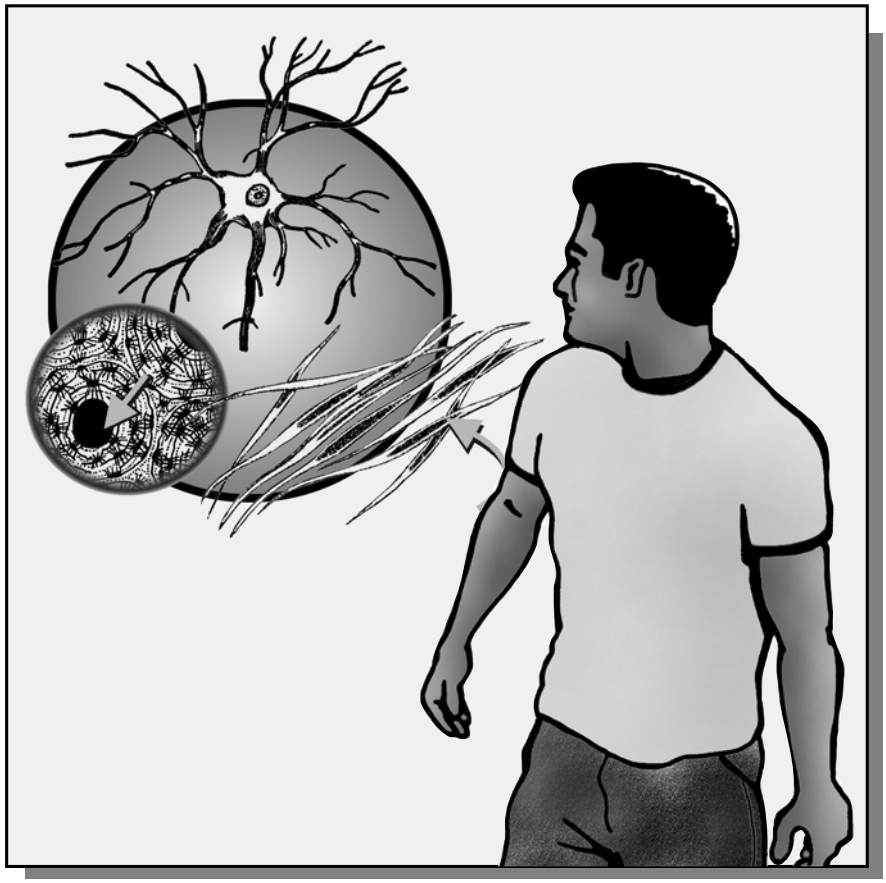
Natural Science Mysteries

Activities



Chapter 3

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Natural Science
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Chapter 3

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ACTIVITIES
Lesson 1:
Light and Sound



Sound

You are making progress! ***Answer the following questions. Fill in the blanks with 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. In the first paragraph, to what is the fog likened or **compared**? _____

2. The choice of words used to describe the type of day to which the boys awoke would best be classified as: _____.
   (a) bright and cheery (c) dangerous
   (b) gloomy (d) uneventful

3. Tom **compared** the sound he heard to a _____.

4. Which do modern foghorns **NOT** use to produce sounds? _____
   (a) magnetic fields (c) vibrating metal disks
   (b) compressed air (d) a low-pitched sound

5. In paragraph 7, which sentence gives the **main idea** of the paragraph? (Write the complete sentence.)
   _____
   _____

6. Most sounds that we have travel through which medium? _____
   (a) air (c) objects such as doors being slammed
   (b) water (d) voices, sirens, horns and other sound devices

7. Number in **chronological order** (1-7) the steps in human hearing:
   _____ molecules expand farther apart
   _____ impulses carried to brain
   _____ air is compressed, increasing air pressure
   _____ brain interprets impulses as sound
   _____ vibrating motion changed to nerve impulses
   _____ air is released, decreasing air pressure
   _____ ear drums vibrate

8. ***Sound*** is a _____ motion.
   (a) pulse
   (b) wave
   (c) coiled
   (d) molecular

9. Which is **NOT** true of sound waves? _____
   (a) They move forward. (c) They spread out certain distances, then stop.
   (b) They spring forward. (d) They spread out and keep going.

10. Why do sound waves **NOT** travel in a ***vacuum***? _____
   _____
   (a) Sound waves have to have empty space in which to move.
   (b) Objects in a vacuum do not move back and forth.
   (c) Sound waves travel out too far.
   (d) Sound waves travel out too slowly.

11. **Cause:** Sound does not travel in space, and astronauts cannot speak to each other in a normal manner; therefore, (**effect:**) _____
   _____.

12. In paragraph 13, the reader can **conclude** that to *dampen* sound would mean to: _____
   _____
   (a) make it slightly damp with water (c) decrease it
   (b) increase it (d) balance it

13. To ***soundproof*** a room really means to: _____
   _____.
   (a) eliminate all sound from leaving or entering a room
   (b) greatly reduce sound vibrations in a room
   (c) vacuum a room thoroughly
   (d) build the room away from noisy highways, airports, etc.

14. List four action words from paragraphs 15-18 that tell how sound is generated:
   _____, _____, _____,
   _____.

15. Which of the foregoing words demonstrate how the human voice box works?
   _____

16. **Compare:** The workings of the voice box would be most like which musical instrument?
   _____
   (a) drum (b) harmonica (c) banjo (d) violin

17. The ***frequency*** of a sound is the same as its _____.

18. The ***pitch*** range for people with excellent hearing is _____ to _____ vibrations per second.

19. Most people hear best at _____ vibrations per second, which also represents _____ on a music scale.

20. What does the aging process usually do to one's hearing range? _____
_____

(a) It only impairs the higher ranges.
(b) It only impairs the lower ranges.
(c) It impairs both the higher and lower ranges.
(d) It impairs the middle ranges the most.

Match the following terms relating to sound.

21. _____ pitch — (a) how much the air is disturbed
22. _____ ***loudness*** — (b) depends on the medium in which it travels
23. _____ speed — (c) the rate of vibration

On the chart below, contrast the speed at which sound travels in each of the different mediums.

Mediums (states of matter)	**Speed of Sound** (contrasts)
24. metal (solid)	
25. water (liquid)	
26. air (gas)	

27. Other than the medium in which sound travels, the speed of sound can vary with: _____
_____.

(a) temperature and air pressure
(b) the origin of the sound
(c) changing pitch (frequency)
(d) how the volume is adjusted

28. Regardless of origin, pitch or loudness, sound travels at the same _____ through the medium of _____.

On the chart below, categorize the trails in the story according to their maintenance priorities.

Priority	**(Names/Descriptions/Types of) Trails**
29. High (stated by Ranger Eldridge)	
30. Medium (stated by Ranger Eldridge)	
31. Low (**inferred** by Ranger Eldridge)	

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


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ACTIVITIES
Lesson 2:
Light and Sound



Light

You are making progress! ***Answer the following questions. Fill in the blanks with 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. Which illustration below fits the description of a Pulaski given in paragraph one? _____

(a)  (b)  (c)  (d) 

2. Which did Ranger Eldridge **NOT** instruct the boys to do ? _____
_____
(a) make use of their Pulaskis
(b) repair trails
(c) evict messy campers
(d) pick up campers' litter

3. Tom thought some items looked *vaguely* familiar. The reader could just as well substitute which of the following words for *vaguely*? _____
(a) definitely, clearly
(b) specifically
(c) certainly
(d) somewhat, partly

4. The three kinds of waves mentioned are _____, _____, and _____.

5. Name the two types of comparable waves (that have something in common):
_____ and _____.
How do they **compare**? (Tell what they have in common. Answer in a complete sentence.)
_____.

6. In paragraphs 8 and 9, which wave is **NOT** comparable to the other two? _____
_____

7. **Contrast:** (How is this wave different from the other two?) Place an "X" in front of all that apply.
_____ Light waves require a medium.
_____ Light waves do not require a medium.
_____ Light waves can travel in a vacuum.
_____ Light is electromagnetic.

From paragraphs 11 and 12, describe in single key words on the chart below (#8, 9) the speed of light and sound in the various mediums. Some are done for you.

	(Mediums of Travel)		
Types of Waves	**Air**	**Dense material**	**Vacuum**
8. sound			does not travel here
9. light	slower		

10. Light changes direction when _____.

Match the following terms for #14-18.

11. _____ **Refraction** (a) curved or hollowed inward

12. _____ **Convex lens** (b) light rays bouncing off from an object

13. _____ **Reflection** (c) light rays spreading out

14. _____ **Concave** mirror (d) thicker in middle

15. _____ **Diffraction** (e) light bends when entering new medium

16. A *breakwater* wall is an example of the principle of: _____.
    (a) reflection
    (b) refraction
    (c) diffraction
    (d) convection

17. The ***frequency*** of sound is its _____.

18. The frequency of visible light is its _____.

19. The color _____ has the shortest wavelength, while _____ has the longest wavelength.

20. Arrange the six colors of the ***visible*** (light) ***spectrum*** in order from shortest to longest:
    _____, _____, _____, _____, _____, _____

21. The complete electromagnetic spectrum includes visible light, _____, _____, _____, _____, _____, _____, _____, and _____.

22. What do infrared sensory organs accomplish for certain animals? _____
    _____
    (a) They help animals smell their prey.
    (b) They help animals see their prey at night.
    (c) They help animals detect their prey's body heat.
    (d) They keep animals from being detected as they approach their prey.

23. Which rays emitted by the Sun can be harmful to humans? _____
    (a) X-rays
    (b) ultraviolet rays
    (c) gamma rays
    (d) infrared rays

24. Which rays are most penetrating and therefore most harmful? _____
    (a) infrared and gamma rays
    (b) ultraviolet and X-rays
    (c) X-rays and gamma rays
    (d) infrared X-rays

25. In the story, the reader can tell that Tom felt like he had been: _____.
    (a) beaten up
    (b) stripped of dignity
    (c) victimized
    (d) made to feel like a criminal

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


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ACTIVITIES
Lesson 3:
Light and Sound

Reading Lenses and Telescopes

You are making progress! ***Answer the following questions. Fill in the blanks with 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 basic conflict in this on-going story is between: _____.
   (You may need to **reread** the story episode in Lesson 2.)
   (a) Bryan and Tom
   (b) Tom and Ranger Eldridge
   (c) Bryan and Ranger Eldridge
   (d) Tom and James Olsen

2. On a pair of binoculars marked 10 x 20, the number 10 represents the _____ power, and 20 represents the _____.

3. _____ persons can see distant objects easily, but up-close items are blurry.

4. Convex lenses to improve poor vision for close-up work were introduced by _____ during the _____.

5. Convex lenses were also known as _____; an example of which is a _____.

6. Which of the following does **NOT** describe a ***real image***? (Hint: refer to your vocabulary list.)
   _____
   (a) an image that can be projected onto a surface, such as a screen or sheet of paper
   (b) an upside down projected image
   (c) a mirror-image of a real person or thing
   (d) may be projected by convex lenses in cameras, telescopes or microscopes, etc.

7. A ***camera obscura*** is: _____.
   (a) used by artists to project an image around which they can trace
   (b) an obscure (hidden) camera
   (c) an angled mirror
   (d) another name for a convex lens

8. Simple lens magnification depends on _____.

9. A longer ***focal length*** results in _____ magnification.
   (a) greater (b) less (c) equal (d) balanced

10. _____ people can see up close, but distant objects are blurry.

11. What type of lens is prescribed for a ***nearsighted*** person? _____
(a) convex (b) reading lens (c) concave (d) real image

12. **Effect:** A convex lens is sometimes called a burning glass be**cause:** _____
_____.
(a) it can become too hot to hold on to
(b) it focuses light which can get hot enough to start a fire
(c) the heat becomes so intense due to focused light coming through the glass that the lens will melt or burn
(d) it was made from molten or burning glass and then cooled

13. Hans Lipperhey operated an optical shop. The reader can **conclude** that Hans was in the business of designing equipment to assist people's
_____.
(a) hearing
(b) sight
(c) walking
(d) body building

14. Read the following **dictionary** entries, then choose the definition that best explains the meaning of the words *spectacle maker*, referring to Hans Lipperhey. _____

spectacle (spek tekel) n. **1a.** A remarkable or impressive sight. **b.** A grand public display or performance. **2.** spectacles. A pair of eyeglasses.

(a) Definition 1a
(b) Definition 1b
(c) Definition 2
(d) none of these

15. Dutch spectacle maker Hans Lippershey made the first _____ in his optical shop for military use in the year _____.

16. The telescope quickly became known as a _____.

17. Italian scientist Galileo constructed a _____ and used it to study _____.

18. **Cause:** Galileo's _____ used lenses to bend light to a focus, therefore, (**effect:**) it was known as a _____.

19. _____ built his telescope in 1609. Newton built a different kind about the year _____.

20. What was different about Newton's telescope in **contrast** to Galileo's invention? Newton used a _____ to bring _____
_____.

21. Telescopes of Newton's design are called: _____.
    (a) refractors
    (b) reflectors
    (c) primary lenses
    (d) both a and c

22. Isaac Newton, like many other early scientists used references in the Bible as a launching pad for scientific investigations. Which reference did Newton use in this case?
    _____

23. Newton wanted to *verify* the existence of various things mentioned in the Bible. Consider the following **dictionary** definitions:

    verify (věr'i'fī) vt. **1**. to prove the truth of a thing by experimentation and testimony. **2**. to search out truth by research, examination or comparison. **3**. to be in a position to confirm a thing.

    Based on the above definitions, to *verify* something means to: _____

    (a) become very interested in the subject
    (b) prove it false or disprove it
    (c) prove it true or confirm it
    (d) none of these

24. **Summarize** in three **key words** from your text a description of early microscope lenses:
    _____, _____, _____

25. In the story, how did the boys discourage hikers from taking unmarked side trails?
    _____
    (a) They blocked the trails with brush and fallen tree branches.
    (b) They blocked the trails with rocks and tree branches.
    (c) They blocked the trails with large rocks.
    (d) They posted detour signs with arrows.

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


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Name: _____

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ACTIVITIES
Lesson 4:
Energy

Heat

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

1. In the first paragraph, how would you characterize the person the boys were tracking?
   _____
   (a) careful and tidy
   (b) careless and sloppy
   (c) handicapped
   (d) angry and perverted

2. What makes you think so? (Give **evidence** for your response by writing a supportive sentence from your text.): _____
   _____

3. The reader can tell that Tom's backpack was: _____.
   (a) heavy
   (b) lighter than Bryan's
   (c) odd-shaped
   (d) heavier than Bryan's

4. The boys lost the: _____.
   (a) backpack
   (b) main trail
   (c) side trail
   (d) footprints

5. Which item in Tom's backpack served as an ***insulator***? _____
   (a) sleeping bag (c) ground pad cover
   (b) ground pad (d) wrapped power bars

6. Conduction is the transfer of heat by _____.

7. Which is **NOT** true of a conductor? _____
   _____
   (a) It readily transfers heat.
   (b) It controls heat transfer.
   (c) Atoms gain motion and influence nearby atoms.
   (d) Most metals are involved.

8. From paragraphs headed by vocabulary words ***conductor***, ***conduction*** and ***insulator***, **categorize** the following items on the chart below: teakettle, most metals, potholder, hot water pipes, fiberglass, wool felt, coats, blankets, feathers, fur/hair, steel beams, foam.

Conductors	Insulators

9. ***Convection*** is the movement of heat by air _____.

10. Which states of matter can flow? _____
    (a) solids, liquids
    (b) solids, gases
    (c) gases, liquids
    (d) solids, liquids, gases

11. **Effect:** Only flowable substances can transfer heat by both conduction and convection, be**cause:** _____
    _____.

12. _____ is the transfer of heat by electromagnetic waves.

13. Of the three types of heat transfer, what is unique about ***radiation***? (Answer in a complete sentence.) _____
    _____.

14. ***Heat*** is a type of _____ and a form of _____ (at the molecular level).

15. _____ is the average speed of molecules in a substance.

16. Heat ***energy*** always moves: _____.
    (a) up to a higher region of temperature
    (b) down to a lower region of temperature
    (c) sideways to an equal region of temperature
    (d) up and down depending on circumstances

17. Which is **NOT** something upon which the total heat energy of a body depends?

_____

(a) its total temperature
(b) its total energy
(c) its total mass
(d) its type of substance

18. _____ is the ability of a substance to retain heat.

19. In the experiment of the heat capacity of both hot water and iron, which substance was shown to have the greater heat capacity? _____

20. Which statement from the text provides **evidence** for your answer to question 19?

_____

(a) Iron, being heavier than water, has a greater heat capacity.
(b) Water, being fluid, has a greater heat capacity than a non-fluid.
(c) The water temperature increased by 1ºC.
(d) The temperature of the iron decreased by 9ºC.

21. **Compare and Contrast** the metric ***calorie*** with the ***food calorie***. On the chart below, write the word *compare* or the word *contrast* to tell which statements represent comparisons (or similarities), and which represent contrasts (or differences).

Statement	Evaluation
(a) The name *calorie* is shared.	
(b) One food calorie = 1,000 metric calories.	
(c) Heat required to raise 1 gram of water by 1ºC is a calorie.	

22. In the metric system, heat is measured in _____, while temperature is measured in _____.

23. What is the **main idea** of the last paragraph of text before the story episode? _____

_____

(a) Most substances expand when they are heated.
(b) Concrete highways can buckle on hot summer days.
(c) Railway rails expand and contract with temperature changes.
(d) Expansion joints are necessary for railways and bridges.

24. Be**cause** cement roads can _____ and railroad tracks can _____, and bridge beams can _____ on hot days, (**effect**:) engineers lay tracks with _____ and build roads and bridges with _____.

25. From the closing paragraph of the story, (**effect:**) the boys _____, be**cause** they sensed the man they were chasing was just ahead.

26. **Cause:** The boys did not want to be seen, so (**effect:**) _____ _____.

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

Name: _____

Date: _____ Grade: _____



ACTIVITIES
Lesson 5:
Energy

Energy

You are making progress! ***Answer the following questions. Circle the correct answers or fill in the blanks 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. Number the events of this story episode in **chronological order** (1-9).
   _____ The man jumped into the boat.
   _____ The man sat on the backpack, reading a map.
   _____ Bryan prepared hot cocoa.
   _____ The man started his outboard motor.
   _____ Tom ran down the beach, yelling.
   _____ Tom began shivering violently.
   _____ The man dropped the backpack.
   _____ Tom gashed the boat with his Pulaski.
   _____ Tom ran into the water.

2. _____ occupies space and has mass.

3. _____ is the ability to do work.

4. Which is **NOT** true about ***work***? _____
   (a) It is the ability to put matter in motion.
   (b) It is the transfer of energy from one place to another.
   (c) It can be traced to the energy of the Sun.
   (d) It is usually thought of as a force.

5. Regarding energy and work, the reader can **conclude** that early man and animals had one thing in common: _____.

Working backwards from number 11 to 6 below, label each step given in paragraphs 13-15 pertaining to producing human muscle power. Numbers 8 and 11 are done for you.

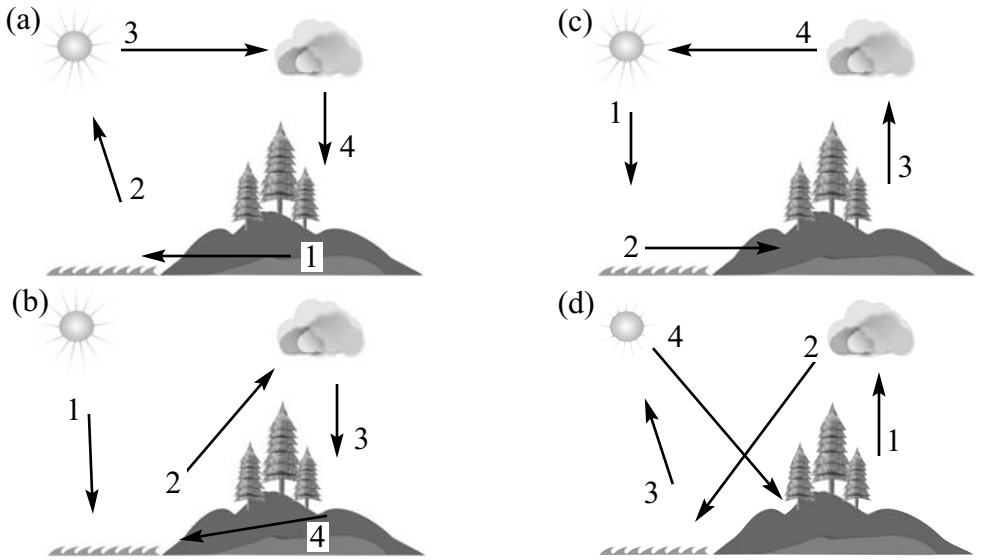
6. _____ ---> 7. _____ ---> 8. animal ---> 9. _____ --->

10. _____ ---> 11. muscle power

12. The ultimate source(s) of energy is (are): _____.
    (a) muscles (c) food
    (b) machines (d) the Sun

13. In addition to muscle power, people have harnessed _____ and _____ _____ as sources of energy.

14. Which of the following diagrams is an accurate representation of the water cycle? _____



From paragraphs 20-28, complete the outline below of the various kinds of fuel (#15-21). Main categories are shown with numbers. Details are noted with lower-case letters and bracketed numbers. Do NOT write complete sentences. Use as few words as possible in an outline to communicate main ideas. Some parts are done for you.

15. Wood
    (a) Used for centuries
    (b) Releases _____ and _____ when burned

16. Peat
    (a) Forms in _____
    (b) Mostly composed of _____ material
    (c) Compressed, dried peat used as _____

17. _____
    (a) Formed by _____ under extreme _____
    (b) Called a _____

18. Plant (fossil) fuels
    (a) Include _____, _____, _____
    (b) Main source of energy was _____

Complete the outline *continued*

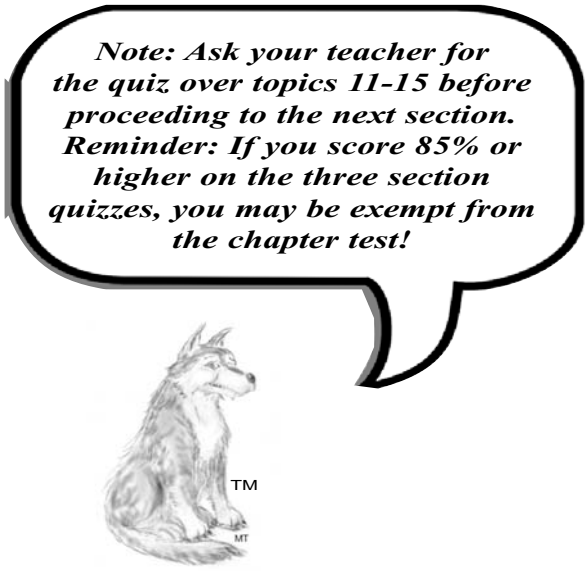
19. _____
    (a) Fossil fuel from _____
    (b) Simplest form is _____
    (c) Used as common _____
    (d) Stored _____

20. _____ (or _____)
    (a) A _____ with many uses
        [1] As a _____
        [2] As _____
        [3] As _____
    (b) Probably formed from _____
    (c) Formed in _____ rock
    (d) Collects in _____
    (e) Brought to surface of ground by _____

21. Hydrocarbons
    (a) Include _____ and _____
    (b) Made of _____ and _____
    (c) Forms _____ when burned

22. In the story, what did Tom find in his recovered backpack? _____

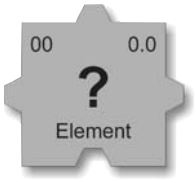
23. Write the **Life Principle:** *"*_____
    _____.*"*




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ACTIVITIES
Lesson 6:
Elements

Elements and Compounds

You are making progress! ***Answer the following questions. Fill in the blanks with 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. In the story, the map Tom found was written in: _____.
   (a) English (c) French
   (b) Spanish (d) Italian

2. Which statement is true of gold? _____
   (a) It can be exfoliated.
   (b) It tarnishes under certain conditions.
   (c) It is unable to be expanded.
   (d) It has luster and great value.

3. The smallest possible piece into which an element can be divided and still keep its identity is a(n): _____.
   (a) atom (c) subatomic particle
   (b) molecule (d) element

4. Name two combinations early chemists used to try to make gold: _____ and_____; _____ and_____.

5. A single atom has all the _____ of an element.

6. An element contains only atoms that are: _____.
   (a) opposite in nature (c) exactly alike
   (b) incapable of being divided (d) made of pure gold

7. Over the years, chemists have discovered _____ naturally occurring elements.

8. All ***elements*** are composed of: _____.
   (a) atoms (c) compounds
   (b) mixtures (d) chemical formulas

9. Which statement is **NOT** true of a mixture? _____
   _____
   (a) It is a physical combination of ingredients.
   (b) Ingredients can be separated from the mixture.
   (c) Ingredients are chemically combined.
   (d) All mixtures involve more than one substance.

10. **Compare** mixtures and compounds. (How are they alike?) _____
    (a) Both are composed of two or more substances.
    (b) Both are physically combined.
    (c) Both are chemically combined.
    (d) None of these

11. What are the basic **contrasts** (differences) between mixtures and compounds?
    Mixtures are _____
    and _____.
    Compounds are _____
    and _____.

12. Each element is designated by a _____.

13. Chemical _____ represent compounds formed from elements in simple _____.

Review Questions (#14-22). Give the name of each chemical symbol or formula from paragraphs 18 and 22-26.

14. *C* _____

15. *O* _____

16. CO_2 _____

17. H_2O _____

18. *H* _____

19. CH_4 _____

20. *CO* _____

21. H_2O_2 _____

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

Name: _____

Date: _____ Grade: _____



ACTIVITIES
Lesson 7:
Compounds

Atoms and Molecules

You are making progress! ***Answer the following questions. Fill in the blanks with 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. In the story, what action did Del take regarding the map written in French? _____
   _____
   (a) She translated the writing into English.
   (b) She took it to her mother in Cadey to translate.
   (c) She made a copy of the map.
   (d) She gave a copy of the map to Tom.

2. _____ generates heat energy that can cause a fiery reaction between certain substances.

3. Which is **NOT** true of chemical reactions? _____
   _____
   (a) Molecules combine to give a new product.
   (b) Once started, some reactions keep going a long time without additional help.
   (c) Some reactions require continuous energy input to keep going.
   (d) Reactions serve to divide compounds into their original elements.

4. Define a molecule of a compound. _____
   _____

5. What harmful elements combine to produce a "harmless" table salt molecule? _____
   _____

6. Compounds are chemical substances made of: _____.
   (a) identical elements
   (b) different molecules
   (c) identical molecules
   (d) hydrogen and oxygen atoms

7. What is true of atoms in any given molecule? _____
   _____

Give the ratios of the atoms in each compound listed below (#8-10). The first one is done for you.

8. Glucose ($C_6H_{12}O_6$)= 6 carbon to 12 hydrogen to 6 oxygen

9. Methane (CH_4)= _____

10. Butane (C_4H_{10})= _____

Using what you just learned about chemical formula ratios, give the ratios of the following compounds (#11-12).

11. Carbon dioxide = _____

12. Water = _____

13. **Contrast:** From paragraph 17, place an "X" in front of each statement that tells what chemical reactions accomplish with compounds that is different from what happens with mixtures:
    _____ They allow molecules to retain their own properties.
    _____ Original molecules/atoms are rearranged.
    _____ New molecules/compounds are formed chemically.
    _____ Molecules are only physically combined.

14. Ordinary chemical reactions cannot _____or_____ atoms, but only rearrange them.

Match the terms with their correct meanings for #15-17.

15. _____ ***proton*** (a) circles the nucleus of an atom, has a negative charge

16. _____ ***neutron*** (b) part of an atom's nucleus, has no charge

17. _____ ***electron*** (c) positively charged, part of an atom's nucleus

18. In paragraph 24, the _____ of an element is the number of its protons, which is always a _____ number.

19. **Effect**: Normally, an atom is electrically _____, be**cause** the total positive charge of the _____ equals the total negative charge of the _____.

20. When an atom loses an electron, the atom is no longer _____, but has a positive charge and is called a _____.

21. An atom that gains an electron is no longer _____, but has a negative charge and is called a _____.

22. In the story, Ranger Eldridge instructed the boys to: _____
    _____.
    (a) save the old Barnett Lumber Mill
    (b) document the status of the mill
    (c) purchase a good quality 35-mm camera
    (d) take pictures of animals near the site

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



Chemical Bonds

ACTIVITIES
Lesson 8:
Compounds

You are making progress! ***Answer the following questions. Fill in the blanks with 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. In the story, what did the boys see that they had been told did not exist? _____
   _____

2. What unexpected discovery did the boys make at the old mill? _____
   (a) a pond (c) bear cubs
   (b) a storage shed (d) a fresh footprint

3. Photography was invented by two Frenchman, Joseph _____ and Louis _____, in the early _____.

4. The first photographs were printed on: _____.
   (a) a special paper
   (b) specially formulated cloth
   (c) thin sheets of metal
   (d) none of these

5. The word *photography* was invented by: _____.
   (a) Joseph Niépce (c) William Talbot
   (b) Louis Daguerre (d) John Herschel

6. Modern photographic film contains a compound of _____.

7. The concept that "opposites attract" is a part of the laws of _____
   _____.

Match the terms with their definitions for #8-10.

8. _____ ***ionic compounds*** (a) shared electrons

9. _____ ***covalent bonds*** (b) substance formed by sharing electrons

10. _____ ***covalent compounds*** (c) substances formed by attraction between ions

11. Which element shares more electrons and forms more compounds than any other element?
    _____

In #12 and 13, compare diamond with graphite (give similarities).

12. Both ***diamond*** and ***graphite*** are composed of _____.

13. Both substances share _____ with other _____ atoms.

In #14-15, contrast diamond with graphite (give their differences).

14. In diamond, carbon atoms share electrons with _____ other carbon atoms arranged in a _____ pyramid style.

15. In graphite, carbon atoms share electrons with _____ other carbon atoms arranged in a _____.

16. Graphite is (stronger or weaker) _____ than diamond and is used as a _____.

17. Chemically ***active*** elements form _____.

18. ***Inert*** elements do not participate in _____ and therefore do not form _____.

In the chart below, indicate which elements are active or inert by placing an "X" in the proper columns, as given in the last paragraph of this lesson before the story episode.

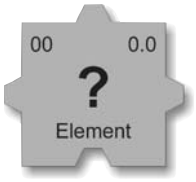
Element		Active	Inert
19.	silver		
20.	helium		
21.	bromine		
22.	oxygen		
23.	hydrogen		
24.	carbon		

25. In the story, which thought processes did Bryan use to evaluate the footprints he found? (Place an "X" in front of all that apply.)
_____ process of elimination (ruled out certain things that did not apply to the situation)
_____ contrast and comparison (noted similarities and differences in footprints)
_____ constructive criticism (offered criticism with the intent of helping the one who made the footprints)
_____ (d) cause and effect (tried to figure out why this had happened)

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

Name: _____

Date: _____ Grade: _____



ACTIVITIES
Lesson 9:
Elements

Metals

You are making progress! ***Answer the following questions. Fill in the blanks with 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. From the story, number in **chronological order** (1-8) the boys' activities at the old mill and Barnett house:
   _____ noted the needed repairs
   _____ noticed smoke from the chimney
   _____ measured and sketched the mill
   _____ noticed movement in the house
   _____ described the buildings in writing
   _____ set up their tents
   _____ noticed the "no trespassing" sign
   _____ walked uphill to the house
2. Three purposes of state and national parks are: _____, _____, _____.
3. _____ are often used in historical descriptions of past civilizations.

Match the terms with their definitions for #4-10.

4. _____ Copper	(a) a compound of copper and zinc
5. _____ ***Bronze***	(b) use of stone tools and weapons
6. _____ ***Alloy***	(c) soft metal with a reddish-brown luster
7. _____ ***Stone Age***	(d) use of iron tools, weapons
8. _____ ***Bronze Age***	(e) use of bronze tools, weapons
9. _____ ***Brass***	(f) compound of copper and tin
10. _____ ***Iron Age***	(g) one metal compounded with another to yield a stronger product

11. In response to the iron hammer discovery, what questions could you ask that would raise interesting, researchable issues? Place an "X" in front of all that apply.
    _____ Did dinosaurs make the hammer?
    _____ Are geologic time tables accurate?
    _____ Did dinosaurs and man coexist?
    _____ Did a cataclysmic event such as a worldwide flood shuffle Earth's strata?
    _____ Was ancient man an unintelligent ape creature, or did he possess technologies beyond our own?

12. The singular form of ***strata*** is _____.
(Hint: read your vocabulary words.)

13. Which set of **guide words in a dictionary** would you use to find the word *strata*?
_____
(a) strafe to stranger (c) strain to strawberry
(b) straight to strass (d) strategic to strawflower

14. Complete the following equation:
iron ore + ***charcoal*** + heat = _____.

15. Ancient ironworkers discovered that less _____ in the formula produced _____.

16. Look up ***luster*** in your vocabulary list, then supply three single word synonyms (other words with the same meanings): _____, _____, _____.

17. From paragraphs 16-19, which is **NOT** true of gold? _____
(a) It is yellow colored and resists moisture.
(b) It is apt to tarnish quickly.
(c) It is used mainly for coins and jewelry.
(d) It has kept its value since ancient times.

18. The best conductor of electricity is: _____.
(a) gold (b) silver (c) copper (d) none of these

19. List the precious metals in order of their value: _____, _____, _____.

20. The only metals without a silvery shine are _____ and _____.

21. In **contrast** to other metals, mercury is the only metal that is _____
_____.

22. Aluminum was difficult to extract from _____ ore before the discovery of _____, which enabled aluminum to be _____ released from its ore.

23. In order from paragraph 27, what are the two most common metals used in construction?
_____, _____

24. **Effect:** _____ wires are used extensively to conduct electricity, be**cause** they are efficient, _____ and _____.

25. "Bryan saw that the fugitive wore tall hiking boots. . . ." In the **context** of this story, select the meaning of the word *fugitive* from the **dictionary** entry below; then choose the correct response. _____

fugitive (fyoo ji tiv) **1.** a person who is fleeing from prosecution or intolerable circumstances **2.** having taken flight or run away **3.** fleeting, brief, elusive thoughts **4.** subjects or writings of passing interests **5.** a homeless, wandering person, or vagabond

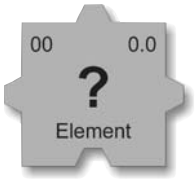
(a) definition 1
(b) definition 2
(c) definition 3
(d) definition 4
(e) definition 5

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


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Name: _____

Date: _____ Grade: _____



ACTIVITIES
Lesson 10:
Elements

Families of Elements

You are making progress! ***Answer the following questions. Fill in the blanks with 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. "Bryan was *pensive*." In **context** of the story, the reader can tell Bryan was:
   _____.
   (a) angry (c) sad, depressed
   (b) becoming frustrated (d) using analytical thought processes

2. Over the years, chemists have found 92 naturally occurring _____ which combine to produce millions of _____.

3. Elements were described by their _____ and _____ properties.

Classify as physical or chemical the following properties on the chart below that are discussed in paragraphs 11-15 of your text. Place an "X" in each appropriate category.

Properties	Chemical	Physical
4. weight, mass, density		
5. boiling/freezing temperatures		
6. solvency (power to dissolve substances)		
7. heat/electricity conducting		
8. active or inert		
9. make compounds with oxygen		
10. formation of acids, bases, salts		
11. appearance		
12. brittleness		
13. electrons exchanged		

14. The ***Periodic Table of the Elements*** was invented by a _____ chemist named _____, about the middle _____.

15. Elements on the Periodic Table are grouped in vertical columns called _____ _____.

16. Families of elements on the Periodic Table are grouped according to: _____ _____.
(a) their physical properties
(b) when they were discovered
(c) their chemical properties
(d) their ability to conduct electricity

For #17-19 refer to the Periodic Table of the Elements in this lesson or at the end of your text. Locate the vertical families (columns) listed below. Notice their differences on the Periodic Table. Name the families (columns) represented, along with their Roman numerals.

Family members	Family name	Roman numeral
17. Lithium—Francium		
18. Fluorine—Astitine		
19. Helium—Radon		

20. **Effect:** Although listed in the same column as sodium, the element _____ is set apart as a class of its own, be**cause** it has such _____ _____.

21. Of all the elements, hydrogen is chemically the: _____.
(a) most active (c) most complex
(b) most toxic (d) simplest

22. Which is **NOT** true of acids? _____
(a) They always contain hydrogen.
(b) They have a sour taste.
(c) They corrode metal.
(d) They bubble to the surface of liquids.

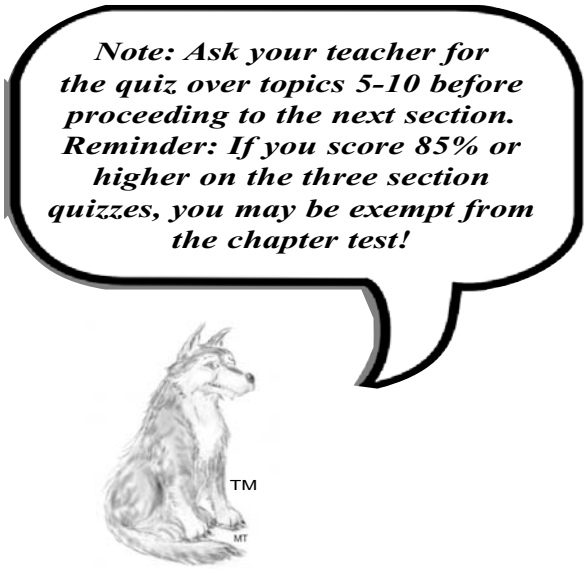
23. **Summarize** the uses of acids: They have many _____ uses and most will dissolve _____. Mild hydrochloric acid helps the _____ process. Certain acids are used to give foods and drinks a _____ taste.

24. Acid strength can be measured by a _____ or by _____ paper.

25. In the story, how did the boys locate the secret compartment? _____
_____

(a) They followed clues from the hidden shoebox.
(b) They overheard a whispered conversation.
(c) They discovered a loose board in a closet.
(d) They obtained clues from an old photograph.

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




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Name: _____

Date: _____ Grade: _____



ACTIVITIES
Lesson 11:
Compounds

Acids, Bases and Salts

You are making progress! ***Answer the following questions. Fill in the blanks with 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. In the story, (**effect**:) The boys hoisted their backpacks into a tree be**cause:** _____
_____.
(a) the boys wanted to keep James Olsen from finding the packs
(b) the boys wanted to be able to watch the packs from a distance
(c) the boys wanted to keep the packs out of reach of bears
(d) the packs were too heavy to carry any further

2. In the **context** of the story, which of the following is the best definition of a *ravine*?
_____
(a) a dry river bed
(b) a deep, rushing stream
(c) a deep mine shaft
(d) a narrow, steep sided valley or canyon

Categorize acids given in paragraphs 9-16 on in the chart below.

Name	Type/Strength	Source/Use
3.		
4.		
5.		

6. **Compare** acids (tell what they have in common): They _____,
_____, and _____.

7. Be**cause** an ***antacid*** contains a ***base*** (the opposite of an _____),
(**effect:**) it _____ acids.

8. The word *antacid* is composed of *ant* plus the **root word** *acid*. Which of the following **dictionary** definitions of *ant* would give the correct meaning to *antacid*?
_____
(a) an insect that lives in a colony
(b) an abbreviation for various words such as *antonym*, *antenna*, *antacid*
(c) a prefix (letters at the beginning of a word) meaning to work against a thing, a variation of anti— as in *antagonist, antasthmatic*
(d) a suffix (letters on the end of a word) meaning to perform or promote action as in *contestant*, *stimulant*

9. Bases are _____ tasting, _____ feeling and turn red litmus paper _____.

10. All acids contain _____.

Categorize bases given in paragraphs 22-25 on in the chart below.

Chemical Name	Common Name/Product	Type or Strength	Use
11.			
12.			
13.			

14. From the **context** of the common name of sodium bicarbonate, the reader could **conclude** that sodium bicarbonate is used for _____ as well as for cleaning.

15. When sodium combines with chlorine, the result is common _____.

16. Study the arrangement of the following compound, then write the chemical formula for common table salt.

Elements: *H* (*hydrogen*) + *Cl* (*chlorine*) ⟶ (*unite to form*) *HCl* (*Hydrochloric acid*)

Elements: _____ + _____ ⟶ (*unite to form*) _____

17. **Review question.** Place an "X" in front of each statement that tells what happens when acids and bases combine.
_____ They both become weaker.
_____ They both become stronger.
_____ They neutralize each other.
_____ A salt and water are formed.

18. The word *salary* comes from the Roman word for _____, which Roman soldiers received as _____ for their services.

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



ACTIVITIES
Lesson 12:
Compounds

Atomic Science

You are making progress! ***Answer the following questions. Fill in the blanks with 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.***

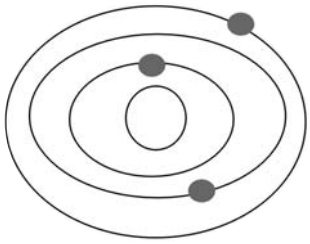
1. In the story, Bryan speculated that (**effect**:) the reason the authorities had not publicized the ancient petroglyphs was be**cause:** _____
   _____.
   (a) they did not know about the site
   (b) they had more important things to do
   (c) the site was too hard to get to
   (d) they feared vandals or treasure hunters would damage the site

2. The reader can tell from the **context** that *petroglyphs* are stone _____ or _____.

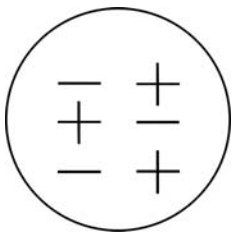
3. Chemists in the 1800s disagreed about the concept: _____
   _____.
   (a) that all matter is made of atoms
   (b) that matter could not be destroyed
   (c) that matter could not be created
   (d) of what an atom looked like

4. Which illustration shows how most early chemists viewed the atom? _____

   (a) Planetary Model



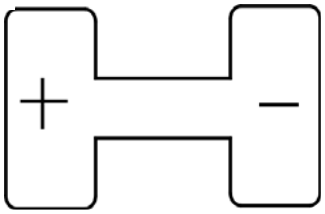
   (c) Spherical Model



   (b) Orbital Model



   (d) Dumbbell Model



5. Which illustration from question #4 represented the next general understanding of what the atom looked like? _____
   (a) Planetary Model (c) Spherical Model
   (b) Orbital Model (d) Dumbbell Model

6. Which illustration from question #4 represents the current scientific view of the atom? _____

7. Each electron has a _____ and a definite _____.

8. Scientists describe the atom as having a _____ formed around _____.

9. An atom's _____ have the main role in ***chemical reactions***.

10. The number of _____ does not change during a chemical reaction.

11. **Effect:** Neutrons were so named be**cause** they are _____, meaning they do not carry a _____.

12. The nucleus of an atom contains _____ and _____.

13. All atoms of the same element must have the same number of neutrons. _____
    (a) True or (b) False

14. The terms ***atomic weight*** or ***atomic mass*** are used interchangeably to mean the number of protons and neutrons in the nucleus of an atom. _____
    (a) True or (b) False

15. Which is **NOT** true of an element's ***isotopes***? _____
    _____
    (a) They have equal numbers of protons but different neutrons.
    (b) They are both forms of the same element.
    (c) They have identical properties.
    (d) Their extra neutrons do not allow them to form compounds with other elements.

16. **Contrast** the way elements are expressed in compounds and as isotopes. (You may need to review chemical formulas in lesson 11.) Then place an "X" in front of each isotope.
    _____ Carbon-12
    _____ $Carbon_{14}$
    _____ Uranium-238
    _____ $Carbon_{12}$

17. What causes an element to be unstable? _____
    _____
    (a) the wrong mix of protons and electrons
    (b) the wrong mix of neutrons and protons
    (c) the wrong combination of elements
    (d) the wrong temperature settings

18. From paragraphs 20 and 21, name three things that happen to an atom's nucleus when an element undergoes ***radioactive decay***. The nucleus _____, separates into _____ and releases _____, _____ particles.

19. Subatomic alpha particles travel at the incredible speed of _____.

20. A nuclear reaction changes the _____ of an atom.

21. Place an "X" before each response that applies to elements numbered above 92.
_____ naturally occurring
_____ artificial
_____ radioactive
_____ very stable
_____ unstable

22. Nuclear power plants produce: _____.
(a) nuclear weapons
(b) electricity
(c) subatomic particles
(d) steam driven turbines

23. Pound for pound, uranium generates up to forty million times more energy than coal. Into which category below would that number fall? _____
(a) 1,000-2,500
(b) 40,000-4,000,000
(c) 20,000,000-40,000,000
(d) 6,000,000-20,000,000

24. Bryan **compared** the slab of stone with its petroglyphs to a stone billboard. This means he: _____.
(a) spoke of similarities between the two items
(b) spoke of differences between the two items
(c) spoke of how to construct a billboard of stone
(d) spoke of how to carve the markings

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


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Name: _____

Date: _____ Grade: _____



ACTIVITIES
Lesson 13:
Energy

Making Electricity

You are making progress! ***Answer the following questions. Circle the correct answers or fill in the blanks 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. In the story, as the boys hiked toward the bluff, the key question in their minds was: _____.
   (a) How could they duplicate the marks with spray paint?
   (b) What were the differences between the alphabets of French, Spanish and Dutch explorers?
   (c) What kind of writing or pictures were used by Native Americans or Vikings?
   (d) Who could have made the markings?

2. Light can generate electricity. _____
   (a) True or (b) False

3. In atoms, electricity is in the: _____.
   (a) neutral charges of the neutron
   (b) positive charges of the neutron
   (c) flow of the electrons
   (d) working of all parts of the atom together

4. **Effect:** A ***photoelectric effect*** is **caused** by _____ striking atoms with loosely held _____ in their outer orbits, which enables electrons to escape.

5. Solar cells generate _____ from _____.

6. The _____ is the side of the solar cell that loses electrons (which are negative).

7. The _____ is the side of the solar cell that gains electrons.

8. Place an "X" in front of each correct statement regarding the use of solar cells.
   _____ They are inexpensive to operate.
   _____ They are good to use in remote areas where no other source or electricity exits.
   _____ Solar batteries have to be charged on sunny days in order to have electricity during dark or cloudy times.
   _____ Solar cells show great potential as the main source of electricity for the future.

9. Name the three ways electricity can be generated, as discussed in paragraphs 14-16. _____, _____ and _____.

10. By which method do batteries produce electricity? _____

11. The main components of an automobile battery are: a _____ electrode, a _____ electrode, _____, _____ and _____.

Answer #12-17 based on what happens when an automobile battery is in use.

12. Electrons are attracted by the positive electrode that is attached to lead oxide sheets. _____
    (a) True or (b) False

13. Hydrogen joins with oxygen to produce _____.

14. Negative lead _____ become positive and go into solution.
    (a) electrons (b) proton (c) neutrons (d) atom

15. _____ impart electricity to the radio, lights and other electric devices.
    (a) Electrons (b) Neutrons (c) Protons (d) Molecules

16. _____ are repelled by the negative charge of the lead sheets.

17. **Effect:** A battery no longer produces _____, be**cause** lead plates become coated with _____.

18. The reader can **conclude** that a ***lead-acid battery*** is the proper name for an automobile battery. _____ (a) True or (b) False

19. Lead acid batteries can be recharged. In this **context**, *recharged* means: _____
    _____.
    (a) to be charged more than once for an item that was purchased
    (b) to be full of energy and stamina
    (c) to charge again with electricity
    (d) to be charged again by law enforcement officers for a felony or misdemeanor

20. During what approximate time period was the lead-acid battery invented? _____
    (a) 1750-1800 (c) 1875-1900
    (b) 1835-1875 (d) 1890-1925

21. The reader could **conclude** that an electromagnet is magnetic only as long as electricity is flowing to it. _____ (a) True or (b) False

22. Place an "X" in front all responses that apply to the means by which most electricity is produced.
    _____ solar energy
    _____ friction
    _____ chemical means (batteries)
    _____ electric generators
    _____ squeezing crystals

23. In the story, the boys were dumbfounded at the disappearance of the town they had come to photograph. The reader can **conclude** that *dumbfounded* means: _____ _____.

(a) you are dumb if you are found out
(b) a dumb person has been found
(c) to be speechless with amazement
(d) none of these

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


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Name: _____

Date: _____ Grade: _____



ACTIVITIES
Lesson 14:
Energy

Using Electricity

You are making progress! ***Answer the following questions. Fill in the blanks with 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. In the story, (**effect:**) the boys were disappointed be**cause:** _____ _____.
   (a) their spirits were dampened
   (b) the mysterious town did not exist
   (c) they were lost in thought
   (d) they only had two small flashlights to find their way in the dark

2. Producing _____ is one of the most important functions of electricity.

3. The _____, invented in the mid _____ was the first light-producing electrical device.

4. Carbon is an electricity-conducting nonmetal. _____ (a) True or (b) False

5. For which use was the ***arc lamp*** **NOT** suitable? _____
   (a) street lights
   (b) search lights
   (c) stage/theater lights
   (d) home use

6. _____ is famous for inventing the ***incandescent*** light bulb in _____.

7. **Effect:** Edison's and Latimer's carbon filaments were replaced by tungsten in the early 1900s be**cause** tungsten provided a _____ that was not as _____ as carbon.

8. When were ***fluorescent*** lights invented? _____

9. ***Neon*** lights operate on a principle similar to what causes _____ to glow.

Review Questions. Match the types of lights with the principles by which they operate (#10-13).

10. _____ incandescent
11. _____ fluorescent
12. _____ neon
13. _____ arc lamp

(a) ultraviolet light is transformed into visible light by a special coating inside the bulb
(b) electricity jumps between carbon rods to produce light
(c) thin filament inside bulb heated by electricity, causes filament to glow, most common in homes
(d) electricity causes gases to move up and down, producing visible light

14. Electricity is a form of energy that can easily be changed into other energy forms. _____
(a) True or (b) False

15. _____, _____, _____, and _____ are produced by electricity.

16. Which of the following are true of magnets and magnetic fields? Place an "X" in front of all that apply.
_____ has north and south poles
_____ has east and west poles
_____ poles were named from magnetic compass needle
_____ unlike magnetic poles attract each other
_____ like magnetic poles repel each other
_____ either pole attracts iron

17. _____ were one of the first uses of electricity.

18. **Compare** the following items mentioned in paragraphs 17-20 (tell what they have in common): doorbells, telegraph machines, audio speakers (for radio, stereo and telephone handsets) and electric motors. They all make use of _____ _____.

19. How do copy machines and computer printers **compare** (or what do they have in common)? They both utilize _____.

20. Number in **chronological order** (1-7) the steps involved in printing a sheet of paper with a copy machine or computer printer:
_____ dry ink or colored particles are sprinkled on metal sheet in printer
_____ paper to be printed picks up ink particles
_____ image to be printed is drawn with light on metal sheet in printer
_____ electrons neutralize static charge in blank areas of metal sheet where no drawing is
_____ ink falls away from blank areas where no static charge (and no drawing) is
_____ ink particles stick where metal sheet has kept a static charge
_____ paper is pressed against metal sheet and heated

21. The heat-producing effects of electricity were first observed in: _____.
(a) electric heaters (c) camp fires
(b) clothes dryers (d) lightning

22. In the story, the boys' cabin had been ransacked. What item had been stolen? _____ _____

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

Name: _____

Date: _____ Grade: _____



ACTIVITIES
Lesson 15:
Geology

Three Spheres

You are making progress! ***Answer the following questions. Fill in the blanks with 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. In the story, (**effect**:) Del thought the French words from the map, translated "copper stones," marked the location of the copper deposits be**cause**: _____ _____.

Complete the outline below (#2-4) about various kinds of maps from paragraphs 9-12 in your text. Main categories are shown with numbers. Sub-points are noted with lower-case letters and details are bracket numbers. Do NOT write complete sentences. Outlines use as few key words as possible to communicate main ideas. Outlines serve to organize textual material; therefore, an outline may not follow the exact chronological order of a text.

2. _____ maps—show surface of lithosphere
   - (a) Show _____ features
     - [1] shape of _____
     - [2] _____ above sea level
     - [3] small bodies of water
   - (b) Show _____ features
     - [1] towns and _____
     - [2] _____
     - [3] _____
     - [4] _____
     - [5] _____
   - (c) Different colors indicate
     - [1] open fields
     - [2] _____
     - [3] _____
   - (d) Commonly called _____

Complete the outline *continued*

3. _____ charts—deal with hydrosphere
   (a) Deal with _____ bodies of _____
   (b) Provide information for navigation about possible _____
      [1] _____
      [2] _____
      [3] _____
      [4] _____
   (c) Show aids to navigation
      [1] _____
      [2] _____

4. _____ charts—deal with the atmosphere
   (a) Show
      [1] _____ and _____
      [2] _____
      [3] _____
      [4] _____
   (b) Used in _____

Review question: Match the "spheres" with the "states" in #5-7. The three spheres of Earth parallel the three states of matter.

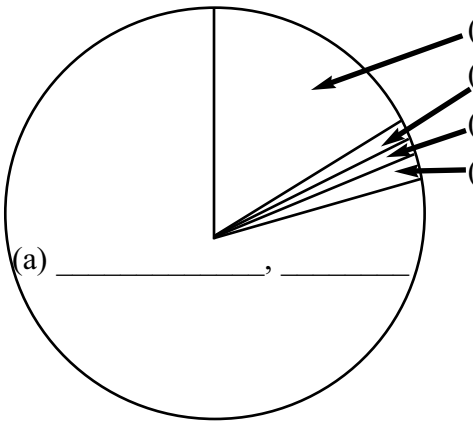
5. _____ ***atmosphere*** (a) solid rocks and soil
6. _____ ***hydrosphere*** (b) gases
7. _____ ***lithosphere*** (c) liquid water

8. The _____ is the first (or lowest) level of the atmosphere and reaches about _____ upward from Earth's surface.

9. Most clouds and general weather conditions occur in the _____.

Label the pie graph with names and percentages of atmospheric gases given in paragraph 15 of your text. One is done for you.

10.



(b) _____, _____
(c) total of others , .07%
(d) _____, _____
(e) _____, _____

Percentages are based on 100. All of a thing is 100 percent of it. All percentage charts and graphs add up to 100. Use this information to answer #11-12.

11. Based on the above information, what mathematical process should you use to determine the percentage for the "others" category of the pie graph in question #10? _____

    _____

    (a) Add all the percentages together.
    (b) Subtract the total percentages given in the text (paragraph 15) from 100%.
    (c) Multiply the largest percentage by the smallest one given.
    (d) Divide the largest percentage by the smallest one given.

12. How could you check your work to make sure your answer for the "others" category is correct? _____

    _____

On the chart below, classify the atmospheric items given in paragraphs 16 and 17 of your text according to levels of the atmosphere to which they pertain.

13. **Mostly the same at all levels**	14. **Most abundant at lower levels**	15. **Most abundant at upper levels**

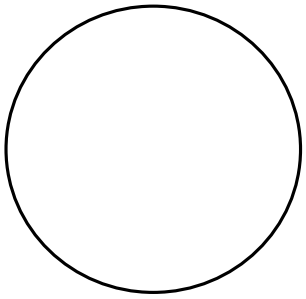
16. The three states of matter are found in the hydrosphere. Tell what they are and give an example of each:

    _____ (example: _____)
    _____ (example: _____)
    _____ (example: _____)

17. Place an "X" in front of each correct statement from your text, paragraph 18, regarding the hydrosphere.

    _____ It includes all forms of water on the planet.
    _____ Water is the most abundant substance on Earth.
    _____ Liquid water covers about three-fourths of Earth's surface.
    _____ Liquid water, glaciers, water vapor (fog, clouds), snow, ice and frost together cover about 90 percent of the surface at times.
    _____ The hydrosphere overlaps the atmosphere at times.

18. **Label the pie chart below**, using the information from responses #17 (c) and (d). First, convert 3/4 to a percentage. Next, calculate the percentage difference between 90% and 75% to determine the percentages of non-liquid water substances. Draw in lines to separate the categories, then label the chart with names and percentages. Remember, all percentages in any given chart add up to 100.



19. In the above pie chart, what percentage could be labeled "dry ground"? _____

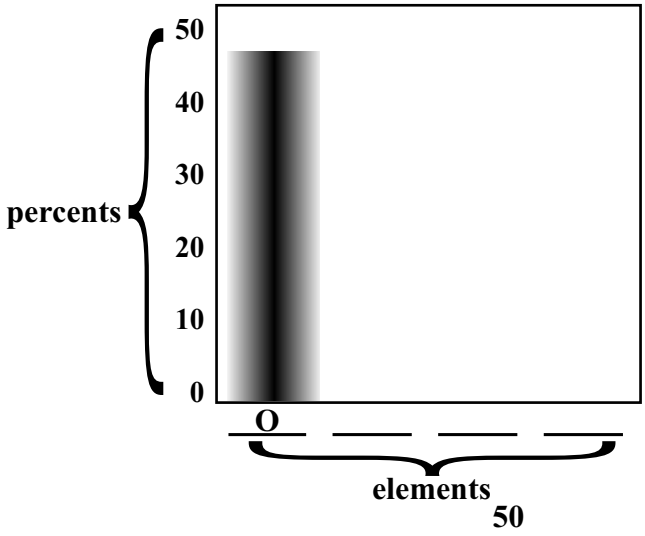
20. Write two sentences from paragraph 19 as **evidence** of two things that are unique to Earth among the planets in our solar system. _____
_____
_____

21. The four most abundant elements in the oceans are: _____, _____, _____, and _____.

22. Hydrogen and oxygen combine to make _____, while sodium and chlorine bind together to produce _____.

23. The solid part of Earth is called the: _____.
(a) atmosphere (b) hydrosphere (c) lithosphere (d) troposphere

24. Using the information in paragraph 23 of your text, **draw in and label the columns** of the bar graph below with the symbols of the single elements given according to their percentages. The first one is done for you.



25. The previous chart percentages total only _____. On the basis of 100%, what is the percent of all other elements in Earth's crust? _____

26. Most minerals are composed of a variety of _____.

27. Of what four elements is a common type of feldspar composed? _____, _____, _____, _____

28. _____ is the most abundant element in the lithosphere and hydrosphere.
(a) hydrogen (b) oxygen (c) nitrogen (d) ozone

29. What is the second most abundant element in the atmosphere? _____

30. **Reread** paragraph 15. Which element ranks ahead of oxygen in the atmosphere? _____

31. Which statement is **NOT** true of oxygen? _____
_____
(a) It is one of the least active/reactive elements.
(b) It forms compounds with most other elements.
(c) It does not stay in the atmospheres of other planets.
(d) It is produced by plants during photosynthesis.

32. In the story, what did the boys hope to find at the Cadey museum? _____
_____
(a) a map of the town
(b) a copy of the lost map
(c) the original of the lost map
(d) a tourist map of the island

33. 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!




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