States of Matter



Teacher Notes

Teacher - ____

OCM BOCES Science Center

Activity 1: What Is a Solid?(p. 13)

Students begin by determining the characteristics of a solid. They observe the shapes of two solids and measure their dimensions. They also conclude that solids change in neither size nor shape when moved from one container to another.

Vocabulary

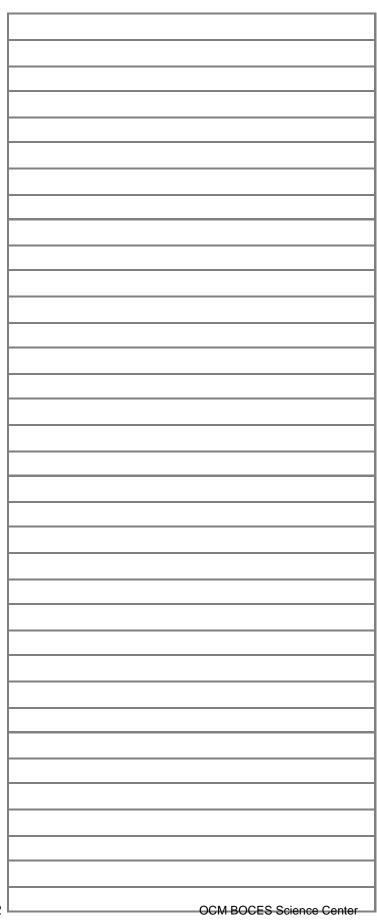
predict – to guess about what will happen based upon what you already know **property** – a characteristic of something **shape** – the form or outline of an object **size** – how big something is (volume) **solid** – matter that has a shape and size that does not easily change

Activity 2: What is a liquid?(p. 19)

Students determine the characteristics of a liquid. They pour a given amount of liquid into two different containers and conclude that a liquid changes shape but not volume when moved from one container to another.

Vocabulary

cubic centimeters – cm³, cc, a measurement of how much space something takes up (length, width and height) **liquid** – matter that easily changes shape but the volume stays the same **volume** – how much space something takes up (length, width and height)



Activity 3: What is a gas? (p. 27)

Students determine the characteristics of a gas. They demonstrate that air takes up space and identify it as a third state of matter – gas. Then they change the shape of a blown-up balloon by pressing on it. They learn that gas changes to fit the shape and the volume of its container.

Vocabulary

gas – matter that easily changes shape and volume

states of matter – the three conditions that matter can be in: solid, liquid, gas

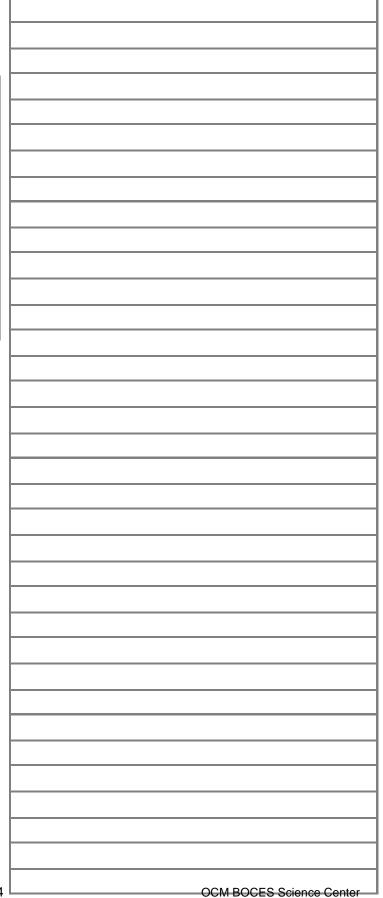


Activity 4: What is "changing state" and what affects it? (p. 35)

Students investigate melting – the change in state of matter from a solid to a liquid. They discuss the variables that affect the rate of melting and begin a Changing States chart on which they record the effect of heat on changing the states of matter.

Vocabulary

melting – changing a solid to a liquid by heating (adding energy) variable - something that is made to be different in an experiment

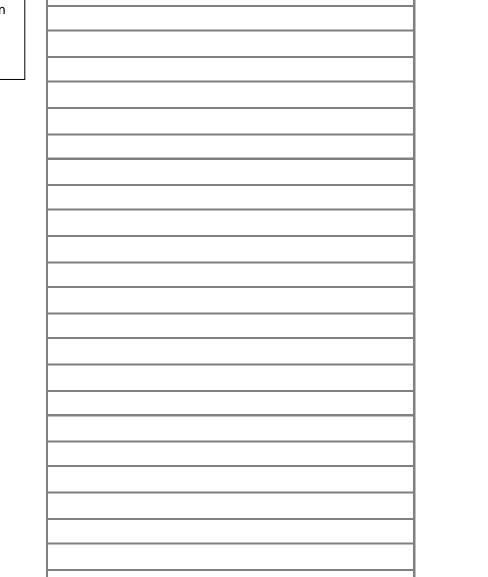


Activity 5: What can I do to change the speed of the melting of ice? (p. 41)

Students continue their investigation of melting. They suggest ways of both speeding up and slowing down the melting of ice. They then carry out experiments to test their hypotheses. Finally, students discuss variables that can affect melting and the efficiency of various insulators.

<u>Vocabulary</u>

insulation – material that can trap heat in or keep it out **insulator** – a type of material through which air or heat cannot easily pass

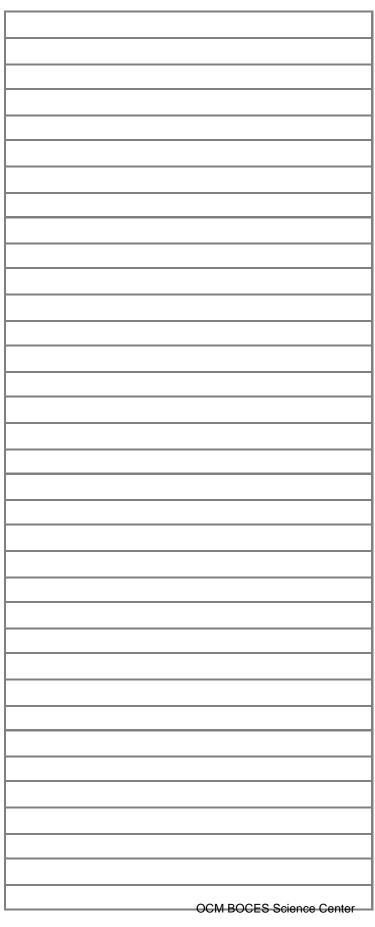


Activity 6: What is a thermometer and how do I use it? (p. 51)

Students investigate how a thermometer works and learn how to use one to measure temperature. First they observe the reaction of the liquid in a thermometer stem to both hot and cold water. They then relate the level of liquid in a thermometer stem to the numbers on a thermometer back. They identify the temperature of a substance as the level at which the red liquid in the stem stops moving.

Vocabulary

degrees Celsius – a unit scale for measuring temperature temperature – a measurement of how much energy something has (how hot or cold) thermometer – a tool used to measure temperature in degrees



Activity 7: What is the "melting point" of a substance? How do I measure it? (p. 57)

Students use their experience with thermometers to measure the melting points of ice and butyl state. After comparing the recorded melting points of ice and butyl state, they conclude that different types of matter have different melting points - that is, different temperatures.

Vocabulary

butyl sterate – a substance whose melting and freezing point is about room temperature melting point - the temperature at which a solid changes to a liquid

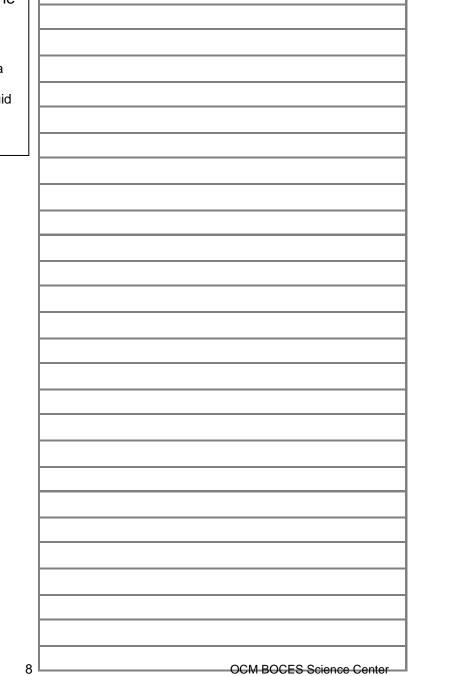


Activity 8: What do we call the process where a liquid changes to a gas? What causes a liquid to change to a gas? (p. 65)

Students investigate the change of state from gas to liquid. They infer that evaporation occurs when added heat raises the temperature of a liquid. They define boiling point and add the concept of evaporation to the Changing States chart.

Vocabulary

boiling point – the temperature at which a liquid rapidly changes to a gas evaporation – the process by which a liquid changes to a gas water vapor - water in the gas state



Activity 9: What do we call the process where a gas changes to a liquid? What causes a gas to change to a liquid? (p. 73)

Students investigate the change of state from gas to liquid. They compare water before and after it changes state and conclude that it is the same substance in both states. Students define condensation and add it to the Changing States chart.

Vocabulary

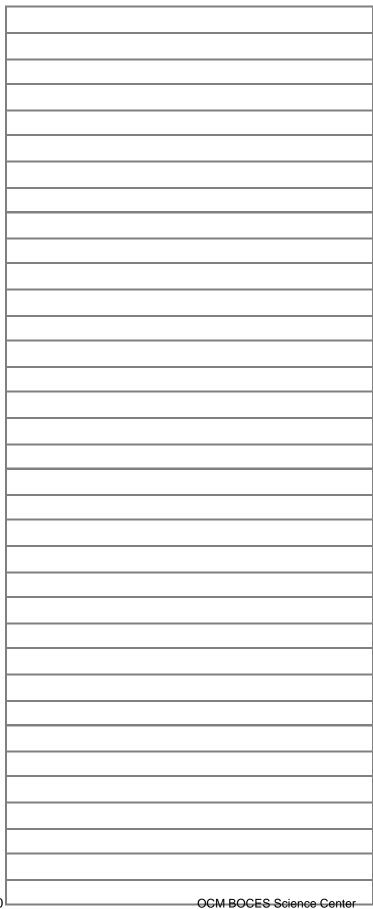
condensation – the process by which a gas changes to a liquid

Activity 10: What do we call the process where a liquid changes to a solid? What causes a liquid to change to a solid? (p. 81)

Students investigate freezing – the change of state from liquid to solid.

Vocabulary

freezing – removing energy from a liquid by lowering the temperature until it changes to a solid



Activity 11: What is the "freezing point" of a substance? (p. 89)

Students measure the temperature at which various materials freeze. They observe that not all substances freeze at the same temperature, and conclude that different types of matter have different freezing points – that is, they change state from liquid to solid at different temperatures.

Vocabulary

freezing point – the temperature at which a liquid changes to a solid

Activity 12: How is the ability of matter to change state important to us? (p. 97) Students use what they have learned about states of matter to make a tasty treat. Vocabulary

States of Matter Kit #43

Assessment for Activit

Section 1 – Hands On

Section 2 – Visual Analys

Section 3 – Critical Think

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