

interactive SCIENCE



WORKBOOK

Grade 8



SEMESTER

1

Name: _____

Class: _____

Teacher: _____

PEARSON

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GRADE 8

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Lesson 1: How Scientists Work? (use with pages 370 – 375)

Building Vocabulary: Match each term with its definition by writing the letter of the correct definition in the right column on the line beside the term in the left column.

- | | |
|-----------------------------------|---|
| _____ 1. predicting | a. an observation dealing with numbers or amounts. |
| _____ 2. observing | b. explaining or interpreting observations. |
| _____ 3. qualitative observation | c. grouping together items that are alike in some way. |
| _____ 4. inferring | d. evaluating observations and data to reach conclusions. |
| _____ 5. science | e. using one or more senses to gather information. |
| _____ 6. analyzing | f. an observation that deals with descriptions that cannot be expressed in numbers. |
| _____ 7. quantitative observation | g. making a statement or claim about what will happen in the future. |
| _____ 8. classifying | h. a way of learning about the natural world. |



Modified True or False: If the statement is true, write true. If the statement is false, change the underlined word or words to make the statement true.

- _____ 1. Classifying involves evaluating observations and data to reach a conclusion about them.
- _____ 2. Tools, such as the microscope, can help scientists when they are observing.
- _____ 3. Scientists make predictions to help them study things that cannot be observed directly.
- _____ 4. A(n) qualitative observation involves descriptions that cannot be expressed in numbers.
- _____ 5. Inferring is a way to learn about the natural world.



Answer the following questions.

1. Name six skills scientists use to help them form and answer questions about the natural world.

2. What is the difference between quantitative and qualitative observations?



3. How does making models help scientists observe?



4. What is the difference between inferring and predicting?



Name: _____

Date: _____

Lesson 2: The Characteristics of Scientific Knowledge? (use with pages 376 – 383)

Modified True or False: If the statement is true, write true. If the statement is false, change the underlined word or words to make the statement true.

- _____ 1. Scientific reasoning is characterized by **subjective** reasoning.
- _____ 2. Reasoning based on **personal feelings** is objective reasoning.
- _____ 3. A pseudoscience is not a way of knowing but a set of **beliefs**.
- _____ 4. Understanding the world requires both scientific and **pseudoscientific** ways of knowing.
- _____ 5. Science and its methods are characterized by a(n) **chaotic** approach to learning about the world.



Fill in the blank to complete each statement.



1. All scientific investigations involve collecting relevant _____ to support researchers' conclusions.
2. Having an attitude of _____ can lead to new understandings.
3. _____ are facts, figures, and evidence collected during a scientific investigation.
4. _____ is a skill that scientists use in scientific investigations.
5. Pseudoscience is based on _____.



Answer the following questions in the spaces provided.



1. How do scientists analyze empirical evidence?

2. Give one example of a pseudoscientific idea and one example of a scientific idea.

3. How might the conclusions drawn from scientific investigations change?



Building Vocabulary: Match each term with its definition by writing the letter of the correct definition in the right column on the line beside the term in the left column.

- | | |
|-------------------------------|---|
| _____ 1. empirical evidence | a. facts, figures, and other evidence |
| _____ 2. objective reasoning | b. based on evidence |
| _____ 3. skepticism | c. based on personal feelings or values |
| _____ 4. pseudoscience | d. an attitude of doubt |
| _____ 5. subjective reasoning | e. data and observations collected through a scientific process |
| _____ 6. data | f. set of subjective belief |



Name: _____

Date: _____

Lesson 3: Designing an Experiment? (use with pages 384 – 393)

Building Vocabulary: Match each term with its definition by writing the letter of the correct definition in the right column on the line beside the term in the left column.

- | | |
|---------------------------------|---|
| _____ 1. controlled experiment | a. a repetition of an experiment. |
| _____ 2. hypothesis | b. a generalization that makes sense of observations by using logical reasoning. |
| _____ 3. repeated trial | c. an error in the design of the experiment. |
| _____ 4. dependent variable | d. the factor that is purposely changed to test a hypothesis |
| _____ 5. scientific explanation | e. the process by which people gather evidence about the natural world and propose explanations based on this evidence. |
| _____ 6. bias | f. an attempt by a different group of scientists to conduct the same experiment. |
| _____ 7. scientific inquiry | g. the factor that may change in response to the independent variable. |
| _____ 8. independent variable | h. a possible answer to a scientific question. |
| _____ 9. replication | i. a scientific experiment in which only one variable is changed at a time |



Modified True or False: If the statement is true, write true. If the statement is false, change the underlined word or words to make the statement true.

- _____ 1. To test a hypothesis, a scientist purposely changes the dependent variable.
- _____ 2. When drawing a conclusion, scientists examine the data to see if it supports or fails to support the hypothesis.
- _____ 3. The factor that may change in a controlled experiment is the dependent variable.
- _____ 4. A helpful tool for keeping data organized during an experiment is a graph.
- _____ 5. A hypothesis can be accepted as true after two repeated trials have been performed.



Answer the following questions.



1. What is the function of a hypothesis in the scientific inquiry process?

2. What role do independent and dependent variables play in a controlled experiment?

3. Why are repeated trials required before accepting a hypothesis as true?

4. How do scientists develop scientific explanations about subjects that are impossible to study through controlled experiments?



Name: _____

Date: _____

Lesson 1: Scientific Measurement? (use with pages 414 – 423)

Building Vocabulary: Match each term with its definition by writing the letter of the correct definition in the right column on the line beside the term in the left column.

- | | |
|---|---|
| _____ 1. mass | a. a standard measurement system based on the number 10. |
| _____ 2. density | b. the amount of space taken up by an object. |
| _____ 3. metric system | c. the measure of the amount of matter in an object. |
| _____ 4. weight | d. a version of the metric system used by modern scientists. |
| _____ 5. meniscus | e. the measure of how much mass is contained in a given volume. |
| _____ 6. volume | f. the curve of the liquid used for measuring volume. |
| _____ 7. International
System
of Units (SI) | g. the measure of the force of gravity acting on an object. |



Modified True or False: If the statement is true, write true. If the statement is false, change the underlined word or words to make the statement true.

- _____ 1. Because it is affected by gravity, an object's mass would be less on the moon, where there is less gravity.
- _____ 2. The basic SI unit for the volume of a rectangular solid is the liter.
- _____ 3. Density determines whether an object will float or sink in water.
- _____ 4. The best unit for measuring the length of a pencil is the nanometer.
- _____ 5. The basic unit for measuring mass is the kilogram.



Answer the following questions.

1. Why do scientists use SI as a standard system of measurement?





Give the basic SI units by completing the table below.

Quantity	SI Unit
Length	
Mass	
Weight	
Volume	
Density	
Time	
Temperature	



Name: _____

Date: _____

Lesson 2: Mathematics and Scientific Thinking (use with pages 424 – 431)**Building Vocabulary: Fill in the blank to complete the statement.**

1. _____ communicate how precise measurements are.
2. Sources of error may produce _____ that do not fit the data set.
3. The difference between the known value and its measured value is called the _____.
4. Approximations based on reasonable assumptions are called _____.

Modified True or False: If the statement is true, write true. If the statement is false, change the underlined word or words to make the statement true.

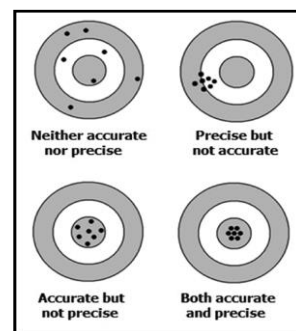
- _____ 1. An estimate is an approximation of a number based on reasonable assumptions.
- _____ 2. Accuracy refers to how close a group of measurements are to each other.
- _____ 3. The mean is the middle number in an ordered set of data.
- _____ 4. The median appears most often in a list of numbers.
- _____ 5. To find percent error, you subtract the true value from the experimental value and divide by the true value.
- _____ 6. The anomalous data in a measurement include all digits measured exactly, and one estimated digit.

**Answer the following questions.**

1. When are estimates useful?



2. What is the difference between accuracy and precision?



Calculate the mean, median, mode, and range for the following data set:

14.9	13.9	13.9	12.8	11.7
------	------	------	------	------

Solution:

Mean: _____	Median: _____	Mode: _____	Range: _____

Name: _____

Date: _____

Lesson 3: Using Graphs in Science (use with pages 432 – 435)**Building Vocabulary: Write the definitions to the following words in the space provided.**

1. Graph

2. Linear graph

3. Nonlinear graph

4. Outlier

**Modified True or False: If the statement is true, write true. If the statement is false, change the underlined word or words to make the statement true.**

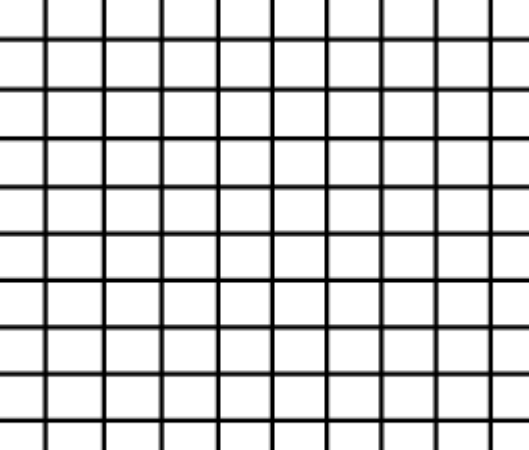
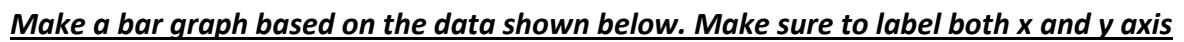
- _____ 1. Bar graphs can be used to represent categorical data.
- _____ 2. When a graph has no clear trend, it means the variable are related.
- _____ 3. Scientists control changes in the independent variable.
- _____ 4. Data points do not fall in a straight line on a(n) nonlinear graph.
- _____ 5. When scientists use graphs to identify trends, they are making a forecast about what will happen in the future.

**Answer the following questions.**

1. Give an example of how a scientist might use a graph of the relationship between population growth and time **to identify a trend**.

-
-
-
-

-
-
-
-
-



Subject	Vote
Math	2
English	10
Social Studies	4
Science	2
History	12



Name: _____

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Lesson 4: Models and Systems (use with pages 436 – 443)Circle the letter of the correct answer.

- Scientists test their ideas about things they cannot observe directly by building _____.
 a. models
 b. theories
 c. systems
 d. evidence
- Input, output, and process are parts of a(n) _____.
 a. system
 b. assumption
 c. model
 d. hypothesis
- Models can help scientists understand a system's _____.
 a. assumptions
 b. investigations
 c. processes
 d. theories
- Scientists may use a computer to keep track of the variables in a complex _____.
 a. model
 b. program
 c. feedback
 d. system



Modified True or False: If the statement is true, write true. If the statement is false, change the underlined word or words to make the statement true.

- _____ 1. A(n) simple system is difficult to model.
- _____ 2. The mercury cycle, water cycle, and rock cycle are all models.
- _____ 3. Your heart pumping faster when you exercise is an example of input.
- _____ 4. Scientists may make assumptions to simplify a model.
- _____ 5. The output of a toaster is electricity.
- _____ 6. All models are physical objects.

Answer the following questions.

- A **(model/system)** is a group of parts that work together to perform a function.
- Is a handheld can opener a system? Explain.

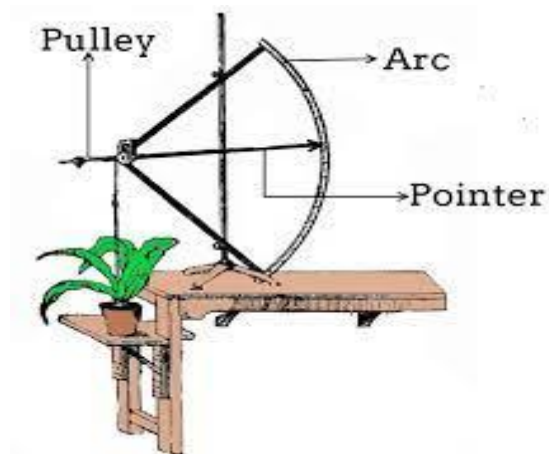


3. What is the input when you use a can opener?



Building Vocabulary: Match each term with its definition by writing the letter of the correct definition in the right column on the line beside the term in the left column.

- | | |
|-------------------|--|
| _____ 1. process | a. action or series of actions that happen in a system |
| _____ 2. output | b. material or energy that goes into a system |
| _____ 3. feedback | c. representation of an object or process |
| _____ 4. model | d. changes a system in some way |
| _____ 5. input | e. material or energy that comes out of a system |
| _____ 6. system | f. group of parts that work together to carry out a function |



Name: _____

Date: _____

Lesson 5: Safety in the Science Laboratory (use with pages 444 – 449)**Building Vocabulary: Fill in the blank to complete the statement.**

1. A(n) _____ is used to put out fires.
2. A(n) _____ symbol is used when you need to protect your clothes.
3. A(n) _____ symbol is used when you need to protect your hands from chemicals.
4. A(n) _____ symbol is used when you need to protect your eyes from glass breakage.
5. Wear sunglasses and a hat when you do an investigation in the _____.

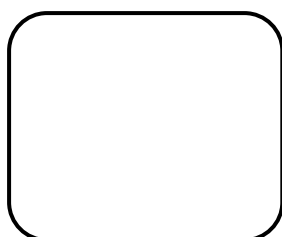
**Modified True or False: If the statement is true, write true. If the statement is false, change the underlined word or words to make the statement true.**

- _____ 1. The field is any area outside the science laboratory.
- _____ 2. Wear heat-resistant gloves when working with chemicals.
- _____ 3. Wear an apron to protect yourself and your clothes from chemicals.
- _____ 4. Wear plastic gloves to protect your hands from hot beakers.
- _____ 5. The disposal symbol always appears on investigations that use hot plates.
- _____ 6. A fire blanket is used to smother flames.

**Answer the following questions.**

1. Name two reasons for good preparation before an investigation.

2. Draw and name one safety symbol and tell what it means.



3. Describe how to properly care for animals during investigations.

4. Give one safety practice you should always use at each stage of an investigation.

5. What safety symbols would you expect to see in an investigation using animals?



Name: _____

Date: _____

Lesson 1: Darwin's Theory (use with pages 8 – 17)Circle the letter of the correct answer.

1. Members of a species can mate with each other and produce _____.

a. gene pools

c. variations

b. fertile offspring

d. adaptations

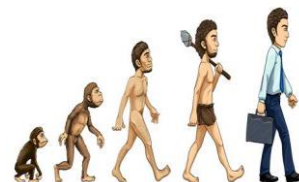
2. The different shapes of bird beaks are examples of _____.

a. fossils

c. evolution

b. adaptation

d. naturalism



3. Only the organisms with a desired characteristic are bred in _____.

a. artificial selection

c. England

b. natural selection

d. South America

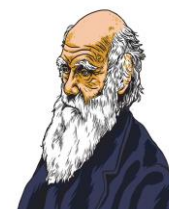
4. The preserved remains of an organism that lived long ago is a(n) _____.

a. adaptation

c. fossil

b. Galápagos

d. Beagle

Modified True or False: If the statement is true, write true. If the statement is false, change the underlined word or words to make the statement true._____ 1. Today scientists know that organisms are much less diverse than Darwin imagined._____ 2. In Darwin's book The Population of Species, he proposed that evolution occurs by means of natural selection._____ 3. Without variation, all the members of a species would have the same traits._____ 4. To understand how evolution might occur, Darwin studied the offspring of wild animals that were produced by artificial selection._____ 5. In 1858, Alfred Russel Wallace and Charles Darwin proposed an explanation for how evolution occurs._____ 6. Darwin made a number of important observations on the Hawaiian Islands.



Building Vocabulary: Fill in the blank to complete each statement.

1. A(n) _____ is a group of similar organisms that can mate with each other and produce fertile offspring.
2. A(n) _____ is a trait that helps an organism survive and reproduce.
3. A scientific _____ is a well-tested concept that explains a wide range of observations.
4. The process by which individuals that are better adapted to their environment are more likely to survive and reproduce is called _____.
5. That some newly hatched turtles can swim faster than others of the same species is evidence of _____ within a species.



Understanding Main Ideas: Answer the following questions.

1. Who was Charles Darwin, and what did he do on the Beagle's five-year voyage around the world?

2. What is evolution?

3. When members of a species compete, what do they compete for?

4. What happens when species overproduce offspring?

5. How do helpful variations accumulate in a species over time?

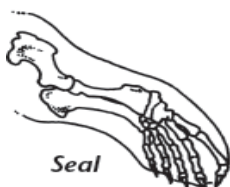
Name: _____

Date: _____

Lesson 2: Evidence of Evolution (use with pages 18 – 21)**Building Vocabulary: Write the definitions to the following words in the space provided.***Homologous structures*

**Fill in the blank to complete each statement.**

1. Similar structures that related species have inherited from a common ancestor are called _____ structures.
2. Scientists compare the _____ bases in the DNA of different species to infer how closely related the species are.
3. In most cases, evidence from DNA and _____ has confirmed conclusions about evolutionary relationships based on fossils, embryos, and body structure.
4. An organism's _____ is its basic body plan.
5. Fishes, amphibians, reptiles, birds, and mammals all have an internal skeleton with _____.
6. Scientist can compare the order of _____ in protein to see how closely related two species are.

**Answer the following questions.**

Seal

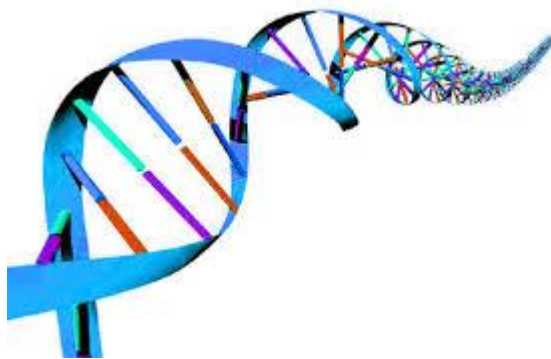


Bird

1. Compare and contrast the bones of a bird's wing and a seal's flipper.

2. *What can scientists infer from the similarities between these two structures?*

3. *Describe how DNA evidence might be used to confirm scientists' conclusions about any relationship between birds and seals.*



Name: _____

Date: _____

Lesson 3: Rate of Change (use with pages 22– 25)**Building Vocabulary: Write the definitions to the following words in the space provided.**

1. Gradualism

2. Punctuated Equilibrium

**Modified True or False: If the statement is true, write true. If the statement is false, change the underlined word or words to make the statement true.**

- _____ 1. A new species can form when a group of individuals remains completely separated from the rest of its family long enough to evolve different trait that prevent reproduction.
- _____ 2. A natural catasrophe such as a river or volcano, may separate group members.
- _____ 3. The Kaibab squirrel and the Abert's squirrel are members of the same species.
- _____ 4. Scientists have developed three patterns to describe the rate of evolution.
- _____ 5. The fossil record shows patterns of gradualism over short periods of time.
- _____ 6. Evolution explains how variations can lead to changes in a species.

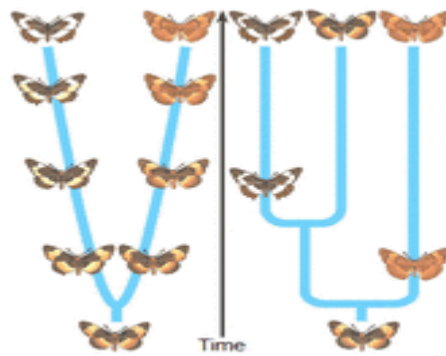
**Answer the following questions.**

1. How do new species form?



2. What are some examples of natural barriers than can separate group members?

3. What evidence in the fossil record supports gradualism?



Name: _____

Date: _____

Lesson 1: What Causes Climate? (use with pages 38 – 45)**Building Vocabulary: Match each term below by writing the letter of the correct definition.**

a. leeward

b. polar zones

c. climate

d. windward

e. tropical zone

f. marine climate

g. temperate zones

h. monsoon

i. continental climate

- _____ 1. The average year-after-year conditions of temperature, precipitation, winds, and clouds
- _____ 2. An area near the equator that receives direct sunlight all year round
- _____ 3. The side of a mountain that faces oncoming wind
- _____ 4. A climate that is not warmed or cooled by the ocean
- _____ 5. Areas that extend from about 66.5° to 90° north and south latitudes
- _____ 6. The side of a mountain that does not face oncoming wind
- _____ 7. Sea and land breezes over a large region that change directions with the seasons
- _____ 8. Areas located from about 23.5° to 66.5° north and south latitudes
- _____ 9. A moderate climate affected by winds off the ocean

**Modified True or False: If the statement is true, write true. If the statement is false, change the underlined word or words to make the statement true.**

- _____ 1. Temperature is affected by latitude, altitude, distance from large bodies of water, and ocean currents.
- _____ 2. Many mountainous areas have warmer climates than the lower around them.
- _____ 3. In general, areas near the poles have warmer climates because the sun's rays hit Earth's surface more directly there.
- _____ 4. The main factors that affect temperature are prevailing winds, the presence of mountains, and seasonal winds.
- _____ 5. Climate is the average, year-after-year conditions of temperature, precipitation, wind, and clouds in an area.

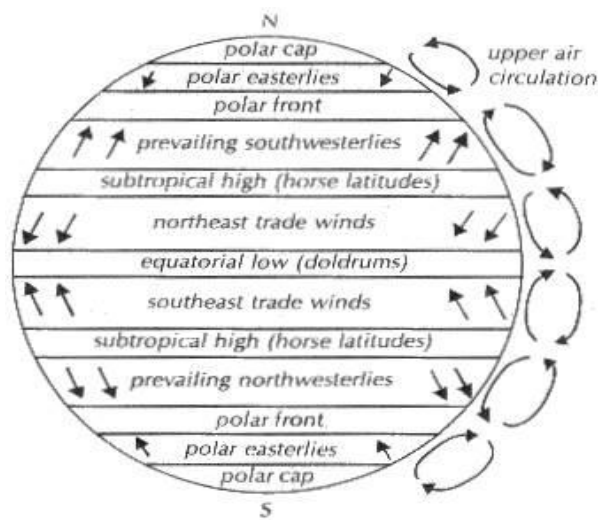


Answer the following questions.



1. Explain why some places on Earth are warm and others are cold.

2. How do prevailing winds affect the precipitation an area experiences?



Name: _____

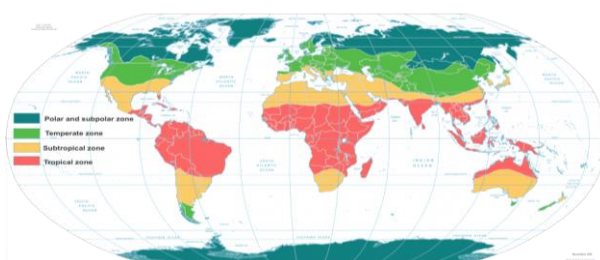
Date: _____

Lesson 2: Climate Regions? (use with pages 46 – 55)**Building Vocabulary: Match each term below by writing the letter of the correct definition.****a. permafrost****b. subarctic****c. savanna****d. humid subtropical****e. desert****f. tundra****g. rain forest****h. steppe**

- _____ 1. Arid regions that get less than 25 cm of rain yearly.
- _____ 2. Forest in which abundant rain falls year-round
- _____ 3. Climate is wet and warm, but not as hot as tropics
- _____ 4. Climate that lies north of the humid continental climates
- _____ 5. Tropical grassland
- _____ 6. Permanently frozen tundra soil
- _____ 7. Semiarid region, also called a prairie or grassland
- _____ 8. Climate region north of the subarctic

**Modified True or False: If the statement is true, write true. If the statement is false, change the underlined word or words to make the statement true.**

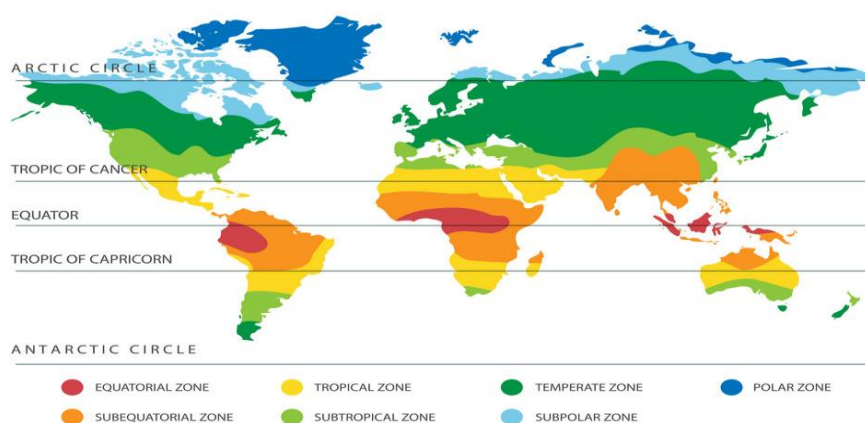
- _____ 1. Scientists classify daily weather according to factors including temperature, precipitation, and vegetation.
- _____ 2. The main climate regions are tropical rainy, dry, temperate marine, temperate continental, polar, and highlands.
- _____ 3. Temperate continental climates are found only on continents in the Northern Hemisphere.
- _____ 4. Humid subtropical, marine west coast, and Mediterranean are three kinds of rainy climates.
- _____ 5. In the Southern Hemisphere there are no large land areas at the right latitude for polar climates to occur.





Complete the table below by filling in the climate regions.

<i>Climate Region</i>	<i>Precipitation</i>	<i>Temperature</i>
	<i>Heavy</i>	<i>Low</i>
	<i>Low</i>	<i>Hot or cold</i>
	<i>Heavy</i>	<i>Mild</i>
	<i>Moderate</i>	<i>Warm to cold</i>
	<i>Low to moderate</i>	<i>Cold</i>
	<i>Varies with altitude</i>	<i>Varies with altitude</i>



Name: _____

Date: _____

Lesson 3: Changes in Climate (use with pages 56 – 61)**Building Vocabulary: Fill in the blank to complete each statement.**

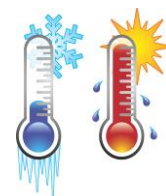
1. Solid particles or liquid drops in gas, called _____, can stay in the upper atmosphere for months or years, reflecting away some incoming solar radiation.
2. Dark, cooler regions on the surface of the sun, called _____ have been linked to short-term climate changes.
3. Over millions of years, warm climate periods have alternated with cold climate periods known as _____, or glacial episodes.

**Modified True or False: If the statement is true, write true. If the statement is false, change the underlined word or words to make the statement true.**

- _____ 1. During each ice age, huge sheets of ice called aerosols covered large parts of Earth's surface.
- _____ 2. Scientists believe that if plants or animals today need certain conditions to live, then similar plants and animals in the past also required those conditions.
- _____ 3. Earth's climate has not been affected by the angle of Earth's axis and the shape of Earth's elliptical orbit around the sun.
- _____ 4. Scientists have concluded that there have been about five ice ages on Earth during the last two million years, the last ending about 10,000 years ago.
- _____ 5. Changes in climate occur slowly, but the consequences of such changes are great.

**Answer the following questions.**

1. What principle do scientists follow when they study ancient climates?



2. List three sources of information scientists use to learn about ancient climates.

3. How does Earth's surface change during an ice age?

4. What are three possible causes of climate change?



Name: _____

Date: _____

Lesson 4: Human Activities and Climate Change (use with pages 62 – 67)**Building Vocabulary: Fill in the blank to complete each statement.**

1. A gradual increase in the temperature of Earth's atmosphere is called _____.
2. An energy-rich substance formed from the remains of organisms is a(n) _____.
3. A gas in the atmosphere that traps heat is called a(n) _____.

**Modified True or False: If the statement is true, write true. If the statement is false, change the underlined word or words to make the statement true.**

- _____ 1. Many human activities are increasing the level of the greenhouse effect in the atmosphere.
- _____ 2. One effect of global warming is drought and desertification.
- _____ 3. Another effect of global warming is changes to ecosystems in the biosphere.
- _____ 4. Being more energy-efficient will help to limit the radiation of heat back to space as infrared waves.
- _____ 5. Most of the carbon dioxide in the atmosphere was released by human beings burning methane.

**Answer the following questions.**

1. Define the greenhouse effect and identify the four steps involved in the process.

2. Explain why the level of greenhouse gases in the atmosphere is rising.

3. *Identify one important effect of the rise in the level of greenhouse gases.*

4. *Explain what changes to the biosphere, rising sea levels, drought and desertification, regional changes in temperature, and melting glaciers have to do with one another.*

5. *Identify three human solutions for limiting global warming and climate change.*

