# Fourth Grade

## Plants

Indicator(s): Explain that plants are made of smaller units called cells. Draw plant cells and identify the parts. Ls4.3. Classify common plants according to their characteristics (e.g., tree leaves, flowers, seeds, roots and stems). LS4.5 Describe how organisms interact with one another in various ways (e.g. many plants depend on animals for carrying pollen or dispersing seeds.) LS4.2 **Relate plant structures to their specific functions (e.g., growth, survival, reproduction).**

I can...

_____ 1. Define cell, cell wall, cell membrane, nucleus, cytoplasm, chloroplast, vacuole, mitochondria, ribosomes, germination, maturity, reproduction, conifer, deciduous, photosynthesis, monocot, dicot, and growth.

_____ 2. Explain that plants are made of millions of different kinds of small units called cells.

_____ 3. Illustrate an plant cell and label its main parts.

_____ 4. Relate that plants get their characteristics from cells.

_____ 5. Recognize and classify various types of plants and label their parts.

_____ 6. Classify common plants according to their characteristics (e.g., tree leaves, flowers, seeds, roots and stems).

_____ 7. Explain how plant parts/structures help plants grow, survive and reproduce.

_____ 8. Provide examples of how different plants & animals interact to help plants grow, survive and reproduce.

_____ 9. Predict and explain ways that plants can adapt to survive in less than ideal conditions.

**Plants**

Indicator(s): **LS4.1 Compare the life cycles of different plants including germination, maturity, reproduction, and death.** Ls4.4. Observe and explore that fossils provide evidence about plants that lived long ago and the nature of the environment at that time.

I can...

_____ 1. Define sprout, offspring, seed, seedling

_____ 2. State the basic steps of the life cycle of a plant.

_____ 3. Observe, describe, and draw the steps of a plant's life cycle.

_____ 4. Tell the differences and similarities between several types of plants as they grow, reproduce, and die.

_____ 5. Grow my own plant, measure/chart its growth, and predict the changes in the plant's life cycle.

_____ 6. Compare and contrast characteristics of plants of today with plant fossils.

_____ 7. Determine the environment of plants from structures observed in fossils.

_____ 8. Evaluate the structures of plants in fossils and determine whether the plant could survive and thrive today.

**Matter: Physical and Chemical Change**

Indicators: Define matter. Define atoms and relate them to the different elements. Explain that elements make up different substances like air, water, salt, and minerals. Ps4.3. Describe objects by the properties of the materials from which they are made and that these properties can be used to separate or sort a group of objects (e.g., paper, glass, plastic and metal). **PS4.4 Explain that matter has different states (e.g. solid, liquid, and gas) and that each state has distinct physical properties.**

I can...

_____ 1. Define matter, phase or state and provide examples of shape, volume, density, solid, liquid, gas, physical properties, density, texture, malleability, ductility, conductivity, hardness, brittle, crystal, luster, elasticity, metal, nonmetal, temperature and heat.

_____ 2. Define atoms (find elements on the periodic table) and give their physical properties.

_____ 3. Explain that elements make up different substances like air, water, salt, and minerals.

_____ 4. Observe and describe physical properties (hardness/brittleness, shape, state, texture, elasticity, conductivity, color) of various substances and group/classify objects by their properties.

_____ 5. Investigate the differences between solid, liquid, and gas phases of a substance such as water.

_____ 6. Predict and test which substances will sink or float.

_____ 7. Observe and record the changes in shape, volume, density, hardness, temperature, and motion/energy of molecules.

_____ 8. Predict, test, and explain how/why properties like density, elasticity, hardness, malleability, and conductivity change with phase changes.

**Matter: Physical and Chemical Change**

Indicators: **PS 4.1 Identify characteristics of a simple physical change (e.g. heating or cooling can change from one state to another).** Emphasize that physical changes DO NOT make a new substance.

I can...

_____ 1. Define particles, substance, dissolve, evaporate, condense, freeze, melt, solidify, expand, contract.

_____ 2. Explain that physical changes only change how a substance looks, not what it is made of.

_____ 3. Recognize examples of physical changes like freezing water, cutting paper, breaking glass, evaporating a puddle.

_____ 4. Provide my own examples of physical changes.

_____ 5. Evaluate the changes in an object as a result of a physical change.

Indicators: 4.2 **Identify characteristics of a simple chemical change. When a new material is made by combining two or more materials, it has chemical properties that are different from the original materials (e.g. burning paper, vinegar and baking soda).** Emphasize that the atoms are rearranged and chemical changes DO make a new substance.

I can...

_____ 1. Redefine atoms and explain that they make up everything. Define rust, tarnish, corrode, digestion.

_____ 2. Explain that chemicals are made of atoms bonded together in groups.

_____ 3. Define a chemical change as one when two or more materials combine and make something new because atoms are rearranged.

_____ 4. Observe and point out the 5 signs of chemical change (release gas bubbles, produce light, create a solid, exchange heat energy, and change color.)

_____ 5. Recognize examples of chemical changes like combing hydrogen and oxygen making water, burning paper, rusting metal, digesting food.

_____ 4. Provide my own examples of chemical changes.

_____ 5. Evaluate the changes in an object as a result of a chemical change.

**Weather**

Indicator(s) : Es4.2. Identify how water exists in the air in different forms (e.g., in clouds, fog, rain, snow and hail). **ES4.3 Investigate how water changes from one state to another (e.g., freezing, melting, condensation, and evaporation).**

I can...

_____ 1. Refine freezing, melting, condensation, evaporation, humidity, barometer, thermometer, rain gauge.

_____ 2. List forms of water in the air and describe their characteristics.

_____ 3. Interpret a diagram of a water cycle and point out water in various forms.

_____ 4. Explain how and why water moves through the water cycle.

_____ 5. Create a model of a water cycle.

_____ 6. Relate changes in phases of water to weather events.

_____ 7. Evaluate how different climates would impact the water cycle.

**Weather**

Indicator(s) : Es4.1. Explain that air surrounds us, takes up space, moves around us as wind, and may be measured using barometric pressure. Es4.5. Record local weather information on a calendar or map and describe changes over a period of time (e.g., barometric pressure, temperature, precipitation symbols and cloud conditions). **ES4.4 Describe weather by measurable quantities such as temperature, wind direction, wind speed, precipitation and barometric pressure. Graph data and interpret trends.** Es4.6. Trace how weather patterns generally move from west to east in the United States. Es4.7. Describe the weather which accompanies cumulus, cumulonimbus, cirrus and stratus clouds.

I can...

_____ 1. Define barometric pressure, precipitation, cumulus cloud, cumulonimbus cloud, cirrus cloud and stratus clouds.

_____ 2. Recognize and explain symbols used on weather maps.

_____ 3. Recognize the different kinds of clouds.

_____ 4. Record weather conditions (barometric pressure, temperature, precipitation type/amount, wind speed/direction, cloud cover) over a time period.

_____ 5. Graph weather data and interpret trends.

_____ 6. Describe the weather conditions that accompany specific types of clouds.

_____ 7. Interpret a national weather map and predict the weather for a specific area.

**Geology: Weathering**

Indicators: Es1.3. Explain that all organisms cause changes in the environment where they live; the changes can be very noticeable or slightly noticeable, fast or slow (e.g., spread of grass cover slowing soil erosion, tree roots slowly breaking sidewalks). Es4.9. Identify and describe how freezing, thawing and plant growth reshape the land surface by causing the weathering of rock. Es4.8. Describe how wind, water and ice shape and reshape Earth's land surface by eroding rock and soil in some areas and depositing them in other areas producing characteristic landforms (e.g., dunes, deltas and glacial moraines). **ES 4.10 Describe evidence of changes on Earth's surface in terms of slow processes (e.g. erosion, weathering, mountain building and deposition) and rapid processes (e.g. volcanic eruptions, earthquakes, and landslides.)**

I can...

_____ 1. Define weathering, erosion, thawing, dunes, deltas, moraines.

_____ 2. Recognize and explain that all organisms cause changes in the environment where they live; the changes can be very noticeable or slightly noticeable, fast or slow.

_____ 3. Identify and describe processes that reshape the land surface by causing the weathering of rock.

_____ 4. Identify and describe processes that reshape the land surface by depositing rock and soil in other areas to create landforms.

_____ 5. Describe evidence of changes on Earth's surface in terms of slow processes and rapid processes.

_____ 6. Evaluate how the Earth has changed over millions of years.

_____ 7. Predict what the Earth will look like in the future due to the weathering processes in action now.

***Science and Technology Standards***
**Benchmark 3-5: Describe how technology affects human life.**

ST3.1. Describe how technology can extend human abilities (e.g., to move things and to extend senses).

ST3.2. Describe ways that using technology can have helpful and/or harmful results.

ST3.3. Investigate ways that the results of technology may affect the individual, family and community.

ST4.1. Explain how technology from different areas (e.g., transportation, communication, nutrition, healthcare, agriculture, entertainment and manufacturing) has improved human lives.

ST4.2. Investigate how technology and inventions change to meet peoples' needs and wants.

ST5.1. Investigate positive and negative impacts of human activity and technology on the environment.

**Benchmark 3-5: Describe and illustrate the design process.**

ST3.4. Use a simple design process to solve a problem (e.g., identify a problem, identify possible solutions and design a solution).

ST3.5. Describe possible solutions to a design problem (e.g., how to hold down paper in the wind).

ST4.3. Describe, illustrate and evaluate the design process used to solve a problem.

ST5.2. Revise an existing design used to solve a problem based on peer review.

ST5.3. Explain how the solution to one problem may create other problems.

***Scientific Inquiry Standards***
**Benchmark 3-5: Develop, design and safely conduct scientific investigations and communicate the results.**

SI3.4. Identify and apply science safety procedures.

SI3.6. Communicate scientific findings to others through a variety of methods (e.g., pictures, written, oral and recorded observations).

SI4.3. Develop, design and conduct safe, simple investigations or experiments to answer questions.

SI4.4. Explain the importance of keeping conditions the same in an experiment.

SI4.5. Describe how comparisons may not be fair when some conditions are not kept the same between experiments.

SI4.6. Formulate instructions and communicate data in a manner that allows others to understand and repeat an investigation or experiment.

SI5.4. Identify one or two variables in a simple experiment.

SI5.5. Identify potential hazards and/or precautions involved in an investigation.

SI5.6. Explain why results of an experiment are sometimes different (e.g., because of unexpected differences in what is being investigated, unrealized differences in the methods used or in the circumstances in which the investigation was carried out, and because of errors in observations).

**Benchmark 3-5: Safely use appropriate instruments to observe, measure, and collect data when conducting scientific investigations.**

SI 3.1, 4.1. Select the appropriate tools and use relevant safety procedures to measure and record length, weight, volume, temperature and area in metric and English units.

SI4.3. Develop, design and conduct safe, simple investigations or experiments to answer questions.

SI5.1. Select and safely use the appropriate tools to collect data when conducting investigations and communicating findings to others (e.g., thermometers, timers, balances, spring scales, magnifiers, microscopes and other appropriate tools).

**Benchmark 3-5 B: Organize and evaluate observations, measurements, and other data to formulate inferences and conclusions.**

SI3.2. Discuss observations and measurements made by other people.

SI3.3. Read and interpret simple tables and graphs produced by self/others.

SI3.5. Record and organize observations (e.g., journals, charts and tables).

SI4.2. Analyze a series of events and/or simple daily or seasonal cycles, describe the patterns and infer the next likely occurrence.

SI5.2. Evaluate observations and measurements made by other people and identify reasons for any discrepancies.

SI5.3. Use evidence and observations to explain and communicate the results of investigations.

***Scientific Ways of Knowing***

**Benchmark 3-5 SWKA. Distinguish between fact and opinion and explain how ideas and conclusions change as new knowledge is gained.**

SWK4.1. Differentiate fact from opinion and explain that scientists do not rely on claims or conclusions unless they are backed by observations that can be confirmed.

SWK5.1. Summarize how conclusions and ideas change as new knowledge is gained.

**Benchmark 3-5 SWKB. Describe different types of investigations and use results and data from investigations to provide the evidence to support explanations and conclusions.**

SWK3.1. Describe different kinds of investigations that scientists use depending on the questions they are trying to answer.

SWK4.3. Explain discrepancies in an investigation using evidence to support findings.

SWK5.2. Develop descriptions, explanations and models using evidence to defend/support findings.

SWK5.3. Explain why an experiment must be repeated by different people or at different times or places and yield consistent results before the results are accepted.

SWK5.4. Identify how scientists use different kinds of ongoing investigations depending on the questions they are trying to answer (e.g., observations of things or events in nature, data collection and controlled experiments).

**Benchmark 3-5 SWKC. Explain the importance of keeping records of observations and investigations that are accurate and understandable.**

SWK3.2. Keep records of investigations and observations and do not change the records that are different from someone else's work.

SWK4.2. Record the results and data from an investigation and make a reasonable explanation.

*SWK4.*4. Explain why keeping records of observations and investigations is important.

*SWK5.*5. Keep records of investigations and observations that are understandable weeks or months later.

**Benchmark 3-5 SWKD. Explain that men and women of diverse countries and cultures participate in careers in all fields of science.**

SWK3.3. Explore through stories how men and women have contributed to the development of science.

SWK3.4. Identify various careers in science.

SWK3.5. Discuss how both men and women find science rewarding as a career and in their everyday lives.

*SWK5.* 6. Identify a variety of scientific and technological work that people of all ages, backgrounds and groups perform.