

"Our mission is to prepare each student to be a successful and responsible member of society."

North Smithfield School District

Seventh Grade Science Curriculum

North Smithfield Scope and Sequence SCIENCE Curriculum: K-12

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Diversity of Living Things Unit Design

Middle School – Grade 7

RI Statements of Enduring Knowledge - (Established Goals):

LS -1 All living organisms have identifiable structures and characteristics that allow for survival (organisms, populations, & species).

LS - 2 Matter cycles and energy flows through an ecosystem.

LS - 3 Groups of organisms show evidence of change over time (structures, behaviors and biochemistry).

LS3 - Groups of organisms show evidence of change over time (structures, behaviors, and biochemistry).

<p>Text to be Used: McDougal Littell</p> <p>& *Unit Resource Book (URB) where noted</p>		<p>Diversity of Living Things (DOL) Cells & Heredity (C&H) Ecology (E) Human Biology (HB) <u>OR to be done in Health Classes*(Where underlined and in italics)</u></p>
<p>Related Rhode Island GSE's (Understandings)</p>	<p>RI Assessment Targets Assessment Evidence</p>	
<p>LS1 (7-8) – 1 Students demonstrate understanding of biodiversity by... 1a giving examples of adaptations or behaviors that are specific to a niche (role) within an ecosystem.</p> <p>1b explaining how organisms with different structures and behaviors have roles that contribute to each other's survival and the stability of the ecosystem.</p> <p>LS1 (7-8) – 2 Students demonstrate understanding of structure and function-survival requirements by... 2a explaining how the cell, as the basic unit of life, has the same survival needs as an organism (i.e., obtain energy, grow, eliminate waste, reproduce, provide for defense). 2b observing and describing (e.g., drawing, labeling) individual cells as seen through a microscope targeting cell membrane, cell wall, nucleus, and chloroplasts.</p>	<p>LS1 (5-8) – INQ+ SAE- 1 <i>Using data and observations about the biodiversity of an ecosystem make predictions or draw conclusions about how the diversity contributes to the stability of the ecosystem.</i> Text Reference: Chapter 3.1(DOL) (P.85-91) Activity: How are plants alike/ different? p.83 (DOL) Text Reference: Ecology Chapter 2, p.47 (E) and 1.3 pp. 26 & 27</p> <p>Text Reference; Chapter: Chapter 5.1-5.4(DOL) pp. 157-187 Activity: What good are legs? p.164(DOL) Connecting Sciences- Sticky Feet, p.172(DOL) Bird Beak Adaptations, URB, p.44(DOL)</p> <p>LS1 (5-8) SAE+FAF –2 <i>Describe or compare how different organisms have mechanisms that work in a coordinated way to obtain energy, grow, move, respond, provide defense, enable reproduction, or maintain internal balance (e.g., cells, tissues, organs and systems).</i> Text Reference; Chapter 1, pp. 6-8(C&H) Getting Ready to Learn, p.8(C&H) Text Reference; Chapter 1.1(C&H) pp.9-15 Investigate Cell Models p. 31(C&H) Text Reference; Chapter 1.2(C&H) pp.18-24</p>	

2c observing, describing and charting the growth, motion, responses of living organisms.

LS1 (7-8)–4 Students demonstrate understanding of differentiation by...

4b comparing individual cells of tissues and recognizing the similarities of cells and how they work together to perform specific functions.

4c explaining how each type of cell, tissue, and organ has a distinct structure and set of functions that serve the organism as a whole.

LS2 (7-8) –6 Students demonstrate an understanding of energy flow in an ecosystem by ...

6a explaining the transfer of the sun’s energy through living systems and its effect upon them.

6c explaining the relationship between photosynthesis and respiration.

**LS3 (7-8)-9
Students demonstrate an understanding of Natural Selection/evolution by...**

9a explaining the genetic variation/traits of organisms are passed on through reproduction and random genetic changes.

LS4 (7-8)-10

Students demonstrate an understanding of human body systems by...

10a identifying the biotic factors (e.g.,

Activity: How do animal and plant cells compare? p. 21(C&H)
Text Reference; Chapter 2.3(C&H) pp.56-63
Activity: How do particles move? p. 56(C&H)
Activity: How does cell size affect transport? p. 62(C&H)
Chapter Investigation: Diffusion, pp. 64-65(C&H)
Graphing Growth, p. 15(DOL)

LS1 (5-8) FAF –4

Explain relationships between or among the structure and function of the cells, issues, organs, and organ systems in an organism.

Text Reference: Chapter 2.1, p. 44 (C&H)

Text Reference; Chapter 2.3(C&H) pp.56-63

Activity: How do particles move? p. 56(C&H)

Activity: How does cell size affect transport? p. 62(C&H)

Chapter Investigation: Diffusion, p 115, URB(C&H)

LS2 (5-8) SAE– 6

Given a scenario trace the flow of energy through an ecosystem, beginning with the sun, through

organisms in the food web, and into the environment (includes photosynthesis and respiration)

Text Reference; Chapter 2.1-2.3(C&H) (pp.41-65)

Activity: Internet-Photosynthesis, p. 39(C&H)

Activity: Elodea and B.T.B. Lab (Sarah/Gale)

LS3 (5-8) – POC - 9

Cite examples supporting the concept that certain traits of organisms may provide a survival advantage in a specific environment and therefore, an increased likelihood to produce offspring.

Genetics-Explore-p. 144 (C&H)

LS4 (5-8) – INQ –10

Use data and observations to support the concept that environmental or biological factors affect human body systems (biotic & abiotic).

Text Reference: Chapter 1 (HB) pp.9-30

Internet Activity-The Human Body, p.133 (HB)

Text Reference: Chapter 5.1-5.3(HB) pp.133-155

Activity: Are there patterns to growth? P.133 ; How has life expectancy changed over time? P.137(HB)

microbes, parasites, food availability, aging process) that have an effect on human body systems.

10b identifying the abiotic factors (e.g., drugs, altitude, weather, pollution) that have an effect on human body systems.

Students demonstrate an understanding of patterns of human health/disease by...

10c identifying the biotic (e.g., microbes, parasites, food availability, aging process) and abiotic (e.g., radiation, toxic materials, carcinogens) factors that cause disease and affect human health.

Text Reference: Chapter 5.2, pp.144-146 (HB) EXCLUDE-DONE IN HEALTH

Text Reference: Chapter 5.3 (HB) pp.148-153
Activity: How easily do germs spread? p.148

Health Curriculum: Standards Covered-Personal Health, Nutrition, Mental & Emotional Health, Substance Use & Abuse Prevention

	Focus Questions (Essential Questions)	Instructional Activities & Investigations (INQ)	Big Ideas (Understandings)
1	What is life?	Text Reference: Chapter 1.0 (DOL) pp.6-35 Activity: Where can you find microscopic life? pp.6-7 (DOL) Getting Ready to Learn, p.8 (DOL)	<ul style="list-style-type: none"> • Any free-living thing is an organism. • All living organisms exhibit common characteristics: they grow, consume nutrients, exchange gases, respond to stimuli, reproduce, need water, and eliminate waste. • Bacteria and protists have the characteristics of living things while viruses are not alive.
2	What are the characteristics of microscopic life?	Text Reference: Chapter 1.1(DOL) pp.9-14 Explore: Organisms p. 9 (C&H)	
		Text Reference: Chapter 1.1-1.4(DOL) pp.6-35 (DOL) Activities: Activity: How quickly do bacteria multiply? p.7 Activity: Math in Science-Graphing Growth p.15 Activity; How do infections spread? p.25 Activity: What lives in pond water? p.31	
3	How does an organism get energy and material from its environment? How do multicellular organisms meet their needs?	Text Reference: Chapter 2.0(DOL) pp. 40-71 Activity: How can a multicellular organism reproduce on its own? p.41 (DOL) Getting Ready to Learn, p.42(DOL) Text Reference: Chapter 2.1, pp. 43-50(DOL) Activity: What are some advantages of specialization? p.44(DOL)	<ul style="list-style-type: none"> • Multi-cellular organisms meet their needs in different ways. • Plants are producers. • Animals are consumers. • Most fungi are decomposers.

	<p>In what form does a plant store energy? How do animals respond to their environment?</p> <ul style="list-style-type: none"> • What are decomposers? 	<p>Text Reference: Chapter 2.2, pp. 51-57(DOL) Activity: Where does it come from? p.41(DOL) Text Reference: Chapter 2.3 (DOL) pp.58-64 Activity: What does an owl eat and how well does it digest its food? p. 60(DOL)</p>	
4	<ul style="list-style-type: none"> • What are cells? • How did the invention of the microscope change the study of biology? • What is the structure and function of cells? 	<p>Text Reference; Chapter 1.0, pp. 6-8 Getting Ready to Learn (C&H) Text Reference; Chapter 1.1(C&H) pp.9-15</p> <p>Text Reference; Chapter 1.2(C&H) pp.18-24 Activity: How do animal and plant cells compare? p. 21(C&H)</p> <p>Text Reference; Chapter 1.3(C&H) pp.26-32 Activity: How do roots differ from leaves? p.26(C&H) Activity: What are some of the limitations of using a cell model to represent a cell? p..31(C&H) Cells and Spacesuits, p. 33(C&H) Text Reference; Chapter 2.1-2.3(C&H) pp.41-63 Activity: Internet-Photosynthesis, p. 39(C&H) Elodea and B.T.B. Lab (Department)</p>	<ul style="list-style-type: none"> • The cell is the basic unit of life. • All living things share common characteristics. • All living things are made up of cells • The microscope is a scientific instrument which allows us to see the inside of a cell. • Cells have the same needs and perform the same functions as more complex organisms. • All cells need energy and materials for life processes.
5	<ul style="list-style-type: none"> • How do cells capture and release energy? 	<p>Text Reference; Chapter 2.1-2.2(C&H) pp.41-54 Activity: How can you tell if fermentation releases material? p. 53(C&H)</p> <p>Text Reference; Chapter 2.3(C&H) pp.56-63 Activity: How do particles move? p. 56(C&H) Activity: How does cell size affect transport? p. 62(C&H) Chapter Investigation: Diffusion, URB, p. 115 (C&H)</p>	<ul style="list-style-type: none"> • Cells have defining structures, such as membranes, cell walls, nuclei, chloroplasts, ribosomes, mitochondria, and cytoplasm. • Materials move across the cells membranes

6	<ul style="list-style-type: none"> • How are plants alike/ different? • How do plants grow? 	Text Reference; Chapter 3.0-3.1(DOL) pp.82-91 Activity: How are plants alike/ different? p.83 (DOL)	<ul style="list-style-type: none"> • Plants are a diverse group of organisms that live in many land environments. • Seeds and pollen are reproductive adaptaions • The cotyledon is the primary source of energy for seed germination. • Many plants reproduce with flowers and fruit.
		Text Reference; Chapter 3.3 (DOL) pp.98-103 Activity: What conditions make a pinecone open? p.102(DOL)	
		Chapter Investigation: Which seeds will grow? pp. 104-105(DOL) <i>May need to modify/differentiate.</i> Text Reference; Chapter 3.4(DOL) pp.107-114	
7	<ul style="list-style-type: none"> • What is transpiration? 	Text Reference; Chapter 3.1, p.87(DOL) Chloroplast Math, p. 115(DOL)	<ul style="list-style-type: none"> • Xylem is the system of tubelike connected cells that transports water from the roots to all structures of the plant. • Stomates are openings on leaves that are controlled by guard cells.
		Activity: What parts of a flower can you identify? p. 111(DOL)	
8	<ul style="list-style-type: none"> • What are the parts of a flower? • How do plants reproduce? 	Text Reference; Chapter: Chapter 3.4 (DOL) pp.107-114	<ul style="list-style-type: none"> • Pollen from the anthers on stamens and eggs in the ovules of the pistil are the male and female cells that combine during sexual reproduction to develop into a seed. • Sepals, petals, stamens, and pistils are the major structures of typical flowers.
		Text Reference; Chapter: Chapter 3.4(DOL) pp.107-114 Investigation: Flower Parts, p.111(DOL)	
9	<ul style="list-style-type: none"> • How do organisms adapt in order to survive? 	Text Reference; Chapter: Chapter 5.1-5.4(DOL) pp.157-187 Activity: How does a fish's shape help it move? p.157(DOL) <i>For discussion purposes</i> Activity: What good are legs? P.164(DOL) Connecting Sciences- Sticky Feet, p.172(DOL) Bird Beak Adaptations, URB, p. 344(DOL)	<ul style="list-style-type: none"> • Adaptations are structures or behaviors of organisms that enhance their chances to survive and reproduce in their habitat. • Insects have three body parts, six legs and two antennae.
		Text Reference; Chapter: Chapter 4.4(DOL) pp.142-149 Activity: What are some characteristics of arthropods? p..142(DOL) Pill Bugs recommended.	

North Smithfield Middle School Unit Design- ECOLOGY

Grade Level 7

Text to be Used: McDougal Littell

& *Unit Resource Book (URB) where noted

**Ecology (E) Diversity of Living Things (DOL)
Cells & Heredity (C&H)**

RI Statements of Enduring Knowledge - (Established Goals):

LS1 – All living organisms have identifiable structures and characteristics that allow for survival (organisms, populations, & species).

LS2 – Matter cycles and energy flows through an ecosystem.

LS3 - Groups of organisms show evidence of change over time (structure, behaviors, biochemistry).

LS4 – Humans are similar to other species in many ways, and yet are unique among Earth’s life forms.

Related Rhode Island GSE’s (Understandings)	RI Assessment Targets Assessment Evidence ***High Priority
<p>LS1 (7-8)-1 Students demonstrate an understanding of biodiversity by...</p> <p>1a giving examples of adaptations or behaviors that are specific to a niche (role) within an ecosystem.</p> <p>1b explaining how organisms with different structures and behaviors have roles that contribute to each other’s survival and the stability of the ecosystem.</p> <p>LS1 (5-6)-2 Students demonstrate an understanding of structure and function survival requirements by...</p> <p>2a describing structures or behaviors that help organisms survive in their environment (e.g., defense, obtaining nutrients, reproduction, and eliminating waste).</p>	<p>LS1 (5-8) – INQ + SAE –1 *** <i>Using data and observations about the biodiversity of an ecosystem make predictions or draw conclusions about how the diversity contributes to the stability of the ecosystem.</i> Text Reference: Chapter 1.1 (E) pp.9-13 Activity: How do plants react to sunlight?p.7(E) Activity: What is soil?p.7(E) Internet Activity, p.7(E)</p> <p>Text Reference: Chapter 2.1-2.3(E) pp.45-68 Activity: How many roles can living things have in an ecosystem?p.43(E) How do living things interact where you live?p.43(E) Estimating Populations, pp.52-53(E)</p> <p>LS1 (5-8) – SAE + FAF –2 *** <i>Describe or compare how different organisms have mechanisms that work in a coordinated way to obtain energy, grow, move, respond, provide defense, enable reproduction, or maintain internal balance (e.g., cells, tissues, organs and systems)</i></p>

<p>LS1 (7-8)-3 Students demonstrate an understanding of reproduction by...</p> <p>3a explaining reproduction as a fundamental process by which the new individual receives genetic information from parent(s).</p> <p>3b describing forms of asexual reproduction that involves the genetic contribution of only one parent (e.g., binary fission, budding, vegetative propagation, regeneration).</p> <p>3c describing sexual reproduction as a process that combines genetic material of two parents to produce a new organism (e.g., sperm/egg, pollen/ova).</p> <p>LS2 (7-8)-5 Students demonstrate an understanding of equilibrium in an ecosystem by...</p> <p>5a identifying which biotic (e.g., bacteria, fungi, plants, animals) and abiotic (e.g., weather, climate, light, water, temperature, soil composition, catastrophic events) factors affect a given ecosystem.</p> <p>5b analyzing how biotic and abiotic factors affect a given ecosystem.</p> <p>5c predicting the outcome of a given change in biotic and abiotic factors in an ecosystem.</p> <p>5d using a visual model (e.g., graph) to track population changes in an ecosystem</p>	<p>LS1 (5-8) – POC–3 *** <i>Compare and contrast sexual reproduction with asexual reproduction.</i></p> <p>Text Reference: Chapter 2.1, pp.48-49 (DOL)</p> <p>Text Reference: Chapter 1.2 p. 58 (C&H)</p> <p>Text Reference: Chapter 4.3, pp.118-124 (HB)</p> <p>:</p> <p>LS2 (5-8) – INQ + SAE–5 *** <i>Using data and observations, predict outcomes when abiotic/biotic factors are changed in an ecosystem.</i></p> <p>Text Reference: Chapter 1.1 pp. 10-13 (E)</p> <p>Text Reference: Chapter 1.1 (E) pp.10-13</p> <p>Text Reference: Chapter 2.1-2.2 (E) pp.45-61 Activity-How do predator-prey populations interact? p.57(E)</p> <p>Activity- Estimating Populations, pp. 52-53(E)</p> <p>LS2 (5-8) – INQ + SAE–6 ***</p>
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LS2 (7-8)-6

Students demonstrate an understanding of energy flow in an ecosystem by...

6a explaining the transfer of the sun's energy through living systems and its effect upon them.

6b describing the basic processes and recognizing the names and chemical formulas of the substances involved in photosynthesis and respiration.

6c explaining the relationship between photosynthesis and respiration.

Students demonstrate an understanding of food webs in an ecosystem by...

6d creating or interpreting a model that traces the flow of energy in a food web.

LS2 (7-8)-7

Students demonstrate an understanding of recycling in an ecosystem by...

7a diagramming or sequencing a series of steps showing how matter cycles among and between organisms and the physical environment.

7b developing a model for a food web of local aquatic and local terrestrial environments.

7c explaining the inverse nature or complementary aspects of photosynthesis/respiration in relation to carbon dioxide, water and oxygen exchange.

7d conducting a controlled investigation that shows that the total amount of matter remains constant, even through its form and location change as matter is transferred among and between

Given a scenario trace the flow of energy through an ecosystem, beginning with the sun, through organisms in the food web, and into the environment (includes photosynthesis and respiration).

Text Reference: Chapter 1.1, p.12 (E)

Text Reference: Chapter 1.2, pp. 16-18(E)

Activity- What is one form in which carbon is stored on the ocean floor?(E)

Text Reference: Chapter 1.1, pp. 12-13, 22(E)

Activity-Bottle Biology as Teacher Demo/Generic Department Developed (Optional)

Text Reference: Chapter 2.2, pp.48-49 (C&H)

Elodea and B.T.B. Lab (Department)

Text Reference: Chapter 1.3, pp. 26-28 (E)

LS2 (5-8) –SAE–7

Given an ecosystem, trace how matter cycles among and between organisms and the physical environment (includes water, oxygen, food web, decomposition, recycling but not carbon cycle or nitrogen cycle).

Text Reference: Chapter 1.2, pp. 16-20(E)

Activity-Temperature and the water cycle, p.21(E)

Text Reference: Chapter 1.3, pp. 26-28 (E) (Use p.27 as model)

Text Reference: Chapter 1.2, pp. 16-18(E)

Activity- What is one form in which carbon is stored on the ocean floor?(E)

Text Reference: Chapter 1.1, pp. 12-13, 22(E)

organisms and the physical environment (e.g., bottle biology, mass of a closed system over time.

LS3 (7-8)-9

Students demonstrate an understanding of Natural Selection/evolution by...

9a explaining the genetic variation/traits of organisms are passed on through reproduction and random genetic changes.

9b gathering evidence that demonstrates evolutionary relationships among organisms (e.g., similar in body structure, early development, traits).

9c differentiate between acquired and inherited characteristics and giving examples of each.

9d explaining how natural selection leads to evolution (e.g., survival of the fittest).

9e describing how scientists' understanding of the way species originate or become extinct has changed over time.

LS4 (7-8)-11

Students demonstrate an understanding of human heredity by...

11a recognizing that characteristics of an organism result from inherited traits of one or more genes from parents and others result from interactions with the environment.

11b tracing a genetic characteristic through a given pedigree (e.g., genealogical chart, Queen Victoria-hemophilia or hypothetical example) to demonstrate the passage of traits.

11c identifying that genetic materials (i.e., chromosomes and genes) are located in the cell's nucleus.

LS3 (5-8) – POC–9

Cite examples supporting the concept that certain traits of organisms may provide a survival advantage in a specific environment and therefore, an increased likelihood to produce offspring.

Text Reference: Chapter 4.1-4.3(C&H) pp.101-122

Activity: How are traits distributed?p.99(C&H)

Internet Activity-Mendel's Experiment(C&H) p.99

Text Reference: Chapter 4.1-4.3(C&H) pp.101-122

Activity: How are traits distributed?p.99(C&H)

Internet Activity-Mendel's Experiment(C&H) p.99

Text Reference; Chapter: Chapter 1.2(LOT)

Chapter Investigation: Modeling Natural Selection, pp.26-27(LOT)

LS4 (5-8) – INQ–11 ***

Using data provided, select evidence that supports the concept that genetic information is passed on from both parents to offspring.

Text Reference: Chapter 4.1-4.3(C&H)

Activity: How are traits distributed?p.99(C&H)

Internet Activity-Mendel's Experiment(C&H)

Activity: How can probability help predict results?p.110 (C&H)

Activity: Do probabilities affect each other?p.114 (C&H)

Activity: Why does sexual reproduction need a special form of cell division?p.117(C&H)

Text Reference: Chapter 5.2, p. 147(C&H)

	Text to be Used : McDougal Littell Text	Ecology (E) Diversity of Living Things (DOL) Cells & Heredity (C&H) & *Unit Resource Book (URB) where noted	
	Focus Questions (Essential Questions)	Instructional Activities & Investigations (INQ)	Big Ideas (Understandings)
	<p>What are the different factors that make up an ecosystem?</p> <p>How do biotic and abiotic factors affect an ecosystem?</p>	<p>Text Reference: Chapter 1.1 (E) pp.9-13 Activity: How do plants react to sunlight?p.7(E) Activity: What is soil?p.7(E) Internet Activity, p.7(E) Math in Science p.21(E)</p>	<ul style="list-style-type: none"> • Matter and energy together support life within an ecosystem. • An ecosystem is a system of interacting organisms and nonliving factors in a specified area.
	<p>How is matter exchanged between organisms and their environment?</p>	<p>Text Reference: Chapter 1.2(E) pp.16-20 Activity: What is one form in which carbon is stored on the ocean floor?p.19(E)</p>	<ul style="list-style-type: none"> • Matter cycles through ecosystems. • Water cycles through ecosystems.
	<p>How do living things move energy through an ecosystem?</p> <p>How are feeding relationships important in an ecosystem?</p> <p>How does the amount of energy change as it flows through an ecosystem?</p>	<p>Text Reference: Chapter 1.3(E) pp.22-28 Activity: How can you observe energy changing forms?p.22(E) Activity: Where do decomposers come from?p.25(E)</p> <hr/> <p>Text Reference: Chapter 1.4(E) pp.30-37 Activity :How can you graph climate data for your area?p.35(E)</p>	<ul style="list-style-type: none"> • Energy flows through ecosystems. • The amount of energy changes as it flows through an ecosystem. • Biomes contain many ecosystems.

	<p>How do organisms interact in an ecosystem?</p> <p>What effect do interactions have on an ecosystem?</p> <p>How does an ecosystem's population change over time?</p>	<p>Text Reference: Chapter 2.1-2.3(E) Activity: How many roles can living things have in an ecosystem?p.43(E) How do living things interact where you live?p.43(E) Estimating Populations, URB, p.125(E)</p>	<ul style="list-style-type: none"> • Ecosystems interact with each other and the environment. • Ecosystems are defined by interactions among organisms and physical factors.
	<p>How does sharing resources affect the ecosystem?</p> <p>How does pollution and a loss of diversity affect the environment?</p> <p>How do we use data and observations about the biodiversity of an ecosystem to help make predictions and/or draw conclusions about the stability of an ecosystem?</p>	<p>Text reference: Chapter 3.1-3.3(E) pp.81-105 Activity: How can you model resource distribution?p.81(E) Activity: Where do you find air pollution?p.91(E) Investigate- Particles in the Air,p.91(E) Activity: What happens when soil is compressed?p.98(E) Biomagnification, p.29(E)</p> <p>Text Reference: Chapter 4.1-4.3(C&H) pp.101-122 Activity: How are traits distributed?p.99(C&H) Internet Activity-Mendel's Experiment(C&H) p.99</p>	<ul style="list-style-type: none"> • Humans and human population growth affect the environment.
	<p>How are characteristics inherited?</p> <p>What is phenotype/genotype?</p>	<p>Activity: How can probability help predict results?p.110 (C&H) Activity: Do probabilities affect each other?p.114 (C&H) Activity: Why does sexual reproduction need a special form of cell division?p.117(C&H)</p>	<ul style="list-style-type: none"> • Living things inherit traits in patterns. • Patterns of heredity can be predicted.

Unit Design- Waves, Sound, & Light

Middle School – Grade 7

Texts to be used: Waves, Sound & Light (W)
McDougal Littell & *Unit Resource Book (URB) where noted

RI Statements of Enduring Knowledge - (Established Goals):

PS 2 Energy is necessary for change to occur in matter. Energy can be stored, transferred and transformed, but cannot be destroyed.

<p>PS2 (5-6)- 6 Students demonstrate an understanding of energy by...</p> <p>6a <u>differentiating among the properties</u> of various forms of energy.</p> <p>6b <u>explaining how energy may be stored in various ways</u> (e.g. batteries, springs, height in terms of potential energy).</p> <p>6c <u>describing sound as the transfer of energy through various materials</u> (e.g. solids, liquids, gases).</p> <p>PS2 (7-8)- 6 Students demonstrate an understanding of energy by...</p> <p>6a using a real world example to explain the <u>transfer of potential energy to kinetic energy</u>.</p> <p>6c explaining that while energy may be stored, transferred, or transformed, the <u>total amount of</u></p>	<p>PS1 (5-8) – SAE + MAS–4 *** <i>Represent or explain the relationship between or among energy, molecular motion, temperature, and states of matter.</i></p> <ul style="list-style-type: none">Text reference: Chapter 2.0-2.2 pp.34-48 (W) <p>PS2 (5-8)-SAE+ POC- 6 Given a real-world example, show that within a system, energy transforms from one form to another (i.e., chemical, heat, electrical, gravitational, light, sound, mechanical).</p> <ul style="list-style-type: none">Investigations: (Set up stations for “Explore Activities” on page 35 (W)) <p>Investigation: What is sound p/37 (W)</p> <p>PS2 (5-8) INQ+SAE+POC – 7 <i>Use data to draw conclusions about how heat can be transferred (convection, conduction, radiation).</i></p> <p>PS3 (7-8) - LA Students demonstrate an understanding of the visible spectrum of light by...</p> <p>LAa experiment how light from the sun is made up of a mixture of many different colors of light (e.g. using prisms, spectrometers, crystals).</p> <ul style="list-style-type: none">Investigation: Wavelength & Color p.p. 100-101, (W)Demonstrate: Prisms and light-colors/spectrum <p>Lab representing in words, diagrams, or other models <u>the visible spectrum as a part of the electromagnetic spectrum (consisting of visible light, infrared, and ultraviolet radiation) and composed</u></p>
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energy is conserved.

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of all colors of light

- Text reference: 3.0 -3.3 **(W)** pp.72 -92
- Investigation: How does the signal from a remote control travel? P. 73 **(W)**
- Investigation: How can you make radio waves? P. 79 **(W)**
- Discuss: Are cell phones harmful? P.87 **(W)**

LAc differentiating between electromagnetic and mechanical waves.

- Text Reference: Chapter 1.0-1.1 pp. 8-15 **(W)**
- Investigation: How will the rope move? P.9 **(W)**
- Inquiry: How do waves compare? P. 13 **(W)**
- Longitudinal vs transverse wave on a spring/slinky pp.13 & 14 **(W)**
- Text Reference: Chapter 1.2 pp.16-21
- Go over "graphing of a wave-reinforcing graphing skills p.19
- Investigation :How can you change frequency? P. 20 **(W)**
- Investigation: Wavelength p.22 **(W)**
- Text reference: Chapter 1.3 pp. 24-30
- Investigation: How do ripples reflect? P.24
- Demonstrate: Reflection of waves & Refraction p.25 **(W)**
- Investigation: How can you make a wave diffract? P.26 **(W)**
- Discuss p. 27 & 28 (W) "Waves Interact with other waves"
- Text reference: Chapter 2.1-2.2 pp.34-48 **(W)**
- Investigations: (Set up stations for "Explore Activities" on page 35 **(W)**
- Investigation: What is sound p/37 **(W)**

Text to be used:
McDougal Littell & *Unit Resource Book (URB) where noted

Waves, Sound & Light (W)

	Focus Questions (Essential Questions)	Instructional Activities & Investigations (INQ)	Big Ideas (Understandings)
1	What is a wave?	<ul style="list-style-type: none"> Text Reference: Chapter 1.0-1.1 pp. 8-15 (W) Investigation: How will the rope move? P.9 (W) 	<ul style="list-style-type: none"> A wave is a disturbance in a medium (Electromagnetic require no medium) that is a result of energy being transferred from place to place.
2	How do waves transfer energy?	<ul style="list-style-type: none"> Inquiry: How do waves compare? P. 13 (W) Longitudinal vs transverse wave on a spring/slinky pp.13 & 14 (W) 	<ul style="list-style-type: none"> Transverse waves are where the medium moves perpendicular to the direction of the wave Longitudinal waves are where the medium moves parallel to the direction of the wave. Earthquakes are examples of waves as are waves in water and sounds.
3	What are the measurable properties of all waves?	<ul style="list-style-type: none"> Text Reference: Chapter 1.2 pp.16-21 Go over “graphing of a wave-reinforcing graphing skills p.19 Investigation :How can you change frequency? P. 20 (W) Investigation: Wavelength p.22 (W) 	<ul style="list-style-type: none"> Frequency is the number of waves made by a source through a medium every second. Period is the time for one complete wave (oscillation) Wavelength is the linear distance or length of one complete wave. Velocity is the speed of the wave. Amplitude is the maximum displacement of the medium.
4	Waves behave in predictable ways	<ul style="list-style-type: none"> Text reference: Chapter 1.3 pp. 24-30 Investigation: How do ripples reflect? P.24 Demonstrate: Reflection of waves & Refraction p.25 (W) Investigation: How can you make a wave diffract? P.26 (W) Discuss p. 27 & 28 (W) “Waves Interact with other waves” 	<ul style="list-style-type: none"> Waves can reflect, refract, diffract, and interfere with each other. Constructive interference is where wave energies add up and destructive is where energies subtract from each other.

5	Sound is a wave	<ul style="list-style-type: none"> • Text reference: Chapter 2.1-2.2 pp.34-48 (W) • Investigations: (Set up stations for “Explore Activities” on page 35 (W)) • Investigation: What is sound p/37 (W) 	<ul style="list-style-type: none"> • Sound is a longitudinal wave
7	How do we hear sound waves?	<ul style="list-style-type: none"> • Text reference: pp. 38-39 (W) • Discuss diagrams, pp.38-39 (vocal chords & ears”)(W) 	<ul style="list-style-type: none"> • Structure of the ear and vocal chords are important to their function as receiver and transmitter of sound waves. • Sound waves travel through solids, liquids, and gases.
8	How does sound transfer energy? (How does sound waves vibrate particles?)	<ul style="list-style-type: none"> • Investigation: p.41 How does sound transfer energy? p. 41 (W) 	<ul style="list-style-type: none"> • Sounds travel fastest in solids, then slower in liquids, and slowest in gases due to the arrangement/closeness of particles that transfer energy.
9	What are the unique traits of electromagnetic waves?	<ul style="list-style-type: none"> • Text reference: 3.0 -3.3 (W) pp.72 -92 • Investigation: How does the signal from a remote control travel? P. 73 (W) <u>or</u> demonstration with SMART Board Remote • Investigation: How can you make radio waves? P. 79 (W) • Discuss: Are cell phones harmful? P.87 (W) • Investigation: Wavelength & Color p.p. 100-101, (W) • Demonstrate: Prisms and light-colors/spectrum 	<ul style="list-style-type: none"> • Electromagnetic waves travel through various media and space (vacuum) • Color of an object depends on the wavelengths of light reflected by the object. • White light is composed of all the colors of the spectrum.