Randolph County School System 6-8 Curriculum Pacing

8th Grade Science At a Glance

1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Intro/Getting to know students/Scientific Method (2 Weeks) **8.E.2 Geologic Time/Fossils (4 Weeks)** (8.E.2.1 and 8.E.2.2) **8.L.4 History of Earth/Change Over Time (3 Weeks)** (8.L.4.1 and 8.L.4.2)	**8.L.3 Ecology/Populations (3 Weeks)** (8.L.3.1, 8.L.3.2, and 8.L.3.3) **8.L.5 Molecular Biology (2 Weeks)** (8.L.5.1 and 8.L.5.2) **8.E.1 Hydrosphere (4 Weeks)** (8.E.1.1, 8.E.1.2, 8.E.1.3, and 8.E.1.4)	**8.P.1 Chemistry (9 Weeks)** (8.P.1.1, 8.P.1.2, 8.P.1.3, and 8.P.1.4)	**8.P.2 Energy Resources (2 Weeks)** (8.P.2.1 and 8.P.2.2) **8.L.1 Microbiology (2 Weeks)** (8.L.1.1 and 8.L.1.2) **8.L.2 Biotechnology (1 Week)** (8.L.2.1) ***Review and Testing (4 Weeks)***

Randolph County School System 6-8 Curriculum Pacing

8th Grade Science 1st Quarter Pacing

New Standards to be Taught

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Learning Targets/Essential Questions:

- I can form a hypothesis based on prior knowledge of a subject.
- I can analyze data collected from an experiment.
- I can identify independent, dependent, and controlled variables in an experiment.
- I can conduct an experiment.

Key Vocabulary

Intro

- Scientific method
- Hypothesis
- Observation
- Inference
- Independent variable
- Dependent variable
- Constant
- Control
- Analysis
- Conclusion
- Mass
- Volume

Key Concepts and Skills	**Resources**
• Scientific method • Measurement • Lab tools • Science skills	• See Randolph County Schools website for resource list

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New Standards to be Taught

8.E.2: Understand the history of Earth and its life forms based on evidence of change recorded in fossil records and land forms. (4 Weeks)

- 8.E.2.1: Infer the age of Earth and relative age of rocks and fossils from index fossils and ordering of rock layers (relative dating and radioactive dating).
- 8.E.2.2: Explain the use of fossils, ice cores, composition of sedimentary rocks, faults, and igneous rock formations found in rock layers as evidence of the history of the Earth and its changing life forms.

8.L.4: Understand the evolution of organisms and landforms based on evidences, theories and processes that impact the Earth over time. (3 Weeks)

- 8.L.4.1: Summarize the use of evidence drawn from geology, fossils, and comparative anatomy to form the basis of biological classifications systems and the theory of evolution.
- 8.L.4.2: Explain the relationship between genetic variation and an organism's ability to adapt to its environment.

Learning Targets/Essential Questions:

- I can identify types of fossils based on how they were formed.
- I can explain how fossil evidence supports the geological time scale.
- I can explain how the geological time scale shows the major events and diversity life forms in Earth's history.
- I can identify the four main time eras and the events that characterize them.
- I can apply the law of superposition to determine the relative age of the fossils.
- I can differentiate between relative and absolute age.
- I can give examples of absolute and relative dating.
- I understand how index fossils are used to help determine the age of rocks and rock layers.
- I can interpret the rock cycle.
- I can explain how ice cores are used to determine how Earth's climate has changed over time.
- I can provide examples of natural selection.
- I can explain the adaptations of organisms over time due to changes in their environment.
- I can classify organisms.
- I can compare organisms to see if they share common ancestors.
- I can conclude how moving continental plates may have influenced past environments.
- I can explain how the movements of tectonic plates can cause changes in climate and geologic features.

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Key Vocabulary			
8.E.2.1	***8.E.2.2***	***8.L.4.1***	***8.L.4.2***
• Fossil • Fossil Record • Extinction • Geologic Time Scale • Precambrian • Mesozoic Era • Cenozoic Era	• Relative Age • Law of Superposition • Index Fossils • Trilobite • Ice Core • Fault • Rock Cycle • Absolute Age • Half Life • Radiometric Dating	• Biological Evolution • Natural Selection • Adaptation • Genetic Variation • Mutation • Species • Taxonomy • Biodiversity • Analogous Structure • Homologous Structure	• Geological Evolution • Plate Tectonics • Continental Drift • Pangaea
Key Concepts and Skills • Fossils & Fossil Types • Geologic time • Mass Extinction • Rock Cycle • Relative Dating • Absolute Dating • Biological Evolution • Geologic Evolution • Natural Selection • Adaptations • Continental Drift/Plate Tectonics • Ice Core		**Resources** • See Randolph County Schools website for resource list	

Randolph County School System 6-8 Curriculum Pacing

8th Grade Science 2nd Quarter Pacing

New Standards to be Taught

8.L.3: Understand how organisms interact with and respond to the biotic and abiotic components of their environment. (3 Weeks)

- 8.L.3.1: Explain how factors such as food, water, shelter, and space affect populations in an ecosystem.
- 8.L.3.2: Summarize the relationship among producers, consumers, and decomposers including the positive and negative consequences of such interactions including:
    - Coexistence and cooperation
    - Competition (predator/prey)
    - Parasitism
    - Mutualism
- 8.L.3.3: Explain how the flow of energy within food webs is interconnected with the cycling of matter (including water, nitrogen, carbon dioxide, and oxygen).

Learning Targets/Essential Questions:

- I can differentiate between abiotic and biotic factors.
- I can identity limiting factors within an ecosystem and discuss the impact they have on the populations of organisms within the ecosystem.
- I can identify the levels of organization of living things.
- I can I can organize and group organisms as producers, consumers, and decomposers in both an ecosystem and a food web/food chain.
- I can illustrate how the processes of photosynthesis and describe how energy flows from the sun to producers to consumers and to decomposers.
- I can explain the impact of symbiotic relationships on an ecosystem.
- I can explain the interconnectedness of aquatic and terrestrial food chains.
- I can create a food chain when given the information about the environment.
- I can assess the similarities and differences between a food web and a food chain.
- I can explain and illustrate the processes involved in the Nitrogen Cycle, and the Carbon Cycle.
- I can model the flow of energy through an ecosystem using an energy pyramid.

Randolph County School System 6-8 Curriculum Pacing

Key Vocabulary		
8.L.3.1	***8.L.3.2***	***8.L.3.3***
• Producers • Consumers • Decomposers • Abiotic Factor • Biotic Factor • Habitat • Limiting Factor • Density Dependent Factor • Density Independent Factor • Ecosystem • Community • Population • Species • Population Density	• Symbiosis • Mutualism • Parasitism • Commensalism • Predation • Predator • Prey • Competition • Food Web	• Aquatic Food Chain • Terrestrial Food Chain • Nitrogen Cycle • Carbon Cycle • Autotroph • Heterotroph • Energy Pyramid

Key Concepts and Skills	**Resources**
• Biotic and Abiotic Factors • Interactions of Organisms • Terrestrial and Aquatic Food Chains and Food Webs • Competition • Symbiosis • Limiting Factors • Energy flow through an ecosystem	• See Randolph County Schools website for resource list

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New Standards to be Taught

8.L.5: Understand the composition of various substances as it relates to their ability to serve as a source of energy and building materials for growth and repair of organisms. (2 Weeks)

- 8.L.5.1: Summarize how food provides the energy and the molecules required for building materials, growth and survival of all organisms (to include plants)
- 8.L.5.2: Explain the relationship among a healthy diet, exercise, and the general health of the body (emphasis on the relationship between respiration and digestion)

Learning Targets/Essential Questions:

- I can summarize ways in which food provides energy and necessary nutrients to organisms through cellular respiration.
- I can explain and illustrate the process in which photosynthesis transforms light energy into chemical energy.
- I can describe how glucose is used for building cellular structures.
- I can identify organic compounds and their use for growth and survival.
- I can explain how healthy diets and exercise relate to good health among humans.
- I can describe the relationship between respiration and digestion.
- I can list the factors which affect the overall metabolic rate in the human body.
- I can describe the affect poor lifestyle choices have on long term body health.

Key Vocabulary

8.L.5.1	*8.L.5.2*
• Glucose • Protein • Sugar • Carbohydrate • Lipid • ATP • Cellular Respiration • Photosynthesis	• Respiration • Digestion • Circulation • Metabolism • Homeostasis
Key Concepts and Skills • Cell Structure (review) • Mitosis/Meiosis • Cellular energy	**Resources** • See Randolph County Schools website for resource list

Randolph County School System 6-8 Curriculum Pacing

• Photosynthesis • Cellular Respiration • Body health	

New Standards to be Taught

8.E.1: Understand the hydrosphere and the impact of humans on local systems and the effects of the hydrosphere on humans. (4 Weeks)

- 8.E.1.1: Explain the structure of the hydrosphere including
  - Water distribution on earth
  - Local river basins and water availability
- 8.E.1.2: Summarize evidence that Earth's oceans are a reservoir of nutrients, minerals, dissolved gases, and life forms:
  - Estuaries
  - Marine Ecosystems
  - Upwelling
  - Behavior of gases in the marine environment
  - Value and sustainability of marine resources
  - Deep ocean technology and understandings gained
- 8.E.1.3: Predict the safety and portability of water supplies in North Carolina based on physical and biological factors, including
  - Temperature
  - Dissolved Oxygen
  - pH
  - Nitrates and phosphates
  - Turbidity
  - Bio-indicators
- 8.E.1.4: Conclude that the good health of humans requires:
  - Monitoring of the hydrosphere
  - Water quality standards
  - Methods of water treatment
  - Maintaining safe water quality
  - Stewardship

Randolph County School System 6-8 Curriculum Pacing

Learning Targets/Essential Questions:

- I can recognize the distribution of water of earth and organize it based on its location and percentage of total water.
- I can illustrate and explain the stages of the water cycle.
- I can model examples of why water is referred to as the universal solvent.
- I can identify the unique properties of water.
- I can distinguish examples of water in the three main states of matter.
- I can identify and explain the unique characteristics of estuaries.
- I can explain the importance of estuaries as a marine ecosystem.
- I can illustrate how upwelling occurs in the oceans.
- I can classify different types of phytoplankton and zooplankton.
- I can differentiate between different types of natural resources provided by the oceans.
- I can describe the unique environments found within the deep ocean floor.
- I can interpret the physical, chemical, and biological measurements collected from the hydrosphere that indicate poor water quality.
- I can explain how turbidity, pH, and temperature relate to water quality.
- I can identify bio-indicators and explain how they relate to water quality.
- I can argue how excess nitrates and phosphates can result in eutrophication and affect water quality.
- I can recognize harmful contaminates and determine where they originate.
- I can illustrate how human activities can lead to pollution.
- I can propose solutions to pollution.
- I can outline laws that have been passed to protect water quality.
- I can give examples of water conservation.
- I can illustrate how salt water can be converted to usable fresh water.

Key Vocabulary

8.E.1.1	*8.E.1.2*	*8.E.1.3*	*8.E.1.4*
• Hydrosphere • River basin • Watershed • Saltwater • Freshwater • Ice	• Estuaries • Brackish water • Marine ecosystem • Ocean • Ocean zones • Coral reef	• Indicator • Water quality indicator • pH • Nitrates • Phosphates • Turbidity	• Pollution • Point source pollution • Non-point source pollution • Water quality • Pesticides

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• Glacier • Ice burg • Surface water • Groundwater • Aquifer • Transpiration • Infiltration • Runoff • Universal Solvent • Polarity • Cohesion • Adhesion • Surface tension • Density • Specific Heat	• Nertic zone • Abyss • Intertidal zone • Open ocean • Upwelling • Photosynthesis • Chemosynthesis • Hydrothermal vent • Salinity	• Bio-indicators • Macro-invertebrates • Temperature • Dissolved Oxygen (DO) • Sewage • Eutrophication	• Herbicides • Stewardship • Water treatment
Key Concepts and Skills • The water cycle (review) • Properties of water • Water distribution on earth • Marine ecosystems • Water quality • Human Impact on water		**Resources** • See Randolph County Schools website for resource list	

Randolph County School System 6-8 Curriculum Pacing

8th Grade Science 3rd Quarter Pacing

New Standards to be Taught

8.P.1: Understand the properties of matter and changes that occur when matter interacts in an open and closed container. (9 Weeks)

- 8.P.1.1: Classify matter as elements, compounds, or mixtures based on how the atoms are packed together in arrangements
- 8.P.1.2: Explain how the physical properties of elements and their reactivity have been used to produce the current model of the Periodic Table of Elements
- 8.P.1.3: Compare physical changes such as size, shape, and state to chemical changes that are the result of a chemical reaction to include changes in temperature, color, formation of a gas or precipitate
- 8.P.1.4: Explain how the idea of atoms and balanced chemical equations support the law of conservation of mass

Learning Targets/Essential Questions:

- I can identify chemical/physical properties and changes.
- I can identify evidence that chemical change has occurred.
- I can calculate the density of an object.
- I can identify the three states of matter and organize substances based on these properties.
- I can describe the parts of an atom.
- I can create a model of an atom.
- I can model how atoms combine to make compounds.
- I can describe how I come into contact with elements everyday.
- I can differentiate between an element, a compound, and a mixture.
- I can recognize elements within a chemical formula of a compound.
- I can identify chemical formulas for common compounds.
- I can differentiate between a homogeneous and heterogeneous mixture.
- I can explain how mixtures and compounds are separated.
- I can explain how Mendeleev contributed to the periodic table.
- I can identify groups on the periodic table.
- I can use the periodic table to identify characteristics of elements.
- I can differentiate between metals, nonmetals, and metalloids and classify elements based on this differentiation.
- I can use the periodic table to find out the number of electrons, protons, and neutrons in an element's atom.

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- I can use the periodic table to determine the number of valence electrons an element has.
- I can illustrate how atoms combine by sharing valence electrons.
- I can demonstrate the law of conservation of mass through balancing chemical equations.
- I can identify the reactants and products in a chemical equation.
- I can model how atoms are conserved during a chemical reaction.
- I can measure the mass before and after a chemical reaction to show the conservation of mass.

Key Vocabulary

8.P.1.1	*8.P.1.2*	*8.P.1.3*	*8.P.1.4*
• Atom • Proton • Electron • Neutron • Element • Compound • Mixture • Homogenous Mixture • Heterogeneous Mixture • Colloid • Molecule • Pure substance • Atomic number • Atomic mass	• Periodic table • Group • Period • Valence electron • Metals • Nonmetals • Metalloids • Ductile • Malleable • Insulator • Conductor	• Matter • Physical property • Chemical property • Density • Solubility • Melting point • Boiling point • States of matter • Solid • Liquid • Gas • Chemical change • Physical change • Precipitate	• Law of Conservation of Mass • Chemical reaction • Chemical equation • Coefficient • Subscript • Reactant • Product • Yield

Key Concepts and Skills

- Physical properties
- Physical change
- Chemical properties
- Chemical change
- Atoms
- Element
- Compound

Resources

- See Randolph County Schools website for resource list

• Types of mixtures • Periodic Table of the Elements • Law of Conservation of Mass • Chemical equations • Chemical reactions • ***10 REQUIRED COMMON SUBSTANCES:*** water (H_2O), carbon dioxide (CO_2), sucrose ($C_{12}H_{22}O_{11}$), oxygen (O_2), table salt (NaCl), household bleach (NaClO), hydrochloric acid (HCl), ammonia (NH_3), baking soda ($NaHCO_3$), vinegar ($HC_2H_3O_2$, 5% Solution)	

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8th Grade Science 4th Quarter Pacing

New Standards to be Taught

8.P.2: Explain the environmental implications associated with the various methods of obtaining, managing, and using energy. (2 Weeks)

- 8.P.2.1: Explain the environmental consequences of the various methods of obtaining, transforming and distributing energy
- 8.P.2.2: Explain the implications of the depletion of renewable and nonrenewable energy resources and the importance of conservation

Learning Targets/Essential Questions:

- I can identify the many forms of energy that we can use in our daily lives.
- I can compare and contrast the different kinds of energy sources and the effects on the environment.
- I can identify ways to use energy from the sun.
- I can discuss the implications of the depletion of renewable and non-renewable resources.
- I can list ways to conserve energy.
- I can give examples of the environmental impacts of using fossil fuels in the future.

Key Vocabulary

8.P.2.1	*8.P.2.2*
• Energy • Solar energy • Wind energy • Hydroelectric energy • Geothermal energy • Biomass • Nuclear energy	• Renewable resource • Nonrenewable resource • Energy conservation • Fossil fuel
Key Concepts and Skills • Energy usage • Depletion of resources • Renewable resources • Nonrenewable resources	**Resources** • See Randolph County Schools website for resource list

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New Standards to be Taught

8.L.1: Understand the hazards caused by agents of diseases that affect living organisms (2 Weeks)

- 8.L.1.1: Summarize the basic characteristics of viruses, bacteria, fungi, and parasites relating to the spread, treatment, and prevention of disease
- 8.L.1.2: Explain the difference between epidemic and pandemic as it relates to the spread, treatment, and spread of disease.

Learning Targets/Essential Questions:

- I can discuss how viruses spread in the human body.
- I can describe how bacteria reproduce and mutate.
- I can differentiate between a virus, bacteria, fungi, and Protists.
- I can explain how parasites can cause disease.
- I can explain how different types of treatments for diseases caused by viruses, bacteria, and fungi.
- I can explain the difference between an epidemic and a pandemic.
- I can explain how diseases are transmitted and spread.
- I can identify ways to treat disease.
- I can explain methods of preventing diseases.
- I can give examples of diseases caused by specific microbes.
- I can identify cancer-causing agents.
- I can give examples of mutagens that can cause disease.

Key Vocabulary

8.L.1.1	*8.L.1.2*
• Microbe • Pathogen • Virus • Parasite • Host cell • Bacteria • Fungi • Protest • Protozoa • Algae	• Epidemic • Pandemic • Antibiotic • Vaccination • Infectious disease • Contagion • Vector • Carrier • Non-infectious disease • Cancer

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• Mutant	• Carcinogen • Mutagen
Key Concepts and Skills • Microbes • Diseases • Epidemics • Pandemics • Treatment of disease • Prevention of disease	**Resources** • See Randolph County Schools website for resource list

New Standards to be Taught

8.L.2: Understand how biotechnology is used to affect living organisms. (1 Week)

- 8.L.2.1: Summarize aspects of biotechnology including:
  - Specific genetic information available
  - Careers
  - Economic benefits to North Carolina
  - Ethical Issues
  - Implications for agriculture

Learning Targets/Essential Questions:

- I can identify economic benefits of biotechnology in North Carolina, which include agriculture, medicine, and the environment.
- I can explore careers in biotechnology.
- I can debate the ethics of Genetic Modification and cloning.

Key Vocabulary

8.L.2.1

- Biotechnology
- Gene
- Cloning
- Genetic modification
- Bioremediation
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Key Concepts and Skills	Resources
• Careers • NC Economic Benefits • Ethical Issues	• See Randolph County Schools website for resource list