

MAPPING KINDERGARTEN SCIENCE INSTRUCTION

Concept: Sources of Heat

PWC Strand: Physical Science

PWC Objective: K.4.1

The student will investigate and understand different sources of heat and their effects on different objects. Key concepts include:

- the sun as Earth’s natural source of heat **(SOL 1.6a)**
- human-made sources of heat **(PWC)**
- the effects of temperature (hot and cold) on objects **(PWC)**

What Students Should Know (Critical Attributes)	What Students Should Be Able To Do (Essential Skills)
<p><u>Essential Questions:</u></p> <ul style="list-style-type: none"> • What is our major source of natural heat on Earth? • How can we make other sources of heat? • How can we warm up cold things? <p><u>Critical Attributes:</u></p> <p>1.6a Some sources of heat are natural and some are human-made.</p> <p>1.6a The sun is the Earth’s most important natural source of heat. It warms the air, water, and the land and the objects on and in the air, land, and water.</p> <p>PWC Humans make other sources of heat. A fire burning in a fireplace, a light bulb in a lamp, and heat from a furnace at home or school during the winter are all examples of heat we make.</p> <p>PWC Heat travels from warm things to cooler things. When warm things are put with cold things, the cooler ones warm up. Heat sources can warm up cool things by directly touching them or from a distance.</p>	<ul style="list-style-type: none"> • Identify the sun as the Earth’s most natural source of heat. • Give examples of heat sources humans can produce. • Explain that heat travels from warm things to cold things. • Make predictions about the effects of heat on different objects such as the effect of the sun on a snowman or the heat from an oven on cake batter.

MAPPING KINDERGARTEN SCIENCE INSTRUCTION

Concept: Describing Physical Properties of Matter

PWC Strand: Physical Science

PWC Objective: K.4.2

The student will investigate and understand that the physical properties of objects can be described. Key concepts include:

- words used to describe physical properties, including color, shape, texture, relative size, and relative weight **(SOL K.4a-d)**
- words used to describe position and speed **(SOL K.4e)**

What Students Should Know (Critical Attributes)	What Students Should Be Able To Do (Essential Skills)
<p><u>Essential Questions:</u></p> <ul style="list-style-type: none"> • What are examples of physical properties (characteristics) of objects we can observe and describe? • What are some words we can use to describe the position and speed of objects? <p><u>Critical Attributes:</u></p> <p>K.4a We can learn a great deal from observing and describing the properties of objects. Objects can have some properties that are similar to other objects and have some properties that are different from other objects.</p> <p>K.4a The physical properties we can describe about objects include their color, shape, texture, relative size, and relative weight.</p> <p>K.4b Objects can also be described according to its position relative to another object and its motion.</p>	<ul style="list-style-type: none"> • Identify and name eight basic colors, including red, orange, yellow, green, blue, and purple. <i>Note: Indigo and violet are not required at this level.</i> • Recognize “black” and “white” by name (although they are not spectral colors) • Identify and name basic shapes, including triangle, square, and rectangle. • Compare and contrast objects that are flexible, stiff, straight, and curved. • Compare and contrast textures of objects, including rough, smooth, hard, and soft. • Compare the relative size and weight of objects using the concepts of heavy/light, long/short, wide/thin, big/little, and large/small. • Compare the relative lengths of objects by measuring them using non-standard units. • Identify the position of an object using position words: over/under, in/out, above/below, left/right. • Group objects according to their speed: fast or slow.

MAPPING KINDERGARTEN SCIENCE INSTRUCTION

Concept: Properties of Water

PWC Strand: Physical Science

PWC Objective: K.4.3

The student will investigate and understand that water has properties that can be observed and tested. Key concepts include:

- states of water **(SOL K.5a)**
- effect of the amount of heat (temperature) on states of water **(SOL K.5a)**
- natural downhill flow of water **(SOL K.5b)**
- materials may float or sink in water **(SOL K.5c)**

What Students Should Know (Critical Attributes)	What Students Should Be Able To Do (Essential Skills)
<p><u>Essential Questions:</u></p> <ul style="list-style-type: none"> • What are the different states of water? • How does liquid water move? • What causes water to change from one state to another? • What do objects do when they are placed in water? <p><u>Critical Attributes:</u></p> <p>K.5a We can observe water in different states. The water we drink, swim and bathe in, and that falls to Earth as rain is <u>liquid</u>. Water can be a <u>solid</u>, like ice cubes, icicles, and snow. Water can also be a <u>gas</u>, like the steamy water vapor in the bathroom after a shower or bath.</p> <p>K.5a Changes in the amount of heat (temperature) will cause water to change from one state to another. When water heats up, it turns to a gas (steam or vapor). When water cools, it turns from liquid water to ice.</p>	<ul style="list-style-type: none"> • Identify the different states of water. • Classify examples of different states of matter as solid, liquid, or gas. • Predict how solid, liquid, and gaseous water will change in state when exposed to temperature changes.

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What Students Should Know (Critical Attributes)	What Students Should Be Able To Do (Essential Skills)
<p>K.5b When we observe liquid water, we see that it moves, or flows. When it is poured into a container, it spreads out to fill the container. When it is poured or allowed to move on its own, it flows downhill.</p> <p>K.5c When some objects are placed in water, the water supports them and they float. When some objects are placed in water, they are too heavy for the water to support, and they sink.</p>	<ul style="list-style-type: none">• Describe the natural flow of water.• Predict where a stream of water will flow when poured or allowed to move on its own. • Explain why some objects float in water while others do not.• Predict whether items will float or sink when placed in water. (Items to use include wood, metal, fruits, paper, and plastic.)

MAPPING KINDERGARTEN SCIENCE INSTRUCTION

Concept: Light and Shadows

PWC Strand: Physical Science

PWC Objective: K.4.4

The student will investigate and understand basic concepts related to light and shadows. Key concepts include:

- shadows can occur naturally (SOL K.7a)
- shadows can be produced (SOL K.7b)

What Students Should Know (Critical Attributes)

What Students Should Be Able To Do (Essential Skills)

Essential Questions:

- What is a shadow?
- How do shadows occur naturally?
- How can we produce shadows?

Critical Attributes:

- K.7a A shadow is an image of an object created when light is blocked by that object. Living and non-living things produced shadows naturally whenever sunlight is present.
- K.7b We can make shadows by using artificial light sources, such as electric light bulbs in lamps and flashlights. We can make an image of our hand on the wall by blocking the light moving between the light source and our hand.

- Explain what shadows are.
- Describe how shadows are made naturally by objects in sunlight.

- Identify and describe artificial sources of light that can produce shadows.
- Describe how to produce shadows using light sources.
- Match objects with the shadows they would create.
- Analyze how shadows change as the direction of the light source changes.

MAPPING KINDERGARTEN SCIENCE INSTRUCTION

Concept: Magnets

PWC Strand: Physical Science

PWC Objective: K.4.5

The student will investigate and understand basic characteristics of magnets. Key concepts include:

- words used to describe observations of magnets **(SOL K.3a)**
- useful applications of magnets at school and home **(SOL K.3b)**

What Students Should Know (Critical Attributes)	What Students Should Be Able To Do (Essential Skills)
<p><u>Essential Questions:</u></p> <ul style="list-style-type: none"> • What can magnets do? • What kinds of things will magnets attract? • What kinds of useful magnets can be found at school and home? <p><u>Critical Attributes:</u></p> <p>K.3a A magnet is an object that <u>pushes</u> or <u>pulls</u> other objects without touching it. A magnet that pulls an object toward it <u>attracts</u> that object. A magnet that pushes an object away is not attracted to it, and <u>repels</u> it. We can pull objects that are attracted to magnets. We can push objects away that are repelled by magnets. The force of the attraction or repulsion moves the objects without actually touching them.</p> <p>K.3a Objects that are attracted to magnets are made of certain <u>metals</u> such as iron-bearing, nickel, and cobalt. <u>Nonmetal</u> objects are not attracted to magnets.</p> <p>K.3b Because magnets attract certain metals, they can be useful at school or home. Some screwdrivers and can openers contain magnets. A magnet often found at home is a refrigerator magnet.</p>	<ul style="list-style-type: none"> • Explain what magnets are. • Explain in their own words essential vocabulary related to magnets: push/pull; attract/repel); attraction/non-attraction, and metal/nonmetal. • Predict and test which common objects will be attracted to magnets and objects not attracted to magnets. • Classify objects as being attracted or not attracted to magnets (such as an iron nail, iron-bearing paper-clip, cereal, paper). • Identify items in the home that contain a magnet or magnets such as can openers, magnetized screwdrivers, magnetic games, refrigerator magnets. • Evaluate the importance and usefulness of magnets in the home.