Grade 2 Planning Guide

Kindergarten Planning Guide | Grade 1 Planning Guide | Grade 2 Planning Guide
Grade 3 Planning Guide | Grade 4 Planning Guide | Grade 5 Planning Guide
Combined K-5 Planning Guide

What is Included in this Document?

Grade Level Pacing Guides
The Pacing Guide is a resource to support your year-long planning. The units can be taught in any order. In most units, the lessons build on one another. Therefore, we strongly recommend the lessons within each unit are taught in the sequence they are presented. Extensions are available for each lesson and offer an opportunity for students to continue their science content learning. They include assessments and a curated collection of additional activity suggestions, online resources, project ideas, and readings.

Mystery Science - NGSS Alignment
Mystery Science is aligned to the Next Generation Science Standards (NGSS). Each lesson is aligned to a topic, performance expectation, science and engineering practice, disciplinary core idea, and crosscutting concept. This document explains how each lesson is aligned to the Next Generation Science Standards.

Generate Activity Supply Lists
To make planning easier, you can generate supply lists by grade, classroom, unit, or lesson using our Supply Calculator.

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Grade 2

Mystery Science recommends teaching the lessons within each unit in the order they are presented. The units themselves can be taught in any order. The lesson (exploration & activity) is designed to take an hour per week. Extensions can expand upon each lesson.

	Animal Adventures (3-6 weeks)	Plant Adventures (5-10 weeks)	Work of Water (4-8 weeks)	Material Magic (5-10 weeks)
Week 1	Lesson 1: How many different kinds of animals are there? ***(2-LS4-1)***	Lesson 1: How did a tree travel halfway around the world? ***(2-LS2-2)***	Lesson 1: If you floated down a river, where would you end up? ***(2-ESS2-2 and 2-ESS2-3)***	Lesson 1: Why do we wear clothes ***(2-PS1-1, 2-PS1-2, K-2-ETS1-2, and K-2-ETS1-3)***
Week 2	Lesson 2: Why do frogs say “ribbit”? ***(2-LS4-1)***	Lesson 2: Could a plant survive without light? ***(2-LS2-1)***	Lesson 2: Why is there sand at the beach? ***(2-ESS2-2)***	Lesson 2: Can you really fry an egg on a hot sidewalk? ***(2-PS1-1 and 2-PS1-2)***
Week 3	Lesson 3: How could you get more birds to visit a bird feeder? ***(2-LS4-1, K-2-ETS1-1, K-2-ETS1-2, K-2-ETS1-3)***	Lesson 3: Why do trees grow so tall? ***(2-LS2-1)***	Lesson 3: What’s strong enough to make a canyon? ***(2-ESS1-1, 2-ESS2-1 and 2-ESS2-2)***	Lesson 3: Why are so many toys made out of plastic? ***(2-PS1-1, 2-PS1-2 and 2-PS1-4)***
Week 4		Lesson 4: Should you water a cactus? ***(2-LS2-1 and 2-LS4-1)***	Lesson 4: How can you stop a landslide? ***(2-ESS2-1, K-2-ETS1-1, K-2-ETS1-2, K-2-ETS1-3)***	Lesson 4: What materials might be invented in the future? ***(2-PS1-1, 2-PS1-2, K-2-ETS1-2, K-2-ETS1-3)***
Week 5		Lesson 5: Where do plants grow best? ***(2-LS2-1 and 2-LS4-1)***		Lesson 5: Could you build a house out of paper? ***(2-PS1-1, 2-PS1-3, K-2-ETS1-2, K-2-ETS1-3)***

Lesson Extensions. Extensions are available for each lesson and offer an opportunity for students to continue their science content learning. They include assessments and a curated collection of additional activity suggestions, online resources, project ideas, and readings.

More Science each week	Longer Science units	Cross Curricular Integration
Use items from the Extensions if you have more time.	Add a week after each lesson to teach items from the Extensions.	If you want to extend the lesson during literacy time, use reading and writing Extensions.

Animal Adventures (3-6 weeks)

Biodiversity

Grade 2 Mystery Science & NGSS Alignment - Life Science (LS)

In this unit, students begin to develop an understanding of the world's animal biodiversity. They explore animal classification and the traits that define each group. Students then turn their focus to habitats and how the surrounding environment affects what organisms live in a particular environment.

Grade 2 Life Science	Performance Expectations	Focus	Disciplinary Core Ideas (DCIs) (Lesson Conceptual Flow)	Scientific & Engineering Practices (SEPs)	Crosscutting Concepts (CCC)
Lesson 1 How many different kinds of animals are there?	2-LS4-1	Biodiversity & Classification	There are *so many* different kinds of animals--even today, we haven't discovered all of them! Before it was easy to travel and visit each other's continents, people only knew about the types of animals from where they grew up. Early scientists eventually started exploring different places and learning about new animals. They discovered the wide variety of living things in habitats, called biodiversity. Scientists organized the animals they discovered into groups based on their shared characteristics. **DCI: LS4.D**	Students **evaluate and communicate information** by sorting animals based on their traits and explaining their choices. Then, students sort the animals based on the traits scientists use to classify the animals as mammals, birds, reptiles, and invertebrates. Students determine which group 'challenge animals' belong to, based on their characteristics.	Students identify **patterns** in animal's characteristics in order to group them.
Lesson 2 Why do frogs say "ribbit"?	2-LS4-1	Biodiversity, Species, & Habitats	Frogs are a really neat example of the biodiversity in North America! In just one habitat, there can be many different frog species. Scientists study frog biodiversity by analyzing the different frog sounds they hear in a habitat--each frog species has a unique call. The variety of frog species in a habitat, depends on the amount of resources a habitat has. The more resources, the more types of frogs! **DCI: LS4.D**	Students listen to a variety of frog calls, then **analyze** the sounds from two different habitats to determine which frogs are there. They then construct an **argument from evidence** about which habitat is more biodiverse based on the amount of different frog calls.	Students identify **patterns** in frog calls in order to determine how biodiverse a habitat is.
Lesson 3 How could you get more birds to visit a bird feeder?	2-LS4-1 K-2-ETS1-1 K-2-ETS1-2 K-2-ETS1-3	Biodiversity & Engineering	Not all bird feeders are created equally! Bird feeders come in all shapes, sizes, and colors--they even hold different types of food. Different bird feeders attract different bird species. People like to see different birds up close, so engineers designed bird feeders to help solve this problem. There are so many different bird feeders and each one has strengths and weaknesses, depending on what type of bird you want to attract! **DCI: LS4.D**	Students **define a problem** by stating which type of bird they want to design a bird feeder for, and what its needs are. Each student **designs a solution** by comparing multiple sketches and **developing a model** of a bird feeder that best meets the needs of the bird they want to attract. Students reflect on how to improve their prototype.	Students explore the **cause and effect** relationship between bird feeder design and the type of food in it and the types of birds that visit it.

Plant Adventures (6-12 weeks)

Structure, Function & Adaptations

Grade 2 Mystery Science & NGSS Alignment - Life Science (LS)

In this unit, students continue to explore the needs of plants through hands-on investigations. They explore why and how plants disperse their seeds, what those seeds need in order to grow, and what the adult plants need in order to survive and thrive.

Grade 2 Life Science	Performance Expectations	Focus	Disciplinary Core Ideas (DCIs) (Lesson Conceptual Flow)	Scientific & Engineering Practices (SEPs)	Crosscutting Concepts (CCC)
Lesson 1 How did a tree travel halfway around the world?	2-LS2-2	Seed Dispersal	Many plants start as seeds! There are a lot of different types of seeds, all with unique shapes. In order for more plants to grow, seeds need to move away from the parent plant and grow into a new plant. Plants depend on wind, water, and animals to disperse their seeds. **DCIs: LS2.A**	Students **model** seed dispersal by creating three different seed flyers. They **investigate** how each seed flyers' structure helps the seed disperse.	Students explore how the **structure** of a seed helps it disperse (**function**).
Lesson 2 Could a plant survive without light?	2-LS2-1	Water, Sunlight, & Plant Growth	When a seed is in soil, the first thing to grow are its roots. The seed needs water to grow, but does it also need soil? Making careful observations of plants that are grown with and without soil, we can observe that plants grown in soil look healthier. But can a plant survive without sunlight? Although seeds can sprout without sunlight, they need light to be healthy and survive. Plants need sunlight and water to grow. **DCIs: LS2.A**	Students **plan and carry out an investigation** to determine how light affects plant growth. They grow some radish seeds in light conditions and some radish seeds in dark conditions and then **analyze their data** through close observations of the plants after several days.	Students observe the **effects** of plants grown in the dark and in the light. They observe that when plants are grown in the dark, it **causes** them to be less healthy (and eventually those plants cannot survive).
Lesson 3 Why do trees grow so tall?	2-LS2-1	Light, Leaves, & Competition	We've learned that plants need water and minerals to survive, but they also need light! It's possible to watch plants grow *toward* light following the sun throughout the day. The leaves of a plant soak up the sun and deliver it to the rest of the plant. Trees compete for sunlight, so their leaves are at the top of the tree and they grow as tall as possible. **DCIs: LS2.A**	Students make a Grass Head and **conduct an investigation** to determine the sun's impact on the direction plants grow. **Analyzing data**, students predict growth patterns of plants.	Students consider the **effect** sunlight has on plant growth. Students analyze the role of the leaves (**structure**) in helping the plant capture sunlight (**function**).
Lesson 4 Should you water a cactus?	2-LS2-1 2-LS4-1	Adaptations & Habitat	All plants need sunlight and water to survive, but they don't need the *same* amount of them. There are plants that like shade, and live on the forest floor. There are even plants that need small amounts of water and can survive in the hot and dry desert. **DCIs: LS2.A, LS4.D**	Students **analyze the data** from their Grass Head in Lesson 3. They compare their growth pattern prediction with the actual results to determine if the grass grew in the direction of the sunlight.	Students consider the **cause and effect** relationship between a plant's needs and the habitat it survives best in. Students consider how plants have **structures** that help them survive in their environment (**function**).

(continued)

Plant Adventures (6-12 weeks)

Structure, Function & Adaptations

Grade 2 Mystery Science & NGSS Alignment - Life Sciences (LS)

Grade 2 Life Science	Performance Expectations	Focus	Disciplinary Core Ideas (DCIs) (Lesson Conceptual Flow)	Scientific & Engineering Practices (SEPs)	Crosscutting Concepts (CCC)
Lesson 5 Where do plants grow best?	2-LS2-1 2-LS4-1	Adaptations & Habitat	In order to grow a plant successfully, it's important to know its needs! We've learned that plants need different amounts of sunlight and water. If you planted a cactus in an area that got a lot of rain, it probably wouldn't survive. Knowing a plant's needs helps gardeners and farmers grow plants. **DCIs: LS2.A, LS4.D**	Students engage in a **model** simulation of a farm with different growing conditions in different areas of the farm. Students consider the needs of a plant in order to determine where it will grow best.	Students consider the **cause and effect** relationship between a plant's needs and the habitat it survives best in.

Work of Water (4-8 weeks)

Earth's Surface Processes

Grade 2 Mystery Science & NGSS Alignment - Earth & Space Science (ESS)

In this unit, students explore how water shapes the Earth's surface. Students construct and use models of mountains to demonstrate that water flows downhill, and in the process, transforms huge rocks into the tiny grains of sand we find at the beach. Students also construct and use model hills to determine the causes of erosion, and to design solutions to problems caused by erosion.

Grade 2 Earth Science	Performance Expectations	Focus	Disciplinary Core Ideas (DCIs) (Lesson Conceptual Flow)	Scientific & Engineering Practices (SEPs)	Crosscutting Concepts (CCC)
Lesson 1 If you floated down a river, where would you end up?	2-ESS2-2 2-ESS2-3	Mapping & Earth's Surface Features	Rivers are bodies of water that are moving! When we look at a map of the earth's surface, we see that big rivers empty into the ocean. Earth's surface looks flat on a map, but we know that it is actually *quite* hilly. If we looked at a map with texture we'd see that rivers begin at points of high land, flow to points of low land and then into the ocean. **DCIs: ESS2.B, ESS2.C**	Students **develop a model** of the earth's surface and **carry out an investigation** to discover how rivers flow. They **construct an explanation** about where on the earth's surface rivers start and end.	Students identify **patterns** about where rivers start and end on earth's surface.
Lesson 2 Why is there sand at the beach?	2-ESS1-1 2-ESS2-1 2-ESS2-2	Rocks, Sand, & Erosion	In the last lesson, we explored how rivers flow from high points of the earth's surface to low points and into the ocean. Oceans are usually next to sandy beaches - but how did all of that sand get there? As the rivers flow toward the ocean, rocks collide into one another causing them to break into smaller pieces. By the time those rocks reach the end of the river, they are *tiny* rocks - or sand! **DCIs: ESS1.C, *Foundational for* ESS2.A, ESS2.B**	Students **conduct an investigation by modeling** how rocks tumble through a river and break. Students **construct an explanation** for why there is sand at the beach.	Students reason about the **cause and effect** of rocks tumbling in a river (cause) and turning into sand (effect). Students begin to explore that **changes** to the earth's surface can happen slowly through the process of erosion.
Lesson 3 What's strong enough to make a canyon?	2-ESS1-1 2-ESS2-1 2-ESS2-2	Erosion, Earth's Surface, & Landforms	Water is incredibly powerful - even powerful enough to move the earth's surface! Heavy rains wash away dirt and rocks, creating canyons - this process is called erosion. Most canyons have rivers flowing from them, and as time passes the water continues to carry away dirt, rocks, and sand. Because of this, canyons continue to grow deeper and wider over time. **DCIs: ESS1.C, ESS2.A, ESS2.B, ESS2.C**	Students **conduct an investigation** by **modeling** what happens to land when it rains over and over. Students **construct an explanation** for how the water changed the land.	Students consider the **cause and effect** of how heavy rains (cause) create canyons on earth's surface (effect). Students begin to explore that **changes** to the earth's surface can happen slowly through the process of erosion.

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Work of Water (4-8 weeks)

Earth's Surface Processes

Grade 2 Mystery Science & NGSS Alignment - Earth & Space Science (ESS)

Grade 2 Earth Science	Performance Expectations	Focus	Disciplinary Core Ideas (DCIs) (Lesson Conceptual Flow)	Scientific & Engineering Practices (SEPs)	Crosscutting Concepts (CCC)
Lesson 4 How can you stop a landslide?	2-ESS1-1 2-ESS2-1 K-2-ETS1-1 K-2-ETS1-2 K-2-ETS1-3	Erosion & Engineering	Landslides - when the earth loosens and is washed away down a hill - is more likely to happen after a wildfire! The fire burns the plants, which soak up rainwater and stabilize the soil with their roots. After a heavy rain, the water loosens the soil and washes the soil away, causing a landslide. Landslides pose many dangers for people! **DCIs: ESS1.C, ESS2.A, ETS1.A, ETS1.B, ETS1.C**	Students **define the problem** that landslides create. They **design solutions** to stabilize soil and prevent landslides. Students compare their solutions and engage in argument from this evidence to determine which designs are most effective.	Students apply the concept that **changes** to earth's surface can happen rapidly during a landslide. Students mimic natural **structures** and their **functions** to create a design solution that lessens the impact of landslides.

Material Magic (5-10 weeks)

Properties & Phases of Matter

Grade 2 Mystery Science & NGSS Alignment - Physical Science (PS)

In this unit, students explore the properties of materials and matter! They describe and classify different types of materials by properties like hardness, flexibility, and absorbency, and they investigate how those properties are useful in meeting basic human needs (such as clothing and cooking). They also investigate how heating and cooling affect the properties of materials.

Grade 2 Physical Science	Performance Expectations	Focus	Disciplinary Core Ideas (DCIs) (Lesson Conceptual Flow)	Scientific & Engineering Practices (SEPs)	Crosscutting Concepts (CCC)
Lesson 1 Why do we wear clothes?	2-PS1-1 2-PS1-2 K-2-ETS1-1 K-2-ETS1-2 K-2-ETS1-3	Material Properties & Engineering	Materials have a set of unique properties that determine their use. Clothes are made of material, and we wear them to protect us. We choose clothing based on its properties. For example, if it was hot outside we would wear something light and opaque to protect us from the sun. **DCIs: PS1.A, ETS1.A, ETS1.B**	Students **define the problem** that a hat is needed to shade the sun. They **carry out an investigation** of the properties of the provided materials. Next, each student **designs a solution** by selecting materials to create a hat that blocks the sun.	Students consider the **pattern** that different materials share similar properties. Students test the **effect** a material's properties have on its function.
Lesson 2 Can you really fry an egg on a hot sidewalk?	2-PS1-1 2-PS1-2	Classify Materials, Insulators, Properties	One interesting property of materials is whether they are an insulator (a material that does not allow the movement of heat) or a conductor (a material that moves heat easily). If you know which property a material has, you can choose the best one for your purpose! **DCIs: PS1.A**	Students **carry out an investigation** to test if a material is an insulator. **Analyzing the data**, they determine which material they would use to pick up something hot.	Students consider the **pattern** that different materials share similar properties. Students test the **effect** a material's properties have on its function.
Lesson 3 Why are so many toys made out of plastic?	2-PS1-1 2-PS1-2 2-PS1-4	Heating, Cooling, & Phases of Matter	Another property of materials is if they are meltable or not. If a material is meltable, it melts into a liquid when you heat it up! All meltable material melts at different temperatures. Some may melt in your hands, while others need fire. This property is useful because you can heat a substance, melt it, pour the liquid into any mold, let it cool and harden again to make different shapes. **DCIs: PS1.A, PS1.B**	Students **conduct an investigation** to determine which type of candy will melt in hot water. **Analyzing the data**, students compare their predictions to what actually occurred. Students **engage in an argument** as to which candy to mail using **evidence** from the investigation to support their claim.	Students observe the **pattern** that different materials share similar properties. Students consider the **cause and effect** of heat being added to meltable substances. They observe that when heat (**energy**) is applied to a meltable substance (**matter**) it changes shape.

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Material Magic (5-10 weeks)

Properties & Phases of Matter

Grade 2 Mystery Science & NGSS Alignment - Physical Science (PS)

Grade 2 Physical Science	Performance Expectations	Focus	Disciplinary Core Ideas (DCIs) (Lesson Conceptual Flow)	Scientific & Engineering Practices (SEPs)	Crosscutting Concepts (CCC)
Lesson 4 What materials might be invented in the future?	2-PS1-1 2-PS1-2 K-2-ETS1-1 K-2-ETS1-2	Inventions & Engineering	Over time, inventions of materials with new properties have helped solve problems. New materials are constantly being invented and made into products that could be available in the future. **DCIs: PS1.A, ETS1.A, ETS1.B, *Foundational* ETS1.C**	Students use a new material to **design solutions** to solve a real life problem. Students **engage in an argument** for the merits of their design.	Students observe the **pattern** that different materials share similar properties. Some materials have properties that **cause** them to be better suited to a purpose. They begin to explore how the **structure** of a designed object relates to its **function**.
Lesson 5 Could you build a house out of paper?	2-PS1-1 2-PS1-3 K-2-ETS1-2 K-2-ETS1-3	Materials, Properties, & Engineering	Building materials--like wood, concrete, and steel-- all share an important property, strength. They are easy to build with because you can combine many small pieces and make a bigger structure. But those aren't the only materials you can use to build! Paper doesn't seem like it has the right properties for building--it's flexible and isn't strong. Surprisingly, you can change the properties of paper to make it stronger and a better building material. **DCIs: PS1.A, ETS1.B, ETS1.C**	Students **design a solution** to building a tall tower and a strong tower out of paper. They change the properties of paper by folding, bending and cutting paper.. Students **model** the building process by assembling small pieces in order to build an object.	Students consider that **matter**, in this case paper, can be broken into smaller pieces or change shapes. Students consider the **cause and effect** relationship between a material's properties and its uses.