

**5th Grade: Lesson 1.1**  
**Activity Sheet**  
**Matter is Made of Tiny Particles**

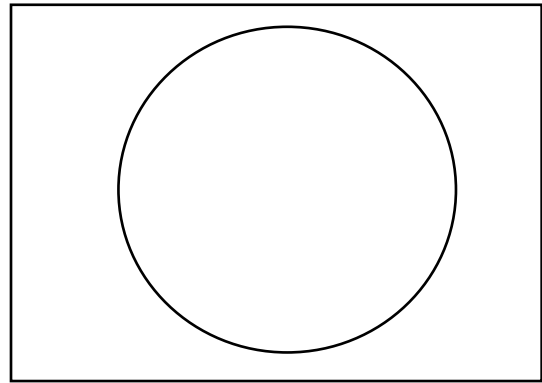
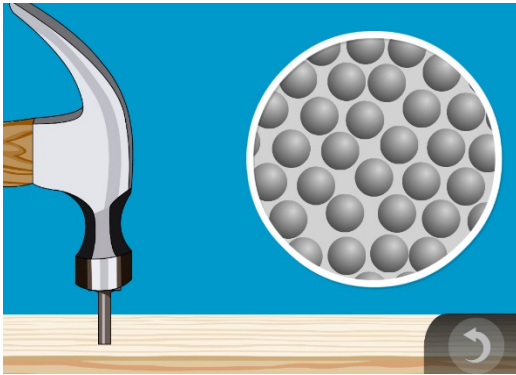
Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Safety:** Wear safety glasses or goggles, and be sure to follow all safety instructions given by your teacher. Wash your hands after completing the activity.

**INTRODUCTION**

To start the lesson, your teacher demonstrated the hardness of a hammer. You also saw an animation showing a model of the atoms that make up the solid material of the hammer.



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1. In the round area on the right, draw circles to represent the atoms or molecules in a solid. On the line underneath, write down whether the atoms are **very attracted**, **somewhat attracted**, or **not attracted** to each other.

**ACTIVITY**

**Question to investigate:**

Is an empty bottle really empty?

**Materials**

- Flexible plastic soda bottle (18–20 oz.) with cap
- Balloon

**Procedure**

1. Look at and touch the uncapped bottle.
2. Do you think the bottle is completely empty? **YES** or **NO**  
If you answered “no”, what do you think is in the bottle?



### Procedure

1. Carefully put a balloon on the top of the bottle.
2. Hold the bottle and squeeze it until you can't squeeze it any further.



### WHAT DID YOU OBSERVE?

3. What happens to the balloon when you squeeze the bottle?
4. What do you think happened to the molecules when you squeezed the bottle and the balloon expanded?

### Question to investigate

Can you force the molecules of a gas to move closer together?

### Procedure

1. Take the balloon off of the bottle and put the cap on tightly.
2. Squeeze the bottle.

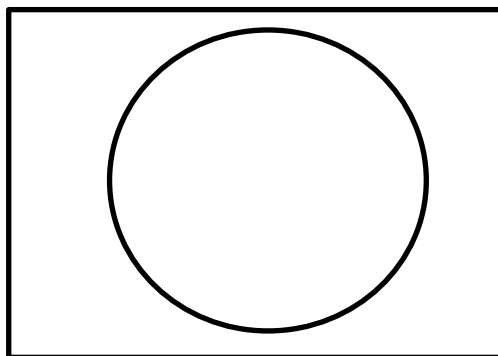


### WHAT DID YOU OBSERVE?

5. Even though the closed bottle with its cap on tight contains gas molecules, were you still able to squeeze the bottle?

### EXPLAIN IT WITH ATOMS AND MOLECULES

You saw an animation of gas in a bottle with the cap on.



6. In the round area on the right, draw circles to represent the molecules of a gas. Under the drawing, write down whether the molecules are **very attracted**, **somewhat attracted**, or **not attracted** to each other.

7. You can't squeeze solid substances like metal or rock, so what is it about the molecules of a gas that allows you to squeeze it?

### Question to investigate

Can you force the molecules of a liquid to move closer together?

#### Materials

- Flexible plastic soda bottle (18–20 oz.) with cap
- Water

#### Procedure

1. Fill the bottle with water to the very top and put the cap on securely.
2. Squeeze the bottle.

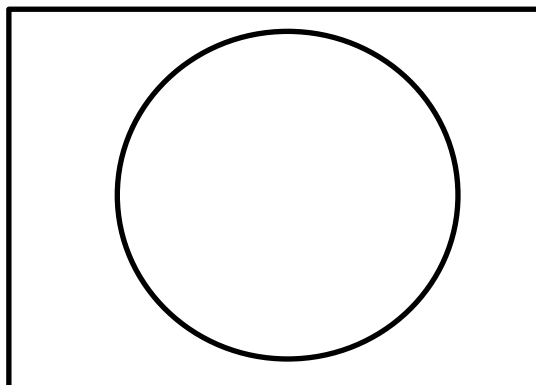


### WHAT DID YOU OBSERVE?

8. Were you able to squeeze the bottle filled with water as much as when there was only air in the bottle? **Yes** or **No**

### EXPLAIN IT WITH ATOMS AND MOLECULES

You saw an animation of water in a bottle.



9. In the empty round area on the right, draw circles to represent the molecules of a liquid. Under the drawing, write down whether the molecules of the liquid are **very attracted**, **somewhat attracted**, or **not attracted** to each other.

10. Describe how the molecules of a liquid act differently from the molecules of a gas.

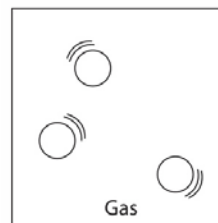
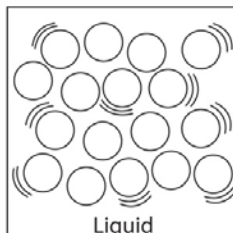
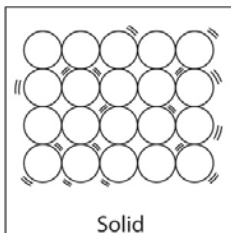
11. Thinking about your models of the molecules in a gas and a liquid, why do you think a closed bottle of gas is easier to squeeze than a closed bottle of liquid?

### TAKE IT FURTHER

You saw a demonstration in which sand was poured into a cup.

12. When sand is poured into a cup, it takes the shape of the cup. Does that make sand a liquid? **Yes** or **No**

13. If you could look at the atoms in a single grain of sand, what state of matter do you think they would look most like? **Solid**, **Liquid**, or **Gas**



14. A mound of shaving cream keeps its shape even though it is not in a container. Does that mean that shaving cream is a solid? **Yes** or **No**

15. What different states of matter are in shaving cream?

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