Grade 2 Science

Unit Title: Matter: May/June (MP 4)

Big Idea: Students explore the effect of mixing different kinds of matter and the effect of adding or taking away energy.

Investigation Questions	NGSS/ PA Core Standards	Objectives/ Lab Activities	Key Vocabulary	Reading Wonders Connection
LESSON 1: SMALL PARTS MAKE BIG THINGS Pre-Unit Assessment: Can We Build a Large Pyramid Using Small Cubes? How Can We Arrange the Same Pieces to Build Different Things?	**NGSS Standards:** **2-PS1-1:** Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties. **2-PS1-2:** Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose. **2-PS1-3:** Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object. **2-PS1-4:** Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot. **K-2-ETS1-1:** Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool. **K-2-ETS1-2:** Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem. **PA Standards:** **S.K-2.C.1.1.1** Describe basic changes to properties of matter (e.g., formation of mixtures and solutions, baking and cooking, freezing, heating, evaporating, melting). (3, 5)	Use a model to provide evidence that large structures can be made by combining small pieces. Collect evidence to prove that individual pieces can be rearranged to create structures with different shapes. Identify the specifications to build a structure.	• Different • Matter • Part • Particle • Small • Specifications • Structure • Whole	• Go Math Chapter 11
LESSON 2: WHAT'S THE MATTER What Are the Three States of Matter? Why Can't We See Particles? How Does the Motion of Particles Change? Is Gas Made of Particles?		Define the three states of matter of water. Provide evidence for the existence of particles and explain why they cannot be seen. Draw distinctions between each state of matter by explaining how its particles move.	• Evaporation • Flexible • Gas • Graduated cylinder • Invisible • Liquid • Matter • Microscope • Particle • Physical change • Solid • State of matter • Substance	• Wonders Unit 3 Week 1 • **Wonders Unit 6 Week 2**

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	3.2.2.A4 Experiment and explain what happens when two or more substances are combined (e.g. mixing, dissolving, and separated (e.g. filtering, evaporation). (3) **3.2.2.A5** Recognize that everything is made of matter. (2) **3.2.3.A1** Differentiate between properties of objects such as size, shape, and weight and properties of materials that make up the objects such as color, texture, and hardness. (4, 6) **S3.C.1.1.1** Describe matter in terms of its observable properties (e.g., weight, mass, shape, size, color, texture, state). (4, 5) **S3.C.1.1.2** Classify matter using observable physical properties (e.g., weight, mass, shape, size, color, texture, state). (4, 5) **S3.C.1.1.3** Classify a substance as a solid, liquid, or gas. (2) **S3.C.1.1.5** Describe how the properties of matter can be changed (e.g., heating, cooling, physical weathering). (5) **S3.A.3.2.1** Identify what models represent (e.g., simple maps showing mountains, valleys, lakes, and rivers; dioramas). (1) **S.K-2.A.1.1.1** Identify a scientific fact as something that can be observed using the five senses. (1, 2) **S4.A.1.1.1** Distinguish between a scientific fact and an opinion, providing clear explanations that connect observations and results (e.g., a scientific fact can be supported by making observations). (2, 3) **S.K-2.A.2.1.1** Understand that making a change to an investigation may change the outcome(s) of the investigation. (5) **S.K-2.A.2.1.2** Describe outcomes of an investigation. (4, 5) **S.K-2.A.2.2.1** Identify simple tools that can be used in an investigation (e.g., measuring cup, hand lens, ruler, balance scale, thermometer). (2) **3.2.K.A6** Planning and Carrying Out Investigations; Engaging in Argument From Evidence CCC Patterns; Cause and Effect (1)	Use balloons to draw conclusions about gases and the behavior of their particles. Construct an argument for how particle behavior changes as matter changes state.	• Water vapor	
LESSON 3: SOLIDS, LIQUIDS, AND MIXTURES What Are the Properties of Solids? What Are the Properties of Liquids? What Is a Mixture?		Determine the properties related to solids by comparing different materials. Determine the properties related to liquids by comparing different materials. Make conclusions about the properties of a material by creating a mixture. Identify physical changes that occur when matter is mixed.	• Characteristic • Fluid • Fluidity • Malleability • Mixture • Property • Viscosity	• Wonders Unit 3 Week 1 • **Wonders Unit 6 Week 2**
LESSON 4: DESCRIBING MATTER Which Physical Properties Describe These Materials? Which Is the Best Material to Build With?		Identify buoyancy as a property of matter. Test the buoyancy of different materials and make connections between the results and how the materials are used.	• Colloid • Float • Porous • Sink	• Wonders Unit 3 Week 1 • **Wonders Unit 6 Week 2**

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	3.2.K.A6 Planning and Carrying Out Investigations; Engaging in Argument From Evidence CCC Patterns; Cause and Effect; Energy and Matter (2) **3.2.K.A6** Planning and Carrying Out Investigations; Constructing Explanations and Designing solutions CCC Patterns; Cause and Effect (3) **3.2.K.A6** Analyzing and Interpreting Data; Engaging in Argument From Evidence CCC Patterns; Cause and Effect (4)	Analyze the properties of materials and identify their uses.		
LESSON 5: HEATING MATTER How Does Matter Change State? How Do Chemical Reactions Cause Identity Changes? Why Is It Important to Evaluate Design Plans?		Observe state changes to construct an argument about physical changes. Observe a chemical reaction to construct an argument about chemical changes. Distinguish physical reactions from chemical reactions by their reversibility. Analyze data to determine if a material is suited for a particular use. Evaluate learning by completing a summative assessment.	• All vocabulary from previous lessons. • Chemical change • Identity change • State change	• Wonders Unit 3 Week 1 • **Wonders Unit 6 Week 2**

Grade 2 Science

Unit Title: Ecosystem Diversity: November/ December (MP 1 & 2)				
Big Idea: An ecosystem is the living and nonliving things that interact with one another in a specific area.				
Investigation Questions	**NGSS/ PA Core Standards**	**Objectives/ Lab Activities**	**Key Vocabulary**	**Reading Wonders Connection**
LESSON 1: Organisms & Habitats What do Living Things Need? What Type of Habitat Do I Live In? What Do Plants Need to Grow?	**NGSS standards –** **2-LS2-1:** Plan and conduct an investigation to determine if plants need sunlight and water to grow. **2-LS2-2:** Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants. **2-LS4-1**: Make observations of plants and animals to compare the diversity of life in different habitats. **K-2-ETS1-2:** Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem. **K-2-ETS1-3:** Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs. **PA Standards –** **S.K-2.B.1.1.2** Identify a plant or animal based on a given life cycle stage (e.g., butterfly, frog, seed-producing plant). (2) **S.K-2.B.3.1.1** Distinguish between living and nonliving things.(1) **S.K-2.B.3.1.2** Identify plants and animals as living things.(1) **4.1.1.A** Identify and describe the basic needs of living things in a terrestrial habitat.(1, 4) **4.1.2.A.** Describe how a plant or an animal is dependent upon living and nonliving things in an aquatic habitat.(2) **4.1.2.D** Identify differences in living things (color, shape, size, etc.) and describe how adaptations are important for survival.(2) **4.1.3.D** Identify organisms that are dependent from one another in a given ecosystem. Define habitat and explain how a change in habitat affects an organism. (1, 5) **4.2.2.C** Identify and describe the basic needs of plants and	Identify the relationship between nonliving and living things. Describe the needs of living things and how they rely on their habitat to meet their needs. Distinguish habitats by their characteristics. Plan an investigation using radish seeds to determine the needs of plants.	● Characteristic ● Climate ● Diverse ● Ecosystem ● Habitat ● Living ● Nonliving ● Organism ● Photosynthesis ● Producer ● Protect ● Shelter ● Survive	● **Wonders Unit 2 All Weeks** ● Wonders Unit 6 Week 1

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LESSON 2: Plant Growth What is the Life Cycle of a Plant? Where Do Plants Grow?	animals in an aquatic ecosystem.(2) **S3.B.1.1.2** Classify living things based on their similarities and differences.(1) **S3.B.1.1.3** Describe the basic needs of plants and animals and their dependence on light, food, air, water, and shelter. (1, 4) **S3.B.2.1.1** Identify adaptations of plants and animals that have helped them to survive. (3) **S3.B.2.1.3** Identify characteristics for plant and animal survival in different environments (e.g., desert, forest, ocean). (1) **S3.B.3.1.1** Identify the living and nonliving components of an ecosystem (e.g., living [plants, animals]; nonliving [water, soil, air]). (1, 4) **S3.B.3.1.2** Describe the interactions between living and nonliving components of an ecosystem (e.g., plants [water, sunlight]; animals [air, shelter]). (1, 4) **S3.B.3.2.1** Describe what happens to an animal when its habitat is changed.(5) **S3.A.3.2.1** Identify what models represent (e.g., simple maps showing mountains, valleys, lakes, and rivers; dioramas). (4) **S.K-2.A.1.1.1** Identify a scientific fact as something that can be observed using the five senses.(2) **S4.A.1.1.1** Distinguish between a scientific fact and an opinion, providing clear explanations that connect observations and results (e.g., a scientific fact can be supported by making observations). (2, 3) **S.K-2.A.2.1.1** Understand that making a change to an investigation may change the outcome(s) of the investigation. (5) **S.K-2.A.2.1.2** Describe outcomes of an investigation.(5) **S.K-2.A.2.2.1** Identify simple tools that can be used in an investigation (e.g., measuring cup, hand lens, ruler, balance scale, thermometer).(4) **3.2.K.A6** Planning and Carrying Out Investigations; Engaging in Argument from Evidence CCC Cause and Effect; Structure and Function (1) **3.2.K.A6** Developing and Using Models; Engaging in	Describe the life cycle of plants. Examine the relationship between plants and animals. Analyze different plants to identify their habitats.	● Energy ● Food ● Plant ● Pollination ● Soil	● **Wonders Unit 2 All Weeks** ● Wonders Unit 6 Week 1
LESSON 3: Plant and Animal Interactions How Do Plants Depend on Animals? How Do Animals Help to Pollinate or Disperse Seeds?		Explain the interdependence between plants and animals. Design and build a model to simulate pollination or seed dispersal. Make connections between a habitat and challenges related to pollinating or dispersing seeds.	● Germination ● Pollination ● Reproduction ● Seed ● Seed dispersal	● **Wonders Unit 2 All Weeks** ● Wonders Unit 6 Week 1
LESSON 4: Diversity of Life Can I Design a Habitat? What Will the Pill Bugs Prefer? Where Do Pill Bugs Live?		Identify the characteristics of different habitats to define the term “diversity.” Design two model habitats to determine the preferences of a pillbug.	● Preference	● **Wonders Unit 2 All Weeks** ● Wonders Unit 4 Week 1 ● Wonders Unit 4 Week 4

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	Argument From Evidence CCC Cause and Effect; Structure and Function (2) **3.2.K.A6** Developing and Using Models; Engaging in	Communicate results to draw conclusions about the preferred habitat of a pillbug.		
LESSON 5: Relationships in an Ecosystem What Have Humans Done? What Have You Learned About Ecosystem Diversity?	Argument From Evidence; Communicating, and Evaluating Information CCC Cause and Effect; Structure and Function (3) **3.2.K.A6** Planning and Carrying Out Investigations;Obtaining, Evaluating, and Communicating Information CCC Cause and Effect; Structure and Function (4) **3.2.K.A6** Developing and Using Models; Engaging in Argument From Evidence CCC Cause and Effect (5)	Explain human impact on the distribution of resources in a habitat. Evaluate the effect of human actions on ecosystems. Revisit the interdependence of living and nonliving things to evaluate what students have learned.	● Impact ● Pollution	● **Wonders Unit 2 All Weeks**

Grade 2 Science

Unit Title: Earth Materials: February/March (MP 3)

Big Idea: Earth's surface is constantly changing.

Investigation Questions	NGSS/ PA Core Standards	Objectives/ Lab Activities	Key Vocabulary	Reading Wonders Connection
LESSON 1: WATER Pre-Unit Assessment: What Do We Know About Earth's Materials? Where's the Water? How Does Water Change on Earth? How Much of Earth Is Water and How Much Is Land?	**NGSS standards:** **2-ESS1-1:** Use information from several sources to provide evidence that Earth events can occur quickly or slowly. **2-ESS2-1:** Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land. **2-ESS2-2:** Develop a model to represent the shapes and kinds of land and bodies of water in an area. **2-ESS2-3:** Obtain information to identify where water is found on Earth and that it can be solid or liquid. **2-PS1-1:** Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties. **K-2-ETS1-1:** Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool. **K-2-ETS1-2:** Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem. **PA Standards:** **S.K-2.D.1.1.1** Identify different types of Earth materials (e.g., rock, soil, sand, pebbles). (2, 4) **S.K-2.D.1.3.1** Identify features on Earth's surface (e.g., lakes, rivers, oceans, mountains, plains, volcanoes). (1)	Begin building an age-appropriate understanding about the materials that compose Earth. Identify the uses of water and recognize its various forms. Describe how water and ice can change the shape of land through erosion. Use a map to identify different types of water sources. Use a model to identify the stages of the water cycle. Determine and graph the percentage of water compared to land.	● Condense ● Condensation ● Earth's materials ● Erosion ● Evaporate ● Evaporation ● Glacier ● Lake ● Ocean ● Precipitation ● Relief map ● River ● Temperature ● Water cycle ● Water vapor	● Wonders Unit 2 Week 3 ● Wonders Unit 3 Week 4 ● **Wonders Unit 4 All Weeks**

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LESSON 2: ROCKS What Can We Learn by Studying Rocks? Can I Make a Claim About How Landforms Change?	**S.K-2.D.1.3.2** Describe natural events that alter Earth's surface (e.g., volcanic eruptions, floods, hurricanes, earthquakes). (5) **S3.A.3.2.1** Identify what models represent (e.g., simple maps showing mountains, valleys, lakes, and rivers; dioramas).(3) **3.3.2.A4** Explore and describe that water exists in solid (ice) and liquid (water) form. Explain and illustrate evaporation and condensation. (1) **S3.C.1.1.4** Recognize and identify how water goes through phase changes (i.e., evaporation, condensation, freezing, and melting). (1) **S3.D.1.1.1** Recognize that rock is composed of different kinds of minerals. (2) **S3.D.1.1.2** Describe the composition of soil as weathered rock and decomposed organic material. (4) **S3.D.1.2.3** Describe the ways living things benefit from the uses of water resources. (1)	Make close observations using a hand lens. Use a student-designed plan to sort rocks by their characteristics. Classify rocks based on their characteristics. Recognize that some objects are made of more than one material. Use evidence and reasoning to support a claim about changes in landforms.	● Igneous rock ● Metamorphic rock ● Mineral ● Rock ● Sediment ● Sedimentary rock ● Weathering	● Wonders Unit 3 Week 4 ● **Wonders Unit 4 All Weeks**
LESSON 3: SAND What Can We Learn by Studying Sand? How Can Water Change Sand? How Can Wind Change Sand? Can We Design a Barrier to Reduce Wind Erosion?	**S3.D.1.3.1** Identify ways that cause Earth's surface to be constantly changing (e.g., wind and water erosion, contraction and expansion of surfaces). (1,3) **S3.D.1.3.2** Distinguish between ways that tear down the surface of Earth and those that build up the surface (e.g., erosion, weathering, volcanic activity, earthquakes). (3,5) **S3.D.1.3.3** Distinguish between slow and rapid changes to Earth's surface (i.e., rapid [earthquakes, volcanic activity]; slow [weathering, erosion]). (3,5) **S4.C.1.1.2** Categorize/group objects using physical characteristics. (3,4) **S.K-2.A.1.1.1** Identify a scientific fact as something that can be observed using the five senses. (1,5) **S4.A.1.1.1** Distinguish between a scientific fact and an opinion, providing clear explanations that connect observations and results (e.g., a scientific fact can be supported by making observations). (1,5) **S.K-2.A.2.1.1** Understand that making a change to an investigation may change the outcome(s) of the investigation. (6) **S.K-2.A.2.1.2** Describe outcomes of an investigation. (3)	Observe the properties of sand, and recognize that some objects are made of more than one material. Describe how sand is formed over time. Investigate the connection between water, wind, and the erosion of the materials that make up Earth's surface. Explore and design solutions to reduce wind erosion on sand dunes.	● Barrier ● Desert ● Sand ● Sand dune ● Vegetation	● Wonders Unit 2 Week 3 ● Wonders Unit 3 Week 4 ● **Wonders Unit 4 All Weeks**

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LESSON 4: SOIL What Makes Up Soil? What Can We Learn by Studying Soil? How Can Wind and Water Affect Soil?	**S.K-2.A.2.2.1** Identify simple tools that can be used in an investigation (e.g., measuring cup, hand lens, ruler, balance scale, thermometer). (1) **S.K-2.A.3.1.1** Describe a system as being made of multiple parts that work together. (1) **3.4.4.C2** Describe the engineering design process: Define a problem. Generate ideas. Select a solution and test it. Make the item. Evaluate the item. (6) **3.2.K.A6** Developing and Using Models; Obtaining, Evaluating, and Communicating Information CCC Patterns (1) **3.2.K.A6** Planning and Carrying Out Investigations; Constructing Explanations and Designing Solutions CCC Patterns; Stability and Change (2) **3.2.K.A6** Constructing Explanations and Designing Solutions CCC Cause and Effect; Stability and Change (3) **3.2.K.A6** Constructing Explanations and Designing Solutions CCC Stability and Change (4) **3.2.K.A6** Constructing Explanations and Designing Solutions; Obtaining, Evaluating, and Communicating Information CCC Patterns; Stability and Change (5) **3.2.K.A6** Constructing Explanations and Designing Solutions; Developing and Using Models; Obtaining, Evaluating, and Communicating Information CCC Patterns; Stability and Change (6)	Observe the properties of soil. Recognize that soil contains nutrients for plant growth and is composed of different materials. Analyze the components of soil obtained from the local area. Investigate the connection between water, wind, and the erosion of natural materials on Earth.	● Conserve ● Humus ● Runoff ● Soil ● Topsoil	● Wonders Unit 3 Week 4 ● **Wonders Unit 4 All Weeks**
LESSON 5: CHANGING EARTH, CHANGING LAND How Do Glaciers Change Land? How Do Rivers Change Land? How Do Earth's Natural Processes Change Land?		Investigate the connection between water, ice, and the erosion of the materials that Earth is made of. Recognize the characteristics of several landforms and how they change over time. Use a model to investigate how glaciers and rivers can change the shape of the land over time. Discuss how other naturally occurring processes on Earth, such as volcanoes and the movement of Earth's plates, can create and change landforms.	● Deposition ● Glacier ● Island ● Landform ● Volcano	● Wonders Unit 2 Week 3 ● Wonders Unit 3 Week 4 ● **Wonders Unit 4 All Weeks**

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LESSON 6: MY MODEL ISLAND Can I Make a Model to Show What I Have Learned? What Can I Share About My Model Island? What Have I Learned About Earth's Materials?		Recognize the connection between wind, water, and ice and the erosion of the materials that make up Earth's surface. Identify that some changes to landforms occur slowly, over a period of time, while others happen quickly. Create a model to explain the characteristics of landforms and the effect of erosion on those landforms. Present models and communicate information to classmates about the materials that make up Earth's surface. Evaluate learning throughout the unit, and compare that knowledge to initial ideas from the beginning of the unit.	● All vocabulary from previous lessons.	● Wonders Unit 2 Week 3 ● Wonders Unit 3 Week 4 ● **Wonders Unit 4 All Weeks**

Grade 2 Science

Unit Title: Matter: May/June (MP 4)

Big Idea: Students explore the effect of mixing different kinds of matter and the effect of adding or taking away energy.

Investigation Questions	NGSS/ PA Core Standards	Objectives/ Lab Activities	Key Vocabulary	Reading Wonders Connection
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LESSON 2: WHAT'S THE MATTER What Are the Three States of Matter? Why Can't We See Particles? How Does the Motion of Particles Change? Is Gas Made of Particles?		Define the three states of matter of water. Provide evidence for the existence of particles and explain why they cannot be seen. Draw distinctions between each state of matter by explaining how its particles move.	• Evaporation • Flexible • Gas • Graduated cylinder • Invisible • Liquid • Matter • Microscope • Particle • Physical change • Solid • State of matter • Substance	• Wonders Unit 3 Week 1 • **Wonders Unit 6 Week 2**

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LESSON 4: DESCRIBING MATTER Which Physical Properties Describe These Materials? Which Is the Best Material to Build With?		Identify buoyancy as a property of matter. Test the buoyancy of different materials and make connections between the results and how the materials are used.	• Colloid • Float • Porous • Sink	• Wonders Unit 3 Week 1 • **Wonders Unit 6 Week 2**

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LESSON 5: HEATING MATTER How Does Matter Change State? How Do Chemical Reactions Cause Identity Changes? Why Is It Important to Evaluate Design Plans?		Observe state changes to construct an argument about physical changes. Observe a chemical reaction to construct an argument about chemical changes. Distinguish physical reactions from chemical reactions by their reversibility. Analyze data to determine if a material is suited for a particular use. Evaluate learning by completing a summative assessment.	• All vocabulary from previous lessons. • Chemical change • Identity change • State change	• Wonders Unit 3 Week 1 • **Wonders Unit 6 Week 2**