Third Grade Science

Course Overview

Students learn to observe and analyze through hands-on experiments, and gain further insight into how scientists understand our world. They observe and chart the phases of the moon, determine the properties of insulators and conductors, and make a three-dimensional model of a bone. Students will explore topics such as:

- **Weather—**air pressure; precipitation; clouds; humidity; fronts; forecasting
- **Vertebrates—**features of fish, amphibians, reptiles, birds, and mammals
- **Ecosystems—**climate zones; tundra, forests, desert, grasslands, freshwater, and marine ecosystems
- **Matter—**phase changes; volume; mass; atoms; physical and chemical changes
- **Human Body—**the musculoskeletal system; the skin
- **Energy—**forms of energy; transfer of energy; conductors and insulators; renewable and nonrenewable energy resources
- **Light—**light as energy; the spectrum; how the eye works
- **Astronomy—**phases of the moon; eclipses; the solar system; stars and constellations; the Milky Way

Course Outline

Weather

- Identify forms of precipitation (rain, snow, sleet, and hail) and explain how they form
- Use appropriate tools to measure and record weather conditions, including air temperature, wind direction, wind speed, humidity, and pressure
- Explain that air masses meet at fronts and that most weather changes occur along fronts
- Explain how air moves in cold and warm fronts and identify common weather patterns associated with each
- Identify humidity as the amount of water vapor in the air
- Identify common weather patterns associated with changes in air pressure
- Recognize that meteorologists rely on data collected from various resources, such as weather stations, weather balloons, weather satellites, and weather radar
- Interpret weather maps and their symbols, including those for cloud cover, precipitation, temperature, pressure, and fronts

Classification of Vertebrates

- Distinguish between *vertebrates* and *invertebrates*
- Recognize that some animals have constant internal body temperatures and others have internal body temperatures that fluctuate depending on the temperature of their surroundings
- Identify different groups of vertebrates (fish, amphibians, reptiles, birds, and mammals) according to their common characteristics

Ecosystems

- Explain than an *ecosystem* includes all living things in a particular region
- Describe *climate* as the usual weather in a certain area over many years
- Identify the three main climate zones as *tropical, temperate,* and *polar*
- Recognize that scientists use patterns of climate, vegetation, and animal life to identify different ecosystems
- Describe different ecosystems: tundra, boreal forest, temperate deciduous forest, tropical rain forest, grasslands, desert, freshwater, and marine
- Recognize that living things have physical and behavioral adaptations that enable them to survive in a particular ecosystem

Ecosystems of the Past

- Recognize that many organisms that once lived on Earth are extinct, and while some of them resembled animals and plants alive today, others were quite different
- Compare modern ecosystems with similar ecosystems from Earth's geologic past (for example, reef, tundra, and forest)
- Recognize methods (fossils, tree rings, and ice) scientists use to study past ecosystems

Properties of Matter

- Identify forms of matter: solid, liquid, and gas
- Describe the properties of solids, liquids, and gases (for example, *solids* have a definite shape and a definite volume; *liquids* have a definite volume but no definite shape; *gases* have neither definite shape nor definite volume)
- Recognize that all matter is made of particles called *atoms*, which are constantly in motion and much too small to be seen with the naked eye
- Describe the motion of atoms in solids, liquids, and

gases: atoms in solids vibrate slightly but do not change positions; atoms in liquids vibrate too much to stay in a fixed position; and atoms in gases move freely
- Describe how matter changes states when heated (from solid to liquid to gas) or cooled (from gas to liquid to solid)
- Use appropriate tools to measure the length, volume, mass, and weight of objects in metric units
- Convert measurements from one metric unit to another, such as millimeter (mm) to centimeter (cm)
- Define volume as the amount of space occupied by matter
- Recognize that mass is the resistance of an object to acceleration by a force
- Recognize that the mass of an object stays the same, but its weight changes depending on where it's weighed

Physical and Chemical Changes of Matter

- Identify a physical change as either a change in size and shape (by cutting, breaking, or grinding) or a change in phase (by melting, boiling, freezing, evaporating, or condensing)
- Classify changes in matter as chemical or physical
- Identify clues that suggest a chemical change (for example, producing heat or light, or changing color)
- Recognize that atoms of different elements can combine to form compounds, such as when hydrogen and oxygen combine to form water
- Recognize that scientists organize all known chemical elements in the Periodic Table, representing each element with a symbol

Human Body

- Explain that bones, cartilage, tendons, and ligaments make up the skeletal system
- Identify bones by shape (flat, curved, long, short, and irregular), name (skull, backbone, ribs, pelvis, and femur), and function (protection, support, and movement)
- Examine the internal structure of bones
- Observe that bones have tiny passageways containing nerves, blood vessels, and marrow where blood cells are made
- Identify musculoskeletal connections such as joints (ball and socket, hinge, pivot, and gliding), ligaments, and tendons, and describe how they function
- Examine how the human body heals and repairs broken bones
- Describe different types of muscles as skeletal, smooth, or cardiac and identify them as voluntary or involuntary
- Recognize that most skeletal muscles work in pairs: *flexors* contract to move a bone as *extensors* relax
- Identify the skin as the body's largest organ
- Explain the main functions of the skin (protecting, cooling, and sensing)
- Identify and describe the skin's two main layers (epidermis and dermis) and its structures, such as sweat glands, hair follicles, oil glands, and sense receptors

Energy

- Identify the earth's major source of energy as the sun, and recognize that you see and feel this energy as light and heat and that this energy makes life on Earth possible
- Recognize that energy can be stored in many forms, such as food, fuel (for example, coal, oil, gas, wood, and batteries), and even coiled springs and stretched rubber bands
- Recognize that energy is used to do work
- Recognize that machines and living things convert stored energy into different forms of energy, such as heat, light, and motion
- Explain that a *conductor* is a substance that allows energy to pass through it easily, while an *insulator* is a substance that allows little or no energy to pass through it
- Classify energy sources as either *renewable* (wind, wood, solar, hydroelectric, and geothermal) or nonrenewable (natural gas, oil, coal, and nuclear)

Light

- Explain that when light strikes an object, it can be reflected, transmitted, or absorbed
- Recognize that as light travels from one medium to another it refracts (bends)
- Explain that the color of an object is due, in part, to the color of light that is reflected back to your eyes
- Explain that a dark surface absorbs more light than a light surface and a light surface reflects more light than a dark surface
- Recognize that vision is one of your primary senses and that your vision relies on light energy
- Recognize that when an object is seen, light rays enter the eye and are interpreted by the brain
- Identify various parts of the eye: cornea, iris and pupil, lens, retina, optic nerve, rods, and cones

Sun, Earth, and Moon

- Describe the rotation and revolution of Earth: Earth completes one *rotation* on its axis every 24 hours, while it completes one orbit around the sun, or *revolution*, every year

- Explain how the tilt of Earth's axis causes the seasons
- State that the moon orbits Earth, and explain that the moon makes one revolution around Earth and one rotation in approximately one month
- Explain that the moon does not produce its own light, but that the moon is visible from Earth because sunlight reflects off its surface
- Describe the way in which the moon's appearance changes during the phases of the lunar cycle: new, full, quarter, crescent, and gibbous
- Explain that when Earth blocks sunlight from the moon, a *lunar eclipse* occurs; when the moon blocks sunlight from the Earth, a solar eclipse occurs
- Describe the features of the lunar landscape, such as craters, lowlands (maria), valleys (rilles), highlands, and soil
- Identify the moon as Earth's natural satellite, and give a simplified current explanation of how the moon was formed

The Solar System and Beyond

- Describe our solar system as a collection of nine planets, moons, and numerous other objects (such as asteroids and comets) with the sun at its center
- State that the force of gravity keeps the planets in orbit around the sun
- Name the planets in our solar system in order starting with the planet closest to the sun
- Identify the layers of the sun: core, photosphere, and corona
- Explain that stars are located far outside our solar system and are much farther away from Earth than the nine planets in our solar system
- Recognize that stars are classified according to their brightness, or *magnitude,* and that the brightness of a star in the sky has to do with its size and distance from Earth
- Recognize some prominent stars, such as Polaris, Sirius, Betelgeuse, and Rigel, and constellations, such as the Little Dipper, the Big Dipper, and Orion
- State that our solar system is part of the Milky Way galaxy
- Recognize that telescopes magnify the appearance of some distant objects in the sky, such as the moon and the planets, and increase the number of visible stars

Lesson Time and Scheduling

Total lessons: 72. If you teach Science twice a week, you can comfortably complete the program within a typical school year.
Lesson Time: 60 minutes. You might choose to split the lessons into smaller segments. The K[12] online lesson tracking system will allow you to pick up wherever you left off in any given lesson.

Standard Curriculum Items

A Walk in the Boreal Forest by Rebecca L. Johnson
A Walk in the Desert by Rebecca L. Johnson
A Walk in the Rainforest by Rebecca L. Johnson
A Walk in the Tundra by Rebecca L. Johnson
A Walk in the Deciduous Forest by Rebecca L. Johnson
A Walk in the Prairie by Rebecca L. Johnson
Sunshine Makes the Seasons by Franklyn M. Branley
The Moon Seems to Change by Franklyn M. Branley
Graduated cylinder
Safety goggles
Magnifying glass
Thermometer

Additional Curriculum Items

Some lessons require additional resources, including common household items and books that are readily available online or in your local library:
Modeling clay
Directional compass

NOTE: List subject to change.