AmplifyScience

Grade 5 Hands-on activities

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Hands-on investigation

Hands-on learning is at the heart of Amplify Science, and is integrated into every unit. Each hands-on activity provides clear instructions for the teacher, while providing easily accessible materials in unit-specific kits.

With Amplify Science, students actively participate in science, acting like scientists and engineers as they gather evidence, think critically, solve problems, and communicate their claims.

This document will walk you through an overview of the materials provided for an entire unit, and then focus on one particular activity in that unit to give you a sense of the role hands-on investigation plays in the instruction.

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Grade 5

Patterns of Earth and Sky

In their role as astronomers, students investigate an artifact found on an archeological dig that seems to show patterns in the nighttime sky. Students use a digital simulation of stars, physical models, and a reference text to figure out how the position of stars around the Earth and the spin and orbit of the Earth cause people to see daily and yearly patterns in the stars.

Materials in this unit

Quantity	Description
1	ball, 15 cm diameter
18	dots, sticky, blue*
18	dots, sticky, green*
18	dots, sticky, red*
18	dots, sticky, yellow*
9	globes, inflatable
1	map, world, folded
24	paper, white, sheets (11" x 17")*
5	spheres, small
5	chart paper, sheets* Δ
1	marker, wide tip, black Δ
1	marker, permanent, black Δ
20	markers, assorted colors Δ
1	meterstick Δ
36	paper clips Δ
1	round object, 1.3 mm diameter Δ
9	rulers, 12 in. (optional) Δ
1	scissors Δ
7	sentence strips*
1	stapler
5	sticky notes, yellow, pads 3" x 3"* □ Δ
1	tape, masking, roll* □ Δ

* **consumable item**
□ **included in starter kit**
Δ **items provided by the teacher**

Elementary School Starter Kit

Amplify Science also offers a starter kit for purchase, which includes general science materials needed to conduct most hands-on activities for all units in the curriculum. Starter kit items can fulfill some teacher-provided materials needed for each unit.

Example activity

Spinning Globes

In Lesson 2.5 of *Patterns of Earth and Sky*, students create digital models and engage in a kinesthetic model to show their ideas about the directions up and down at various points on Earth as it spins. To begin, students use the *Patterns of Earth and Sky* Modeling Tool to show which way is up and which way is down for people on opposite sides of Earth. Next, groups of students use globes in a kinesthetic model that allows them to consider what people at various points on Earth see in the sky as up as the Earth spins.

Example activity materials

For each group of four students

- 1 inflatable globe
- 1 set of four sticky dots (1 each: red, blue, yellow, and green)

Unit print materials

Each unit's kit includes print materials for the classroom:

- **Chapter Questions**
- **Key Concepts**
- **Vocabulary**
- **Unit Questions**
- **18 copies of each student book:**

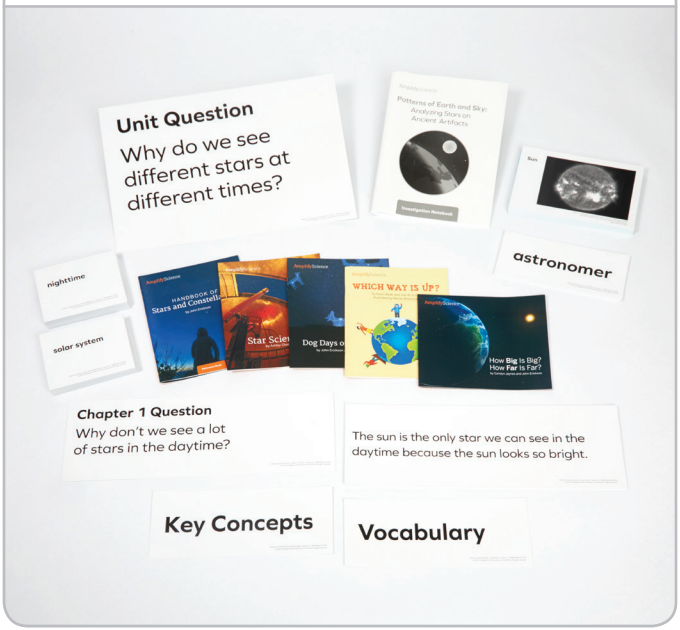
  Star Scientist

  Which Way Is Up?

  Dog Days of Summer

  How Big is Big? How Far is Far?

  Handbook of Stars and Constellations



Modeling Matter

As food scientists working for a large food production company, students take on two work assignments: one related to food safety and one related to the creation of a new food product. Working in this role, students figure out that the properties of materials are related to the properties of the molecules that make up those materials.

Materials in this unit

Quantity	Description
1	acetone (nail polish remover), bottle*
1	balls, foam, cup
1	citric acid, container*
1	cornstarch, container*
2	cumin, powder, pouches*
300	cups, paper, 3 oz.*
8	cups, plastic, 2 oz.*
100	cups, plastic, clear, 14 oz.
21	droppers, glass
1	felt, piece
1	foam peanuts, bag
1	food coloring, blue, red, yellow, green, pack*
1	funnel
1	hook-and-loop fastener, roll
30 ea.	labels, pre-printed: citric acid*, cumin*, pepper*, sugar*
10 ea.	labels, pre-printed: cornstarch*, flour*, lecithin*
1	lecithin, powder, container*
1	marker, permanent, black
2	oil, vegetable, bottles*
60	paper, chromatography, strips*
1	pasta, elbow macaroni, box*
1	pasta, orzo and shells (bag of each)*
1	pepper, container*
9	scoops, half-teaspoon
48	spoons, plastic
150	sticks, wooden, small*
29	vials, with snap lids
1	vinegar, white, container*
3	bowls, mixing Δ
1	fan, electric, box or floor, approximately 20" Δ
8	flour, cups* Δ
36 pairs	gloves, latex free Δ
36	goggles, safety □ Δ
1	jar, glass, with lid, 16 oz. Δ
1	ketchup (or mustard, mayonnaise, or ranch dressing), small packet* Δ
36	lettuce, leaves (or other vegetables)* Δ
1	marker, black, wide-tip Δ
1	measuring cup (1 cup) Δ
several	newspaper, sheets (or paper)* Δ
1	oil, olive, bottle* Δ
18	paper clips Δ
1	paper towels, roll* Δ
1	paper, chart, pad* Δ
18	pencils Δ
37	pennies Δ
1	pitche Δ
several	rocks, small (enough to fill 1 cup) Δ
10	scissors Δ
1	stapler Δ
1	sugar, cup* Δ
1	tablespoon measure Δ
1	tape, clear, roll* Δ
1	tape, masking, roll* □ Δ
9	timing devices (or wall clock) Δ
72	toothpicks* Δ
10	trays, plastic □ Δ
1	vinegar, balsamic and/or red wine* Δ

*** consumable item**
□ included in starter kit
Δ items provided by the teacher

Example activity

Introducing the Fan Model

Having observed the results of a paper chromatography investigation, the class explores a different model of chromatography as a way to apply and expand their understanding of matter at the nanoscale. In Lesson 1.5 of *Modeling Matter*, students observe that different objects (representing molecules) are carried different distances across the floor by moving air from a fan. This model helps students identify more properties of molecules that might affect, and could help explain, the separation of dyes in chromatography.

Example activity materials

For the classroom wall

- **key concept: Different molecules have different properties.**

For the class

- **foam balls**
- **foam peanuts**
- **roll of hook-and-loop fastener**
- **electric fan** Δ
- **small rocks (or similar heavy items)** Δ

Δ items provided by the teacher

Unit print materials

Each unit's kit includes print materials for the classroom:

- **Chapter Questions**
- **Key Concepts**
- **Vocabulary**
- **Unit Questions**
- **18 copies of each student book:**

  Break It Down

  Made of Matter

  Solving Dissolving

  Science You Can't See

  Food Scientist's Handbook

The Earth System

As water resource engineers, students figure out what caused a water shortage on the east side of a fictional island, East Ferris, and work to design a solution to the problem. Applying their knowledge of water distribution and analyzing the interaction among the hydrosphere, biosphere, atmosphere, and geosphere, students communicate the nature of the problem and possible solutions to the people of East Ferris.

Materials in this unit

Quantity	Description
2	aluminum foil, rolls*
3	baking soda, bottles*
2	calcium chloride, bottles*
18	droppers
2	foam cups, 8 oz
1	food coloring, bottle*
18	graduated cylinders, 25 ml
1	inflatable globe
18	labels: “baking soda”
18	labels: “calcium chloride”
18	labels: “phenol red + water”
9	labels: “water”
18	measuring spoon, multi-measure
1	phenol red concentrate, bottle*
18	plastic containers, 16 oz*
2	plastic lids
36	plastic cups, ½ oz*
92	plastic cups, 9 oz*
18	plastic lids, for 9 oz cup
20	plastic cups, 16 oz*
2	plastic wrap, rolls*
218	self-sealing plastic bags, quart size*
18	squeeze bottles
1	tissue paper, pack
18	wooden sticks
5	chart paper, sheets* Δ
1	cooler (insulated, portable box) Δ
18	dark-colored paper, sheet* Δ
2	glass cups, identical Δ
18	hand lenses Δ
180	ice cubes Δ
1	light-colored paper, sheet* Δ
1	marker, black Δ
27	markers, assorted colors Δ
1	masking tape, roll* Δ
27	paper clips, medium Δ
1	pitcher Δ
9	plastic trays, cafeteria size Δ
9	rocks, the approximate diameter of a quarter Δ
1	salt, 8 oz* Δ
1	stapler Δ
–	water* Δ
–	water, hot* Δ

*** consumable item**
Δ items provided by the teacher

Example activity

Mixing Substances Investigation

Previously in the lesson, students have considered wastewater treatment as a potential solution to East Ferris's water shortage. They have read a message from the mayor of East Ferris requesting information about how wastewater treatment works. In Lesson 5.1 of *The Earth System*, students find out that wastewater gets mixed with substances in a wastewater treatment plant and that new substances come out of the plant along with clean freshwater. This discovery leads students to investigate how new substances form. Students observe a chemical reaction by mixing calcium chloride, baking soda, and phenol red solution. They discuss and record their observations of the substances before, during, and after the reaction.

Example activity materials

For the class

- graduated cylinders, 25 mL
- baking soda
- calcium chloride
- phenol red concentrate
- self-sealing plastic bags, quart-size
- “baking soda” labels
- “calcium chloride” labels
- “phenol red + water” labels

Unit print materials

Each unit’s kit includes print materials for the classroom:

- **Chapter Questions**
- **Key Concepts**
- **Vocabulary**
- **Unit Questions**
- **18 copies of each student book:**

  Water Encyclopedia

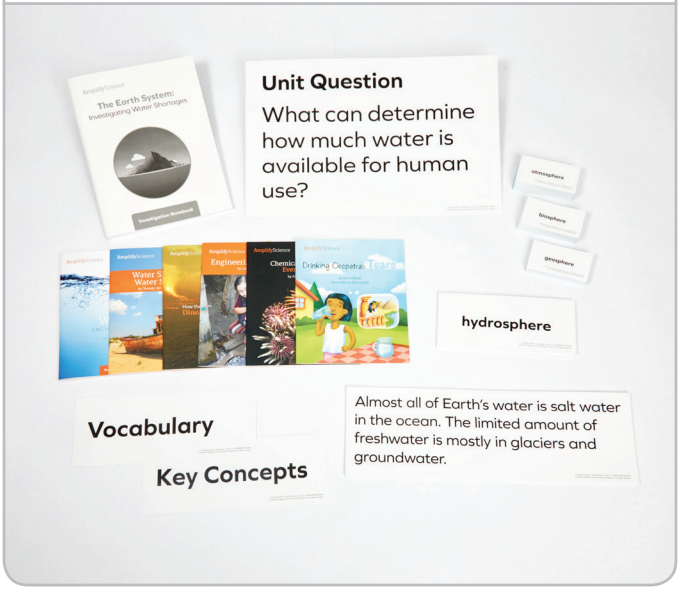
  Engineering Clean Water

  Drinking Cleopatra’s Tears

  Chemical Reactions Everywhere

  Water Shortages, Water Solutions

  How the Earth System Explains Dinosaur Extinction



Ecosystem Restoration

Students work as ecologists as they figure out why the plants and animals in an unhealthy area of the Costa Rican rainforest aren't growing and thriving. Growing a terrarium, using physical models, and using a digital model to investigate how matter and energy move through an ecosystem, students figure out why the rainforest is not thriving, and create a plan for rainforest restoration.

Materials in this unit

Quantity	Description
1	bags, plastic, self-sealing, roll of 150
1	balloons, pack of 10*
2	bottles, spray
10	containers, plastic, large, with lids
1	cubes, plastic, interlocking, blue, pack of 400
1	cubes, plastic, interlocking, green, pack of 50
1	cubes, plastic, interlocking, red, pack of 50
1	cubes, plastic, interlocking, white, pack of 400
125	cups, clear, plastic,
2	pipe cleaners, brown and green, pack of 100 of each
1	seeds, alfalfa, package*
1	seeds, grass, package*
2	Soil A: Nutrient Rich, bags*
1	Soil B: Nutrient Poor, bag*
1	spoons, plastic, box of 48
1	sticks, wooden, pack of 50
1	tokens, plastic, yellow, pack of 360
1	yarn, ball
1	bag, plastic, resealable* Δ
1	flashlight Δ
36	goggles, safety □ Δ
9	leaf litter, handfuls* Δ
18	lenses, hand, plastic □ Δ
1	marker, permanent, black Δ
1	marker, wide tip, black Δ
several	newspaper, sheets* Δ
33	paper clips Δ
6	paper, chart, sheets* Δ
18	paper, white, sheets, 8.5" x 11" * Δ
36	pencils Δ
1	pitcher Δ
11	rubber bands Δ
1	scissors Δ
1	stapler Δ
1	tape, masking, roll* □ Δ
19	trays, plastic □ Δ
–	water* Δ

*** consumable item**
□ included in starter kit
Δ items provided by the teacher

Example activity

Terrarium Observations

In their role as ecologists investigating problems in the Costa Rican rainforest, students create classroom terrariums to serve as model ecosystems. In Lesson 2.1 of *Ecosystem Restoration*, students begin to investigate where plants get their food molecules. Through observing their own terrariums and then comparing their terrariums to another group's terrarium, they consider why some plants might grow better than other plants.

Example activity materials

For each group of four students

- group's terrarium

For each student

- *Ecosystem Restoration* Investigation Notebook (pages 31–34)

Unit print materials

Each unit's kit includes print materials for the classroom:

- **Chapter Questions**
- **Key Concepts**
- **Vocabulary**
- **Unit Questions**
- **18 copies of each student book:**

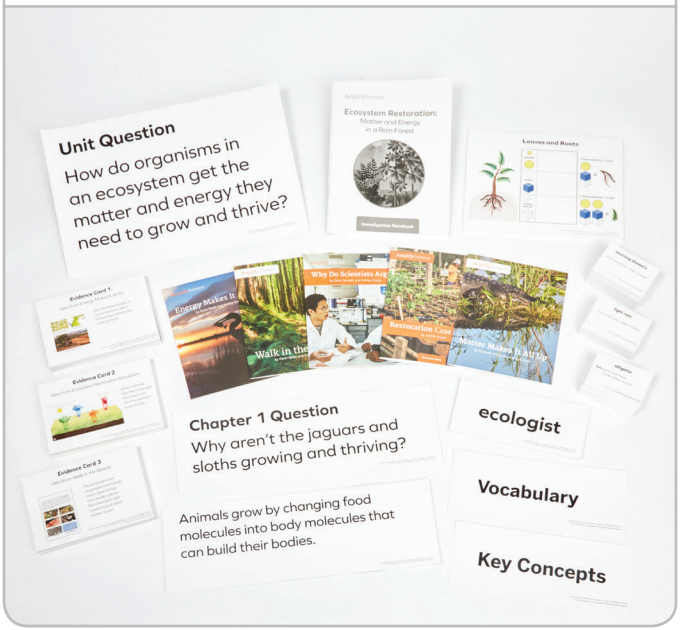
  Walk in the Woods

  Matter Makes It All Up

  Energy Makes It All Go

  Restoration Case Studies

  Why Do Scientists Argue?



Go to **amplify.com/sciencek5**
for a list of all materials in each kit.

Amplify.

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