

Vacuums and Suction

READ ALOUD PASSAGE

You already know that a vacuum is a space with little or no air in it, and that suction happens when air rushes toward an area of lower pressure. To understand why, it helps to picture air as huge numbers of tiny particles bouncing around and bumping into everything nearby. Air pressure is really just the result of all that bumping. Fewer particles bouncing around means fewer bumps, which means lower pressure.

You have probably felt the effects of pressure changes in your own ears. As you go up in an airplane or drive up a mountain, your ears can feel plugged up and then suddenly pop. That popping happens because the air pressure inside your ear needs to match the air pressure outside it. A narrow passage connects the inside of your ear to the back of your throat, and air moves through that passage in little bursts to equalize the pressure, which you feel and hear as a pop.

Air pressure can even be measured with a tool called a barometer. At sea level, ordinary air pressure pushes with a surprising amount of force, about fifteen pounds on every square inch. A famous old demonstration proved just how strong that pushing force really is. Scientists placed two metal hemispheres together with a vacuum inside them, and two teams of horses pulling in opposite directions could not pull them apart. It was ordinary air pressure on the outside, pushing against nothing on the inside, holding the hemispheres together the whole time.

Weather forecasters track air pressure constantly, because pressure differences are what drive the wind and shape the weather. On a weather map, areas of high pressure are marked with an H and areas of low pressure with an L. Air generally flows from high pressure toward low pressure, and watching how those H and L regions shift from day to day helps forecasters predict whether a place is headed for calm skies or a storm.

Activity 1: Word Sort Challenge

Sort the words in the box. Write each word under the right heading.

WORD BANK

narrow calm ears ordinary hemispheres horses pulling bouncing pop
barometer

Nouns

Verbs

Adjectives

Activity 2: Sentence Scramble

These words are mixed up. Put them in order to make a sentence. Start with a capital letter and end with a period.

1. the / result / is / air / really / of / all / that / bumping / just / pressure

2. lower / means / fewer / particles / fewer / bouncing / around / which / pressure / bumps, / means

Activity 3: Because, But, So

Finish the sentence three ways. After because, tell why. After but, tell something different or surprising. After so, tell what happened next.

My ears popped because

My ears popped, but

My ears popped, so

Activity 4: Match the Endings

Draw a line from each sentence start to the ending that makes sense.

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| 1. The horses could not pull the hemispheres apart because | ● | ● A. air pressure was pushing on the outside. |
| 2. The horses pulled as hard as they could, but | ● | ● B. air pressure held them together. |
| 3. There was a vacuum inside the hemispheres, so | ● | ● C. the hemispheres did not move. |