

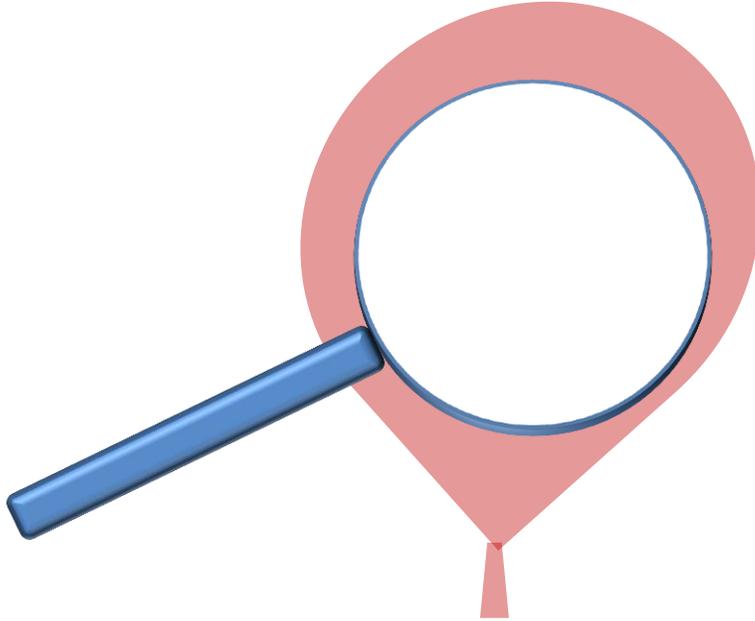
Name: \_\_\_\_\_

Grade: \_\_\_\_\_

## Inside Balloons

### Pre-lab:

- 1) If you could zoom in *really far* inside a balloon, what do you think the air inside would look like?



Use words to help describe this picture.

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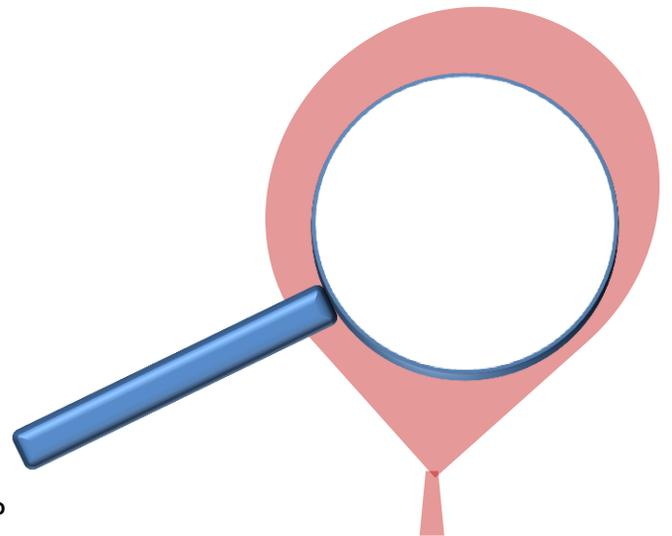
Is the air being still or is it moving?

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If you kept zooming in further and further, would it look any different?

If so, draw what you think it would look like in the picture to the right?



- 2) What do you think the word "pressure" means?

Now give an example of using "pressure" in a sentence.

- 3) Do you think air can apply pressure?

If so, how do you think it does it?

## Inside Balloons: How does air exerts pressure?

**Learning objectives:**

- Students will be able to describe and draw what air looks like at a microscopic level.
- Students will be able to explain how air applies pressure and predict how various changes affect the pressure.

**Activity:**

1. Discuss your ideas about “What the word pressure means?” with your partner. Write down your ideas after discussion.

2. Explore the **Gas Properties Simulation**.

Draw a picture of what you think the air inside this classroom looks like if you could zoom really, really close in on the air.

**Use words to help describe what is happening in this picture.**

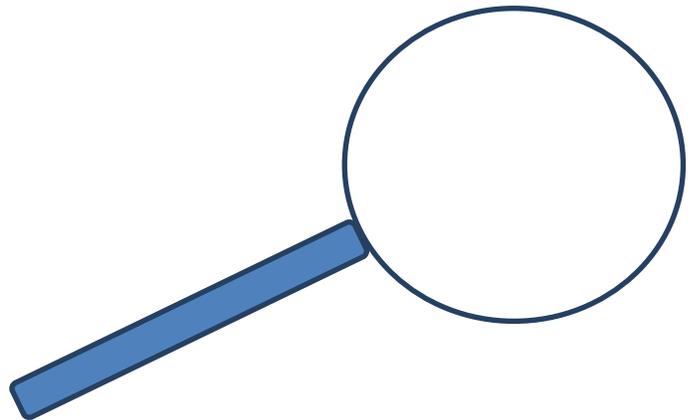
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3. The air inside a balloon will apply pressure on the walls of the balloon. The air inside the box in the Gas Properties Simulation is applying pressure on the lid.

Suppose you were inside the box in the simulation, pushing up on the lid. **How is that similar to, or different than, what the air is doing?**

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4. Balloons can pop!

How many different ways can you find to blow the top off of the container in the sim? \_\_\_\_\_

For each method (up to 3), record the **reading on the pressure gauge** when the top flew off, describe your method and your ideas about **how** the air is able to blow the top off.

Method #	Describe your method	Describe what's changed about the particles are hitting the lid
1 Pressure reading =		
2 Pressure reading =		
3 Pressure reading =		

5. Looking at your observations from Question #4, **which factors do you think affect air pressure?** Justify your answers with evidence from the simulation.

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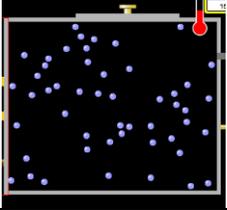
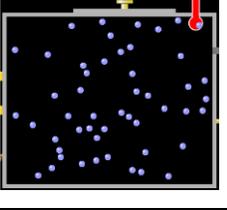
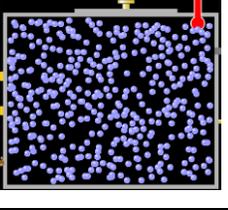
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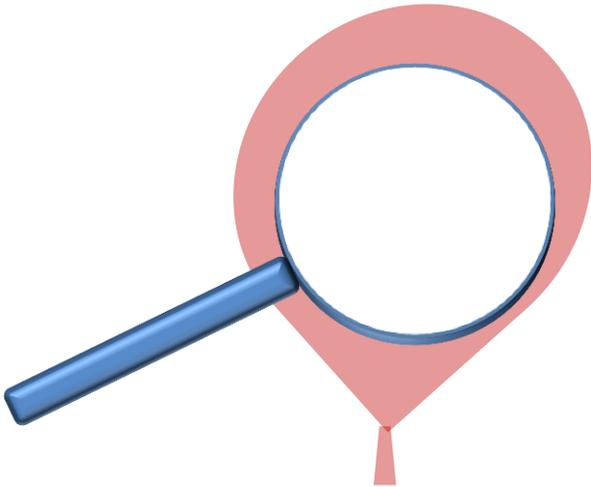
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6. Compare the 4 cases and observations about pressure below.

<b>The Comparisons</b>			
<b>Starting condition</b>	<b>Hotter particles</b>	<b>Particles in smaller box</b>	<b>More, hotter particles</b>
			
Low Temperature	High Temperature	Low Temperature	High Temperature
Regular size box	Regular size box	Half size box	Regular size box
<b>The Observations</b>			
LOW PRESSURE	MEDIUM PRESSURE	MEDIUM PRESSURE	VERY HIGH PRESSURE
			
<p>Use the simulation to develop a <u>General Explanation</u> for <u>how</u> air particles apply pressure that can explain the differences in the cases above.            Write your general explanation here:</p>			
<p>Use your general explanation to explain observations for each case:</p>			

**Inside Balloons: Post-lab:**

- 1) If you could zoom in *really far* inside a balloon, what do you think the air inside would look like?



Use words to help describe this picture.

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Is the air being still or is it moving?

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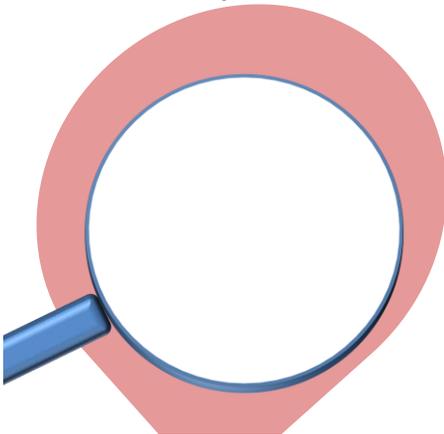
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- 2) How does the air inside the balloon apply pressure?

- 3) Two other balloons are also filled with air, but one is filled with hot air and one box is filled with cold air.

All 3 balloons are at the **SAME PRESSURE**, and the **SAME SIZE**.

If you could zoom in, what would be **different** and what would be **the same about the air inside each**? **Draw a picture and describe what is happening.**



**Room Temperature**

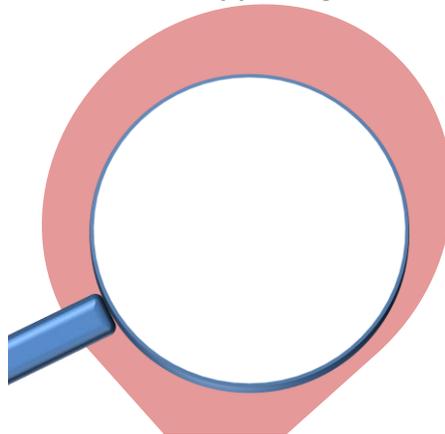
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**Filled with Hot Air**

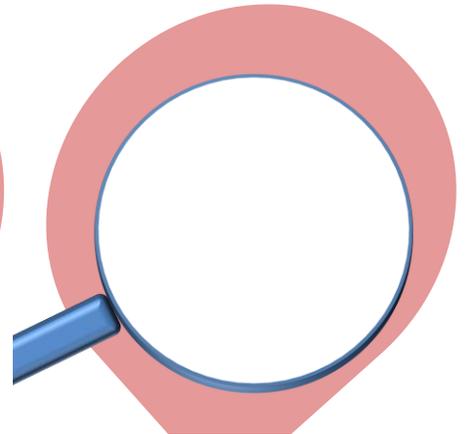
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**Filled with Cold Air**

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4) You and your classmates have a whole pile of tennis balls near a cement wall.

How could you and your classmates apply the most pressure on the wall using the tennis balls?  
(You are not allowed to touch the wall).

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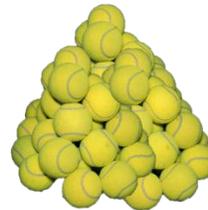
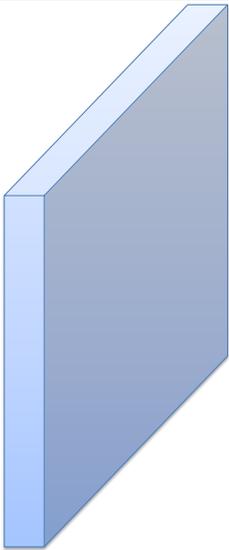
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What instructions would you give your classmates in order to achieve the most pressure?

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5) How **useful for your learning** was this science activity, compared to other science class activities?  
(circle)

More useful

About the same

Less useful

How **enjoyable** was this science class activity, compared to other science class activities? (circle)

More enjoyable

About the same

Less enjoyable

Why did you or did you not find it useful or enjoyable?

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