Lesson #1
The Science Behind a Can of Spray Paint Part 1

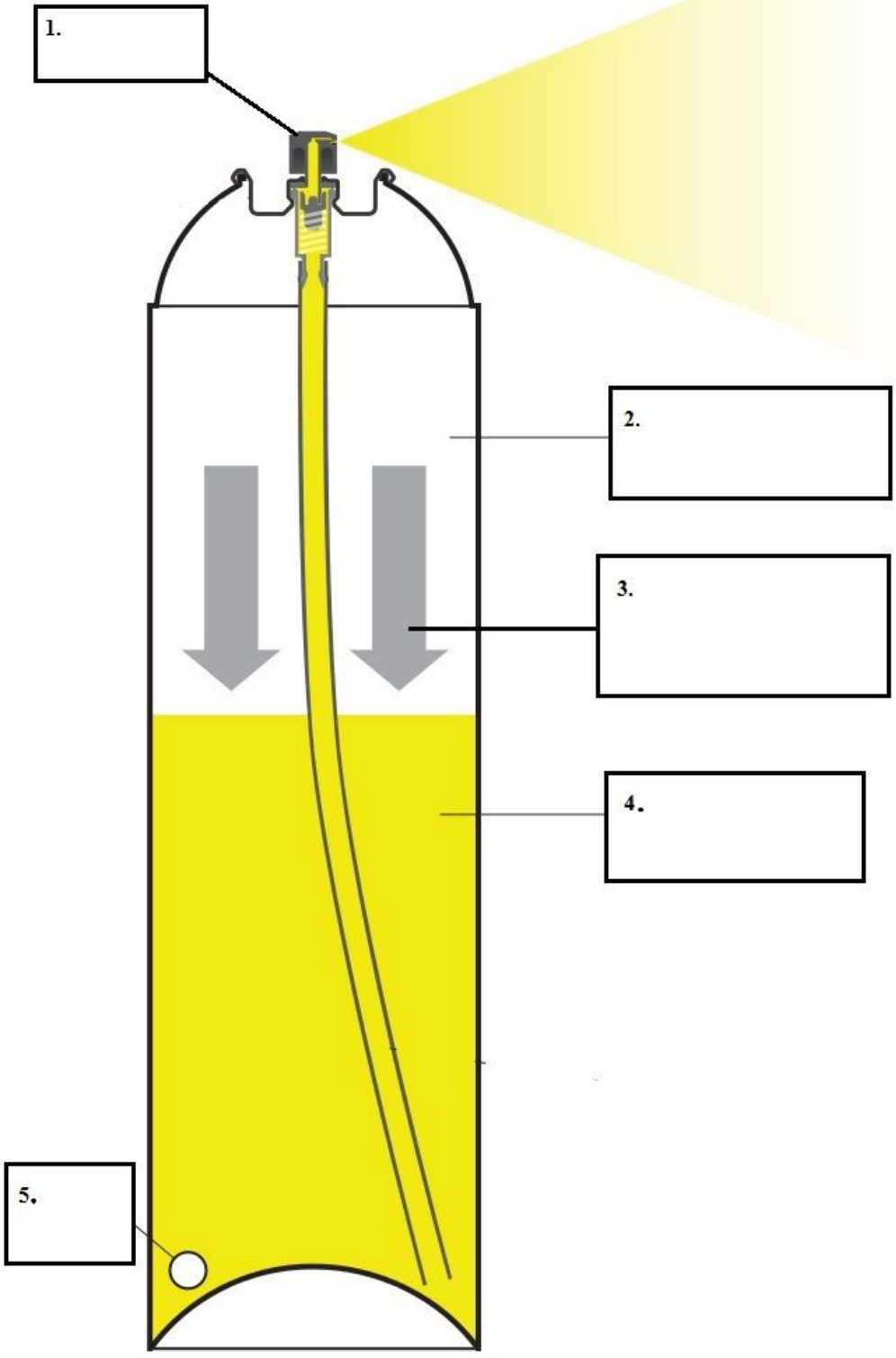
Learning Targets: Students can explain what is inside a can of spray paint and how it works.	
Understandings/Prior Knowledge: General understanding of what a Spray Paint can looks like and its function States of Matter (Gases, Solids, Liquids)	Essential Question(s): How does Spray Paint Work?

Key Understanding	Standards Addressed:
	• The changes of state that occur with variations in temperature or pressure can be described and predicted using these models of matter. (MS-PS1-4) • In a liquid, the molecules are constantly in contact with others; in a gas, they are widely spaced except when they happen to collide. In a solid, atoms are closely spaced and may vibrate in position but do not change relative locations. (MS-PS1-4)
	HA Connection:
	Strengthened Sense of Responsibility

Set-up	Classroom Set-Up: Students should be able to work in groups of 3-4 Students should have enough space to write and draw on chart paper
	Materials and Equipment Needed: Chart Paper (1 per each group of Students) Art supplies such as markers, crayons, or colored pencils Projector or whiteboard to display graphic organizer (below)

Product	RUBRIC:
	Meets
	• Students is able to explain how hydrofluorocarbons and paint are two different types of matter. • Student is able to explain how the change in pressure causes a physical reaction.

Lesson Flow	Mins	Procedure:
	20	Opening: Begin class by having students respond to the EQ: How does spray Paint work. Students can either share out to the whole class or an elbow partner. Explain to students that today they will learn how different states of **Matter** and **Pressure** make Spray Cans work. Divide Students into small groups and pass out chart paper. Project the following diagram on the board and instruct students to copy it on their own chart paper.


1.
2.
3.
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	20	Work Period After students are done creating the diagram above ask this question: "What two types of Matter are inside of a spray paint can?" Students can discuss in groups and then share out. the two types of matter are: Liquid and Gas. Refer students to box 2 and box 4. Ask to students "Which box is pointing to the liquid and which one is the gas?" Students should understand that the liquid is on the bottom, because of its characteristics and that gas will be above. Instruct students to write down in box 4: Paint Instruct students to write down in box 2: High Pressure Gas Explain to students that the gas has a higher pressure than the outside air (atmospheric pressure) and wants to escape the can. Instruct students to write down in box 1: Valve. Explain to students that this valve releases the high pressure gas once it is pressed down. Ask students "What is happening in box 3 once the gas is released?" Students can discuss this in their groups. Possible student responses might be: "The paint is pushed out with the gas" "The gas and paint mix and together they are sprayed out" "The change in pressure makes the gas expand and is forces the paint out" Have students share out and clear up any misconceptions. Instruct students to write down their response in box 3. Ask students: What is that small ball at the bottom of the can and what does it do? Students can discuss is small groups and share out.

		Instruct students to write down in box 5: Pea Explain that the purpose of the pea is to mix the paint with the gas and ensure that the paint does not settle and get lumpy.
		Closing: Students can create a list of other household items that rely on high pressure aerosol cans. Some examples might include : hairspray, cooking materials, automotive supplies, ect. Students can do this individually, in groups, or as a class.

Reflection	How will you check for understanding during instruction and how will you know if learning targets are met? Component 1F → 3D
	Checking for understanding can be done by circulating around the room and groups. The teacher can also verbally check for understanding. The teacher can also check for understanding during student presentations. Students should be able to explain their chart and use it to reference their learning for the day. Students should be able to use academic vocabulary such as matter, pressure, liquid, and gas.