

# SECOND GRADE SCIENCE CURRICULUM

## SCIENTISTS & SCIENTIFIC PROCESSES

An Introduction to Science



## States & Properties of MATTER

GRADE 2



## Exploring Ecosystems & HABITATS

GRADE 2



## LANDFORMS

Earth's Changing Land & Water

GRADE 2



## Plant & Animal Needs

GRADE 2

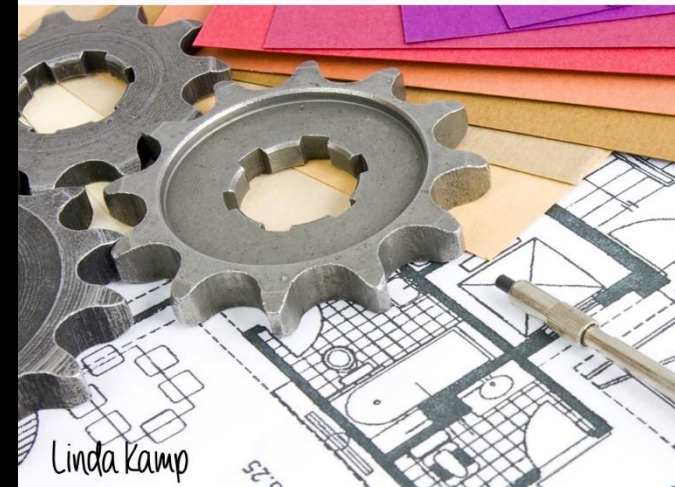
## LIFE CYCLES



## ENGINEERING

& The Engineering Design Process

GRADE 2-3



# NGSS ALIGNED BUNDLE INCLUDES:

**SCIENTISTS &  
SCIENTIFIC PROCESSES**  
An Introduction to Science



GRADES  
2-3

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States & Properties of  
**MATTER** GRADE 2



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Exploring Ecosystems &  
**HABITATS** GRADE 2



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**LANDFORMS** GRADE 2  
Earth's Changing Land & Water



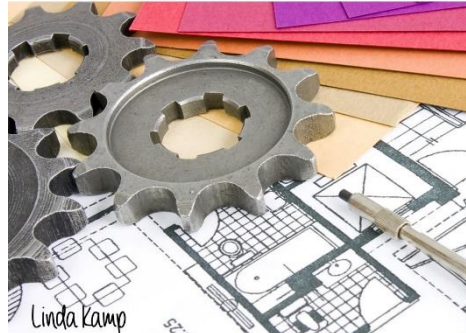
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Plant & Animal Needs  
**LIFE CYCLES** GRADE 2



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**ENGINEERING** GRADE 2-3  
& The Engineering Design Process



Linda Kamp

**6** COMPLETE  
SCIENCE UNITS

**18** WEEKS OF IN-DEPTH  
SCIENCE LESSONS

- Scientists & Science Processes
- Properties of Matter
- Landforms & Earth Changes
- Habitats & Ecosystems
- Plant & Animal Life Cycles
- Engineering Design

# DETAILED, SCRIPTED LESSON PLANS

## EACH LESSON PLAN FEATURES:

- Lesson objectives
- Guiding questions
- Materials list
- Lesson vocabulary
- Scripted procedures & closing questions
- Partner talk
- Journal activity
- Assessment options
- Investigation
- Lesson video links
- NGSS alignment



### Lesson 5

## Investigation 5: How Do Ocean Waves Affect A Shoreline?

TEACHER GUIDE

**QUESTION:** How do ocean waves affect a shoreline? How do they change the shape of the shoreline?

**OBJECTIVE:** Students will show how ocean waves affect a shoreline.

### MATERIALS

Per group:  
-plastic container  
-paint roller  
-sand  
-plastic spoon  
-water  
-lighthouse cutout  
-lab sheet

### Instruct:

"Today you will be building a lighthouse. Show your work."

Give students about a 120 second timer and explain the lighthouse cutout.

### Procedure:

1. Place student groups at their lab stations.
2. Fill the container with 3 inches of sand.
3. Fill the container with water.
4. Observe the lighthouse cutout.
5. Using the paint roller, create a lighthouse on the sand.
6. Continue to observe the lighthouse as you add more sand.

### Optional extension:

Provide students with a lighthouse cutout. Ask students to create a lighthouse on the sand.

2-ESS2-1: Earth and space science designed to build on students' prior knowledge of Earth and space science from kindergarten through grade 1.

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### Lesson 5

## LANDFORMS: EARTH'S CHANGING LAND & WATER

TEACHER GUIDE

## Slow Changes on Earth

**OBJECTIVE:** I can identify earth changes that happen slowly. I can explain how wind and water change the shape of the land.

**GUIDING QUESTIONS:** What processes change the Earth slowly?

**VOCABULARY:** erosion, deposition, weathering

### LESSON:

1. Set the purpose for the lesson by introducing the learning target. "Today we are going to learn about changes to the Earth that happen slowly, and how wind and water slowly change the shape of the Earth's land."
2. Use the posters or cards to introduce lesson vocabulary. Pause to note new vocabulary as you come to them in the lesson slides.
3. Work through the Lesson 5 Power Point slides pausing to discuss the processes that cause the slow changes depicted in each slide. Help students to understand that these changes can take millions of years. Explain to students that mountains are formed by layers of rock deep under the Earth's surface pushing upward in big folds, much like a blanket. (You may wish to bring in a few hand towels to do a quick demonstration of how mountains form. Layer the towels flat on a table, place your hands on opposite sides of the pile of towels, then push them gently inward to create folds.)
4. Pair students to complete the Talk About It activities in the PowerPoint.
5. Support the lesson by showing students the Lesson 5 videos about weathering, erosion, and deposition.

**WRAP UP:** Revisit the learning objectives and call on students to answer the guiding questions. Ask students, "How can changes, like weathering and erosion, affect towns along a coastline?"

**INDEPENDENT PRACTICE:** Students complete the Lesson 5 Write About It in their science journals.

**INVESTIGATION:** Lesson 5: How Do Ocean Waves Affect a Shoreline?

**ASSESSMENT:** Students complete Lesson 5 Quick Check

### MATERIALS:

-Teaching Power Point  
-Science journals  
-Vocabulary cards-  
Lesson 5 Quick Check  
-Lesson 5 Investigation  
\*See teacher notes for materials



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# 6 TEACHING POWERPOINTS



Lesson 6:  
Animals Rely on Plants

Over 90 engaging lessons with multiple components

## LESSON 6 TALK ABOUT IT

## Animals Rely on Plants

Talk with your partner about ways animals depend on plants.



What do animals need that plants provide?

## LESSON 6 JOURNAL

## Write About It

Complete Lesson 6 in your science journal.



## LESSON 6 INVESTIGATE

## How do plants create oxygen?

### QUESTION:

How can you show a plant creating oxygen?

Plants create oxygen for animals and humans to breathe. Investigate how you can see a



Animals depend on plants for shelter.

Birds use parts of plants, such as twigs and grass to build nests. Some smaller animals, like

Animals depend on plants for oxygen.

Animals depend on plants for food.

Animals depend on plants for shelter.

Beavers depend on plants to build their dams.

Animals depend on plants for food.



Koala with her baby

Some animals eat only one kind of plant. Pandas eat only bamboo leaves. Koalas eat only

# 36 HANDS-ON EXPERIMENTS & STEM LABS

Students plan AND conduct experiments

- build models
- design solutions
- test hypotheses

**Investigation 3 Evaluate A Design**  
Lesson 3

**QUESTION:** How do materials and shape make a design better?  
**OBJECTIVE:** Students analyze and evaluate the design features of a pair of scissors.

**Investigation 5 Biomimicry: Build a Model**  
Lesson 5

**QUESTION:** How can you model an example of biomimicry?  
**OBJECTIVE:** Students will make a model of a man-made object with features inspired by nature.

**Investigation 1 Make a Blueprint**  
Lesson 1

**QUESTION:** How can you make a blueprint of an object?  
**OBJECTIVE:** Students will draw a labeled blueprint.

**Investigation 2A: Lab Procedure**  
Lesson 2

Plant & Animal Needs LIFE CYCLES

**QUESTION:** How do plants live in the dark?  
**OBJECTIVE:** Students will observe and record the growth of plants in different light conditions.

**Investigation 1 Lab Procedure**  
Lesson 1

Plant & Animal Needs LIFE CYCLES

**QUESTION:** How do plants live in the dark?  
**OBJECTIVE:** Students will observe and record the growth of plants in different light conditions.

**Investigation 3 Collecting Data From Pictures**  
Lesson 3

Plant & Animal Needs LIFE CYCLES

**QUESTION:** What data can I collect about an animal's needs from a picture?  
**OBJECTIVE:** Students will gather and organize data from pictures.

**Investigation 1 What's Inside a Seed?**  
Lesson 1

Plant & Animal Needs LIFE CYCLES

**QUESTION:** How do the parts of a seed help a plant grow?  
**OBJECTIVE:** Students will diagram the inside of a seed and explain the function of each part.

**MATERIALS:** bag of large lima beans (2-3 beans per student), paper towels, hand lenses, rulers, lab sheets

**PREP:** Soak lima beans for 5-7 minutes in water to soften each student to have 2-3 beans. Students only need to have extra. Some beans will split or not open easily.

**Investigation 4 Do Animals Move Seeds?**  
Lesson 4

Plant & Animal Needs LIFE CYCLES

**QUESTION:** How do animals move seeds?  
**OBJECTIVE:** Students will observe and record the movement of seeds by different animals.

**Investigation 2 Can plants grow without sunlight?**  
Lesson 2

Plant & Animal Needs LIFE CYCLES

**QUESTION:** How do plants live in the dark?  
**OBJECTIVE:** Students will observe and record the growth of plants in different light conditions.

**Investigation 5 BUILD A MODEL WATER PLANT**  
Lesson 5

**QUESTION:** How do water plants adapt to their habitats?  
**OBJECTIVE:** Students will design and build a model of a water plant. Students will explain that plants need certain adaptations to live in water.

**MATERIALS:** Gather materials for students to choose from. Any of these can be used: -clay, -gravel, -pipe cleaners, -straws, -twine, yarn, or string for roots, -green foam craft sheets, -scrap paper, -paper clips, -stapler, -craft glue

**PROCEDURE:** 1. Explain to students that they will build a model of a water plant. Review and discuss adaptations of water plants and remind students to include those when designing their models. 2. Students choose a water plant, identify the adaptations they want to show and draw a design on their lab sheet labeling the parts.

**Investigation 6 Lab Procedure**  
Lesson 6

Plant & Animal Needs LIFE CYCLES

**QUESTION:** How do plants live in the dark?  
**OBJECTIVE:** Students will observe and record the growth of plants in different light conditions.

**Investigation 5B Pollination Demonstration**  
Lesson 5

Plant & Animal Needs LIFE CYCLES

**QUESTION:** How do animals pollinate plants?  
**OBJECTIVE:** Students will build a model of a pollinator to demonstrate it pollinating plants.

**MATERIALS:** -mac & cheese powder (1/3 pack per 3-4 students), -craft sticks, -craft glue, -markers, -hand lens, -pipe cleaners, -optional wiggly eyes, -colored paper or coffee filters for wings, -lg. and sm. flower templates, -lab sheet for each student

**DESIGN:** Choose a pollinator and draw your design. 2. Draw and label your sketch. 3. Explain your design to your class.

**INVESTIGATION:** 1. Review the pollination slides in lesson 5 if needed. Ask students to recall

**Investigation 2 Testing Flexibility**  
Lesson 2

TEACHER GUIDE

**QUESTION:** How do objects test for flexibility?  
**OBJECTIVE:** Students will plan and carry out an experiment to test objects for flexibility. Record science observations to identify observable properties.

**MATERIALS:** -rubber band, -plastic spoon, -metal spoon, -drinking straw

**Investigation 5 Exploration**  
Lesson 5

TEACHER GUIDE

**QUESTION:** How do objects test for flexibility?  
**OBJECTIVE:** Students will plan and carry out an experiment to test objects for flexibility. Record science observations to identify observable properties.

**MATERIALS:** -rubber band, -plastic spoon, -metal spoon, -drinking straw

**Investigation 3 Design a Toy Using a Solid, Liquid & Gas**  
Lesson 3

TEACHER GUIDE

**QUESTION:** How can you use a solid, liquid and a gas to make a toy?  
**OBJECTIVE:** Students will design a solution to a problem. Students will design a toy using specific materials.

**MATERIALS:** Provide a variety of materials for building: masking tape, craft sticks, toothpicks, pipe cleaners, building blocks, clay, bubble wrap, small balloons, liquid glue, scissors

**TEACHER NOTE:** If time allows, have students build their designs with the above materials. Otherwise have students draw & design a toy using materials pictured in the Power Point slide.

**PROCEDURE:** Show students the videos: How Toys Are Made or Where Toys Come From (see Media page for links) to set the purpose and provide context for the investigation. Tell students, "Today we are going to take a toy challenge. The challenge is to make a toy out of a solid, a liquid, and a gas." Explain to students this engineering practice: "You design a solution when you plan to build or make

**Investigation 1 Describing Matter Cracker Lab**  
Lesson 1

TEACHER GUIDE

**QUESTION:** How do you describe matter?  
**OBJECTIVE:** Students will describe matter by its properties.

**MATERIALS:** -crackers in various shapes and sizes, -napkin, or -lab sheet

**PROCEDURE:** Students will look closely at different types of crackers to identify their features. Remember that features can be size, shape, color and the crackers may have similar features, some may be different.

**TEACHER NOTE:** Explain to students this engineering practice: "You design a solution when you plan to build or make

# INTRO SLIDES FOR EACH LAB



Plant & Animal Needs LIFE CYCLES

## TEACHER GUIDE

### Lesson 5

## Investigation 5B Pollination Demonstration

**QUESTION:** How do animals pollinate plants?

**OBJECTIVE:** Students will build a model of a pollinator to demonstrate it pollinating plants.

### MATERIALS:

- mac & cheese powder (1/3 pack per 3-4 students)
- craft sticks -craft glue
- markers -hand lens
- pipe cleaners
- optional wiggly eyes
- colored paper or coffee filters for wings
- lg. and sm. flower templates
- lab sheet for each student



### INVESTIGATION:

1. Review the pollination slides in lesson 5 if needed. Ask students to recall some of the pollinators they saw in the lesson slides.
2. Explain to students, **“Scientists and engineers often make models to understand how something works.”** **“Today you will design and build a model that shows how an animal or insect pollinates a plant.”** **“First, you will choose materials and make a pollinator. Then you will use that model to demonstrate how the animal or insect pollinates plants.”**
3. Provide the materials for students to make their models. Guide students to use the pipe cleaners for legs and to understand how they are similar to the legs of the actual insect. (Example: The pipe cleaners are fuzzy like an insect’s legs.)
4. Students work through the steps of the demonstration on the lab sheet and record what they observe.

**2-LS2-2** Develop a model that mimics the function of an animal in pollinating plants.

**SEP.2** Developing and Using Models

**K-2-EST1-2** Develop a simple sketch, physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

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## Science & engineering practices embedded in each lesson



## LESSON 5B INVESTIGATE

## Pollination Power

### QUESTION:

## How can you model pollination?

Think about how pollinators help plants. Create a model showing how an animal or insect pollinates a plant.



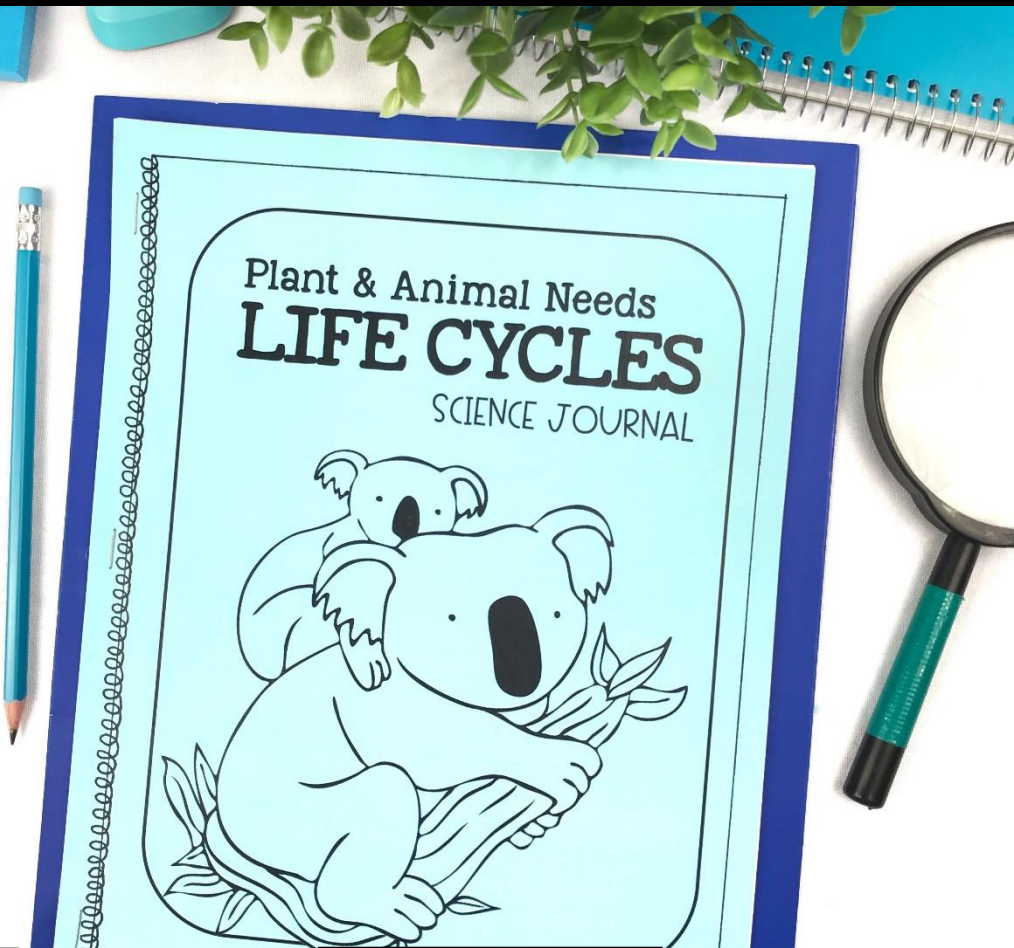
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# See more details of all labs in the unit previews

# STUDENT WORKBOOKS & JOURNAL

## Activities include:

- Applying vocabulary
- Short written response
- Writing to explain
- Labeling diagrams

This block contains a collage of various pages from the science journal. The pages are arranged in a grid-like fashion, showing different lessons and activities. The lessons include:

- Lesson 4 Animal Needs:** "What four things do animals need to survive?" and "What needs is the bamboo forest providing for the panda?"
- Lesson 3 Animal Life Cycles:** "Name two ways animals are born."
- Lesson 6 Animals Rely on Plants:** "What needs is the bamboo forest providing for the panda?"
- Lesson 5 Plants Rely on Animals:** "What is pollination?"
- Lesson 3 Animal Life Cycles:** "Glue the animals in the correct categories."
- Lesson 6 Animals Rely on Plants:** "How do plants help all living things?"
- Lesson 1 The Plant Life Cycle:** "Does each sentence describe a seed or a bulb?" and "What is a life cycle?"
- Lesson 2 Plant Needs:** "What four things do plants need to grow?" and "Label the parts of the plant."
- Lesson 5 Plants Rely on Animals:** "How do plants rely on animals?"
- Lesson 2 Plant Needs:** "How does each part help the plant?" and "Match the job next to each part of a plant."

The pages also feature various illustrations, including koalas, giraffes, and plants, along with text boxes for student responses and activities.

# DETAILED TEACHER GUIDES

**PLANT & ANIMAL NEEDS LIFE CYCLES UNIT TEST** Name Answer Key

**Vocabulary Match**


Write the letter for each definition next to the word it matches.

shelter D A. basic things a plant or animal requires to survive

nutrient E

**Plant & Animal Needs LIFE CYCLES Science Centers TEACHER GUIDE**

**LOCATED IN FILE 3**  
Students use science content to practice these skills:



**Plant & Animal Needs LIFE CYCLES Unit Pacing TEACHER GUIDE**

Day	Lesson
1	Lesson 1: Plant Life Cycle
2	Invest
3	Lesso
4-5	Invest
6	Invest
7	Lesso
8	Invest

**Next Generation Science Standards Alignment TEACHER GUIDE**

**Next Generation Science Standards Alignment**


**Independent Relationships in Ecosystems**  
-2 Develop a simple sketch, drawing, or physical model to show the shape of an object helps it function as needed to solve a problem.

**Developing and Using Models** Develop a model to represent the natural world.

**Reasoning, Evaluating, and Communicating Information** Formulation using various texts, text features (e.g. headings, charts) and other media that will be useful in answering a question.

**Core State Standards**

**Plant & Animal Needs LIFE CYCLES Book List TEACHER GUIDE**



**Plant & Animal Needs LIFE CYCLES Videos TEACHER GUIDE**

**Lesson 1**  
**How Do Seeds Become Plants?**  
<https://www.youtube.com/watch?v=tlkFPyue5X3Q>

**Lesson 1**  
**Plant Life Cycle | BrainPOP Jr.**  
<https://www.youtube.com/watch?v=nFRvDGDm0>

**Lesson 1**  
**Plant Life Cycle | Science for 2nd Grade**  
<https://www.youtube.com/watch?v=cPmYY12Uqg>

**Lesson 2**  
**WHAT DO PLANTS NEED TO GROW?**

**Lesson 1**  
**The Needs of a Plant**  
<https://www.youtube.com/watch?v=dUBIQ1TRd>

**Lesson 2**  
**The Needs of a Plant Song**  
<https://www.youtube.com/watch?v=dUBIQ1TRd>

**Lesson 2**  
**THE CELERY EXPERIMENT**

**Plant & Animal Needs LIFE CYCLES Unit Materials TEACHER GUIDE**

The following materials are needed to do the investigations/labs. All materials can be purchased at the dollar store or Walmart. Some of the materials are optional or can be replaced with items you may already have. \*Please see the teacher notes in each lab for amounts needed. This list does not include printable student copies or basic classroom supplies like pencils, crayons, scissors, or glue sticks.

**Lesson 1**

- bag of large lima beans
- paper towels
- hand lenses
- rulers

**Lesson 2A**

- small plants
- plastic cups for planting
- potting soil
- rulers
- water

**Lesson 2B**

- clear jars or vase
- fresh celery stalks with leaves
- red or blue food coloring
- spoon
- water

**Lesson 3**

- animal picture cards

**Lesson 4**

- informational animal books

**Lesson 5A**

- Velcro
- bird seed
- cotton balls or poly fill
- pipe cleaners
- craft sticks
- craft glue
- wiggly eyes
- toilet paper rolls

**Lesson 5B**

- mac & cheese powder
- craft sticks
- markers
- pipe cleaners
- wiggly eyes
- craft glue
- construction paper
- hand lenses
- paper towel

**Lesson 6**

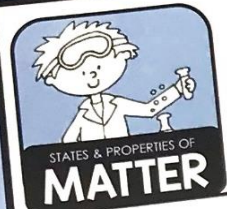
- clear plastic cups or bowls
- hand lenses
- water
- fresh leaves
- small rocks

- Lesson plans
- Teacher notes
- Management & prep tips
- Lab directions with photos
- Materials list
- Related book lists
- Clickable video guide
- Pacing guides
- Standard alignment pages
- Answer keys



# STANDARDS-BASED FOCUS WALLS

## Focus Wall Posters



### BIG IDEA

An object's properties determine the

the



### GUIDING QUESTION

How can properties be observed, measured, and tested?



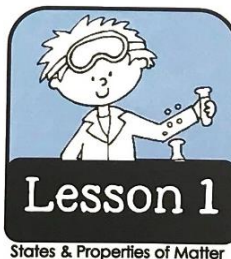
## Vocabulary Cards

reversible properties

**matter**

anything that has weight and takes up space

Lesson 1



I can describe matter by observing its properties.

## Lesson Objective Cards



# FOCUS WALLS INCLUDE:



- Big Idea posters
- Guiding questions cards
- Objectives cards
- Vocabulary display cards

Each lesson closely aligns to the Next Generation Science Standards for Second Grade

# UNIT PLANNING BINDERS

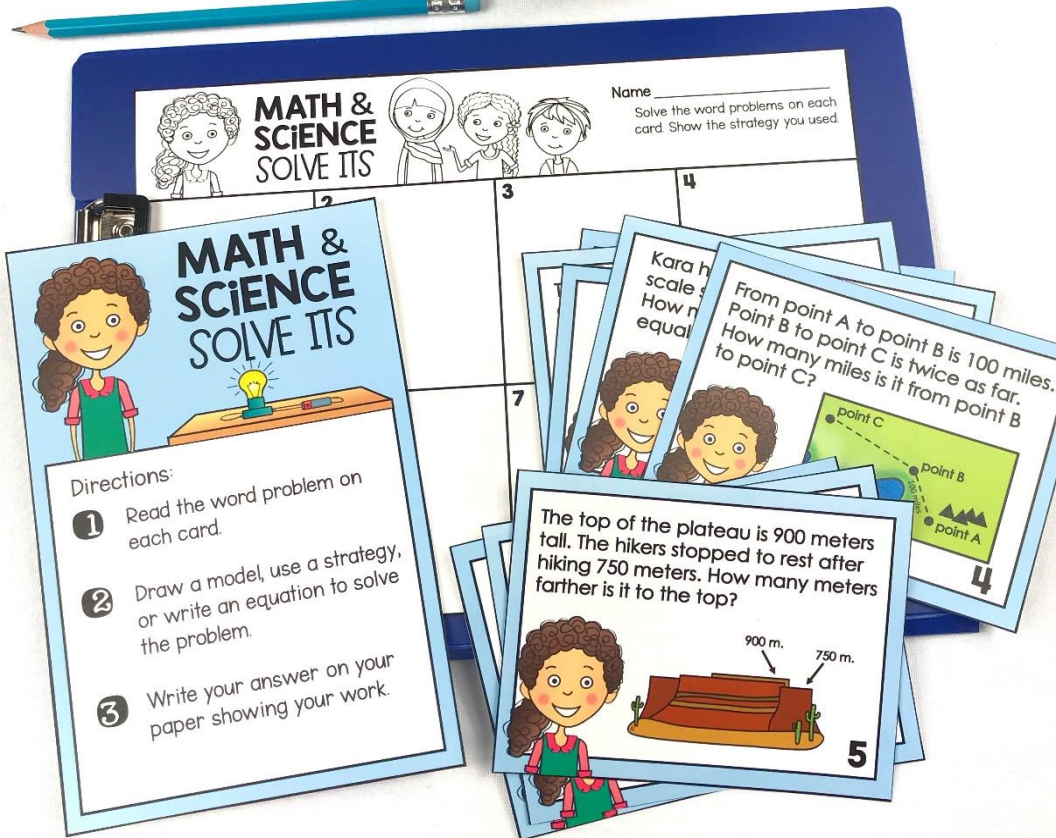


## UNIT BINDERS INCLUDE:

- Binder cover
- Spine label
- Divider tabs
- Section pages
  - lesson plans
  - student journal
  - science centers
  - assessments

# MATH & LITERACY-BASED EXTENSIONS

All units include  
four extension centers



Reinforce science  
content & practice  
math and reading skills



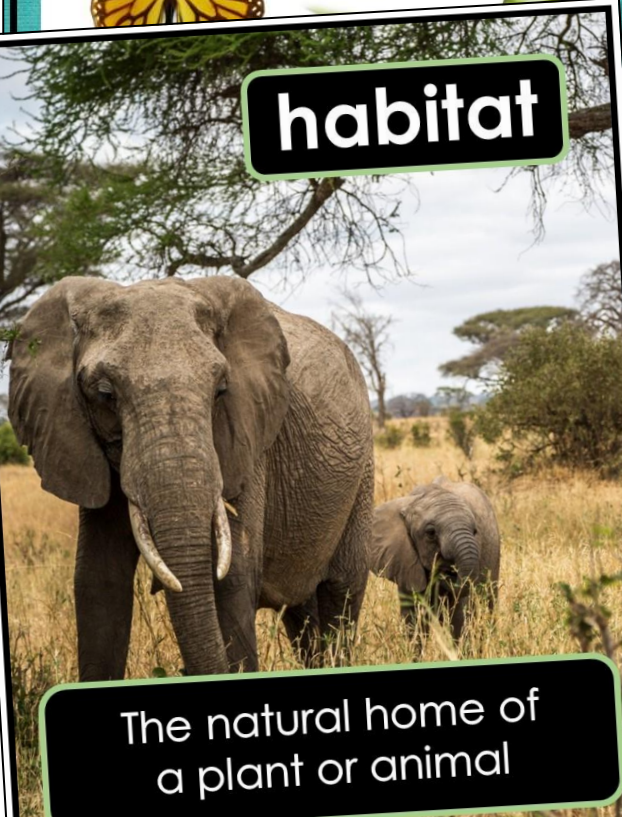
# VOCABULARY POSTERS & DIAGRAMS

## Butterfly Life Cycle



Each unit includes full-page vocabulary posters and diagrams

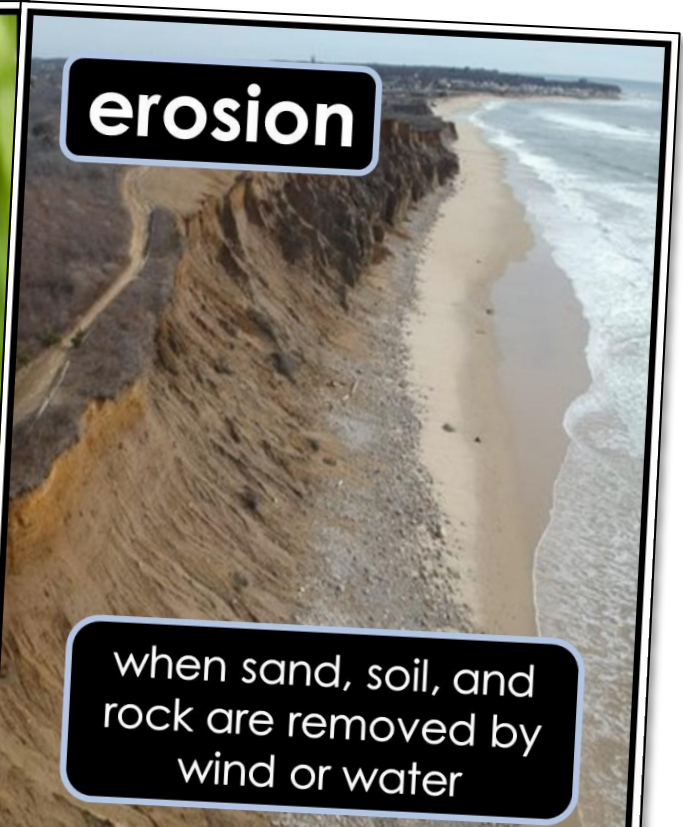
## habitat



## seed dispersal



## erosion



# UNIT BULLETIN BOARD DISPLAYS

## ASK *Identify the Problem*

- What is the problem?
- What are the rules or requirements?
- How would someone else solve it?



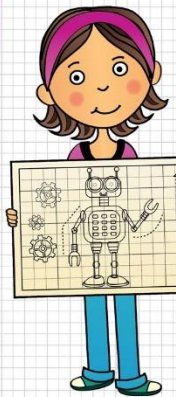
## IMAGINE *Brainstorm ideas*

- Brainstorm ideas and solutions.
- Make a list of your ideas.



## PLAN *Draw a design*

- Draw a diagram.
- What materials will you need?
- Write down the steps you will take.



## CREATE *Follow your plan*

- Follow your plan to build your design.
- Test your design.
- Does it work the way you intended?



## IMPROVE *Make it better*

What works in your design?

What doesn't work?  
How can you improve your design?



## PRESENT *Show others*

- Share your design with others.
- Explain its parts.
- Share how it solves a problem.



Title letters & unit themed elements

# Build a science foundation!

## SCIENTISTS & SCIENTIFIC PROCESSES

An Introduction to Science



## States & Properties of MATTER

GRADE 2



## Exploring Ecosystems & HABITATS

GRADE 2



## LANDFORMS

Earth's Changing Land & Water

GRADE 2



## Plant & Animal Needs

GRADE 2

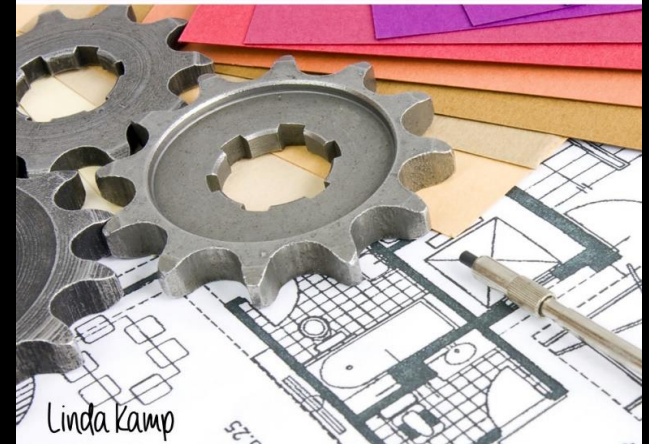
## LIFE CYCLES



## ENGINEERING

& The Engineering Design Process

GRADE 2-3



# YEARLONG SCIENCE CURRICULUM