on all materials being used.
- Wear eye protection.
- Follow safety warnings or precautions, such as wearing gloves or tying back long hair.
- Use all materials carefully, following the directions given.
- Be sure to clean up and dispose of materials properly when you are finished with an activity.
- Wash your hands well after every activity.

Never eat or drink while conducting an experiment, and be careful to keep all of the materials used away from your mouth, nose, and eyes!

Never experiment on your own!

For more detailed information on safety go to www.acs.org/education and click on "Safety Guidelines".

