

8th Grade Science

Science					
Timeline (# of days)	Topic	Standards	Key Vocabulary	Enduring Understandings	Essential Questions
	Physical Science			Students will understand that... <ol style="list-style-type: none"> Matter has specific properties that control its behavior. The periodic table is organized by properties. Chemical reactions follow the Law of Conservation of Mass. Renewable and nonrenewable sources of energy exist. Nonrenewable sources are a limited supply. Conservation is important because of limited supplies. 	<ol style="list-style-type: none"> What makes substances different from each other? If matter cannot be created or destroyed, what happens to it? How can we use chemistry to help us understand the world around us? How do our energy choices affect the earth? How do energy and matter cycle through the earth? What are the tradeoffs for each energy source?
4	☐ Unit 1	8.P.1.1	matter, atom, neutron, proton, electrons, valence electrons, compound, molecule, chemical bonds, mixture, heterogeneous, homogeneous, physical properties, chemical properties, density, solubility, melting point, boiling point, states of matter, chemical change, physical change, precipitant, heterogeneous mixture, homogeneous mixture		
5	☐ Unit 2	8.P.1.2	Atom, protons, neutrons, electrons, element, compound, mixture, molecule, substance, atomic number, atomic mass, metals, nonmetals, metalloids, ductile, malleable, insulator, conductor, periodic table, groups, period, valence electrons, ionic bond, covalent bond		
2	☐ Unit 3	8.P.1.3	physical properties, chemical properties, density, states of matter, physical & chemical change		
3	☐ Unit 4	8.P.1.4	Law of conservation of mass, chemical reactions, chemical equations,		

			coefficient, subscript, reactant, product, yield, open system, closed system, reactivity		
2	☐ Unit 5	8.P.2.1	Energy, solar, wind, hydroelectric, geothermal, biomass, nuclear energy, renewable, nonrenewable, energy conservation, fossil fuels		
1	☐ Unit 6	8.P.2.2	Energy, solar, wind, hydroelectric, geothermal, biomass, nuclear energy, renewable, nonrenewable, energy conservation, fossil fuels		
	Earth Science			Students will understand that...	
3	☐ Unit 1	8.E.1.1	universal solvent -polarity -cohesion -adhesion -surface tension -density -specific heat -hydrosphere -river basin -watersheds -hydrosphere -surface water Ground water	<ol style="list-style-type: none"> Human actions impact the hydrosphere. Oceans are valuable in affecting the climate and providing resources. The hydrosphere is affected by chemical, physical, and biological Characteristics. Water and its movements create ecosystems. The Earth offers evidence about how it and organisms have changed overtime. Earth's history 	<ol style="list-style-type: none"> How does water quality affect life on earth? What makes water unlike any other substance on Earth? What are practical ways of being stewards of the hydrosphere? How do we know the Earth has changed over time? What information about the original organism would you gain from observing a fossil?
6	☐ Unit 2	8.E.1.2	estuary, upwelling, marine ecosystem, aquifer, biodiversity, hydrothermal vent, phytoplankton, photosynthesis, respiration, hydrothermal vent, salinity, producers, consumers, primary, secondary, tertiary, trophic level, zooplankton		
3	☐ Unit 3	8.E.1.3	turbidity, pH, temperature, bioindicator		

			(macroinvertebrate), nitrates, phosphates, pH, turbidity, temperature, dissolved oxygen, sewage, eutrophication	can be measured through the geologic timescale.	
3	☐ Unit 4	8.E.1.4	Point source, nonpoint source, water quality, pesticides, herbicides, stewardship, water treatment, decomposers, abiotic/biotic factors		
3	☐ Unit 5	8.E.2.1	Fossils, geologic time scale, precambrian, paleozoic, mesozoic, cenozoic, fossil record, extinction, relative age, law of superposition, index fossils, trilobites, faults		
3	☐ Unit 6	8.E.2.2	Sedimentary Rock, Igneous Rock, Metamorphic Rock, Rock Cycle, Fault		
	Life Science			Students will understand that... 1. Microbes infect and interfere with normal body functions. 2. Biotechnology is a new controversial field with many careers and improvements in agriculture, medicines and food science. 3. Healthy bodies require a healthy diet and exercise. 4. Beginning with the sun, energy	1. How do you maintain a healthy body? 2. Are all new biotechnologies really improvements? 3. How are we a part of an ecosystem? 4. Where does energy come from and where does it go? 5. In what ways are environmental systems and organisms connected? 6. How do
3	☐ Unit 1	8.L.1.1	Microbiology, Viruses, Bacteria, Protozoa, Parasites, Fungi, Algae, Vaccines, Antibiotics, Host Cell, Unicellular		
3	☐ Unit 2	8.L.1.2	Vectors, Infectious, Pathogens, Epidemic, Pandemic, Antimicrobial		
3	☐ Unit 3	8.L.2.1	Biotechnology, DNA, Bioremediation, Genetic Modification (GM), Cloning, Penicillin, Insulin, Diabetes.		
3	☐ Unit 4	8.L.3.1	Organism, Biotic, Abiotic, Ecosystem, Habitat, Niche, Population, Species, Ecology		
3	☐ Unit 5	8.L.3.2	Producer, Consumer, Decomposer, Scavenger, Predator, Prey, Competition, Mutualism, Commensalism, Parasitism, Symbiosis		

4	☐ Unit 6	8.L.3.3	Photosynthesis/Cellular Respiration, Food Chain/Web, Transpiration, Condensation, Evaporation, Precipitation, Nitrogen Cycle, Nutrient, Carbon Cycle, Water Cycle, Autotroph, Heterotroph	flows and cycles through the ecosystem. 5. Living things are organized into systems that are interconnected. 6. Interactions with and among living systems cause changes in matter, energy, and environment. 7. Organisms have evolved over time.	organisms adapt to changes on Earth?
3	☐ Unit 7	8.L.4.1	Evolution, Plate Tectonics, Lithosphere, Pangaea, Adaptations, Variations, Homologous, Analogous, Embryological, Taxonomy, Geological Time Scale, Plate Tectonic Theory, Divergent, Convergent, Transform		
1	☐ Unit 8	8.L.4.2	Phenotype, Morphological, Biochemical, DNA		
2	☐ Unit 9	8.L.5.1	Mitosis, Meiosis, Plasma Membrane, Multicellular, Prokaryotic, Eukaryotic, Organelle, Photosynthesis, Cells		
2	☐ Unit 10	8.L.5.2	Toxins, Addiction		
4	Review				

Science

I Can Statements

8.P.1.1 Classify matter as elements, compounds, or mixtures based on how the atoms are packed together in arrangements.

I Can

- I can explain the relationships between atoms and elements.
- I can explain how elements combine to form compounds.
- I can differentiate mixtures from compounds.

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.

I Can

- I can explain how the Periodic Table is organized.

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.

I Can

- I can compare physical and chemical changes of matter.
- I can understand that all physical and chemical changes involve a change in energy.

8.P.1.4 Explain how the idea of atoms and a balanced chemical equation support the law of conservation of mass.

I Can

- I can explain how the idea of atoms and a balanced chemical equation support the Law of Conservation of Mass.

8.P.2.1 Explain the environmental consequences of the various methods of obtaining, transforming, and distributing energy.

I Can

- I can understand that energy flows while matter cycles.
- I can 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.

I Can

- I can explain the implications of the depletion of renewable and nonrenewable energy resources and the importance of conservation.

8.E.1.1 Explain the structure of the hydrosphere including:

- **Water distribution on earth**
- **Local river basin and water availability**

I Can

- I can describe the water cycle on earth.
- I can analyze the property of water as a solvent.

- I can explain the distribution of water on earth.
- I can identify local river basins and watersheds and understand the importance as a resource.
- I can determine the importance of groundwater as a valuable resource.
- I can determine that all major watersheds on earth transport water and materials to the ocean.

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**

I Can

- I can evaluate the earth's ocean as a resource or reservoir based on its contents and composition.
- I can identify the movement of water, minerals and dissolved gases within the ocean.
- I can evaluate technologies used to explore the ocean.
- I can explore the importance of estuaries.
- I can analyze the relationship between aquatic and terrestrial food webs.

8.E.1.3 Predict the safety and potability of water supplies in North Carolina based on physical and biological factors, including:

- **Temperature**
- **Dissolved oxygen**
- **pH**
- **Nitrates and phosphates**
- **Turbidity**
- **Bio-indicators**

I Can

- I can determine the health of a water system by analyzing physical, chemical and biological variables.
- I can identify the role of bio-indicators to study environmental factors.

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**

I Can

- I can explain the importance of laws related to protecting the earth's water.
- I can represent the steps used in water treatment plants.
- I can distinguish between point source and non-point source pollution.
- I can determine ways to become a good environmental steward.

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).**I Can**

- I can analyze how rock layers and fossils provide evidence of Earth's history.
- I can compare how Earth's processes that we see today are similar to those in the past.

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.**I Can**

- I can classify the three types of rocks.
- I can interpret changes in earth's lithosphere.
- I can interpret how rocks, fossils and ice cores provide evidence of Earth's past.

8.L.1.1 Summarize the basic characteristics of viruses, bacteria, fungi and parasites relating to the spread, treatment and prevention of disease.**I Can**

- I can summarize the basic characteristics of viruses, bacteria, fungi and parasites.
- I can explain the spread, treatment and prevention of diseases caused by viruses, bacteria, fungi and parasites.
- I can classify bacteria according to their shape.

8.L.1.2 Explain the difference between epidemic and pandemic as it relates to the spread, treatment and prevention of disease.**I Can**

- I can explain the differences between epidemic and pandemic as it relates to spread, treatment and prevention of disease.

8.L.2.1 Summarize aspects of biotechnology including:

- **Specific genetic information available**
- **Careers**
- **Economic benefits to North Carolina**
- **Ethical issues**
- **Implications for agriculture**

I Can

- I can summarize specific genetic information available through biotechnology.
- I can identify career opportunities and economic benefits in the field of biotechnology in the state of NC.
- I can evaluate the ethical issues pertaining to biotechnology.
- I can explain the implications of biotechnology as it affects living organisms.

8.L.3.1 Organism, Biotic, Abiotic, Ecosystem, Habitat, Niche, Population, Species, Ecology

I Can

- I can identify characteristics of an ecosystem.
- I can identify factors that can affect populations in an ecosystem.

8.L.3.2 Producer, Consumer, Decomposer, Scavenger, Predator, Prey, Competition, Mutualism, Commensalism, Parasitism, Symbiosis

I Can

- I can summarize the interactions between producers, consumers and decomposers.
- I can identify the three major kinds of ecosystems.
- I can explain the positive and negative consequences of ecological relationships.

8.L.3.3 Photosynthesis/Cellular Respiration, Food Chain/Web, Transpiration, Condensation, Evaporation, Precipitation, Nitrogen Cycle, Nutrient, Carbon Cycle, Water Cycle, Autotroph, Heterotroph.

I Can

- I can explain the characteristics of food chains and food webs.
- I can describe the water cycle.
- I can describe and analyze the carbon cycle.
- I can describe and analyze the nitrogen cycle.

8.L.4.1 Summarize the use of evidence drawn from geology, fossils, and comparative anatomy to form the basis for biological

classification systems and the theory of evolution.

I Can

- I can understand the meaning and concept of evolution.
- I can interpret how landforms change over time.
- I can evaluate the biological changes overtime which support evolution.
- I can organize and classify organisms according to the biological classification system.

8.L.4.2 Explain the relationship between genetic variation and an organism’s ability to adapt to its environment.

I Can

- I can explain the relationship between genetic variation and an organism’s ability to adapt to its environment.

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).

I Can

- I can evaluate how food provides energy.
- I can identify the steps of mitosis.
- I can identify the steps of meiosis.
- I can conclude that plant and animal cells carry on complex chemical processes.
- I can recognize unicellular organisms.
- I can recognize multicellular organisms.

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).

I Can

- I can explain the relationship between a healthy diet, exercise and a healthy body.

NC Check-Ins Assessed Standards		
Check-In 1 (Physical)	Check-In 2 (Earth)	Check-In 3 (Life)

<input type="checkbox"/> P.1.1 <input type="checkbox"/> P.1.2 <input type="checkbox"/> P.1.3 <input type="checkbox"/> P.1.4 <input type="checkbox"/> P.2.1 <input type="checkbox"/> P.2.2	<input type="checkbox"/> E.1.1 <input type="checkbox"/> E.1.2 <input type="checkbox"/> E.1.3 <input type="checkbox"/> E.1.4 <input type="checkbox"/> E.2.1 <input type="checkbox"/> E.2.2	<input type="checkbox"/> L.1.1 <input type="checkbox"/> L.1.2 <input type="checkbox"/> L.2.1 <input type="checkbox"/> L.3.1 <input type="checkbox"/> L.3.2 <input type="checkbox"/> L.3.3 <input type="checkbox"/> L.4.1 <input type="checkbox"/> L.4.2 <input type="checkbox"/> L.5.1 <input type="checkbox"/> L.5.2
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All items for NC Science Check-Ins at grades 5 and 8 are four-response multiple choice items. Each question is worth one point.

<h2>Resources</h2>	<ul style="list-style-type: none"> • About.com Chemistry Projects • Chemistry Lessons • ClassZone: Chemical Interactions • Jefferson Lab • Periodic Table Videos • Science Learning Hub • Science-Net • The Atoms Family Song • The Science Spot • Virtual Balancing Equations • Virtual Lab Atomic Structure Valance Electrons • Virtual Lab Physical and Chemical Changes • Virtual Lab Properties Lab • Law of Conservation of Matter (8.P.1.4) • Alternative Energy WebQuest (8.P.2) • Energy Quizlet (8.P.2) • NCDPI Released EOG • Energy Activities • Energy Labs • Energy Resources Website (Table of Resources) • Poop to Power Video (8.P.2.2) • Renewable Energy Virtual Lab • Blendspace Oceans and Climate (8.E.1.2) • Blendspace of Ocean Zone (8.E.1.1) • Go Formative EOG review (8.E.1) this is a free resource that allows you to search pre-made
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assessments by other teachers; you choose your grade, state, and standards.

- [Water Quality](#) (8.E.1.3)
- [Oceans' movie by Disney](#). Also has teacher guide.
- [Amoeba Sister Water Properties](#) (8.E.1.3)
- [Classzone: Earth's Waters](#) (8.E.1)
- [Climate Change Data](#) (8.E.1)
- [Creatures of the Deep](#) (8.E.1.2)
- [Earth's Fresh Water](#) (8.E.1) again, you will have to create a log-in, but it is full of resources!
- [Earth's Oceans](#) (8.E.1)
- [Exploring the Oceans Quizlet](#)
- [Fresh Water Quizlet](#)
- [Human Actions and Water](#) (8.E.1.4)
- [Hydrosphere Vents Video](#) (8.E.1.2)
- [Life in the Deep](#) (8.E.1.2)
- [My NASA Data](#) (8.E.1)
- [NOAA](#) (8.E.1)
- [Water Cycle Interactive Lesson](#) (8.E.1)
- [Create Classroom Ice Cores](#) (8.E.2.2)
- [ClassZone: Earth's History and Resources](#) (8.E.2.1)
- [ClassZone: Life Over Time](#) (8.E.2.1)
- [Earth's History Quizlet](#) (8.E.2)
- [Fossil Guy, Fossil Sheets](#) (8.E.2.1)
- [Fossil Rock Anthem](#) (8.E.2)
- [Geological and Biological Time Scale](#) (8.E.2.1)
- [Interactive Geological Time Scale](#) (8.E.2.2)
- [What Evidence Supports Pangaea Virtual Lab](#) (8.E.2.2)
- [Amoeba Sister Cellular Respiration](#) (8.L.5.1)
- [Amoeba Sister Photosynthesis](#) (8.L.5.1)
- [Amoeba Sisters Bacteria](#) (8.L.1.1)
- [Amoeba Sisters Viruses](#) (8.L.1.1)
- [Biotechnology Activities](#) (8.L.2)
- [Biotechnology Gene Splicing](#) (8.L.2)
- [Biotechnology Genetically Modified Virtual Lab](#) (8.L.2)
- [Biotechnology Virtual Lab](#) (8.L.2)
- [Cells Alive](#)
- [Classzone: Cells and Microbiology](#)
- [How Pandemics Spread](#) (8.L.1.2)
- [Interactive Disease Simulator](#) (8.L.1)
- [Investigating Disease and Prevention Webquest](#)
- [Parasites](#) (8.L.1.1)
- [Photosynthesis](#) (8.L.5.1)

- [Ecology Activities](#) (8.L.3)
- [Ecology Quizlet](#) (8.L.3)
- [Food Chain and Food Web Activities](#) (8.L.3.3)
- [Food Chain Game](#) (8.L.3.3)
- [Food Chain Virtual Lab](#) (8.L.3.3)
- [Food Web activities](#) (8.L.3.3)
- [Food Web Virtual](#) (8.L.3.3)
- [Model Ecosystems Virtual Lab](#) (8.L.3)
- [Analogy & Homology](#) (8.L.4)
- [Charles Darwin, Natural Selection Game](#) (8.L.4.2)
- [Evolution 101](#) (8.L.4.2)
- [Heredity & Genetics Quizlet](#) (8.L.4)
- [Peppered Moth Activity](#) (8.L.4.2)

NCFE Weight Distribution

Domain	Grade 8
Matter: Properties and Change	14-16%
Energy Conservation and Transfer	10-12%
Earth Systems, Structures, and Processes	13-15%
Earth History	11-13%
Structure and Function of Living Organisms	19-23%
Ecosystems	9-11%
Evolution and Genetics	11-13%
Molecular Biology	8-10%

Number of Operational Items by Clarifying Objectives

Grade 8 Science Clarifying Objectives	Number of Operational Items by Objective
Matter: Properties and Change	

8.P.1.1	2
8.P.1.2	2-3
8.P.1.3	2
8.P.1.4	3
Energy: Conservation and Transfer	
8.P.2.1	2-3
8.P.2.2	3-4
Earth Systems, Structures, and Transfer	
8.E.1.1	2-4
8.E.1.2	2
8.E.1.3	1-3
8.E.1.4	0-1
Earth History	
8.E.2.1	2-3
8.E.2.2	4-5
Structures and Functions of Living Organisms	
8.L.1.1	3-4
8.L.1.2	1-2
8.L.2.1	4-6
Ecosystems	
8.L.3.1	1
8.L.3.2	2-3

8.L.3.3	3-4
Evolution and Genetics	
8.L.4.1	4
8.L.4.2	3-4
Molecular Biology	
8.L.5.1	2-3
8.L.5.2	1-3