

A PHENOMENA-BASED COLLECTION

Phenomena

in Grades K–5

Real science begins with a question about the real world. A field guide to 18 anchoring phenomena — each one a photograph students can wonder about, investigate, and explain.



Students don't learn science by memorizing it. They learn it by noticing something puzzling in the world — and refusing to look away until they can explain it.

Every entry in this collection starts the same way phenomenon-based units do: with a single real photograph and an honest question. From there, students take on the role of scientists and engineers — gathering evidence, building models, and constructing explanations grounded in the Next Generation Science Standards. 18 storylines, organized across three science disciplines, each anchored to photographs of the world as it actually is.

215 PHOTOGRAPHS	18 PHENOMENA	K–5 GRADE BANDS	3 DISCIPLINES
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The Phenomena

LIFE SCIENCE

01	How do living things get what they need to survive and grow?	Grades K-2
02	What happens when living things die?	Grades 3-5
03	How do animals survive in different places?	Grades 3-5
04	How does a butterfly change as it grows?	Grades K-2
05	How do plants grow and spread to new places?	Grades K-2
06	What are insects and how do they change as they grow?	Grades K-3
07	What makes a bird a bird, and how are birds different from each other?	Grades K-2
08	How do spiders catch food and survive in their environment?	Grades K-3
09	How are reptiles and amphibians alike, and how are they different?	Grades K-3
10	How do parents help their young survive, and how are young animals like their parents?	Grades K-2

EARTH & SPACE SCIENCE

11	How does water shape the land?	Grades 2-4
12	What can fossils tell us about the past?	Grades 3-5
13	How do seasons change the world around us?	Grades K-2
14	How do living things and Earth's systems work together?	Grades 3-5

PHYSICAL SCIENCE

15	How do forces make things move?	Grades K-3
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17	How does matter change from one form to another?	Grades 3-5
18	How do light and heat energy affect the world around us?	Grades K-3



Plants, animals, and the cycles that connect them — from a germinating seed to a spider's web.



Grades K-2

How do living things get what they need to survive and grow?

01

ANCHORING PHENOMENON

Follow a seed's journey from germination to fruit production, discovering how plants and pollinators depend on each other.

Students trace the complete life cycle of a flowering plant, starting with a germinating seed, observing a mature sunflower's structures, meeting a bee pollinator, watching pollination in action, seeing the fruit (pepper) that results, and finally discovering how seeds disperse to start the cycle anew.

Grades K-2

K-LS1-1

2-LS2-1

2-LS2-2



Grades 3-5

What happens when living things die?

02

ANCHORING PHENOMENON

Explore the hidden world of decomposition, from death to new life, and discover the organisms that recycle nature's nutrients.

Students follow the path of energy and matter after an organism dies. They begin with a food chain to understand energy flow, witness death in nature, meet fungal decomposers, observe soil-building earthworms, and finally see how a decaying nurse log supports new plant growth.

Grades 3-5

5-LS2-1

5-PS3-1

4-LS1-1



How do animals survive in different places?

03

ANCHORING PHENOMENON

Investigate the amazing ways animals use camouflage, mimicry, and structural adaptations to survive in their environments.

Students discover increasingly complex survival strategies. They start with general camouflage, then examine a specific insect's leaf mimicry, explore a snake's warning coloration, study protective scales up close, and finally connect these traits to inheritance and variation.

Grades 3-5

Grades 3-5

3-LS4-2

3-LS3-1

4-LS1-1



How does a butterfly change as it grows?

04

ANCHORING PHENOMENON

Watch the complete metamorphosis of a monarch butterfly, from tiny stages to adult, and discover the habitat that supports the whole cycle.

Students observe three distinct life cycle stages of a monarch butterfly captured in photographs, then see the pollinator waystation habitat that provides everything the butterfly needs to complete its cycle.

Grades K-2

Grades K-2

K-LS1-1

1-LS1-2

1-LS3-1



How do plants grow and spread to new places?

05

ANCHORING PHENOMENON

Follow a plant from its first sprout to seed dispersal, discovering the structures and strategies plants use to grow and reproduce.

Students follow a plant's life from sprout to seed dispersal. They observe a pea sprout emerging, a daffodil blooming, the internal structures of a flower, a mature cosmos plant, and finally seeds dispersing to start the cycle over.

Grades K-2

Grades K-2

K-LS1-1

1-LS1-1

2-LS2-1



Grades K-3

What are insects and how do they change as they grow? 06

ANCHORING PHENOMENON

Discover the world of insects from egg to adult, exploring metamorphosis and the characteristics that define these six-legged creatures.

Students follow the insect life cycle from eggs through metamorphosis to adulthood. They observe insect eggs, examine larvae, study a cicada shell as evidence of molting, meet an adult insect, and finally identify the defining characteristics shared by all insects.

Grades K-3

K-LS1-1

1-LS3-1

3-LS1-1



Grades K-2

What makes a bird a bird, and how are birds different from each other? 07

ANCHORING PHENOMENON

Explore the world of birds from shared characteristics to diverse adaptations, discovering how different species survive in unique ways.

Students discover what all birds share, then explore diversity. They learn bird characteristics, observe a common robin, meet a ground-nesting killdeer, watch a specialized hummingbird feeder, and finally see snow geese migrating — showing how birds adapt to survive.

Grades K-2

K-LS1-1

1-LS1-2

2-LS4-1



Grades K-3

How do spiders catch food and survive in their environment? 08

ANCHORING PHENOMENON

Explore the fascinating world of arachnids, from web engineering to camouflage hunting, and discover what makes spiders unique.

Students investigate spider survival strategies. They learn what makes an arachnid, observe a specific orb weaver, study the engineering of a spider web, discover how some spiders use camouflage instead of webs, and finally examine the body structures that help all arachnids survive.

Grades K-3

K-LS1-1

1-LS1-1

3-LS4-3



How are reptiles and amphibians alike, and how are they different? 09

ANCHORING PHENOMENON

Compare and contrast two groups of cold-blooded animals, discovering what makes amphibians and reptiles unique.

Students compare two groups of animals often confused with each other. They observe a frog, compare it to a toad, identify what makes both amphibians, then meet a reptile to contrast with amphibians, and finally observe reptile molting as evidence of growth.

Grades K-3

Grades K-3

K-LS1-1

1-LS1-2

3-LS4-2



How do parents help their young survive, and how are young animals like their parents? 10

ANCHORING PHENOMENON

Follow young animals from egg to adult, discovering how parents protect and feed their offspring and how young animals resemble their parents without being exactly alike.

Students begin with a nest — a structure a parent built before its young arrived — then find eggs hidden in leaf litter by a very different kind of parent. They watch a young bird being fed because it cannot yet feed itself, meet a spotted fawn waiting hidden in the grass, compare that fawn side by side with its mother, and finish with a grown white-tailed deer whose spots are gone. Across the six days students build two ideas: parents behave in ways that help their offspring survive, and young animals look like their parents but are not exactly the same.

Grades K-2

Grades K-2

K-LS1-1

1-LS1-2

1-LS3-1



Earth & Space Science

Water, weather, rock, and time — the slow and sudden forces that shape the world we stand on.



Grades 2-4

How does water shape the land?

11

ANCHORING PHENOMENON

Follow water's journey from the sky to the sea, discovering how it sculpts landscapes through weathering and erosion.

Students follow water through the water cycle, learn to measure precipitation, witness the dramatic power of flooding, observe long-term erosion at a beach, and examine sedimentary rock as evidence of water's work over deep time.

Grades 2-4

2-ESS2-1

2-ESS1-1

4-ESS2-1



Grades 3-5

What can fossils tell us about the past?

12

ANCHORING PHENOMENON

Dig into the rock record and discover how fossils reveal the story of ancient environments and life on Earth.

Students begin by examining sedimentary rock layers, then investigate four different fossils preserved in rock, building evidence about past environments and the organisms that lived in them.

Grades 3-5

3-LS4-1

4-ESS1-1



Grades K-2

How do seasons change the world around us?

13

ANCHORING PHENOMENON

Observe the dramatic transformations that occur as seasons shift, from autumn leaves to frozen ponds to sunrise patterns.

Students observe seasonal changes in order — fall colors and leaf drop, winter freeze and dormancy, spring thaw and renewal, blooming flowers as spring indicators, and finally the sun's role in driving seasonal patterns through its changing position.

Grades K-2

K-ESS2-1

1-ESS1-1

1-ESS1-2



Grades 3-5

How do living things and Earth's systems work together?

14

ANCHORING PHENOMENON

Explore the connections between human activity, soil, water, ecosystems, and large-scale Earth systems to understand our planet as an interconnected whole.

Students zoom out from human land use to planetary-scale systems. They examine agriculture as human-nature interaction, study soil as a living system, connect water's role in cycling nutrients, observe a pond ecosystem's interconnected organisms, and finally see the Gulf of Mexico as a large-scale Earth system affected by everything upstream.

Grades 3-5

5-LS2-1

5-ESS2-1

5-ESS3-1



Physical Science

Forces, energy, light, and matter — the rules that govern how everything moves and changes.



How do forces make things move?

15

ANCHORING PHENOMENON

Discover how pushes, pulls, and balanced forces work together to create motion, from simple demonstrations to real-world engineering.

Students build understanding of forces from the ground up — first exploring what a force is, then distinguishing balanced from unbalanced forces, seeing forces in the dramatic context of a moving train, and finally examining how engineers designed railroad tracks to manage forces.

Grades K-3

Grades K-3

K-PS2-1

K-PS2-2

3-PS2-1



Where does energy come from?

16

ANCHORING PHENOMENON

Trace energy from its natural sources through capture, conversion, and transmission, discovering the many forms energy takes.

Students explore energy by starting with solar panels capturing sunlight, moving to wind turbines harnessing another natural source, examining thermal energy and heat transfer, following power lines that transmit electricity, and finally synthesizing their understanding of energy's many forms.

Grades 3-5

Grades 3-5

4-PS3-2

4-PS3-4

4-ESS3-1



Grades 3-5

How does matter change from one form to another?

17

ANCHORING PHENOMENON

Investigate the properties and states of matter, exploring how heating and cooling cause physical and chemical changes.

Students build understanding of matter from identifying properties to observing state changes. They classify materials by properties, learn the three states of matter, observe freezing, investigate heating effects, and finally distinguish reversible physical changes from irreversible chemical changes.

Grades 3-5

2-PS1-1

2-PS1-4

5-PS1-2

5-PS1-4



Grades K-3

How do light and heat energy affect the world around us?

18

ANCHORING PHENOMENON

Investigate how light behaves and how heat energy moves, from shadows to rainbows to real-world engineering.

Students explore energy through light and heat. They observe shadows formed by blocked light, discover how light splits into a rainbow, learn to measure heat with an infrared thermometer, see heat energy as rising steam, and finally examine how engineers use heat energy in a propane heater.

Grades K-3

1-PS4-2

1-PS4-3

4-PS3-2

AN INVITATION

Hand a child a photograph. *Watch the questions begin.*

Every phenomenon in this guide lives in the gallery — with hotspots, leveled discussion questions, vocabulary, NGSS alignment, and ready-to-teach lesson packets for grades K through 5.

