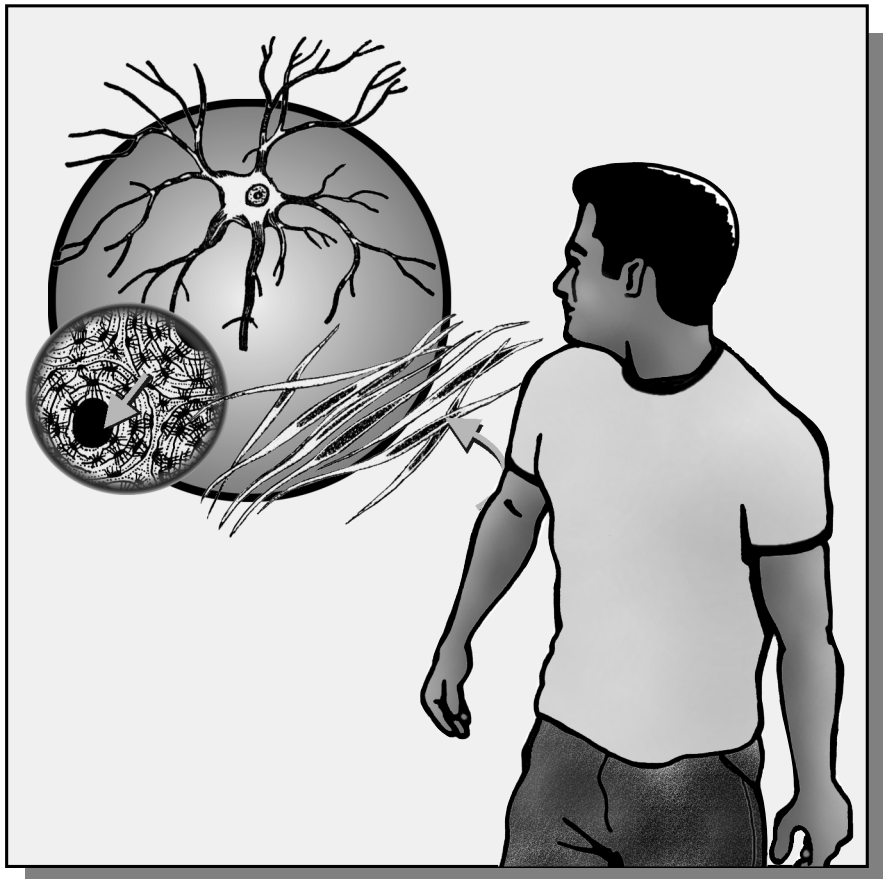
Natural Science Mysteries

Activities



Chapter 2

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Chapter 2

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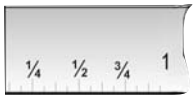
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ACTIVITIES
Lesson 1:
Measurement

Measuring Length and Distance

You are making progress! ***Answer the following questions. Write the correct answers with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

1. Until a measurement theory can be described in scientific terms of _____, it is only a general principle.

2. Early measurements of length were based on: _____.
   (a) distances around the Earth (c) the human body
   (b) events in the heavens (d) the metric system

3. The Roman pace was a measure of: _____.
   (a) distance (b) temperature (c) time (d) weight

4. _____ was the Roman word for 1,000 paces, which became the word _____.

5. A _____ was the distance from elbow to outstretched finger tip.

6. A _____ was the distance between thumb tip and little finger tip of an outspread hand.

7. A ***fathom*** was used to measure: _____.
   (a) the depth of water (c) how fast horses ran
   (b) the height of horses (d) the step of a Roman soldier

8. The ***inch***, ***foot***, ***yard*** and ***mile*** are measures of: _____.
   (a) distance (b) temperature (c) time (d) weight

9. An English mile has_____ feet.
   (a) 3 (b) 12 (c) 36 (d) 5,280

10. To change 14,110 feet to miles, you _____ by 5,280.
    (a) divide (b) multiply (c) add (d) subtract

11. The number that converts between feet and inches is _____.

12. The number that converts between yards and feet is _____.

13. The number that converts between miles and feet is _____.

14. The standard unit for length in the metric system is the _____.

15. A ***centimeter*** contains _____ ***millimeters***.
    (a) 3 (b) 10 (c) 12 (d) 1,000

16. A ***meter*** is 100 centimeters. _____ (a) True or (b) False

17. A ***kilometer*** is 1,000 meters. _____ (a) True or (b) False

18. The primary problem with the metric system is that you have to convert to the English system to use it. _____ (a) True or (b) False

19. One hundred millimeters is about 4 inches. _____ (a) True or (b) False

20. A meter is a little _____ than a yard.
    (a) longer (b) shorter

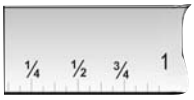
21. In the beginning story episode, Bryan and Tom were headed for _____, when Tom's _____ was stolen.

22. The reader can **infer** from this lesson's final story episode that James Olsen was a _____.
    (a) school teacher
    (b) famous person
    (c) good citizen
    (d) troublemaker

23. Write the **Life Principle:** "_____ _____."

Name: _____

Date: _____ Grade: _____



ACTIVITIES
Lesson 2:
Measurement

Measuring Long Periods of Time

You are making progress! ***Answer the following questions. Write the correct answers with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

1. Ancient cultures used the _____ as the unit for time.

2. The period from sunrise to sunrise was one _____.
   (a) day (b) week (c) month (d) year

3. The Earth's _____ appeared to give the Sun its daily motion across the sky.
   (a) rotation on its axis (c) revolution in its orbit about the Sun
   (b) revolution on its axis (d) rotation in its orbit about the Sun

4. The period from full moon to full moon was one: _____.
   (a) day (b) week (c) month (d) year

5. A ***month*** received its name from the word: _____.
   (a) mare (b) molten (c) mommy (d) moon

6. A ***year*** was the time for the Earth to ***revolve*** in its orbit around the Sun once. _____
   (a) True or (b) False

7. Twelve lunar months of 29.5 days each resulted in a calendar year of 354 days. _____
   (a) True or (b) False

8. The Babylonian calendar had 12 months of _____ days each, for a total of _____ days in a year.

9. The Roman ruler who changed Rome to a ***solar calendar*** of 365 days with an extra day every four years was: _____.
   (a) Gregory (b) Jules Verne (c) Julius Caesar (d) Mark Anthony

10. The purpose of the leap ***day*** was to keep the calendar in agreement with the seasons. _____
    (a) True or (b) False

11. The year is exactly 365 1/4 days long. _____ (a) True or (b) False

12. The ***Gregorian calendar*** is a _____ calendar.
    (a) lunar (b) solar (c) planetary (d) galactic

13. What is a ***centenary year***? _____

14. When will the next centenary ***leap year*** occur? _____

15. When will the next four non-centenary leap years occur? _____, _____, _____, _____

16. _____ is always the extra day on a leap year calendar.

17. Non-leap years have 365 days and are known as _____.

18. The calendar in use in the United States today is the _____ calendar.
(a) Babylonian (b) Egyptian (c) Gregorian (d) Julian

19. In this lesson's beginning story episode, which animal was **NOT** cited as living on the island? _____
(a) deer (b) moose (c) wolf (d) bear

20. In this lesson's final story episode, (**effect:**) the boat was unable to get very close to _____ be**cause:** _____.

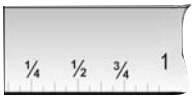
21. Write the **Life Principle:** "_____ _____."

Congratulations! You have finished Lesson 2 Activites. Score your work.

Name: _____

Date: _____ Grade: _____

ACTIVITIES
Lesson 3:
Measurement



Measuring Short Periods of Time

You are making progress! ***Answer the following questions. Write the correct answers with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

1. The time from one phase of the moon to the next was about _____ days.
   (a) one (b) seven (c) 29.5 (d) 365
2. Sunday is named after: _____.
   (a) Jupiter (b) the Moon (c) Saturn (d) the Sun
3. Monday is named after _____.
4. Mars is associated with war because: _____
   _____.
   (a) it is red colored
   (b) it rose in the spring when armies marched off to fight
   (c) the military commander who established the Roman empire was named Marcus Mars
   (d) it was the Roman god of a region where wars were fought
5. The word associated with Mercury was: _____.
   (a) lazy (b) leaden (c) slow (d) speedy
6. Saturday is named after _____.
7. A ***decade*** is _____.
8. How many decades are in a ***century***? _____
9. The time period of 1,000 years is a: _____.
   (a) century (b) decade (c) era (d) millennium
10. A _____ is equal to 10 centuries.
11. The first people most interested in measuring time shorter than the day were:
    _____.
    (a) farmers (b) soldiers (c) merchants (d) fishermen
12. _____ comes from the word *calens*, meaning "first of the month."
13. A military ***watch*** was: _____.
    (a) 3 hours (c) an instrument to tell time
    (b) 4 hours (d) a sentry

14. The Egyptians invented the division of time known as a(n): _____.
    (a) minute (b) hour (c) day (d) watch

15. 1 day = _____ hours

16. 1 ***hour*** = _____ minutes

17. 1 ***minute*** = _____ seconds.

18. Today, the ***second*** is the standard unit of time. _____ (a) True or (b) False

19. Both English and metric systems measure _____ the same way.

20. In this lesson's beginning story episode, the girl talked *incessantly*, which means: _____.
    (a) she stuttered
    (b) she talked very little
    (c) she talked a lot
    (d) she had a speech impediment

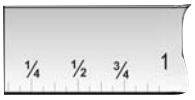
21. In this lesson's closing story episode, the bog was: _____.
    (a) where the trail descended
    (b) by a meandering stream
    (c) on a plateau in the distance
    (d) in a corner of the meadow

22. Write the **Life Principle:** "_____
    _____."

Name: _____

Date: _____ Grade: _____

ACTIVITIES
Lesson 4:
Measurement



Measuring Weight

You are making progress! ***Answer the following questions. Write the correct answers with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

1. A beam scale measures the _____ of an object.
   (a) size (b) weight (c) mass (d) length

2. A troy ***pound*** was _____ ounces.
   (a) 8 (b) 12 (c) 16 (d) 2,000

3. The French ***Troy system*** was never used in the United States. _____
   (a) True or (b) False

4. A person who has no *scruples* is: _____.
   (a) poor (b) lazy (c) dishonest (d) very ill

5. One of the purposes of a government is to encourage business by ensuring that the country's system of ***weights*** and measures are _____ and _____.

6. The American and British ***ton*** are identical. _____ (a) True or (b) False

7. A ***kilogram*** is a measure of: _____.
   (a) length (b) mass (c) temperature (d) time

8. The kilogram was originally defined as the mass of pure water that filled a cubic container 10 centimeters on a side. _____ (a) True or (b) False

9. Today, the standard kilogram is defined as the ***mass*** of: _____
   _____.
   (a) a container of grain at Meade's farm in Nebraska
   (b) a platinum-iridium cylinder in a vault in France
   (c) a vial of mercury in a museum in England
   (d) light emitted in one second by the Sun

10. In the United States ***customary system***, the three most common weights are the _____, _____ and _____.

11. 1 pound = _____ ounces

12. 1 ton = _____ pounds

13. 1 kilogram = _____ ***grams***

14. 1 ***metric ton*** = _____ kilograms

15. 1 kilogram is about _____ pounds

16. 1 pound is about _____ grams

17. The quantity that measures the force of attraction of gravity is: _____.
(a) mass (b) weight (c) friction (d) newtons

18. By moving farther from the center of the Earth, the attraction of gravity becomes: _____.
(a) stronger (b) weaker (c) neutralized

19. Mass and weight of the same object are always the same. _____
(a) True or (b) False

20. In this lesson's beginning story episode, (**effect:**) the moose stank be**cause** of an _____ **caused** by _____.

21. What would happen to the moose if she could not regain her strength? _____
_____
(a) She would be entirely sucked into the bog.
(b) She would become food for wolves.
(c) She would be attended to by a veterinarian Ranger.
(d) none of these

22. From this lesson's final story episode, and from the first episode in lesson 3, arrange the names of Danger Island's human inhabitants in **alphabetical order** (including their titles):
_____
_____

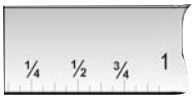
23. Write the **Life Principle:** "_____
_____."

Keep working enthusiastically!
You are nearing the end of Section 1.
Continue to Lesson 5.

Name: _____

Date: _____ Grade: _____

ACTIVITIES
Lesson 5:
Measurement



Measuring Temperature

You are making progress! ***Answer the following questions. Write the correct answers with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

1. The first scientific use of ***temperature*** was by doctors. _____ (a) True (b) False

2. The first ***thermometer*** was credited to _____ in the late _____.

3. ***Daniel Fahrenheit's*** first thermometer in 1709 used _____ to measure temperature.
   (a) air (b) alcohol (c) colored water (d) sulfur

4. Most substances _____ when heated.
   (a) contract (b) expand (c) wilt (d) explode

5. A quantity of known value that everyone agreed to use for a measurement is a _____.

6. Fahrenheit discovered that many liquids had fixed _____ and _____ points.

7. On Fahrenheit's temperature scale, the freezing temperature of water is _____, and the boiling temperature of water is _____.

8. **Effect:** On Fahrenheit's temperature scale, the number of degrees between the boiling and freezing temperatures of water is _____, be**cause** freezing is 32º and boiling is 212º.
   (a) 32º (b) 100º (c) 180º (d) 212º

9. In 1742, _____, a Swedish astronomer, invented what came to be known as the _____ thermometer scale.

10. On the ***Celsius*** temperature scale, the freezing temperature of water is _____.

11. On the Celsius temperature scale, the boiling temperature of water is _____.

12. On the Celsius temperature scale, the number of degrees between the boiling and freezing temperatures of water is: _____.
    (a) 32º (b) 100º (c) 180º (d) 212º

13. The Centigrade scale is an older name for the _____ scale.

14. The one that is part of the metric system is the _____ temperature scale.
(a) Fahrenheit (b) Celsius (c) conversion (d) Galileo

15. Which thermometer scale do scientists use? _____

16. Most countries use the _____ scale.

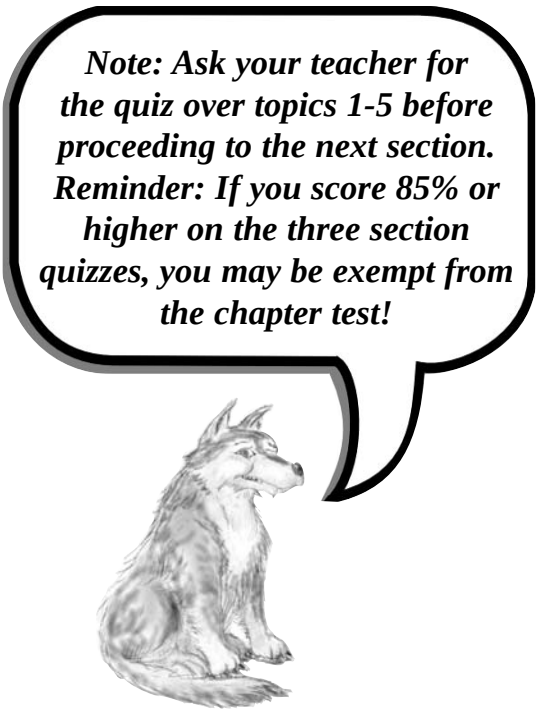
17. Room temperature is about 72º F, or _____ºC.

18. Normal body temperature is about _____ºF, or 37ºC.

19. In this lesson's opening story episode, what did the boys find at the intersection of paths where they had left the backpack? _____
(a) scattered camping supplies
(b) a very strong man
(c) vandals
(d) bear tracks

20. In this lesson's closing story episode, (**effect:**) Mrs. Murphy made a face as Tom came into the lodge be**cause:** _____.
(a) she immediately disliked him
(b) she thought he was poorly dressed
(c) his coat stank
(d) she did not allow coats and backpacks in the house

21. Write the **Life Principle:** "_____
_____."



Name: _____

Date: _____ Grade: _____

ACTIVITIES
Lesson 6:
Light and Sound



Light

You are making progress! ***Answer the following questions. Write the correct answers with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

1. Light travels fastest in: _____.
   (a) a vacuum (b) a diamond (c) air (d) water

2. Layers of air at different temperatures can change the direction that light travels. _____ (a) True or (b) False

3. The illusion of a lake on a desert where, in reality, there is not a lake is an example of a(n):_____.
   (a) mirage (b) naval bay (c) solar flare (d) ultrasonic reflection

4. Light travels _____ (than) sound.
   (a) faster (b) slower (c) about the same speed as

5. Speed is calculated as distance divided by _____.

6. ***Olaus Roemer*** was an early Danish: _____.
   (a) astronomer (b) biologist (c) archaeologist (d) political leader

7. The change in the time of eclipse of Jupiter's moon was caused by: _____
   _____.
   (a) an error in Roemer's calculations
   (b) an error in Roemer's pendulum clock
   (c) light delay between Jupiter and Earth
   (d) the strong gravitational attraction of Jupiter

8. The speed of light is: _____.
   (a) 1,000 seconds (c) 334 meters per second
   (b) 186,000 miles per second (d) 93,000,000 kilometers per second

9. Light from the Sun: _____.
   (a) instantly reaches the Earth
   (b) takes about 8 1/3 minutes to reach the Earth
   (c) arrives in less than 1/50 of a second
   (d) requires many light years to reach Earth

10. Light is ***inversely*** related to distance, which means light and distance are: _____.
    (a) equal (b) unequal (c) unrelated (d) moved in opposite directions

11. If you move two times closer to a source of light, the intensity: _____.
    (a) becomes four times greater
    (b) becomes four times dimmer
    (c) becomes two times greater
    (d) stays the same

12. If you move three times as far from the source of light, the light intensity becomes nine times less. _____ (a) True or (b) False

13. When a quantity decreases by the square of the distance, it is said to follow the _____ - _____ Law.

14. In olden days, a *foot-candle* was a measure of the intensity of: _____.
    (a) electricity (b) gravity (c) light (d) magnetism

15. The modern, metric standard for _____ is the *candela*.

16. In this lesson's beginning story episode, the only clue to the mystery of Danger Island was a _____.

17. In this lesson's closing story episode, the "clue" had been a gift for Del's mother's birthday. (a) True or (b) False

18. Write the **Life Principle:** "_____ _____."

Name: _____

Date: _____ Grade: _____

ACTIVITIES
Lesson 7:
Light and Sound



Electricity

You are making progress! ***Answer the following questions. Write the correct answers with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

1. The first people to describe static electricity were the: _____.
   (a) Arabs (b) Egyptians (c) ancient Greeks (d) Mayans
2. The word *electron* comes from the Greek word for: _____.
   (a) amber (b) feather (c) lint (d) magnetism
3. William Gilbert showed that gemstones could be electrically charged.
   _____ (a) True or (b) False
4. The best ***nonconductors*** of electricity are _____.
5. An example of a good ***conductor*** of electricity is: _____.
   (a) copper (b) glass (c) mica (d) rubber
6. An object that has no charge is said to be _____.
7. The two types of charges are _____ and _____.
8. Electrons have _____ charges, and protons have _____ charges.
9. In his experiment, Ben Franklin concluded that static electric charges that are _____ repel one another.
   (a) like (b) unlike (c) nearly alike
10. Franklin's experiments also showed that unlike static electric charges _____ one another.
    (a) attract (b) repel (c) are neutral toward
11. Unlike static charges are also known as _____ static charges.
    (a) opposite (b) twin (c) similar
12. Franklin concluded that static electric charges of either sign, positive or negative, attract _____ nonconductors.
    (a) charged (b) uncharged (c) metal (d) nonmetal
13. Benjamin Franklin's kite flying experiment in a lightning storm can be described as very: _____.
    (a) dangerous (b) safe (c) smart (d) boring

14. A _____ is a special device that can store electricity.

15. Benjamin Franklin showed that lightning had the same properties as _____ _____.

16. A conducting wire that carries an electric current has a _____ around it.

17. The standard metric unit for measuring electric current is the: _____.
(a) meter (b) kilogram (c) ampere (d) Leyden jar

18. The means of measuring electric current was named in honor of its discoverer, _____.

19. In this lesson's beginning story episode, the boys were informed that (**effect:**) Shell Island was off limits be**cause:** _____ _____.
(a) of the island's rare and beautiful sea shells
(b) the Navy was using the island as a testing ground for battleships to fire shells from off shore.
(c) of the danger from unexploded shells dating from WWII
(d) all of these

20. In this lesson's closing episode, the reader can tell Bryan's **main** interest was to: _____ _____.
(a) find the trail to the bluff
(b) find the twisted tree
(c) solve the mystery of Danger Island
(d) all of these

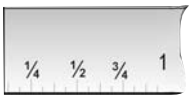
21. Write the **Life Principle:** "_____ _____."

Keep working enthusiastically! Continue to Lesson 8 to increase your knowledge.

Name: _____

Date: _____ Grade: _____

ACTIVITIES
Lesson 8:
Measurement



Large Numbers and the Mole

You are making progress! ***Answer the following questions. Write the correct answers with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

1. Write the Roman numerals: one = _____, five = _____, ten = _____, fifty = _____, one hundred = _____, one thousand = _____.

2. A smaller number written before a larger number in Roman numerals means you: _____.
   (a) add (b) subtract (c) multiply (d) divide

3. Roman numerals were the first numbering system to easily represent numbers beyond a thousand. _____ (a) True or (b) False

4. _____ was a great scientist of the ancient world.

5. The person who invented the term *myriad* for 10,000 was: _____
   (a) Andre Ampere (c) Benjamin Franklin
   (b) Archimedes (d) Olaus Roemer

6. The Romans _____ scientific discoveries as/of the Greeks.
   (a) made as many (b) did not make as many (c) surpassed the

7. The Arabic number system was more confusing than the Roman system. _____
   (a) True or (b) False

8. A number system that allows a symbol to change in value depending on where it is located in a number is a _____ system.

9. Another concept that revolutionized mathematics was the invention of _____ which made the _____ concept possible.

10. The speed of light, 186,000 miles per second, can be written as: _____ miles per second.
    (a) $1.86 * 10^{12}$ (b) $1.86 * 10^{3}$ (c) $1.86 * 10^{5}$ (d) $186{,}000 * 10^{5}$

11. Mega = _____ = 10^{6} (supply the number)

12. _____ = 1,000 = 10^{3} (supply the metric prefix)

13. Hecto = 100 = _____ (supply 10 with the correct ***exponent***)

14. Deca = _____ = 10^{1} (supply the number)

15. _____ = 1 = 10^{0}

16. Electrical power is measured in _____.

17. One megawatt is one _____ watts.

18. A ***mole*** is the chemical name for a furry animal. _____ (a) True or (b) False

19. The metric unit of measure for large numbers of particles is the: _____.
    (a) meter
    (b) kilogram
    (c) second
    (d) Celsius degree
    (e) candela
    (f) ampere
    (g) mole

20. Chemists weigh atoms either by the metric unit of _____, or by comparing other atoms to the established weight of carbon which is known as _____.

21. In this lesson's opening story episode, the boys did not want _____ to accompany them on their island hike.

22. In this lesson's closing story episode, a _____ was strangely interested in the boys.

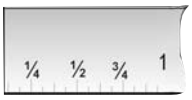
23. Write the **Life Principle:** *"*_____ _____*."*

From information in your text, fill in the chart (#24-28) with Roman numerals that equal the standard Arabic numbers listed below.

24.	1		6		11		16	
25.	2		7		12		17	
26.	3		8		13		18	
27.	4		9		14		19	
28.	5		10		15		20	

Name: _____

Date: _____ Grade: _____



Derived Units and Small Numbers

ACTIVITIES
Lesson 9:
Measurement

You are making progress! ***Answer the following questions. Write the correct answers with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

1. ***Surface area*** is an example of a _____ unit.
   (a) derived (b) base (c) metric (d) common

2. The surface area for a rectangle is found by multiplying length times: _____.
   (a) mass (b) temperature (c) volume (d) width

3. The total area of a flag 10 yards by 14 yards is: _____.
   (a) 10 yards (c) 4 square yards
   (b) 24 yards (d) 140 square yards

4. A surface area of one ***square mile*** is equal to a square field that is one mile on each side. _____ (a) True or (b) False

5. A square mile can be written as *sq. mi.* or: _____.
   (a) mi^2 (b) mi^{-2} (c) mi^3 (d) mi^{sq}

6. **Review.** Number in **order** from smallest to largest, the following surface areas.
   ____ square miles
   ____ square feet
   ____ square yards

7. Yellowstone National Park is roughly a rectangle with a length of 55 miles and a width of 63 miles. To calculate its area: _____.
   (a) add 55 and 63 (c) multiply 55 by 63
   (b) divide 55 into 63 (d) subtract 55 from 63

8. A unit is equal to one. _____ (a) True or (b) False

9. The expression 10^2 would be equal to _____ units.
   (a) 1 (b) 10 (c) 100 (d) 1,000

10. The **prefix** *centi* means _____.

11. The prefix for 0.1 or one-tenth is: _____.
    (a) centi (b) deci (c) micro (d) milli

12. To show 0.01 as 10 with an exponent, the exponent should be: _____.
    (a) 0 (b) –1 (c) +1 (d) –2

13. The prefix *milli* means one: _____.
    (a) tenth (b) hundredth (c) thousandth (d) millionth

14. The prefix that refers to 10^{-6} is: _____.
(a) centi (b) deci (c) micro (d) milli

15. One millionth of a curie is a _____ curie.

16. The metric system began in: _____.
(a) Ancient Greece (b) England (c) France (d) United States

17. The metric system originally was designed to serve only the needs of the scientific community. _____ (a) True or (b) False

18. The metric unit of length began as the: _____.
(a) distance to the Sun divided by 1,000
(b) 1/10,000,000 of the distance from the equator to the North Pole
(c) Greek stadia unit of measure

19. A meter has a length of about 39.37 inches. _____ (a) True or (b) False

20. The meter is _____ unit for length.
(a) a derived (b) the base (c) a common

Fill in the chart below (#21-27). List the seven basic metric units and what each measures. The first one is done for you.

	Base Unit:	Purpose (what it measures):
21.	meter	length or distance
22.		
23.		
24.		
25.		
26.		
27.		

28. Non-basic units are called _____ units.

29. The **main idea** of this lesson's opening story episode is that the boys were: _____ _____.
(a) chasing wolves (c) being followed by wolves
(b) being chased by wolves (d) searching for copper ore

30. Be**cause** it was _____ _____,
(**effect:**) the boys nearly missed the entrance to the mine, in the closing story episode.

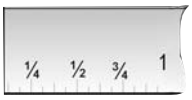
31. Write the **Life Principle:** *"*_____ _____.*"*

Not every lesson will be this difficult! Continue diligently to Lesson 10.

Name: _____

Date: _____ Grade: _____

ACTIVITIES
Lesson 10:
Measurement



Area and Density

You are making progress! ***Answer the following questions. Write the correct answers with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

1. The most common unit for measuring surface area of the ground is the _____ which comes from a word meaning _____.

2. A square, one mile on a side, has an area of _____ acres.
   (a) 4 (b) 40 (c) 209 (d) 640

3. A ***hectare*** is equal to about _____ square meters.
   (a) 1 (b) 10 (c) 1,000 (d) 10,000

4. A hectare is larger than an acre, so to convert from hectare to acre, you should _____ the number of hectares by 2.5.
   (a) multiply (b) divide (c) measure (d) convert

5. Surface area measurements such as the hectare are _____ units.
   (a) base (b) derived (c) common (d) English

6. The ***volume*** of a ***cube*** or ***rectangular solid*** is equal to the product of _____ times _____ times _____.

7. Eight fluid ounces make a: _____.
   (a) cup (b) pint (c) quart (d) gallon

8. A quart contains _____ pints or _____ cups.

9. A gallon contains _____ quarts or _____ pints or _____ cups.

10. Volume is also known as: _____.
    (a) capacity (b) density (c) mass (d) surface area

11. In the English system of weights and measures, the dry quart is the same as the liquid quart. _____ (a) True or (b) False

12. A ***liter*** was set equal to the volume of a cube _____ centimeters on a side.

13. As a general rule for converting from liters to the English measure for ***capacity***, a liter is slightly larger than a: _____.
    (a) pint (b) quart (c) gallon (d) barrel

14. In the metric system, _____, _____ and _____ are related.

15. One thousand grams of water has a volume of 1,000 milliliters. _____
    (a) True or (b) False

16. One gram of water would fill a container with a capacity of one cubic centimeter. _____
(a) True or (b) False

17. Density is defined as the mass of an object compared to its _____.

18. Water has a ***density*** of 1.0: _____.
(a) grams per cubic centimeter
(b) grams per second
(c) kilograms per Kelvin degree
(d) meters per second

19. Lead has a greater density than feathers. _____ (a) True or (b) False

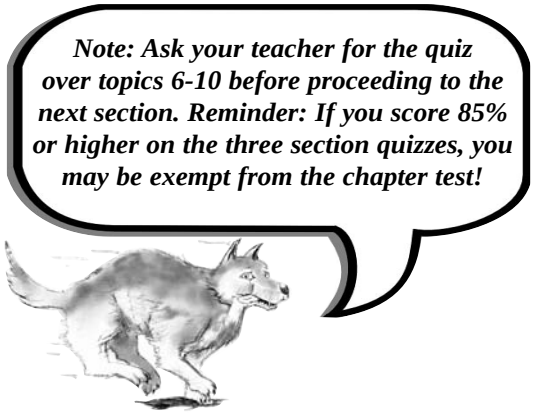
20. The density of water is: _____.
(a) 0.01 g/cm^3 (b) 0.65 g/cm^3 (c) 1.00 g/cm^3 (d) 11.34 g/cm^3

21. Most wood floats in water because its density is _____ than the density of water.
(a) less (c) more dimensional
(b) greater (d) less porous

22. Place the events of this lesson's opening story episode in **chronological order** (1-8).
_____ The boys entered the mine.
_____ The boys pushed the ore cart against the doors.
_____ The lead wolf began sniffing and digging at the mine entrance.
_____ The wolf pack began to close in on the boys.
_____ The boys pushed the doors shut.
_____ The boys secured the ore cart wheels with rocks.
_____ The boys stuffed the opening with Tom's raincoat.
_____ The wolves tried to rip loose the raincoat.

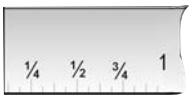
23. In the closing story episode, over what were the wolves fighting?
_____ Which one won? _____

24. Write the **Life Principle:** "_____
_____."



Name: _____

Date: _____ Grade: _____



Tools for Measuring Time, Mass and Weights

ACTIVITIES
Lesson 11:
Measurement

You are making progress! ***Answer the following questions. Write the correct answers with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

1. A ***chronometer*** is an accurate instrument for measuring: _____.
   (a) length (b) mass (c) temperature (d) time

2. The larger timekeeper is the: _____.
   (a) pendulum clock
   (b) balance wheel watch
   (c) chronometer
   (d) quartz watch

3. Pierre Curie discovered that squeezing a _____ produced tiny _____.

4. Electricity going through a quartz crystal causes the crystal to: _____.
   (a) change state (b) explode (c) generate microwaves (d) vibrate

5. The one that is most accurate is a(n): _____.
   (a) atomic clock
   (b) balance wheel watch
   (c) pendulum clock
   (d) quartz crystal watch

6. A cesium ***atomic clock*** can keep accurate time to about one second every: _____.
   (a) year (b) century (c) decade (d) million years

7. ***Mass*** is the: _____.
   (a) amount of matter an object contains
   (b) the pull of gravity upon an object
   (c) identical to the weight of an object
   (d) factor that gives an object energy

8. Colliding with a weightless object has no potential for damage. _____
   (a) True or (b) False

9. In the same gravity field, two objects that have the same mass will have the same ***weight***. _____ (a) True or (b) False

10. The device for measuring weight that is similar to a seesaw is a: _____ _____.
(a) pan balance (b) spring balance (c) center beam balance

11. A _____ is a modification of the pan balance.

12. You would expect to find a beam balance scale in a: _____.
(a) meat market (c) doctor's office
(b) grocery store (d) space station

13. A spring balance such as found in grocery stores for weighing produce uses: _____ _____.
(a) weights of known value to balance the unknown weight
(b) the stretching of a spring to measure an unknown weight
(c) a pan balance with springs
(d) a beam balance with springs

14. The mass of an object cannot be measured in the weightlessness of space. _____
(a) True or (b) False

15. A spring vibrates more slowly if the object it carries is _____ massive.
(a) less (b) more (c) slightly

16. In this lesson's beginning story episode, (**effect:**) the boys arrived at the bluff in good time be**cause:** _____ _____.

17. Del had brought the boys a _____.

18. In this lesson's closing story episode, Del was fearful of her 12 mile walk home, due to wolves in the area. _____
(a) True or (b) False

19. Write the **Life Principle:** "_____ _____."

Name: _____

Date: _____ Grade: _____



ACTIVITIES
Lesson 12:
Physics

Heat and Temperature

You are making progress! ***Answer the following questions. Write the correct answers with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

1. The three ***states of matter*** are _____, _____ and _____.

2. The ***melting temperature*** or point of a ***solid*** is when it changes into a _____.

3. Water at a temperature between 0ºC and _____ is in the ***liquid*** state.

4. The ***boiling temperature*** or point of a liquid is when it changes into a _____.

5. A ***gas*** has neither a definite shape nor a definite: _____.
   (a) mass (b) volume (c) weight (d) energy

6. A _____ is easy to compress.
   (a) solid (b) liquid (c) gas (d) none of these

7. The ***condensation temperature*** or point of a gas is when it changes into a _____.

8. A _____ does not have a definite shape but it does have a definite volume and it flows.

9. The ***freezing temperature*** or point of a liquid is when it changes to a _____.

10. The _____ state of matter has a definite shape and volume.

11. The state of matter that does not flow is a: _____.
    (a) gas (b) liquid (c) solid (d) energy

12. When a liquid ***evaporates***, it is on its way to becoming a _____.

13. When iron gets hot enough, it can become a gas. _____ (a) True or (b) False

14. If mercury is described as a liquid, it is understood that it is: _____
    _____.
    (a) always a liquid under all conditions
    (b) a liquid at room temperature
    (c) a liquid only when subjected to extreme heat
    (d) a liquid only when subjected to extreme cold

15. Oxygen can be changed into either a solid or a liquid. _____ (a) True or (b) False

16. As the temperature becomes colder, molecules move : _____.
    (a) more slowly (b) more quickly (c) about the same speed

17. At ***absolute zero*** (-273ºC) the motion of all molecules of a substance: _____ _____.
    (a) approach the speed of light
    (b) cannot be measured
    (c) reach the sound barrier
    (d) stop moving

18. The temperature scale that begins at absolute zero is named after: _____ _____.
    (a) Anders Celsius
    (b) Benjamin Franklin
    (c) Isaac Newton
    (d) William Thomson (Lord Kelvin)

19. A temperature change of one Kelvin degree is the same as a temperature change of one _____ degree.
    (a) Celsius
    (b) Fahrenheit
    (c) Thompson

20. In this lesson's opening story episode, the boys stumbled upon a mystery when they saw a _____ on _____ which supposedly had never been inhabited.

21. In this lesson's closing episode, Uncle Eldridge confirmed the boys' discovery of the town on the other island. _____ (a) True or (b) False

22. Write the **Life Principle:** *"*_____ _____*."*

You are becoming a scholar! Continue to the next lesson.

Name: _____

Date: _____ Grade: _____



ACTIVITIES
Lesson 13:
Meteorology

Climate

You are making progress! ***Answer the following questions. Write the correct answers with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

1. The name given to weather conditions that have visited an area over a long time is: _____.
   (a) average weather (b) climate (c) atmospheric patterns

2. To determine if the _____ in a certain area is changing, scientists have to keep careful _____ for _____ years or more.

3. The Anasazi Native Americans abandoned their cities because of: _____.
   (a) an Ice Age (b) drought (c) flood (d) over population

4. One of the most dramatic climatic changes happened during the _____ several thousand years ago.

5. ***Glaciers*** are found on every continent except _____.

6. The ice cap at the North Pole is: _____.
   (a) becoming thicker and covering a greater surface area
   (b) increasing in surface area
   (c) increasing in thickness
   (d) growing smaller in surface area and becoming thinner

7. According to the Arctic ice cap studies, the average temperature of the Earth's atmosphere has increased during the last 50 years. _____ (a) True or (b) False

8. The primary source of the Earth's heat is _____.

9. An object grows _____ when it absorbs more heat than it releases.
   (a) cooler (c) transparent
   (b) warmer (d) opaque

10. The action of carbon dioxide in trapping heat in the atmosphere is sometimes called the _____ effect.
    (a) greenhouse (c) solar reduction
    (b) ice age (d) volcano

11. Without carbon dioxide in the atmosphere, (**effect:**) the oceans would _____ be**cause** too much _____ would be released into _____.

12. During the last 150 years, the amount of carbon dioxide in the atmosphere has: _____.
    (a) increased (b) decreased (c) remained constant

13. Since 1850, the average global temperature of the Earth has risen slightly. _____
    (a) True or (b) False

14. One source of carbon dioxide is active _____.

15. The combustion or burning of fuels removes carbon dioxide from the air. _____
    (a) True or (b) False

16. We can **conclude** that the Earth has been getting warmer since the end of the Ice Age.
    _____ (a) True or (b) False

17. In this lesson's opening episode, (**effect:**) Bryan did not want Tom to mention the town or the wolves until the boys had some _____, be**cause:** _____ _____ and send them home.

18. By logically thinking through the wolf episode (in this lesson's closing story segment), Bryan **concluded** that the wolves were only after the putrid-smelling raincoat. _____
    (a) True or (b) False

19. Write the **Life Principle:** "_____ _____."

Name: _____

Date: _____ Grade: _____



ACTIVITIES
Lesson 14:
Meteorology

Weather

You are making progress! ***Answer the following questions. Write the correct answers with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

1. The condition of the atmosphere at any given time is called _____.

2. _____ from the Sun is responsible for Earth's _____.

3. The percent of sunlight that reaches the Earth's surface is about: _____ _____.

4. **Effect:** The Earth is unequally heated by sunlight be**cause:** _____ _____.

5. Daily temperatures are usually warmest in mid-afternoon at about _____ o'clock and coldest just at _____.

6. Large _____ and _____ keep temperatures from rising or falling quickly.

7. A cloudy night is generally _____ than a clear night.
   (a) cooler (b) warmer (c) windier (d) less windy

8. The one that is likely to experience the most extreme temperatures between night and day is: _____.
   (a) a city with clouds overhead (c) a seacoast city or area
   (b) a desert with a clear sky (d) any area with a fog covering

9. _____ or _____ reflects about 80 percent of the sunlight it receives.

10. Which ones absorb sunlight better? _____ and _____.
    (a) ice (b) water (c) snow (d) land

11. The tilt of the Earth's axis **causes**: _____
    (a) day and night (b) global warming (c) the seasons (d) volcanic eruptions

12. In the tropics, the **contrast** between summer, fall, winter and spring is: _____ _____.
    (a) difficult to notice (c) very apparent
    (b) marked by extended darkness (d) marked by extended hours of light

13. The North Pole experiences six months in which the Sun never sets, followed by six months of darkness. _____
    (a) True or (b) False

14. The farther north a person travels from the _____, the more contrast is evident in _____.

15. The record high temperature in the United States is in Death Valley and stands at _____; the record low is _____ in Tanana, Alaska.

16. The three main factors that **cause** weather are _____, _____ and _____.

17. Water: _____.
(a) heats the Earth (b) stores heat (c) distributes heat (d) cools the Earth

18. Winds: _____.
(a) heat the Earth (b) store the heat (c) distribute the heat (d) cool the Earth

19. Breezes along the seashore are caused by: _____.
(a) rotation of the Earth (b) uneven heating (c) high tides (d) low tides

20. ***Trade winds*** are caused by: _____.
(a) rotation of the Earth (b) uneven heating (c) high tides (d) low tides

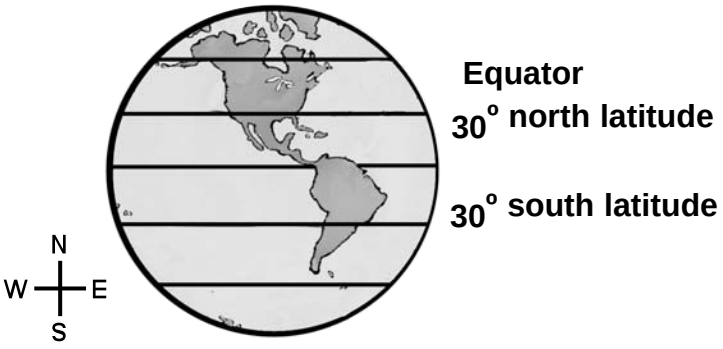
21. Dependable trade winds made possible the _____ between Europe and the New World.

22. In this lesson's story episodes, what was the **main idea—**what mystery were the boys trying to solve? _____

23. Write the **Life Principle:** "_____ _____."

---

24. From the description in your text, supply arrows to show the curved direction of the trade winds on the diagram below from both 30° north and 30° south latitude toward the equator.



25. From your text's description, draw in two triangular trade routes with directional arrows.



Name: _____

Date: _____ Grade: _____

ACTIVITIES
Lesson 15:
Physics



Experimental Science

You are making progress! ***Answer the following questions. Write the correct answers with words, letters or numbers as each question indicates. Check your answers from the Answer Key. Correct all errors, then complete your next goal.***

1. Scientists who relied on _____ made the scientific revolution possible.
2. ***Experiments*** are controlled observations. _____ (a) True or (b) False
3. Until the time of _____, _____ and _____ in the 1600s, scholars and scientists relied upon _____ instead of experiments.
4. Which does **NOT** occur as winds carry moisture-laden air up the west side of a mountain: _____.
   (a) the air pressure falls
   (b) the clouds release the moisture as rain
   (c) the temperature drops
   (d) air contracts and becomes more dense
5. _____ is the primary factor that causes ***precipitation***.
6. Scientific work begins with _____.
7. The first step in answering a scientific question is to: _____.
   (a) collect information (b) conduct an experiment (c) form a hypothesis
8. The telescope and microscope extend the sense of: _____.
   (a) hearing (b) smell (c) taste (d) touch (e) vision
9. Scientific instruments take the guesswork out of _____.
10. The first explanation for a set of untested facts is a: _____.
    (a) hypothesis (c) theory
    (b) scientific law (d) experiment
11. If a ***hypothesis*** is not testable, it is not scientific. _____ (a) True or (b) False
12. A good experiment to determine if an object is steel or fiberglass is to use a _____ test.
13. A hypothesis is used to predict new facts. _____ (a) True or (b) False

14. A hypothesis that survives experimentation becomes a(n): _____.
    (a) educated guess (c) theory
    (b) scientific law (d) scientific instrument

15. The best description of Newton's equation for the force of gravity is that it is a: _____.
    (a) hypothesis (c) theory
    (b) scientific law (d) scientific experiment

16. Once established, ***scientific laws*** cannot be changed. _____
    (a) True or (b) False

17. Be**cause** the boys used the _____ (in this lesson's story episodes), (**effect:**) they were able to solve the mystery of how _____ could come and go so fast on the island.

18. Write the **Life Principle:** *"*_____ _____*."*

Note: Ask your teacher for the quiz over topics 11-15 before proceeding to the next section. Reminder: If you score 85% or higher on the three section quizzes, you may be exempt from the chapter test!

