Amplify Science

Grade 8 Hands-on activities

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MATTER

Hands-on investigation

Hands-on learning is at the heart of Amplify Science, and is integrated into every unit. For each hands-on activity, clear instructions are provided for the teacher, and materials are included 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, to give you a sense of the role hands-on investigation plays in the instruction.

Quantity and materials in each kit are subject to change. For current lists of all materials in each kit, please visit **amplify.com/science68**.

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Grade 8

Harnessing Human Energy

Energy-harvesting backpacks, rocking chairs, and knee braces are just a few of the devices that have been created to capture human energy and use it to power electrical devices. Students assume the role of student energy scientists in order to help a team of rescue workers find a way to get energy to the batteries in their equipment during rescue missions. To do so, students learn about potential and kinetic energy, energy conversions, and energy transformations.

Materials in this unit

Materials in this unit are packaged in 1 box.

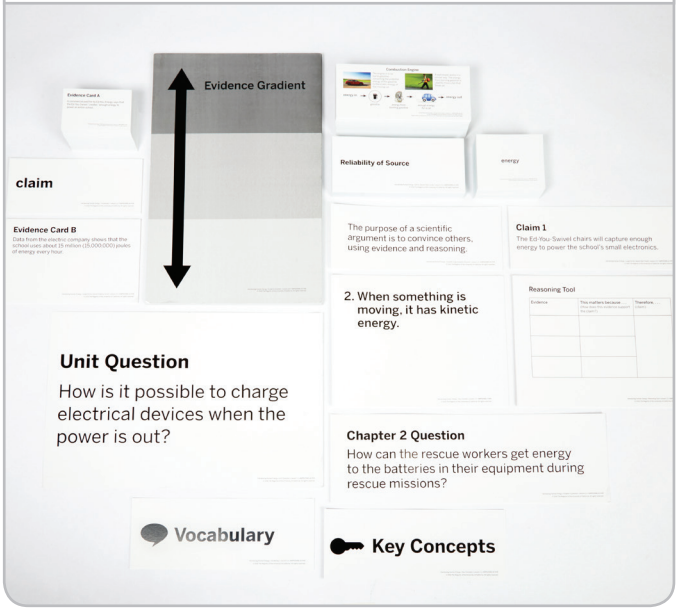
Quantity	Description
10	batteries, D-cell
100	brads*
20	cables with alligator clips
1	clamp-on lamp
10	electric motors
10	fan blades, plastic
10	generators, hand-crank
20	rubber bands
1	solar panel
50	springs, assorted
600 feet	string*
2	toys, wind-up
51	vials, plastic with lid

* **consumable item**

Print materials

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

- **Chapter Questions**
- **Key Concepts**
- **Vocabulary**
- **Unit Questions**
- **Premium print materials (card sets, posters, etc.)**



Force and Motion

In this unit, students engage in authentic work as they take on the role of student physicists working for the fictional Universal Space Agency (USA). They are called upon to assist in the investigation of one recent mishap. Students apply their developing knowledge of force and motion to explain why a space pod failed to dock at the space station as planned. This mystery serves as the anchor phenomenon for the unit. As they investigate, students will learn about the relationship between force, change in velocity, mass, and the equal and opposite forces exerted during collisions.

Materials in this unit

Materials in this unit are packaged in 1 box.

Quantity	Description
20	balls, golf
40	balls, rubber
20	balls, table tennis
40	jar lids
20	rulers, 12", center groove
40	spring-loaded toilet paper roll holders/spindle
20	stopwatches

Print materials

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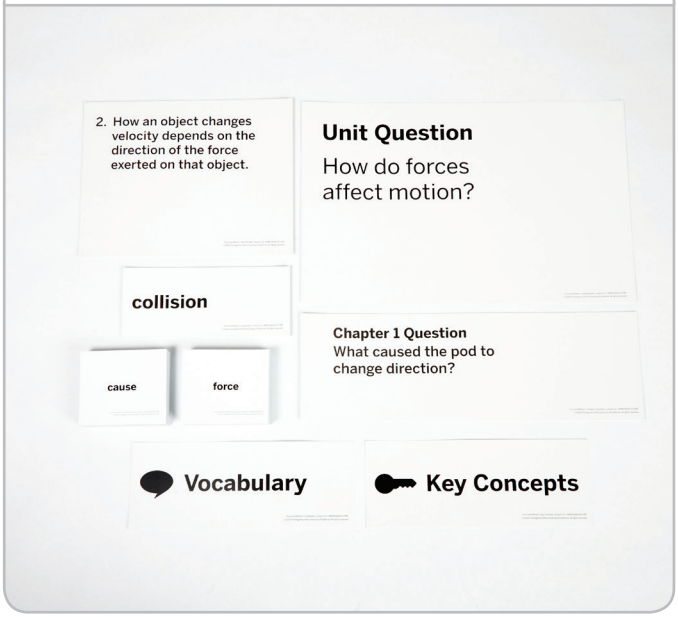
- **Unit Questions**
- **Card sets**



Force and Motion: Engineering Internship

In this unit, students work as mechanical engineering interns at Futura Engineering to design a supply pod that will deliver humanitarian aid packages to people in disaster-stricken locations. Specifically, they learn about engineering practices and deepen their understanding about collision forces. They explore how to manipulate mass and falling speed in the design process, using the SupplyDrop Design Tool to run iterative tests and collect data. They then focus on data analysis, noting the structure and function of different design features, in order to design a pod that survives the impact of colliding with the ground.

Materials in this unit

Materials in this unit are packaged in 1 box.

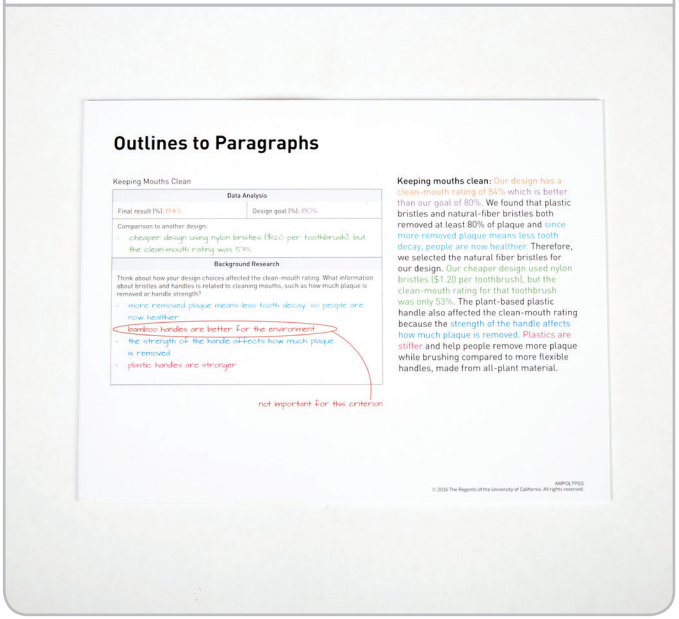
Quantity	Description
15	bags, plastic with zip*
100	coffee filters*
50	containers, plastic*
500	cotton balls*
40 cups	foam peanuts*
100	pipe cleaners*
2	scales, digital
25	steel wool pads*
100	straws, plastic, clear*
200 feet	string*
500	twist ties*

* **consumable item**

Print materials

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

- **Research Proposal Outlines**



Magnetic Fields

In the role of physicists working for the Universal Space Agency, a fictional agency that resembles NASA, students investigate the unexpected results from one test launch of a magnetic spacecraft. While scientists at the USA were testing the launch system, they found that the spacecraft in their third test traveled much faster than expected, and it's this unexpected outcome that serves as the anchor phenomenon for student investigations in the unit. Was there an error in magnet alignment? Was there an unexpected energy increase in the launcher system, or was there more magnetic force? Motivated to understand what affects the movement of magnets, students use the Magnetic Fields Simulation, hands-on activities, and evidence from science articles to learn about magnetic force.

Materials in this unit

Materials in this unit are packaged in 1 box.

Quantity	Description
1	aluminum foil, roll*
30	bags, plastic with zip
10	balls, rubber
10	compression springs
20	craft sticks
20	magnets, strong
20	magnets, weak
100	paper clips
10	pom poms
20	rulers

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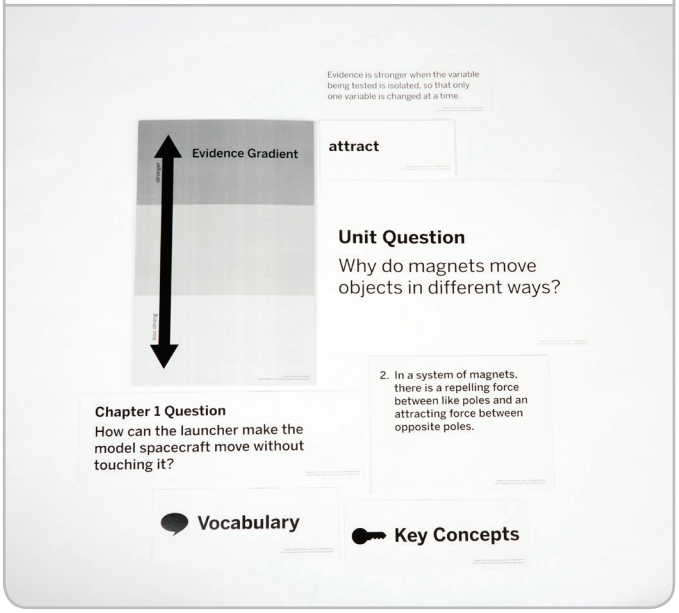

Light Waves

Taking on the role of student spectroscopists working for the fictional Australian Health Alliance, students investigate why Australia's cancer rate is so high, analyzing real data that scientists might consider. This problem serves as the anchor phenomenon that students focus on throughout the unit. Students use the Light Waves Simulation, conduct hands-on activities, read articles, and watch videos to gather evidence about how light interacts with materials. The sim allows students to observe how light carries energy and how this energy causes materials to change when it is absorbed. Students can simulate manipulating the wavelength of light, observing that different types of light have different wavelengths and that different types of light can change a material in different ways.

Materials in this unit

Materials in this unit are packaged in 1 box.

Quantity	Description
80	beads, color-changing
20	binder clips
10	bottles, spray
1	clamp-on lamp
10 of each color	cubes, red and green
10	flashlights, incandescent
10	flashlights, UV (LED bulb)
10	laser pointer
1	light bulb, 60 watt
1	liquid crystal paper, sheet
10	mirrors
5	pipe cleaners
20	stars, glow-in-the-dark
2	thermometers
10	toys, solar-powered
1	transparency paper, sheet

Print materials

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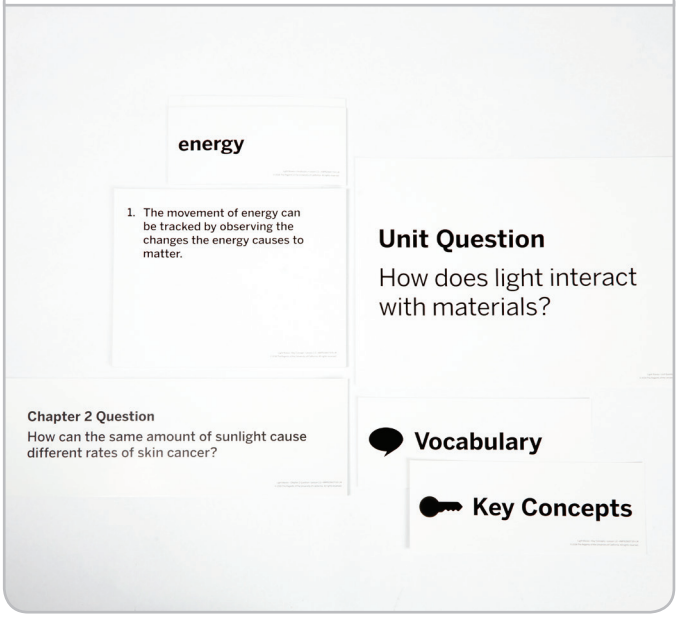

Earth, Moon, and Sun

The *Earth, Moon, and Sun* unit begins as students take on the role of student astronomers, tasked with advising an astrophotographer who needs to take photographs of the Moon for a fictional magazine called *About Space*. The astrophotographer can only take pictures of specific features on the Moon at certain times, and this serves as the anchor phenomenon for the unit. In order to provide advice about when to take photographs of the Moon as well as how to take photographs of a lunar eclipse, students will need to investigate where the Moon's light comes from, what causes the characteristic changes in the appearance of the Moon that we observe, and what conditions are required to view phenomena, such as particular moon phases and lunar eclipses. As students conduct these investigations, they will use a hands-on Moon Sphere Model, the digital Earth, Moon, and Sun Simulation, and the Earth, Moon, and Sun Modeling Tool to gather and represent information about the movement of and light patterns on the Moon.

Materials in this unit

Materials in this unit are packaged in 1 box.

Quantity	Description
41	chopsticks
1	clamp-on lamp
1	lightbulb, 60 watt
41	spheres, foam
40 triangles	transparencies, printed with triangles*

* **consumable item**

Print materials

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

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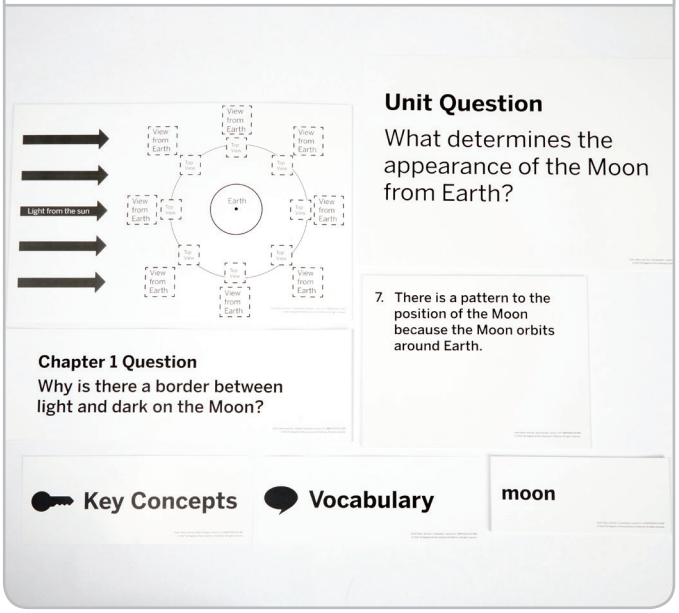
- **Key Concepts**
- **Vocabulary**
- **Unit Questions**
- **Premium print materials (card sets, posters, etc.)**



Natural Selection

According to local legend around Oregon State Park, three unfortunate campers were found dead at their campsite and investigators found only one clue — a rough-skinned newt inside the coffeepot that the campers used to make their morning coffee. Student biologists investigate what caused the rough-skinned newts of Oregon State Park to become so poisonous. They uncover the mechanisms of natural selection, investigating variation in populations, survival and reproduction, and mutation.

Materials in this unit

Materials in this unit are packaged in 1 box.

Quantity	Description
20	bags, plastic with zip, large
100	bags, plastic with zip, small
500	counting cubes, blue
500	counting cubes, green
500	counting cubes, purple

Print materials

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

- **Chapter Questions**
- **Key Concepts**
- **Vocabulary**
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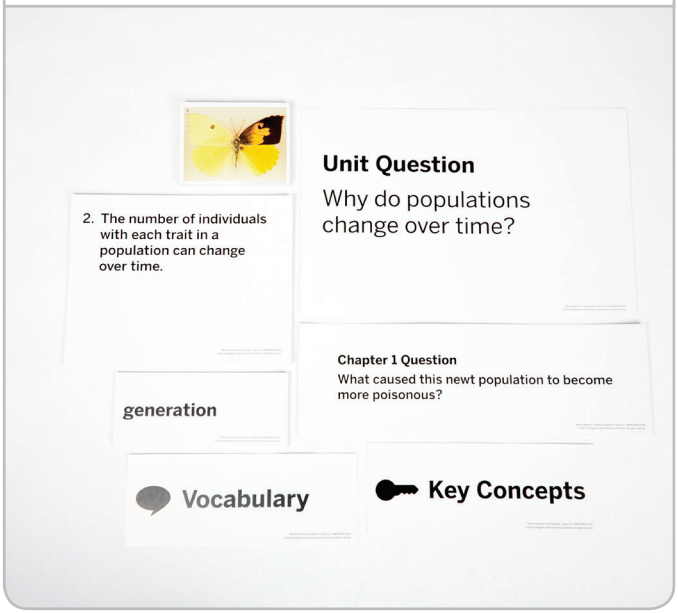


Natural Selection: Engineering Internship

The Natural Selection Engineering Internship asks students to design a treatment that does not cause an increase in the malaria parasite population while considering three criteria: minimizing drug resistance in the malaria parasite population; minimizing patient side effects; and keeping costs low. Students use the MalariaMed Design Tool to collect and analyze data, complete iterative tests, and learn about optimizing designs. By the end of this unit, students can describe engineering practices and compose a written proposal that supports their optimal design for making a safe and effective malaria treatment, one that also manages trade-offs between the project criteria.

Materials in this unit

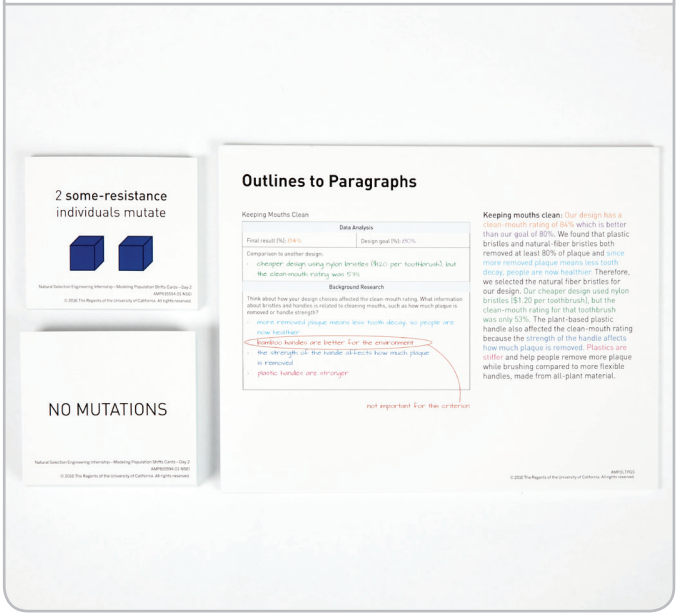
Materials in this unit are packaged in 1 box.

Quantity	Description
3	bags, plastic with zip, large
20	bags, plastic with zip, small
500	counting cubes, blue
500	counting cubes, green
500	counting cubes, purple
20	drawstring bags, non-transparent, small

Print materials

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

- **Research Proposal Outlines**
- **Card sets**



Evolutionary History

In the Evolutionary History unit, students will take on the role of student paleontologists investigating a Mystery Fossil, which serves as the anchor phenomenon for the unit. This fossil is based on a real cetacean (whale) fossil excavated in Pakistan in 2000. The students' task is to determine the Mystery Fossil's evolutionary history so that they can accurately place the specimen in a museum exhibit. To gain an understanding of how paleontologists determine relationships between species, students use the Evolutionary History Simulation to analyze real fossil evidence and explore relationships on an interactive evolutionary tree. With a fossil collection at their fingertips, students identify similarities and differences among the skeletal structures of both extinct and living species.

Materials in this unit

Materials in this unit are packaged in 1 box.

Quantity	Description
20	bags, plastic with zip
1	K'NEX®, Intermediate Math & Geometry kit

Print materials

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

- **Chapter Questions**
- **Key Concepts**
- **Vocabulary**
- **Unit Questions**
- **Premium print materials (card sets, posters, etc.)**

Go to **amplify.com/science68** for a list of all materials in each kit.

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