



Grade 5 Science Curriculum

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<u>4</u>	<i>A: Reproduction Change B: Embryology with Reproduction</i>	<i>A: 2 B: 4 hrs/1 class per week</i>	<i>Jan</i>
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Unit #/Title	1/Changing Earth	Time Frame	6-8 Weeks
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Stage 1 - Identify Desired Results

Standards

3.3.5.A1 Describe how landforms are the result of a combination of destructive forces such as erosion and constructive erosion, deposition of sediment, etc.

3.3.5.A3 Explain how geological processes observed today such as erosion, movement of lithospheric plates, and changes in the composition of the atmosphere are similar to those in the past.

Big Ideas

- Earth is a complex system of interacting rock, water, and air.
- Earth is a continually changing planet.

Essential Questions

- What causes the great changes on the earth's surface?
- How do layers of rock and different types of fossils provide clues about how earth has changed over time?

Content

- Earth's layers: atmosphere, hydrosphere, lithosphere, crust, mantle, and core
- The plate tectonics and events caused by plate movements
- Changes in the Earth's surface: weathering, erosion, deposition
- Rock cycle: igneous rock, sedimentary rock, metamorphic rock, and fossils

Skills

- Identify the earth's layers
- Identify processes that change the earth's surface
- State how rock is altered when it's subjected to heat and pressure under the earth's surface

Unit #/Title	2/Climate	Time Frame	3 Weeks
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Stage 1 - Identify Desired Results

Standards

3.3.5.A5 Differentiate between weather and climate. Explain how the cycling of water, both in and out of the atmosphere, has an effect on climate.

3.3.5.B1 Provide evidence that the earth revolves around (orbits) the sun in a year's time and that the earth rotates on its axis once approximately every 24 hours.

3.2.5.A1 Describe how water can be changed from one state to another by adding or taking away heat.

Big Ideas	Essential Questions
<ul style="list-style-type: none"> Interactions among the air, land, and water play an important role in the weather conditions and climate in a particular location. 	<ul style="list-style-type: none"> How does the sun interact with the earth to produce weather and climate? How does the cycling of water in and out of the atmosphere play an important part in determining climatic patterns? How does temperature affect the change of water from one state to another?

Content	Skills
<ul style="list-style-type: none"> States of matter: solid, liquid, and gas. The water cycle: condensation, evaporation, precipitation, and runoff The difference between climate and weather The greenhouse effect The tilt and revolution of the earth create seasons The day and night cycle is caused by the earth's rotation 	<ul style="list-style-type: none"> Diagram the molecular movement of water from one phase to another Differentiate between weather and climate Identify and explain each process in the water cycle Provide evidence for varying climates across the globe Explain how sun warms the Earth (greenhouse effect)

Unit #/Title	3/Cells	Time Frame	4 Weeks
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Stage 1 - Identify Desired Results	
Standards	
<p>3.1.5.A.5 Explain the concept of a cell as the basic unit of life. Compare and contrast plant and animal cells.</p> <p>3.1.4B2 Recognize that reproduction is necessary for the continuation of life.</p>	
Big Ideas	Essential Questions
<ul style="list-style-type: none"> The cell is the basic unit of structure and function for all living things. 	<ul style="list-style-type: none"> How can the integrated relationships that exist within plant and animal cells carry out life processes? What is the relationship between cells, tissues, and organ systems? How does the microscope contribute to the study of life?
Content	Skills
<ul style="list-style-type: none"> The six life processes: getting energy, using energy, getting rid of waste, reproducing, growing, reacting to change Parts of an animal cell: cell membrane, nucleus, cytoplasm Parts of a plant cell: chloroplasts, cell wall, cell membrane, nucleus, cytoplasm Cells form tissues, tissues form organs, and organs form systems Compound microscope: parts and proper usage 	<ul style="list-style-type: none"> Identify parts of plant and animal cells Compare and contrast the basic structures and functions of plant and animal cells Prove with evidence whether an object is living or nonliving Manipulate a compound microscope to view microscopic objects

Unit #/Title	4A/Reproduction Change	Time Frame	2 Weeks
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Stage 1 - Identify Desired Results

Standards

3.1.5.B1 Differentiate between inherited and acquired characteristics of plants and animals.
3.1.4B1 Describe features that are observable in both parents and their offspring.

Big Ideas	Essential Questions
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| <ul style="list-style-type: none"> • All living things inherit and pass on traits. | <ul style="list-style-type: none"> • What are some patterns of inheritance among living things? • How does the environment and genetics of an individual influence the traits of an individual? |
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Content	Skills
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| <ul style="list-style-type: none"> • Inherited traits are passed from parents to their offspring • Acquired traits are result of interactions with the environment • Law of Dominance illustrated by way of Punnett Square | <ul style="list-style-type: none"> • Use Punnett Square to determine probability of specific trait • Differentiate between acquired and inherited traits |
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Unit #/Title	4B/Embryology	Time Frame	4 Weeks (1 Class/Week)
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Stage 1 - Identify Desired Results

Standards

- 3.1.5.C1** Describe how organisms meet some of their needs in an environment by using behaviors (patterns of activities) in response to information (stimuli) received from the environment.
- 3.1.5.C2** Give examples of how inherited characteristics (e.g. shape of beak, length of neck, location of eyes, shape of teeth) may change over time as adaptations to changes in the environment that enable organisms to survive.
- 4.4.5.A** Explain why animal production is dependent upon plant production.
- 3.1.5.A2** Describe how life on earth depends on energy from the sun.
- 3.1.5.A3** Compare and contrast the similarities and differences in life cycles of different organisms.

Big Ideas

- Organisms reproduce, develop, and have predictable life cycles.

Essential Questions

- How can artificial incubation be used successfully?
- How do organisms change as they go through their life cycles?

Content

- All living organisms depend on the sun for survival
- Organisms have basic needs and can survive only in environments in which their needs can be met
- Animals have life cycles including birth, maturation, reproduction, and death
- Parts of a chicken egg: air cell, albumin, chalazae, blastodisc, inner shell membrane, outer shell membrane, shell, yolk

Skills

- Identify the parts of a chicken egg
- Properly maintain artificial incubation environment
- Accurately recreate stages of embryonic development through scientific drawing
- Safely handle eggs and chicks

Unit #/Title	5/Ecology	Time Frame	4 Weeks
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Stage 1 - Identify Desired Results

Standards

- 3.3.4.A2** Describe the usefulness of Earth's physical resources as raw materials for the human made world.
- 4.1.5.C** Describe different food webs including a food web containing humans.
- 3.4.5.E2** Understand that there are many different tools necessary to maintain an ecosystem, whether natural or man-made.
- 4.2.5.C** Identify physical, chemical, and biological factors that affect water quality.
- 4.1.5.A** Describe the roles of producers, consumers, and decomposers within a local ecosystem.
- 4.2.5.B** Identify important wetlands in the United States.
- 4.2.5.C** Identify physical, chemical, and biological factors that affect water quality.
- 4.5.5.D** Explain the differences between threatened, endangered, and extinct organisms.
- 4.5.5.C** Explain the difference between point and nonpoint source pollution.
- 4.1.4.B** Identify how matter cycles through an ecosystem. Trace how death, growth, and decay cycle matter through an ecosystem.
- 4.1.4.C** Explain how most life on earth gets its energy from the sun.
- 4.1.4.A** Explain how living things are dependent upon other living and nonliving things for survival.
- 4.1.4.E** Explain that ecosystems change over time due to natural and/or human influences.
- 4.5.4.D** Explain how specific adaptations can help organisms survive in their environment.
- 4.1.5.F** Science as Inquiry.

Big Ideas

- Organisms and their environments are interconnected.
- Changes in one part of the system will affect other parts of the system.

Essential Questions

- How can change in one part of an ecosystem affect change in other parts of the ecosystem?
- How does matter and energy link organisms to each other and their environment?
- How do humans have an impact on the diversity and stability of ecosystems?
- How is matter and energy transferred/transformed in living systems?

Content

- An ecosystem is a community of organisms and its interaction with its environment
- Organisms can be categorized by the functions they serve in an ecosystem: producers, consumers, or decomposers
- Organisms in an ecosystem have dependent and interdependent relationships, which can be illustrated by food webs
- Factors that affect growth and reproduction of organisms in an ecosystem include light, water, temperature, and soil
- A pollutant is anything that can harm living organisms when too much of it is released into an ecosystem

Skills

- Identify relationships between living and nonliving things
- Explain the roles of living organisms in an ecosystem
- Develop sensitivity toward living things and understanding that human behavior can positively or negatively affect them
- Create a sustainable terrestrial and aquatic ecosystem

Unit #/Title	6/Motion and Design	Time Frame	12 Weeks
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Stage 1 - Identify Desired Results

Standards

- 3.2.5.B3** Demonstrate how heat energy is usually a byproduct of an energy transformation.
- 3.4.5.D3** Determine if the human use of a product or system creates positive or negative results.
- 3.4.5.E6** Examine how manufacturing technologies have become an integral part of the engineered world.
- 3.2.5.B1** Explain how mass of an object resists change to motion.
- 3.2.5.B2** Examine how energy can be transferred from one form to another.
- 3.4.5.E5** Examine reasons why a transportation system may lose efficiency or fail (e.g. one part is missing or if a subsystem is not working).
- 3.4.5.C3** Identify how invention and innovation create ways to turn ideas into real things.
- 3.4.5.A1** Explain how people use tools and techniques to help them do things.
- 3.4.5.A2** Understand that a subsystem that operates as part of a larger system.
- 3.4.5.A3** Describe how technologies are often combined.
- 3.4.5.C1** Explain how the design process is a purposeful method of planning practical solutions to problems.
- 3.4.5.C2** Describe how design, as a dynamic process of steps, can be performed in different sequences and repeated.
- 3.4.5.D1** Identify ways to improve a design solution.
- 3.4.5.D2** Use information provided in manuals, protocols, or by experienced people to see and understand how things work.
- 3.4.5.E4** Describe how the use of symbols, measurements, and drawings promotes clear communication by providing a common language to express ideas.

Big Ideas

- An object's motion is the result of all forces acting on it.
- The design process requires constant evaluation and adjustment to be successful.

Essential Questions

- How do forces affect the motion of objects?
- What happens to the energy in a system: where does this energy come from, how is it changed within the system, and where does it ultimately go?
- How does the flow of energy affect the materials in the system?

Content

- Moving objects have energy. Faster moving objects have more energy than slower moving objects
- Energy can be stored in a twisted rubber band. This energy can make things move
- Changes in the motion of an object can be produced by different sized forces
- Speeds of objects can be compared (faster, slower) through knowing the distance and time
- Technical drawings ensure close similarity among the finished products
- Technical drawings can be used to convey a particular design to others
- In a drop-weight system that pulls a car, an increase in the pulling force increases the car speed
- A twisted rubber band stores energy that can be used to move a vehicle. The greater the stored

Skills

- Use appropriate technologies to make precise quantitative measurements and observations
- Organize and display data to make inferences and draw conclusions about motion
- Describe the relationships among the parts of a system, the ways that they work together, the flow of matter or energy through the system, and the feedback and control mechanism present in the system
- Given a problem, design, plan, and implement a solution Process includes: idea, create, test, evaluate, redesign, repeat
- Create technical drawings to permanently record vehicles
- Build a vehicle following a technical drawing
- Use a drop-weight system to pull a vehicle
- Follow simple steps in an investigation

<p>energy, the greater the potential motion of the vehicle</p> <ul style="list-style-type: none">• Scientists conduct multiple trials to ensure that the results are not flawed	<ul style="list-style-type: none">• Accurately measure time in seconds and distance in centimeters• Conduct multiple trials of each investigation• Investigate how a propeller changes the motion of a vehicle
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