North Carolina Essential Standards Correlation Chart

Matter: Properties and Change		
Essential Standard	**Clarifying Objectives**	***Coach* Lesson(s)**
8.P.1 Understand the properties of matter and changes that occur when matter interacts in an open and closed container.	8.P.1.1 Classify matter as elements, compounds, or mixtures based on how the atoms are packed together in arrangements.	1, 3, 4
	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.	2
	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.	5, Inv. 1
	8.P.1.4 Explain how the idea of atoms and a balanced chemical equation support the law of conservation of mass.	6, Inv. 1
Energy: Conservation and Transfer		
Essential Standard	**Clarifying Objectives**	***Coach* Lesson(s)**
8.P.2 Explain the environmental implications associated with the various methods of obtaining, managing, and using energy resources.	8.P.2.1 Explain the environmental consequences of the various methods of obtaining, transforming and distributing energy.	7–9
	8.P.2.2 Explain the implications of the depletion of renewable and nonrenewable energy resources and the importance of conservation.	8, 9
Earth Systems, Structures and Processes		
Essential Standard	**Clarifying Objectives**	***Coach* Lesson(s)**
8.E.1 Understand the hydrosphere and the impact of humans on local systems and the effects of the hydrosphere on humans.	8.E.1.1 Explain the structure of the hydrosphere including: • Water distribution on earth • Local river basins and water availability	21, 22; Inv. 2
	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 • Deep ocean technology and understandings gained	22, 23; Inv. 2

Answer Keys

Chapter 1

Lesson 1

Discussion Question

If the atomic number is 79, the atom has 79 protons. The atomic mass is the sum of the protons and neutrons. Subtracting 79 protons from 197 leaves 118 neutrons.

Lesson Review

1. B
2. C
3. B
4. C

Lesson 2

Discussion Question

Copper conducts heat and electricity well. It is shiny, malleable, and ductile, and it is a solid at room temperature. Copper is to the left of the steplike line, which means it is a metal, and these are the characteristics of metals.

Lesson Review

1. C
2. A
3. D
4. B
5. C

Lesson 3

Discussion Question

Water and hydrogen peroxide cannot be expected to have the same properties. Although they are made up of the same elements, a molecule of hydrogen peroxide has two oxygen atoms, while a molecule of water has only one. These substances are different compounds. Each compound has its own set of properties.

Lesson Review

1. C
2. D
3. B
4. C

Lesson 4

Focus on Inquiry

Students' hypotheses and experimental designs will vary. Possible hypothesis: When the water evaporates, the ions form new salt crystals. Possible experiment: Observe salt crystals and then dissolve them in water. Allow the solution to evaporate. With a hand lens, examine any solid left behind to see if it looks like the original crystals.

Lesson Review

1. B
2. C
3. A
4. A

Lesson 5

Focus on Inquiry

Provide groups of students with candles in secure holders. Tapers (not dripless) are best, as they will allow students to see liquid wax run down the side of the candle. Remind students to exercise caution throughout the investigation. Students should not touch the flame or hot wax.

Observations of the unlit candle should include color, size, and shape. Observations of the burning candle may include liquid wax pooling by the wick or running down the side of the candle, light and heat given off at the top of the candle, and possibly smoke rising from the top of the candle. After the candle is blown out, students may observe smoke and the end of the wick glowing. Students should infer that the smoke, light, and heat are evidence of chemical changes. The melting of solid wax when it is heated and the solidifying of liquid wax when it cools are physical changes. Students may note that these are reversible changes, and a reversible change generally indicates a physical change.

Lesson Review

1. D
2. D
3. A
4. B
5. C

Lesson 6

Discussion Question

When you shuffle a deck of cards, the cards are rearranged, but neither the identity nor the number of cards in the deck changes. Likewise, in a chemical reaction, atoms are rearranged, but their identity and the total number of atoms stays the same.

Lesson Review

1. C
2. B
3. C

Chapter 1 Review

1. D 8.P.1.2
2. D 8.P.1.4
3. A 8.P.1.1
4. C 8.P.1.3
5. A 8.P.1.2
6. C 8.P.1.3
7. D 8.P.1.4
8. B 8.P.1.1
9. D 8.P.1.2
10. C 8.P.1.3
11. Sample response: $C_6H_{12}O_6$ is a compound. It is made up of more than one kind of element, and the chemical formula indicates that the elements are always found in the same proportions. 8.P.1.1
12. Sample response: According to the law of conservation of mass, the mass of the

reactants in a chemical reaction is the same as the mass of the products. Matter is not created or destroyed in a chemical reaction. When a chemical equation is balanced, it shows the same number of each kind of atom on both sides of the equation. Atoms are rearranged, but no atoms are created or destroyed. 8.P.1.4

Chapter 2

Lesson 7

Discussion Question

Students should correctly identify the forms of energy used. Encourage students to recognize that most activities involve more than one form of energy. Sample response: I used electrical and thermal energy when I toasted a piece of bread. I used electromagnetic energy from the sun to run my calculator. I used chemical energy from my music player's battery. I used mechanical energy to walk into the classroom.

Lesson Review

1. C
2. A
3. B
4. D

Lesson 8

Discussion Question

Accept all reasonable answers that take into account the advantages and disadvantages of wind energy. Sample response: I would support the idea because wind energy is renewable energy and it does not cause pollution. The wind farm could be located outside residential areas so that the noise would not disturb people in their homes.

Lesson Review

1. A
2. B
3. D
4. A

Lesson 9

Focus on Inquiry

To save time, you may wish to provide students with the data they will need. State and national energy department Web sites can provide information. Your local power company may also be able to supply the data. Remind students that percentages should sum to approximately 100% and angles should sum to approximately 360 degrees, but these totals may vary slightly due to rounding.

Lesson Review

1. A
2. C
3. B

Chapter 2 Review

1. B 8.P.2.1
2. A 8.P.2.2
3. D 8.P.2.1
4. B 8.P.2.1
5. B 8.P.2.2
6. A 8.P.2.1
7. B 8.P.2.2
8. Sample response: A renewable energy resource can be replaced at the rate at which it is used, while a nonrenewable energy resource cannot be replaced at the rate at which it is used. Solar energy is a renewable energy resource. Oil is a nonrenewable resource. 8.P.2.2

Chapter 3

Lesson 10

Focus on Inquiry

If the microscopes available are different from the illustration shown, discuss these differences with your students. If any of your students have not used a microscope before, demonstrate how to carry and use the microscope. Emphasize the importance of not using the coarse adjustment when using the high-power objective.

Prepared slides are called for as a time-saver. Avoid using prepared blood smears because of the lack of nuclei in red blood cells. Epithelial cells or soft tissue, such as liver, are good examples of animal cells. Onion skin or leaf cross sections are good examples of plant cells. Point out to students that prepared slides are usually stained to show detail, and the colors that are seen are not the natural colors of the cells. If prepared slides of cells are not available, have students make wet-mount slides of onion skin or leaves of *Elodea*.

For some cells, nuclei may be visible under lower power. For others, nuclei will not be visible until students change to high power.

Lesson Review

1. D
2. C
3. C
4. A

Lesson 11

Discussion Question

They keep some of the oxygen produced by photosynthesis and use it for respiration. They also take in some oxygen from the air.

Lesson Review

1. A
2. D
3. B
4. B
5. C

Lesson 12

Discussion Question

The cut will heal through mitosis because meiosis produces only sex cells, not ordinary body cells such as those that make up skin.

Lesson Review

1. C
2. B
3. D
4. A

Chapter 3 Review

1. B 8.L.5.1
2. A 8.L.5.1
3. C 8.L.5.1
4. C 8.L.5.1
5. D 8.L.5.1
6. A 8.L.5.1
7. C 8.L.5.1
8. C 8.L.5.1
9. Sample response: The function of meiosis is to produce gametes for reproduction. The function of mitosis is to provide more body cells for growth and repair. Meiosis produces cells with half as many chromosomes as the parent cell. Mitosis produces cells with the same number of chromosomes as the parent cell. 8.L.5.1

Chapter 4

Lesson 13

Focus on Inquiry

The hypothesis should be a testable statement about the effect of exercise on heart rate. Materials should include a stopwatch or clock with second hand for timing exercise and measuring heart rate. If necessary, inform students how to determine heart rate by placing one's fingers on the neck or wrist and finding the number of heart beats per minute.

Make sure students understand that the dependent variable (heart rate) is the result of, or *depends on,* the independent variable (exercise). Independent variables might be the duration of the exercise or the number of repetitions in a given time (for example, number of jumping jacks per minute).

Controlled variables include the amount of time between exercising and measuring the heart rate, the type of exercise, and the method used to measure heart rate.

If you wish to have students carry out their experiments, make sure that the exercise involved in students' experiments can be performed safely by all students.

Lesson Review

1. C
2. C
3. A
4. B

Lesson 14

Discussion Question

Antibiotics should not be used to treat these diseases. Antibiotics do not affect parasites or viruses, so they will not cure these diseases. Also, antibiotics should not be used when they are not needed. Misuse and overuse of antibiotics can lead to the development of resistant bacteria.

Lesson Review

1. A
2. C
3. B
4. A

Lesson 15

Discussion Question

The vaccine contains a weakened form of a pathogen, not a strong form. Because the pathogen in the vaccine is weakened, it cannot cause disease. But it can cause a person's immune system to make antibodies against the pathogen. In the example given, the vaccine will make the brother immune to chickenpox.

Lesson Review

1. C
2. D
3. B

Lesson 16

Discussion Question

Answers will vary. Accept any answers that are reasonable and based on facts. Encourage students to research the topic and to give opinions about specific crops as well as bioengineering in general. Students may find it useful to research specific companies in North Carolina that are doing work involving biotechnology.

Lesson Review

1. C
2. D
3. B
4. D

Chapter 4 Review

1. B 8.L.1.2
2. C 8.L.5.2
3. D 8.L.1.1
4. D 8.L.2.1
5. A 8.L.5.2
6. C 8.L.1.2
7. B 8.L.2.1
8. A 8.L.2.1
9. A 8.L.1.1
10. B 8.L.5.2
11. Sample response: Viruses are not made up of cells and do not carry out any of the functions of life except reproduction. Viruses cannot reproduce without infecting a living cell. 8.L.1.1
12. Sample response: Good hygiene means keeping clean. Washing your hands gets rid of pathogens from objects you may have touched. Hygiene also includes covering your mouth when you cough or

sneeze to avoid spreading disease. You should sneeze into your arm so that you do not get pathogens on your hands. 8.L.1.2

Chapter 5

Lesson 17

Focus on Inquiry

You may need to help students generate a list of microhabitats. You may wish to have students confine their lists to places that are on school grounds. If students will make their observations outside of school time and off school property, emphasize the importance of getting permission to be on private property and having an adult with them. Have field guides to local organisms available for students to use. Tell students that if they do not know the names of organisms they observe, they can take pictures or make sketches. Students' lists will vary but should correctly distinguish between abiotic and biotic factors. Lead students to recognize that microorganisms are also present.

Lesson Review

1. B
2. C
3. D
4. A

Lesson 18

Focus on Inquiry

Possible food chains:

algae → water flea → minnow → perch → eagle

algae → water flea → minnow → perch → bear

algae → water flea → dragonfly → frog → garter snake → eagle

Accept all reasonable answers. Encourage students to think about the role of decomposers in these ecosystems. You may also wish to have students create a food web based on their food chains.

Lesson Review

1. A
2. C
3. C
4. B

Lesson 19

Discussion Question

In the carbon cycle, plants take in carbon dioxide that animals give off during cellular respiration. During the process of photosynthesis, plants use carbon dioxide, along with sunlight and water, to produce oxygen and glucose. Plants take in nitrogen from the soil and use it to make proteins that are eaten by animals for food. Plants return nitrogen to the soil when they die. In the water cycle, plants use their roots to take in water from the soil. They release water to the atmosphere through leaves, in the process of transpiration.

Lesson Review

1. C
2. B
3. C
4. D

Lesson 20

Focus on Inquiry

Students should see that the rise and fall of the wolf population follows the rise and fall of the moose population. The populations increase together, then the moose population begins to decrease. A decrease in the wolf population follows a decrease in the moose population. When the wolf population decreases, the moose population increases again.

Lesson Review

1. A
2. C
3. B
4. B

Chapter 5 Review

1. A 8.L.3.3
2. C 8.L.3.2
3. B 8.L.3.2
4. D 8.L.3.3
5. C 8.L.3.3
6. B 8.L.3.2
7. B 8.L.3.1
8. A 8.L.3.1
9. A 8.L.3.2
10. D 8.L.3.1
11. Answers will vary. Accept all answers that correctly identify the factors and give a reasonable explanation for the importance of each. Sample response: Light is an abiotic factor. The loss of trees will mean that more light will reach plants on the forest floor. Food is a biotic factor. The loss of trees will mean fewer seeds that squirrels and some species of birds feed on. 8.L.3.1
12. Sample response: The body of any organism contains nitrogen. When an organism dies, the nitrogen in the organism's body is released to the soil by decomposers. This makes nitrogen available for plants to take in to use to make proteins. 8.L.3.3

Chapter 6

Lesson 21

Discussion Question

Water from the mountain stream could reach the estuary if they are connected by the same river basin. Although the water from the stream is a small amount, it could affect the estuary in some way. For example, it could carry pollutants to the estuary.

Lesson Review

1. A
2. B
3. A

4. C
5. D

Lesson 22

Discussion Question

The ocean is very deep over the abyssal plain. It would be very difficult to bring up these rocks. It could cost more than the manganese would be worth.

Lesson Review

1. C
2. A
3. B
4. C

Lesson 23

Discussion Question

Pamlico Sound is an estuary. Plentiful nutrients and sheltering grasses make an estuary a good place for fish to live and breed. So there are lots of fish in the water for people to catch.

Lesson Review

1. A
2. C
3. B
4. C

Lesson 24

Discussion Question

Sample responses: They can be careful not to throw trash overboard or throw away nets and other equipment that could harm ocean life. People should check boat engines to be sure they are in good working order and do not leak pollutants into the water.

Lesson Review

1. B
2. C
3. A
4. D

Lesson 25

Focus on Inquiry

Check that students' measured pH values are reasonable and that the averages are correct. Note that the EPA recommends but does not require a pH range of 6.5 to 8.5 for drinking water.

Lesson Review

1. D
2. B
3. C
4. C

Chapter 6 Review

1. C 8.E.1.2
2. A 8.E.1.1
3. B 8.E.1.4
4. A 8.E.1.3
5. C 8.E.1.3
6. D 8.E.1.1
7. A 8.E.1.4
8. A 8.E.1.2
9. D 8.E.1.1
10. B 8.E.1.2
11. Point-source pollution comes from a single location. Non–point-source pollution comes from many places or an unidentified source. It is easier to clean up point-source pollution because the source can often be found and the pollution stopped. Non–point-source pollution has so many sources that it is hard to find them all. 8.E.1.4
12. Sample response: A wide diversity of organisms indicates clean water. Many kinds of organisms can live in clean water. If the water is polluted, some of these organisms do not survive. The species that can live in the polluted water have less competition. So there are larger numbers of fewer species in polluted water. 8.E.1.3

Chapter 7

Lesson 26

Discussion Question

Both earthquakes and volcanoes are likely to occur along plate boundaries, so they often occur in the same areas Also, in some cases, volcanic activity can trigger earthquakes.

Lesson Review

1. D
2. B
3. C
4. D
5. A

Lesson 27

Focus on Inquiry

You can obtain limestone chips from a scientific supply company or a garden center. Soak the chips in water overnight before students begin the activity. Results will vary, but students should see a decrease in the overall mass of the limestone. Students should infer that the vinegar (acid) dissolved some of the limestone, which is what happens during chemical weathering due to acid rain.

Lesson Review

1. B
2. D
3. C
4. D
5. C

Lesson 28

Discussion Question

To describe events in terms of relative age, students should describe the timing of an event relative to two other events from their lists. For example, a student might say, "I started preschool after I was born and before I moved to North Carolina." To describe an event in terms of absolute age, students should describe an event they remember occurring when they were a specific age. For example, a student might say, "I turned 13 at the beginning of this year."

Lesson Review

1. A
2. B

3. D
4. C

Lesson 29

Discussion Question

The dinosaurs lived through most of the Mesozoic era, which lasted about 100 million years. Humans have been on Earth for only about 200,000 years. This is a very short period of time when compared to the length of time that dinosaurs lived on Earth.

Lesson Review

1. D
2. A
3. C
4. C

Lesson 30

Discussion Question

Sample Response: The tiger population may once have consisted of animals without stripes, but a few might have had light markings and color variation in their fur that allowed striped tigers to begin to appear in the population. These animals may have blended in with the tall grasses better than the tigers without stripes, so the striped tigers more easily approached prey without being detected. As a result, striped tigers were more successful hunters and survivors. Very gradually, over many generations, populations of tigers with stripes therefore increased, and populations of those without stripes decreased and eventually became extinct.

Lesson Review

1. D
2. C
3. A
4. B

Lesson 31

Discussion Question

The body shapes are analogous. They have a similar function—easy movement through water—but a different internal structure. Dolphins and sharks do not have a common ancestor. Their streamlined shapes evolved separately.

Lesson Review

1. D
2. B
3. C
4. D

Lesson 32

Focus on Inquiry

Responses will vary but should reflect the understanding that classification involves grouping things together based on similarities. As groups become smaller, items within each group should become more similar. Students should use binomial nomenclature to provide scientific names. They should capitalize the first name and place both in italics.

Lesson Review

1. D
2. D
3. C
4. A

Chapter 7 Review

1. C 8.L.4.1
2. C 8.L.4.2
3. D 8.L.4.1
4. A 8.E.2.1
5. D 8.L.4.1
6. C 8.E.2.2
7. B 8.L.4.2
8. B 8.E.2.1
9. A 8.E.2.2
10. B 8.L.4.1
11. A 8.L.4.2
12. B 8.E.2.1
13. C 8.E.2.2
14. An index fossil is a fossil of an organism that existed for only a short time and lived in many places. Index fossils can be used to identify a relatively narrow time frame in which a rock layer was forming. They are also used to identify rock layers in different parts of the world that were laid down at the same time. 8.E.2.1
15. Sample response: Variation means that there are many differences among the members of a population. Some variations are more useful than others. If the environment changes, a variation that was not useful before could be very useful. A useful variation might help some members of the population survive the change and keep the population from dying out. 8.L.4.2
16. Sample response: Igneous rock can change into metamorphic and sedimentary rock. Igneous rock may be buried or pushed below Earth's surface. If the igneous rock is exposed to high heat and pressure, a chemical change takes place in the rock. This changes the rock into metamorphic rock. Igneous rock on Earth's surface may undergo weathering. This process produces sediment, which can be compacted and cemented into sedimentary rock. 8.E.2.2

Investigation 1

This investigation relates to the content presented in Lesson 5, "Physical and Chemical Changes" (pages 27–32), and Lesson 6, "Chemical Reactions and the Conservation of Mass" (pages 33–36). The investigation may be integrated with those lessons or presented as a stand-alone activity. The investigation integrates content objectives with methods of inquiry. Students' lab reports allow you to assess their understanding of scientific inquiry, safety, and practices of science, as well as their mastery of content.

Question
How does the amount of matter at the beginning of a chemical reaction affect the amount of matter at the end of the reaction? (The exact wording of students' questions may vary.)

Hypothesis
Hypotheses may vary but are likely to indicate that because mass is conserved, changing the amounts of the reactants will result in an equal change in the mass of the products. Hypotheses do not need to be correct but should be reasonable and should show an understanding of the purpose of the investigation.

Materials
Students should list all materials used during this investigation.

Procedure
Students' answers should order the steps of the procedure correctly and should be written clearly so that another student can follow them.

Safety
Possible answers: I wore safety goggles to protect my eyes and a lab apron to protect my clothing; I handled the graduated cylinder carefully; I was careful not to spill the vinegar or baking soda; I avoided breathing in any fumes from the vinegar.

Observations and Data
Students' observations will vary but are likely to include: the substances bubbled as they mixed together; the bag inflated (at least partly) with gas. All cells in the data tables should be filled in.

The equation is balanced, with 3 atoms of carbon, 5 atoms of hydrogen, 5 atoms of oxygen, and 1 atom of sodium on both sides of the equation.

Because there are the same numbers and kinds of atoms on each side of the equation, there is the same amount of matter on each side of the equation.

Conclusion
Individual responses will vary based upon actual hypotheses and data. Sample response: Increasing the mass of the reactants increased the mass of the products. In each part of the experiment, the mass of the products equaled/did not equal the mass of the reactants. My data support/do not support my hypothesis.

If students' results do not support their hypotheses, or do not illustrate conservation of mass, encourage students to suggest a reason, such as that the bag was not sealed properly or the substances were not measured accurately.

Investigation 2

This investigation relates to the content presented in Lesson 21, "Earth's Water" (pages 128–131), and Lesson 25, "Monitoring Water Quality" (pages 145–149). The investigation may be integrated with those lessons or presented as a stand-alone activity. The investigation integrates content objectives with methods of inquiry. Students' lab reports allow you to assess their understanding of scientific inquiry, safety, and practices of science, as well as their mastery of content. You may wish to remove the bottoms from the plastic cups in advance. If not, demonstrate how to cut the bottom from a cup carefully.

Question
How can the water from a freshwater well become salty? (The exact wording of students' questions may vary.)

Prediction
Predictions may vary, but students are likely to say that the removal of freshwater from one area will cause salt water to move toward that area. Predictions do not need to be correct, but should be reasonable and should show an understanding of the purpose of the investigation.

Materials
Students should list all materials used during this investigation.

Procedure
Students' answers should order the steps of the procedure correctly and should be written clearly so that another student can follow them.

Safety
Possible answers: I wore my lab apron to make sure I didn't spill water on my clothing. I handled the materials carefully. I was careful not to spill any water on the floor.

Observations
Observations may vary, but students are likely to note that the colored water moved through the sand toward the plastic cup as water was removed. Suggest that students record data by drawing before-and-after sketches of the model. Students may also use colored diagrams or notes to record the color change of the water that is removed.

Conclusion
Individual responses will vary based upon actual predictions and observations. Sample response: When freshwater was removed from the groundwater under