

California Science Content Standards for K-5

Topic Summary

Kindergarten:

Landforms
Weather and Seasons
Resource Use and Conservation
Animal and Plant Parts
Describing Properties of Materials
Water's Different States

Grade 2:

Rocks, Sand, and Soil
Fossils Provide Evidence of Life
Resources Meet Our Needs
Plant Life cycles and reproduction
Animal Life cycles and reproduction
Inherited Characteristics and Variation
Force and Motion
Simple Tools and Machines
Sound

Grade 4:

The Rock Cycle
Properties of Rocks and Minerals
Shaping the Earth's Surface
Food Chains and Webs
Ecosystems
Electric Circuits
Magnets, Compasses, and Electromagnets
Doing Work with Electrical Energy

Grade 1:

Measuring Weather Observations
Sun Warming the Earth
Plant and Animal Habitats
How Plants/Animals Meet Needs
Properties of Solids, Liquids, Gases
Changing Properties with Mixing, Cooling, and Heating

Grade 3:

Star Patterns in the sky
Phases of the Moon
Earth and Moon Orbits
Adaptations: Change Over Time
Biodiversity and Extinction
Energy: Sun, Forms, Storage, Conversion, and Carrying
Energy and States of Matter
Mixtures and Solutions
All Matter is Atoms
Light and Vision

Grade 5:

Water Distribution and Sources
Water Cycle
Causes of Weather
Solar System and Gravity
Plant Internal Processes
Animal Internal Processes
Atoms, Elements and Periodic Table
Using Properties to Separate Mixtures and Identify Compounds
Properties of Common Molecules

California Science Content Standards for K-5

EARTH SCIENCE

LIFE SCIENCE

PHYSICAL SCIENCE

KINDERGARTEN

The Earth is composed of land, air and water.

- 1) Earth has different landforms, **characteristics of landforms** (mountains, oceans, valleys, rivers, deserts, local landforms - ocean, Mt Tam)
- 2) **Weather changes** daily and seasonally affecting us all
- 3) Many of **Earth's resources are used everyday and some resources can be conserved**

Different plants and animals inhabit Earth.

- 1) You can **observe and describe appearance and behavior** of different plants and animals (similarities, differences of major groups)
- 2) **Stories about plants and animals are sometimes different from reality**
- 3) You can identify **major external structures of common plants & animals** (stems, leaves, roots, arms, legs, wings)

Properties of materials can be observed, measured, predicted.

- 1) You can describe objects' **materials** (paper, cloth, clay) **and physical properties** (shape, size, weight, buoyancy, flexibility, color, magnetism, texture)
- 2) **Water can change from liquid to solid and back again.**
- 3) **Water evaporates**, escaping from an open container, but remaining inside a closed container.

FIRST GRADE

Weather can be observed, measured, described.

- 1) You can **use simple tools to measure weather & record changes** (thermometer, wind vane)
- 2) **Weather changes day to day, but trends are predictable** during a season
- 3) **Sun warms** land, air and water

Plants and animals meet needs in different ways.

- 1) **Different external features of living things (LT) help them thrive** in different environments
- 2) **Needs of living things** (water for plant & animal, food for animals, light for plants)
- 3) **How animals meet needs** (using other LT for food, shelter)
- 4) **Food and teeth shape**: You can tell what many animals eat from the shape of their teeth (sharp eats meat, flat eats plants)
- 5) **How plants meet needs** (roots, leaves, leaf shape)

States of Materials

- 1) **Solids, liquids, gases** have different properties
- 2) Substances' **properties change with mixing, cooling, heating**

SECOND GRADE

Earth is made of materials with distinct properties that provide resources for human activities.

- 1) **Rocks** have different **physical properties** and are made of different combinations of **minerals**
- 2) **Breakage and weathering** create smaller rocks
- 3) **Soils**, created from rock & organic materials, differ in color, texture, water retention, ability to support growth
- 4) **Fossils** provide evidence about ancient life, scientists study fossils to learn about history
- 5) We get **resources from rock, water, plant, soil**, to meet our needs for food, fuel, shelter

Plants and animals have predictable life cycles.

- 1) **LT reproduce their own kind**, offspring resembles parents
- 2) Different animals have different **life cycles**
- 3) **LT inherit characteristics and respond to environment**
- 4) **Individuals of one kind can vary** within any population
- 5) **Plants are affected by environment** (germination, growth, affected by light, gravity, stress)
- 6) **Flowers and fruits** are associated with **plant reproduction**

Motion of objects can be observed and measured.

- 1) **Positions can be described** (relative to objects or background)
- 2) **Motion can be described** (observe position change over time)
- 3) **Motion can be changed with force** (push, pull, size of change is related to strength or amount of force)
- 4) **Simple tools and machines can apply force** (shovels, pulleys)
- 5) **Objects fall** to Earth unless held up
- 6) **Magnets** can apply force to move some objects
- 7) **Sound** is vibration, describe with pitch and volume

THIRD GRADE

Objects in the sky move in regular, predictable patterns.

- 1) **Patterns of stars** stay the same although they appear to move across sky nightly and different stars are visible seasonally.
- 2) **Moon's appearance changes** in a predictable four-wk cycle
- 3) **Telescopes** magnify distant objects in sky, there are many more stars than can be seen with eye alone
- 4) Earth **orbits** sun with other planets, Moon orbits Earth
- 5) **Position of sun in sky** changes during day and seasonally

Adaptations in physical structure or behaviour can improve an organisms chance for survival.

- 1) **Structures of LT help them grow, survive, and reproduce.**
- 2) There are **diverse life forms in different environments.**
- 3) **LT change the environment they live in**, some changes have bad effect on organism, some have good effects
- 4) **When environment changes, LT respond** (may be able to survive and reproduce or may die or move to new environment).
- 5) **LT can disappear from the Earth**, some modern species resemble historic species (dinosaurs and lizards, ferns, some trees)

Energy and matter have multiple forms and can be changed.

- 1) **Energy comes from Sun to Earth** in the form of **light**.
- 2) **Energy can be stored** in many forms (food, fuel, batteries)
- 3) **Energy can be converted to motion and heat** by living things and machines
- 4) **Energy can be carried** in waves (water waves, sound) electric current, and moving objects
- 5) **Matter has three states (solid, liquid, gas) that change when energy is added** (heating to evaporate or melt) **or removed** (cooling to freeze solid)
- 6) **Combining substances can create new substances with different properties**
- 7) **All matter is made of atoms**, particles too small to be seen with the naked eye, not earth, wind, fire, and water as once thought
- 8) Experiments have revealed **many kinds of atoms or elements**

Light has a source and travels in a direction.

- 1) Sunlight can be blocked to create **shadows**
- 2) **Light is reflected** from mirrors and other surfaces
- 3) The **color of light** striking an object affects how our eyes see it
- 4) **Vision**: We see objects when light traveling from an object enters our eye.

	EARTH SCIENCE	LIFE SCIENCE	PHYSICAL SCIENCE
FOURTH GRADE	<p><i>Properties of rocks and minerals reflect the processes that formed them.</i></p> <p>1) You can tell igneous, sedimentary, metamorphic rocks apart by their different properties and different methods of formation, the rock cycle</p> <p>2) You can use a diagnostic property table to identify common rock-forming minerals (quartz, calcite, feldspar, mica, hornblende) and ore minerals.</p>	<p><i>All organisms need energy and matter to live and grow.</i></p> <p>1) Plants are the primary source of matter and energy entering most food chains</p> <p>2) Producers and consumers make up food chains and food webs, competing for resources in ecosystem (herbivores, carnivores, omnivores, and decomposers)</p> <p>3) Decomposers recycle matter from dead plants and animals (includes many microorganisms, fungi, insects)</p>	<p><i>Electricity and magnetism are related effects that have useful applications in everyday life.</i></p> <p>1) You can build series and parallel circuits with wires, batteries and bulbs</p> <p>2) You can build a simple compass to detect Earth's magnetic field</p> <p>3) Electric currents produce magnetic fields, build simple electromagnet</p> <p>4) Electromagnets are used to construct electric motors, generators, and simple devices (doorbells)</p> <p>5) Behaviour of electrically charged objects (repel, attract)</p> <p>6) Magnets have two poles that react to each other (north, south, like poles repel, unlike poles attract)</p> <p>7) Electrical energy can be converted to heat, light, motion (electrical cars and trains, power to homes)</p>
	<p><i>Waves, wind, water, and ice shape and reshape the Earth's land surface.</i></p> <p>1) There are slow and rapid processes that change the Earth (erosion, landslide, volcanoes, earthquakes)</p> <p>2) Natural processes break down rocks into smaller pieces (freezing/thawing, root growth)</p> <p>3) Moving water erodes landforms, rearranging rocks, pebbles, sand, and silt (weathering, transport, deposition)</p>	<p><i>Living organisms depend on one another and their environment for survival.</i></p> <p>1) Ecosystems include both living and non-living components (organisms, soils, climate, etc)</p> <p>2) In each environment some organisms thrive, some do less well, and some cannot survive at all.</p> <p>3) Relationships between plants and animals (pollination, seed dispersal, animals rely on plants for food and shelter)</p> <p>4) Role of microorganisms (beneficial, most are not "germs")</p>	
FIFTH GRADE	<p><i>Water on Earth moves between the oceans and land through the processes of evaporation and condensation.</i></p> <p>1) Most of Earth's water is salt water in oceans which cover most of the Earth's surface</p> <p>2) When liquid water evaporates it turns into water vapor and can reappear as liquid when cooled, or solid if cooled below freezing point</p> <p>3) Water vapor moves in air, can form clouds or fog (tiny droplets of water or ice) and can fall to Earth as rain, hail, sleet, or snow</p> <p>4) Fresh water is limited (located in rivers, lakes, underground sources and glaciers), and can be made more available to meet needs through recycling and avoiding waste.</p> <p>5) Your water comes from particular surface and/or groundwater supplies (local community water sources)</p> <p><i>(Earth Science continued next page)</i></p>	<p><i>Plants and animals have structures for respiration, digestion, waste disposal, and transport of materials.</i></p> <p>1) Multicellular organisms have specialized structures</p> <p>2) Blood circulatory system (heart, lungs), lungs and tissues exchange oxygen and carbon dioxide</p> <p>3) Steps and organs of digestive system</p> <p>4) Role of kidneys, bladder in cellular waste removal</p> <p>5) Plant processes and structures moving sugar, water, minerals</p> <p>6) Plants use carbon dioxide and energy to make molecules of sugar and release oxygen</p> <p>7) Plant and animal cells break down sugar to obtain energy, releasing carbon dioxide and water</p>	<p><i>Elements and their combinations account for all the varied types of matter.</i></p> <p>1) During chemical reactions atoms rearrange into different products with different properties</p> <p>2) All matter is made of atoms, which combine to form molecules</p> <p>3) Common properties of metals (conductivity, pure vs combinations of elemental metals)</p> <p>4) Each element is one kind of atom, organized in Periodic Table</p> <p>5) With instruments you can see that atoms and molecules are discrete and in well ordered arrays.</p> <p>6) Separate mixtures and identify compounds using their chemical and physical properties</p> <p>7) Properties of common molecules (sugar, water, oxygen, etc.)</p> <p>8) Just a few elements make all living things and most materials</p> <p>9) Common properties of salts (sodium chloride)</p>

EARTH SCIENCE

LIFE SCIENCE

PHYSICAL SCIENCE

FIFTH GRADE
continued

Energy from the sun heats the Earth unevenly, causing air movements resulting in changing weather patterns.

- 1) **Wind, convection currents**, are air movements caused by uneven heating of the Earth
- 2) **The oceans influence the weather and the water cycle plays a role in weather patterns**
- 3) There are several **causes and effects of severe weather** (hurricanes, typhoons, tornadoes)
- 4) You can **use weather maps & data to predict weather, forecasts depend on** many variables
- 5) Earth's **atmosphere exerts a pressure**, decreasing with altitude, that is equal in all directions at any point.

The solar system consists of planets and other bodies that orbit the sun in predictable paths.

- 1) The **sun, an average star**, central and largest body in solar system, made of hydrogen and helium
- 2) **Solar system contains:** Earth, moon, sun, eight other planets & their satellites, smaller objects (comets, asteroids)
- 3) Path of a planet (orbit) is due to **gravitational attraction between** Sun and planet.

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