

“Egg”-cellent Air Pressure

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Adapted from the following websites:

<http://www.reachoutmichigan.org/funexperiments/agesubject/lessons/tnrcc/airpressurelesson.html>

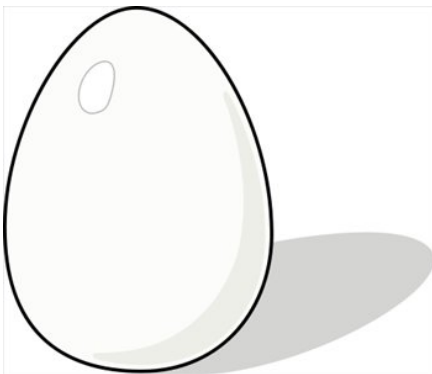
<http://www.lessonplanet.com/article/elementary-science/egg-citing-science-experiments-using-eggs>

**Note: This lesson requires an open area so the smoke from the matches does not set off the fire alarm.*

<i>Objectives</i>	<ul style="list-style-type: none"> • Students will be able to define air pressure. • Students will be able to apply air pressure to a real world situation. • Students will identify how air pressure affects objects.
<i>Materials</i>	<ul style="list-style-type: none"> • Hard-boiled eggs • Matches • Paper towel • Glass jar with opening large enough to almost let an egg pass through • Birthday candles
<i>Procedure</i>	<ol style="list-style-type: none"> 1. Introduce the lesson by having the students respond to the following questions in writing: Can an egg fit through an opening with a smaller circumference than the circumference of an egg? If so, how? 2. Have them record their prediction of what they expect to happen during the experiment. 3. Tell the students that in this experiment they will learn about air pressure. They will watch an egg fit through the top of a glass bottle. 4. Show the following video from TwitVid. How To Suck an Egg into a Bottle?

	<p>http://www.twitvid.com7goch</p> <ol style="list-style-type: none">5. Perform the same experiment in front of the class. Peel the hard boiled eggs just before doing the demonstration.6. Set a small piece of paper towel into the bottom of the bottle.7. Light a match and put this in the bottom of the bottle also.8. Place one hard-boiled egg gently on the opening of the bottle small end first. The egg may “dance” and wobble on top of the opening. Then, the egg will appear to be “sucked” into the bottle.9. Ask students to explain what happened. Allow for students to respond and guide their answers to discuss air pressure.10. Conclude as a class the following: <i>As the air was heated, it began to expand. Some of the air escaped causing the egg to wobble. When the fire was extinguished, the air began to cool and contract. The egg seals the bottle. There is less air in the bottle causing unequal pressure to occur between the air in the bottle and the air outside the bottle. The greater the air pressure on the outside pushes the egg into the bottle equalizing the air pressure inside and outside the bottle.</i>11. Ask students to define air pressure. Guide responses to conclude the following: <i>Air pushes on all surfaces that it touches. This push is called air pressure.</i>12. Perform a second experiment. This time, stick two or three birthday candles into one end of the egg.13. Quickly light all the candles and place the egg on the bottle so that the candles are inside the bottle.14. Tip the bottle upside down. The egg should be pushed up into the bottle as if defying gravity.15. Have students answer the following questions in their science journals.<ol style="list-style-type: none">a. What is air pressure?
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	<p>b. What effect does air pressure have on objects?</p> <p>c. Did the egg really defy gravity? How can this be explained?</p> <p>16. Clean up materials. Make sure matches are properly disposed.</p>
<i>Evaluation</i>	<ul style="list-style-type: none"> • Points should be awarded as follows: <ul style="list-style-type: none"> ○ Student made a clear and logical prediction. (5 points) ○ Student correctly defined air pressure. (5 points) ○ Student explained how air pressure affects objects. (5 points) ○ Student explained how egg was pushed up into the bottle when the bottle was upside down. (5 points) ○ Student was an active participant in the class discussion. (5 points) ○ Total possible points: 25 ○ Partial credit may be awarded.
<i>Standards</i>	<p>3.1.3 Keep and report records of investigations and observations* using tools, such as journals, charts, graphs, and computers.</p> <p>3.1.4 Discuss the results of investigations and consider the explanations of others.</p> <p>3.2.3 Keep a notebook that describes observations and is understandable weeks or months later.</p>



Air pressure: when air pushes on all surfaces that it touches