

**M.S.A.D. #49**  
**Science Learning Objectives**

**KINDERGARTEN**

**Scientific Reasoning and Inquiry**

The student will make predictions, actively explore materials, ask questions, make and describe their observations, and record their observations in a variety of ways (drawings, graphs, stories, poems, etc.). They will examine strengths and weaknesses of simple arguments, and distinguish between important and unimportant information in a simple argument.

**Plants**

The student will ...

1. **X** Sort seeds according to size, shape, and color.
2. Recognize that inside a seed is a baby plant called an embryo.
3. **X** Recognize that most plants make seeds which grow into new plants of the same kind.
4. **X** Identify plants as living things.
5. Recognize differences between plants.
6. Name parts of a plant (leaf, stem, root, seed, and flower).
7. Explain why living things need energy (plants need the sun to grow).

**Animals**

The student will ...

1. Recognize some needs of living things.
2. **X** Name and compare various kinds of past and present animals (where they live, what they eat, how they move).
3. Recognize that animals produce their own kinds.
4. **X** Recognize that baby animals that grow inside their mother's body and that some developed from eggs laid outside their mother's body.
5. Recognize and describe ways in which animals of the species are alike and different (different spots on fur, different hair color, different size, same species characteristics).

**Health and Human Body**

The student will ...

1. **X** Name the five senses.
2. Recognize how each sense is used to collect information.
3. **X** Use the senses to classify objects (smell food, touch fabric, see faces).
4. Recognize the importance of the senses.

5. **X** Name the various body parts (wrist, elbow, knee, ankle, hips, shoulders, forehead, and chest).
6. Recognize body characteristics that make us unique; different (eye color, hair color, freckles, glasses, skin color, and foot size).
7. Classify foods in the four basic food groups.
8. **X** Recognize some sources of foods (cows-milk, ground and trees, vegetables and fruit).
9. Recognize some safety practices around the home, school, and neighborhood (Fireman visit).
10. **X** Identify some personal hygiene practices including hand washing and dental care.
11. **X** Name some reasons for practicing good safety and hygiene habits.
12. **X** Name emotions (sad, happy, and mad).
13. Recognize appropriate ways to express feelings.

## **Ecology**

The student will ...

1. **X** Name differences between living and non-living things.
2. Recognize differences between living and once-living things (dogs vs. Dinosaurs).
3. Recognize the needs of living things (food, water, oxygen, etc.)
4. **X** Name common pond animals.
5. **X** Recognize the stage of metamorphosis of a frog and butterfly.

## **Properties of Matter**

The student will ...

1. **X** Classify objects according to color, shape, weight, and size.
2. **X** Compare and order up to three objects and order according to size.
3. **X** Predict objects that will sink or float.

## **Simple Machines**

The student will ...

1. Identify wheels used in a variety of ways.
2. **X** Recognize that wheels make work easier to do.
3. Observe and examine a wheel that turns on an axle.

## **Astronomy**

The student will ...

1. Recognize the sun as a star.
2. Recognize the sun as the most observable object in our daytime sky.
3. **X** Name, compare objects seen in the day and evening sky (moon, star, sun, and clouds).
4. Recognize that the sun can remain shining even though we cannot see it.
5. Recognize a globe as a model of the earth.
6. Recognize the earth as a planet in space.
7. **X** Name the four seasons of the year.
8. **X** Name characteristics of the four seasons.

### **Geology**

The student will ...

1. Recognize the differences among rocks, sand, and soil.

### **Meteorology**

The student will ...

1. **X** Name and describe kinds of weather as sunny, cloudy, windy, rainy, snowy, calm, warm, hot, or cold.
2. **X** Classify clothing and activities as appropriate for certain kinds of weather.

**GRADE 1****Scientific Reasoning and Inquiry**

The student will make predictions, actively explore materials, ask questions, make and describe their observations, and record their observations in a variety of ways (drawings, graphs, stories, poems, etc.). They will examine strengths and weaknesses of simple arguments, and distinguish between important and unimportant information in a simple argument.

**Energy**

Students will ...

1. **X** Define that a sound is caused by vibrating objects.
2. **X** Demonstrate a vibrating motion using elastic.
3. **X** Demonstrate a high, low, loud, and soft sound.
4. **X** Name some musical instruments that make sounds.
5. **X** Identify different kinds of motion using the following terms: roll, slide, jump, lift, back and forth, up and down, round and round.
6. **X** Define forces such as push or pull.
7. Recognize gravity as a pull that holds all objects and people on the earth.
8. Define friction as the rubbing together of two surfaces.
9. Classify surfaces as those that either increase or reduce action and how surfaces differ in the amount of friction they create.

**Simple Machines**

Students will ...

1. **X** Identify a variety of machines.
2. **X** Appreciate that machines make work easier.
3. **X** Define force as a push or pull.
4. **X** Show that forces can change the size, shape, and direction of things.
5. **X** Identify and explain the use of the six simple machines.
6. **X** Explain how our lives would be different without the invention of simple machines.

**Plants**

Students will ...

1. **X** Explain why we need plants.
2. **X** Classify seeds into groups according to how they travel.
3. **X** Diagram the main parts of a seed.
4. **X** Label an illustration of a plant using the following words: leaf, stem, root, and blossom.

5. **X** Define the use of plants as a food for animals and people and an essential part of a life cycle.
6. Identify a variety of products that come from plants.
7. Describe the functions of roots, stems, leaves, and flowers.
8. Recognize that seeds will grow to look like parent plant.
9. Recognize that plants can grow from bulbs and plant cuttings.
10. **X** Identify differences between living and non-living things.

### **Geology**

Students will ...

1. **X** Demonstrate how water and wind cause erosion.
2. Recognize effects of rain on land.
3. Identify these rocks by color and texture: granite, slate, mica, tourmaline, quartz, sandstone.

### **Oceanography**

Students will ...

1. **X** Define what an island is.
2. Recognize how islands are made.
3. **X** Define oceanographer.
4. Discuss why people explore the ocean.
5. Discuss types of underwater vessels such as submarines, bathyspheres.
6. **X** Recognize forms of ocean life.
7. Locate oceans and lakes on a world map.
8. Recognize differences in salt and fresh water.
9. Compare oceans and lakes in size.
10. Recognize that the amount of light and pressure is different at different water depths.
11. Recognize that plants and animals have different needs for survival at various ocean levels.

### **Animals**

Students will ...

1. **X** Classify a variety of animals as meat eaters, plant eaters, or both.
2. **X** Describe how animals use claws, wings, fins, color, etc., to adapt to their environment.

### **Health and Human Body**

1. **X** Identify the five senses.
2. **X** Review the food groups.

## **GRADE 2**

**\*Note:** The teacher will remind students of the interrelationships of math and science skills.

### **Scientific Reasoning and Inquiry**

The student will make predictions, actively explore materials, ask questions, make and describe their observations, and record their observations in a variety of ways (drawings, graphs, stories, poems, etc.). They will examine strengths and weaknesses of simple arguments, and distinguish between important and unimportant information in a simple argument.

### **Birds**

The students will ...

1. **X** Describe the physical characteristics of birds.
2. **X** List some common Maine birds.
3. Describe ways in which Maine birds are alike and different.
4. Describe environments of some common Maine birds.

### **Insects**

The students will ...

1. **X** Describe the physical characteristics of insects.
2. **X** Identify animals that are insects.
3. **X** Describe the life cycle of a butterfly.

### **Health**

The students will discuss ...

1. Dental health.
2. Personal hygiene.
3. Nutrition.
4. Examples of diseases and their causes.

### **Magnets**

The students will ...

1. **X** Sort objects that are attracted and those that are not attracted by magnets.
2. Recognize how an electromagnet works.
3. Become aware of the many kinds of magnets.
4. **X** Demonstrate the daily uses of magnets.
5. **X** Locate the poles on a magnet.

### **Light**

The students will ...

1. Recognize how light rays bend to form a spectrum.
2. Use a prism to make a spectrum.
3. Identify the sources of light.
4. **X** Demonstrate where a light source must be located in relation to an object to produce a shadow.
5. Define a magnifying lens as one that causes objects to appear larger than they are.
6. Recognize the effect of mirrors on objects and print.

### **Food Chains**

The students will ...

1. **X** Recognize that a food chain is a large system made up of smaller parts.
2. **X** Explain how plants and animals depend on each other for food.
3. **X** Predict what will happen if one part of the food chain is broken.
4. Classify a variety of animals as either plant eaters, meat eaters, or both.

### **Pollution**

The students will ...

1. **X** Discuss how pollution can harm living things.
2. **X** Explain why clean air, land and water are important.
3. **X** Discuss ways air, land, and water become polluted.
4. **X** Discuss how waste materials could be used over again for a constructive purpose.
5. Name ways children can keep their home, school, and community clean.

### **Astronomy**

The students will ...

1. **X** Define a star and a planet.
2. Recognize ways that people, plants, and animals depend on the sun.
3. Make models of or illustrate our solar system.
4. Use a globe model of the sun and earth to demonstrate the movements of the earth causing four seasons.
5. **X** Recognize with a model that the earth rotates and revolves.
6. **X** State that the earth is a planet that revolves around the sun.
7. **X** State that the sun is a star and the center of our solar system.

### **Meteorology**

The students will ...

1. **X** Discuss air and weather.
2. Recognize that conditions in the air create weather
3. **X** Observe changes in temperature using a thermometer.
4. **X** Record and chart weather changes.
5. Recognize what causes snow to melt.
6. Compare wind speed using a modified Beaufort Scale (wind speed chart).
7. Determine wind direction using a wind vane.
8. **X** Recognize how clouds are formed as part of the water cycle: evaporation, condensation, and precipitation.
9. **X** Classify by pictures the following cloud forms: stratus, cirrus, cumulus clouds.

### **Properties of Matter**

The students will ...

1. **X** Exhibit knowledge of the properties of matter by class discussion, illustration and/or description/labeling of illustrations using the following terms: solid, liquid gas, evaporate, condense, melt, freeze, length, and volume.
2. Recognize that water pushes up on objects placed in it.
3. Demonstrate how water rises when objects are placed in it.
4. Become aware that if the force of gravity pulling down on an object is greater than the force of water pushing up, the object sinks.
5. **X** Predict which given objects will sink and which will float.

### **GRADE 3**

**\*Note: The teacher will remind students of the interrelationships of math and science skills.**

### **Scientific Reasoning**

The student will ...

1. **X** Use the scientific method to organize data into charts and tables, analyze data, and draw valid conclusions.
2. **X** Recognize patterns in data and utilize the patterns to make predictions.

## **LIFE SCIENCE**

### **Plants**

The students will ...

1. **X** Understand and be able to describe similarities and differences in the ways plants and animals get food.
2. **X** Identify the different parts of flowers (stamen, pistil, sepal, and petals) and dissect them.
3. **X** Identify common deciduous and evergreen trees.
4. **X** Recognize how fruits form.
5. Identify factors that affect seed germination and record the results of investigations.
6. **X** Recognize the parts of plants and their jobs (root, stem, leaves).

### **Human Body**

The student will ...

1. **X** Discuss the functions of bones for support (skeletal system).
2. Recognize how joints help the body move.
3. **X** Define voluntary and involuntary muscles.
4. **X** Explain how voluntary muscles help the body move (muscular system).
5. Identify major human organ systems (Skeletal, Muscular, Respiratory, Digestive, Circulatory, and Nervous).

### **Nutrition**

The students will ...

1. Recognize that food is the source of energy for the body.
2. **X** Give examples of high energy foods and low energy foods.
3. **X** Describe nutrients (vitamins, minerals, fats, proteins, and carbohydrates) and state their importance in the human body.
4. Identify foods that contain each type of nutrient.
5. **X** Make a model of the food pyramid.
6. Prepare a menu for two days based on a balanced diet.

7. Recognize the importance of good health habits.

## **EARTH SCIENCE**

### **Astronomy**

The students will ...

1. **X** Recognize the positions of the planets in the Solar System.
2. **X** Recognize how the planets differ (size, shape, temperature, length of day, length of year).
3. **X** Recognize what causes the seasons.
4. **X** Draw diagrams showing the tilt of the earth's axis in relation to the sun in winter and in summer.

### **Geology**

The students will ...

1. **X** Classify the three types of rocks (igneous, sedimentary, and metamorphic).
2. **X** Describe or use a model to show how one type of rock was formed.
3. Recognize the steps in a volcanic eruption.
4. Recognize that earthquakes change the earth's crust.
5. Recognize how soil is formed from the breaking apart of rock.
6. **X** Demonstrate the erosion process.
7. Describe how fossils form and make a model of a fossil.
8. Recognize that organisms that are present now have not always existed and that some life forms are extinct.

## **PHYSICAL SCIENCE**

### **Matter**

The students will ...

1. **X** Classify matter as a solid, liquid, or gas.
2. **X** Differentiate between evaporation and condensation, and precipitation in relation to the water cycle.
3. Explain how matter changes in both physical and chemical ways.

### **Energy**

The students will ...

1. Identify different forms of energy (light, heat, magnetism, and electrical).
2. **X** Demonstrate that a force is needed to cause a change in the motion of an object.
3. Draw conclusions about how the amount of force affects the motion of more massive and less massive objects.
4. Predict what might happen if there was no friction.
5. **X** Recognize work as the product of force and distance.

### **Sound**

The students will ...

1. **X** Recognize that vibrating objects cause the air around them to vibrate.
2. **X** Demonstrate that different vibrations produce different sounds.
3. **X** Observe how sound travels through solids, liquids, and gases.

## **GRADE 4**

**\*Note:** The teacher will remind students of the interrelationships of math and science skills.

### **LIFE SCIENCE**

#### **Animals**

The student will ...

1. **X** Report on a selected animal explaining his adaptations and behaviors and how the animal is dependent on its ecosystem.
2. Illustrate how adaptations help animals survive.
3. **X** Draw a food chain beginning with one celled organisms and ending with decomposition.
4. **X** Compare and contrast life cycles, behavior, and structure of frogs and butterflies.
5. Classify animals as vertebrates or invertebrates.
6. Explain parts of a microscope and how to use it.
7. Observe single cell organisms under microscope (i.e., paramecium, amoebae).

#### **Health and Human Body**

The student will ...

1. **X** Make a diagram of the digestive system and label the parts.
2. Recognize excretory systems and its functions.
3. Recognize the basic functions of a cell and their importance to the human body.
4. **X** List some organs of the human body (include heart, lungs, liver, and kidneys).
5. Explain the basic function of tissue in the human body.
6. Recognize the relationship of cells, tissues, and the organ systems.
7. Recognize the circulatory and respiratory systems.

### **PHYSICAL SCIENCE**

#### **Properties of Matter**

The students will ...

1. Recognize the particles in a model of an atom.

#### **Elements**

The students will ...

1. Identify mixture (i.e., salt and water).
2. Identify compound (mixing vinegar and soda).

3. Understand the difference between mixture and compound.

### **Chemical/Physical Reaction**

The students will ...

1. **X** Demonstrate a physical reaction (i.e., melting water).
2. **X** Demonstrate a chemical reaction (i.e., rusting a nail).
3. Discuss the term: physical properties.

### **Energy**

The students will ...

1. Demonstrate use of a thermometer by measuring air temperature.
2. Demonstrate use of thermometer by measuring liquid temperature.
3. **X** Name positive and negative electrical charges through the study of static electricity.
4. List characteristics of charges (like charges repel, opposites attract).
5. **X** Demonstrate a series circuit with batteries and conclude the more lights in a series, the weaker the light.
6. **X** Demonstrate conductors and insulators.
7. Demonstrate a parallel circuit.
8. List ways to produce electricity and discuss which are renewable and which are not (i.e., solar, wind, fossil, fuels, hydro-power, geothermal).

### **Heat**

The students will ...

1. Demonstrate the conduction of heat energy (use metal, glass, and wooden rods).

### **Magnets**

The students will ...

1. Construct a magnetic compass (i.e., magnetize a pin).
2. Student will compare the magnetic field between two like magnet poles and between two opposite magnet poles, recognizing that variables will affect the outcome (i.e., how far the magnets are apart).
3. **X** List examples of objects that attract to magnets and those that do not.

### **Light**

The students will ...

1. **X** Demonstrate that colors make up light (i.e., color wheel).
2. Describe how flat and curved mirrors reflect light.

3. **X** Demonstrate the properties of light using opaque, transparent, and translucent objects.
4. Demonstrate relationship between light and heat.

## **EARTH SCIENCE**

### **Moon**

The students will ...

1. **X** Describe how the position of the moon, sun, and earth make the moon's phases change as the moon revolves around the earth.
2. **X** Illustrate how the position of the earth, sun, and moon causes lunar and solar eclipses.
3. Recognize that people from earth have walked on the moon.
4. Discuss the following features of the moon: crater, light areas, dark areas, and rays.
5. Describe the moon's effect on the earth.

### **Climate**

The students will ...

1. Explain how air masses and weather fronts affect weather.
2. **X** Illustrate the processes of the water cycle.
3. Recognize the effect that wind direction has on weather patterns.
4. Collect data (wind direction, temperature, air masses, humidity, barometer readings to make weather predictions).

### **Oceanography**

The students will ...

1. Discuss Jacques Cousteau's work as an underwater explorer.
2. Construct a topographical map as a replica of land forms in the ocean. Include trenches, continental shelf, continental slope, ocean basin, and ridge.
3. Recognize and discuss their importance: radar and sonar
4. **X** Explain the differences between high tide and low tide.
5. Recognize the moon's affect on tides.
6. Use computers to present information generated from one of their experiments.
7. Create an invention that solves a problem.
8. State an example of bias in information (i.e., advertisements, forestry-clear cutting, power companies, hydropower, and nuclear power).

## **GRADE 5**

**\*Note:** The teacher will remind students of the interrelationships of math and science skills.

## **LIFE SCIENCE**

### **Scientific Reasoning**

In all scientific experiments, students will predict, make observations, collect, record, and analyze data, and draw conclusions. They will also recognize that variables will affect the outcome. Students will learn to formulate and justify ideas and make informed decisions. Students will communicate effectively in the application of science and technology.

### **Plants**

The students will ...

1. **X** Compare and contrast the properties of plants and animals.
2. **X** Explain the reasons botanists classify plants.
3. Classify fruits according to similar characteristics.
4. **X** Describe the differences between vascular and non vascular plants.
5. **X** Identify mosses and ferns.
6. Recognize the difference between flowering seed plants and non-flowering seed plants.
7. Recognize the difference between monocots and dicots by observing germinated seeds.
8. **X** Recognize the stoma's function in transpiration.
9. **X** Compare and contrast deciduous and evergreen trees.
10. **X** Compare and contrast the processes of photosynthesis and respiration.
11. Use a plant key to identify local plants and trees.

### **Ecology**

The students will ...

1. Recognize the stages of any life cycle.
2. Identify plants as annuals, biennials, or perennials.

### **Animals**

The student will ...

1. **X** Classify animals as invertebrates and vertebrates.
2. Recognize sponges, stinging-celled animals, flatworms, and roundworms as simple invertebrates.
3. Recognize and state differences and similarities among simple invertebrates.

4. Recognize mollusks, segmented worms (annelids), arthropods, and spiny-skinned animals (echinoderms) as complex invertebrates.
5. Describe vertebrate's skeletal structure and explain its function.
6. Recognize cold-blooded vertebrates and give examples of animals in each group.
7. Recognize warm-blooded vertebrates and give examples of animals in each group.
8. Define Metamorphosis and draw the stages in the life of a frog or toad.
9. **X** Compare and contrast characteristics of warm and cold blooded animals.
10. **X** List reasons mammals are more complex than other vertebrates.

## **PHYSICAL SCIENCES**

### **Energy**

The student will ...

1. **X** Give examples of specific types of energy.
2. **X** Demonstrate the difference between potential and kinetic energy.
3. Give some everyday examples of these forms of energy: chemical, mechanical, electrical, and solar.
4. Observe the effect of conduction, convection, radiation, and insulation.
5. **X** Draw models of common energy chains to show how energy can be changed from one form to another.
6. Categorize energy sources as renewable or nonrenewable and compare how these sources are used by humans.
7. Observe that when a coil of wire cuts across lines of force around a magnet, electrons move through the wire causing electrical current.
8. Demonstrate and describe the function of a generator and a motor with hand-held generators.
9. Recognize a battery as an example of stored energy.

### **Simple Machines**

The student will ...

1. **X** List six simple machines and tell one way each can do work.
2. Recognize machines as devices that make work easier.

### **Properties of Matter**

The student will ...

1. **X** Calculate the volume of an object using length times height times width.
2. Recognize the terms mass and weight.
3. Demonstrate balance and scale to determine various weights.
4. Recognize density as amount of matter of an object compared to volume.
5. **X** Compare density of various liquids and solids.
6. Demonstrate the effects of gravity.
7. **X** List some common physical properties of matter.

8. **X** Observe, describe and give some examples of physical changes.
9. Observe a demonstration to differentiate between solid, liquid, and gaseous states.
10. Observe chemical change and give examples of rapid and slow chemical changes.
11. **X** Draw a model of an atom identifying the particles of which it is made.
12. Recognize common elements on a Periodic Chart of Elements.
13. **X** Build models to show that atoms combine to make different molecules and/or compounds.
14. Observe how properties of a compound differ from those elements that form it.

### **Astronomy**

The student will ...

1. **X** Define astronomy as the science that deals with space and all bodies in it.
2. Recognize tools and instruments used to study space, i.e., telescopes, satellites.
3. Recognize that distances in space are very large.
4. Recognize that light-year and astronomical units are used to measure distance in space.
5. **X** Locate some common constellations in star charts.
6. Recognize a constellation's place in the sky at different times of the night and in different seasons.
7. Recognize that the earth's rotation causes the stars to appear to move and that the earth's revolution causes constellations to appear in different seasons.
8. **X** Identify constellations seen in each season in Maine.
9. **X** Tell why Polaris is called the pole star.

### **Geology**

The student will ...

1. **X** Name and describe the layers that make up the earth's interior.
2. **X** Tell the difference among igneous, sedimentary, and metamorphic rocks.
3. **X** Recognize that the earth's crust and mantle are divided into plates (plate tectonic theory).
4. Recognize the effects of an earthquake.
5. **X** Identify and describe different types of volcanoes, i.e., shield, cinder cone, composite cone.
6. **X** Tell the difference between weathering and erosion.
7. Recognize ways in which water, glaciers, and wind change the land.
8. Recognize and describe how different land forms are formed, i.e., delta, moraine, desert, sand dune, canyon, U-shaped valley.

### **Meteorology**

The student will ...

1. Discuss ways the weather affects our daily lives.
2. Discuss the effect of gravity on air pressure.
3. **X** Identify instruments used to measure air pressure, temperature, wind speed and direction.
4. Apply an understanding of the effect of air pressure by using a barometer.
5. Recognize the factors that affect surface air temperature.
6. Discuss what causes wind.
7. **X** Recognize types of clouds.
8. **X** Illustrate three basic types of clouds and tell the weather associated with each.
9. **X** Identify a meteorologist as a scientist who studies and forecasts weather.
10. Recognize properties of common air masses.
11. **X** Tell the difference between a cold and a warm front and the weather each one brings.
12. **X** Observe and record changing weather conditions for a minimum of 5 days.
13. Recognize weather symbols, given a key, on a weather map.
14. Discuss terminology and symbols used to read a weather map by listening to a weather report.
15. Create a weather map using weather symbols.
16. Determine the temperature, wind speed and direction, air pressure, and humidity of a number of locations and make comparisons of the data collected.
17. Describe weather at a given location using weather maps.

## **GRADE 6**

**\*Note:** The teacher will remind students of the interrelationships of math and science skills.

## **Scientific Reasoning**

In all scientific experiments, students will predict, make observations, collect, record, and analyze data, and draw conclusions. They will also recognize that variables will affect the outcome.

1. Describe and practice the scientific process.

## **EARTH SCIENCE**

### **Geology**

The student will ...

1. **X** Discuss what a glacier is.
2. Define glacial land forms.
3. Recognize topographical terms and symbols.
4. Examine land forms of regions of the United States by using topographical maps.
5. Recognize characteristics of rocks/minerals within the United States.
6. **X** Discuss the cycle of a rock.
7. Discuss how different types of soil absorb water.
8. Discuss the effect of soil types upon plant growth.
9. Discuss land use compatibility with nature.
10. Discuss erosional and depositional effects upon the geology of an area.
11. Discuss means of preventing erosion.

### **Oceanography**

The student will ...

1. Discuss ocean plants and animals.
2. Discuss life on a sand dune and the significance of sand dunes to human and oceans.
3. Compare the topography of the ocean floor to that of the coastline and land.
4. Discuss characteristics of tides and waves along the Maine coast and some of the effects on shorelines and upon mankind.
5. Discuss the causes, effects, and possible solutions to the coastal pollution problems.
6. **X** Discuss issues and problems related to the development of ocean resources.

### **Astronomy**

The student will ...

1. **X** Define terms relating to a galaxy, astronomers, and universe.

2. **X** Discuss the Milky Way.
3. Locate the position of our solar system in the Milky Way using a star chart.
4. Recognize the two closest galaxies to the Milky Way.
5. **X** Classify galaxies, including size and number of stars. Classify galaxies according to shape.
6. Discuss the possibilities of life on another planet.
7. Discuss the technology of space travel and the advances made as a result of this travel.

## LIFE SCIENCE

### Plants

The student will ...

1. Recognize various ways of growing plants (hydrotropism, phototropism, and geotropism).
2. Discuss the most and least favorable light, soil, and water conditions for plant growth.
3. **X** Explain methods of pollination.
4. **X** Investigate plant germination.
5. Recognize sexual and asexual reproduction.
6. Discuss possible effects of man's technological changes upon plant development.

### Animal Cells/Reproduction

The student will ...

1. Discuss the process of mitosis and meiosis.
2. Discuss internal and external fertilization processes.
3. **X** Discuss human embryo development.

### Body Systems

The student will ...

1. **X** Identify the organs of each body system (skeletal, muscular, circulatory, respiratory, nervous, digestive, excretory, endocrine, and reproductive) and describe how they work together to perform their functions.
2. **X** Describe how the organ systems work together to perform their functions.
3. **X** Compare and contrast human organ systems with those of other species.
4. **X** Identify the causes and effects of diseases, explain their transmission, and identify some prevention strategies.
5. State that bones are living material.
6. **X** Describe the parts of the skeleton and explain the function of each.
7. Recognize that proper diet is essential for building and maintaining strong bones.
8. Recognize types of joints and tell their functions.
9. Recognize injuries to bones and joints.

10. **X** Explain the functions of muscles and tendons.
11. Compare the functions of the three types of muscles.
12. Recognize the importance of diet, exercise, and rest in maintaining healthy muscles.
13. **X** Trace the flow of blood through the body.
14. Recognize the effects of diet, stress, and exercise upon the circulatory system.
15. Discuss respiration.
16. Discuss oxygen transfer.
17. Recognize the parts of the brain and the functions of each part.
18. Recognize that the nervous system functions as the body's communication and control network.
19. Recognize the difference between sensory and motor nerves.
20. Explain/demonstrate how reflexes act to protect the body.
21. **X** List the five main senses and recognize how they aid in protecting the body from danger.
22. Discuss drugs and the effects drugs have upon the human body.

### **Micro-organisms/microscopes**

The student will ...

1. **X** Define microorganism and list characteristics of microorganisms.
2. Discuss protozoa, algae, fungi, bacteria, and viruses.
3. **X** Recognize how microscopes work.
4. **X** Prepare and examine microscope slides of single-celled and multi-celled organisms.
5. **X** Identify the parts of a microscope.
6. **X** Use a microscope to observe cells and microscopic animals.

## **PHYSICAL SCIENCE**

### **Properties of Matter**

The student will ...

1. **X** Design models to test for strength and flexibility.
2. Discuss and hypothesize as to the strongest and weakest shapes given specific criteria.
3. Discuss stress upon a shape and determine the results of the stress.
4. Discuss design changes upon strength and flexibility.

**GRADE 7 – All objectives are core.**

**\*Note: The teacher will remind students of the interrelationships of math and science skills.**

## **LIFE SCIENCE**

### **General Science**

The student will ...

1. Make qualitative and quantitative observations.
2. Describe and practice the scientific process.
3. Understand and practice lab safety during lab situations.
4. Be able to identify basic lab equipment.
5. Measure i.e. length, width, mass, volume, density and temperature.
6. Be able to do simple metric conversions.
7. Support reasoning by using a variety of evidence.
8. Students will make accurate observations using appropriate tools and units of measure.
9. Students will be able to design and conduct scientific investigations which include controlled experiments and systematic observations. Collect and analyze data and draw conclusions fairly.
10. Define and be able to calculate density of various forms of matter.
11. Explain the principle of water displacement.

### **Ecology**

The student will ...

1. Define and describe examples of populations, habitats, niches, and ecosystems.
2. Recognize the three types of symbiosis - commensalism, mutualism and parasitism.
3. Describe the cycles of matter - water, Oxygen/Carbon, and Nitrogen Cycles.
4. Be able to compare food chains and food webs.
5. Identify energy roles-producers, consumers, and decomposers.
6. Describe structural and behavioral adaptations that allow organisms to survive in a changing environment.

## **PHYSICAL SCIENCE**

### **Chemistry**

The student will ...

1. Identify the different formulas for elements, compounds, and molecules.
2. Balance simple equations using the law of conservation of matter.
3. Identify types of reactions.
4. Identify properties of acids and bases.

### **Matter**

The student will ...

1. Explain and give examples of matter.
2. Define solid, liquid, and gas.
3. Recognize elements and their symbols.
4. Explain the difference between compounds and mixtures.
5. Identify chemical and physical changes.

## **Motion, Forces, & Energy**

The student will ...

### **ENERGY**

1. Describe the different forms of energy.
2. Explain the conservation of energy theory.
3. Differentiate between potential and kinetic energy.

### **FORCE**

4. Define force.
5. Define gravity.
6. Differentiate between weight and mass.
7. Explain and give examples of friction in their daily lives.

### **MOTION**

8. Describe the motion of objects using knowledge of Newton's laws.
9. Use formulas to describe motion (speed, acceleration).

## **Electricity**

The student will ...

1. Understand that electric currents carry energy.
2. Explain how series and parallel circuits operate.
3. Describe volts, amps, and ohms.
4. Use Ohm's law to determine values of electricity word problems.
5. Explain how electricity is produced.
6. Understand safety devices in an electric circuit.

**GRADE 8****Scientific Reasoning**

In all scientific experiments, students will predict, make observations, collect, record, and analyze data, and draw conclusions. They will also recognize that variables will affect the outcome.

**Astronomy**

The student will ...

1. **X** compare and contrast (3) theories of universal origins.
2. **X** Explain the concept of space time.
3. **X** Compare and contrast the three types of galaxies.
4. **X** Describe the composition of an average galaxy.
5. **X** Describe the movements of stars and galaxies.
6. **X** Describe the life cycle of a star.
7. **X** Discuss our sun in terms of its stage in the stellar life cycle.
8. **X** Discuss the diversity of objects in the universe.
9. Describe the H-R diagram.
10. Compare and contrast apparent and absolute magnitude using common, everyday examples.
11. Describe (2) methods of solar system formation.
12. **X** List the inner and outer planets from memory.
13. **X** Note characteristics of inner and outer planets.
14. Draw or label a diagram of the sun's structure.
15. Describe features of the sun.
16. Explain how auroras occur.
17. Describe and identify features of the moon.
18. **X** Identify the various phases of the moon.
19. Explain why eclipses occur.
20. Explain why tides occur.
21. **X** Explain why seasons occur.
22. Explain a comet.
23. Explain an asteroid.
24. Explain a meteor/meteoroid/meteorite.

**Geology:**

The student will ...

1. **X** Use chemical symbols to express element names.
2. **X** Compare and contrast sedimentary, igneous and metamorphic rocks.
3. **X** Visually classify representative samples of the three types of rocks.
4. **X** Explain how the rock cycle changes the earth's surface.
5. Compare and contrast various igneous rock formations.
6. **X** Visually identify various mineral samples.

7. **X** Identify various mineral samples by performing identification tests.
8. **X** List the 4 major layers of the Earth.
9. Compare and contrast the following for each of the 4 major layers of the Earth:  
Size; composition; and, state of matter
10. **X** Describe how the earth would have looked 220 million years ago.
11. **X** Describe the driving mechanism for tectonics.
12. **X** Describe the causes of an earthquake.
13. Describe an EQ's intensity, magnitude, using the mercalli and richer scales.
14. Compare and contrast the various types of volcanoes.
15. **X** Describe the causes of volcanism.

## **Oceanography**

The student will ...

1. **X** Describe the hydrologic cycle.
2. **X** Describe how glaciers shape the land.
3. **X** Describe what may happen to rain water.
4. **X** Describe the composition of ocean water.
5. Describe the effect that temperature has on ocean water.
6. Compare and contrast the 3 major depth zones.
7. Compare and contrast the three major life zones of the ocean shore.
8. **X** Describe the physical structure of the edges of the continents.
9. **X** Describe the structure of the ocean floor.
10. **X** Describe currents and waves and their effect on the environment.
11. **X** Describe food chain relationships in the ocean. (focus on photoplankton and oxygen production.)
12. **X** Foster a greater appreciation and respect for the ocean and its significance in our lives. (How does the Gulf affect Maine?) Describe how the Gulf of Maine affects the State of Maine.
13. Locate the Gulf of Maine on a map

## **Meteorology and Climatology:**

The student will ...

1. **X** Compare and contrast the past and present atmosphere of earth.
2. **X** Describe the composition of today's atmosphere.
3. Sketch or describe the oxygen, nitrogen and carbon dioxide cycles.
4. **X** Describe the characteristics of the major layers of the earth's atmosphere.
5. **X** Describe how the greenhouse effect affects the earth.
6. Use correctly a barometer and anemometer.
7. Describe the cause of air pressure.
8. **X** Describe the various types of local wind systems.
9. **X** Locate the position of typical global wind systems on the earth.
10. Visually identify various types of clouds from photos and verbal descriptions.
11. Define precipitation.

12. Describe the characteristics of the three major types of fronts.
13. Describe the cause of rainstorms and snowstorms.
14. **X** Describe the conditions that lead to severe weather.
15. **X** Describe a hurricane.
16. **X** Describe a tornado.
17. Identify areas of the US that are likely to experience a tornado or a hurricane.
18. Read a weather map
19. **X** Collect data in anticipation of weather prediction.