Name _____ Date _____ Class _____

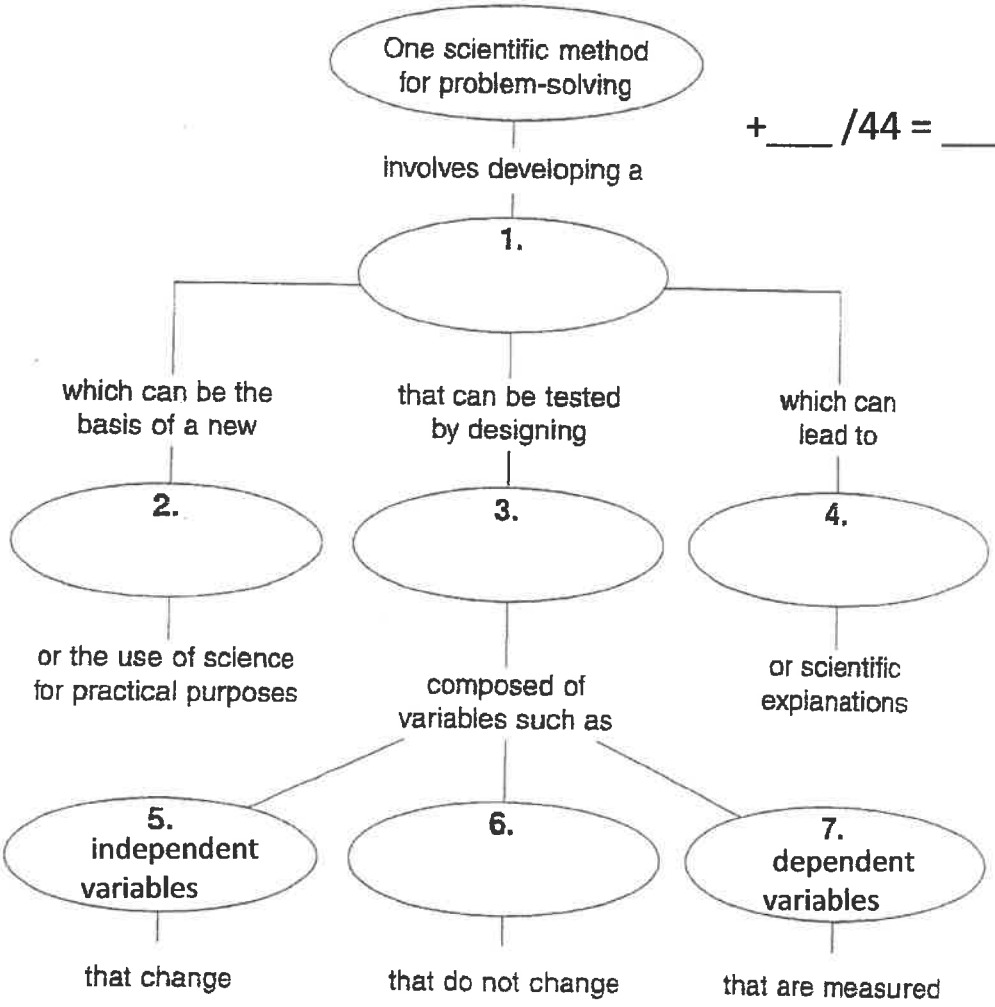
Directed Reading for Content Mastery

Overview
The Nature of Science

Use your textbook and notes to answer these.

Directions: *Complete the concept map by using the words below.*

scientific theories **constants** **technology** **hypothesis**
dependent variables **experiments** **independent variables**



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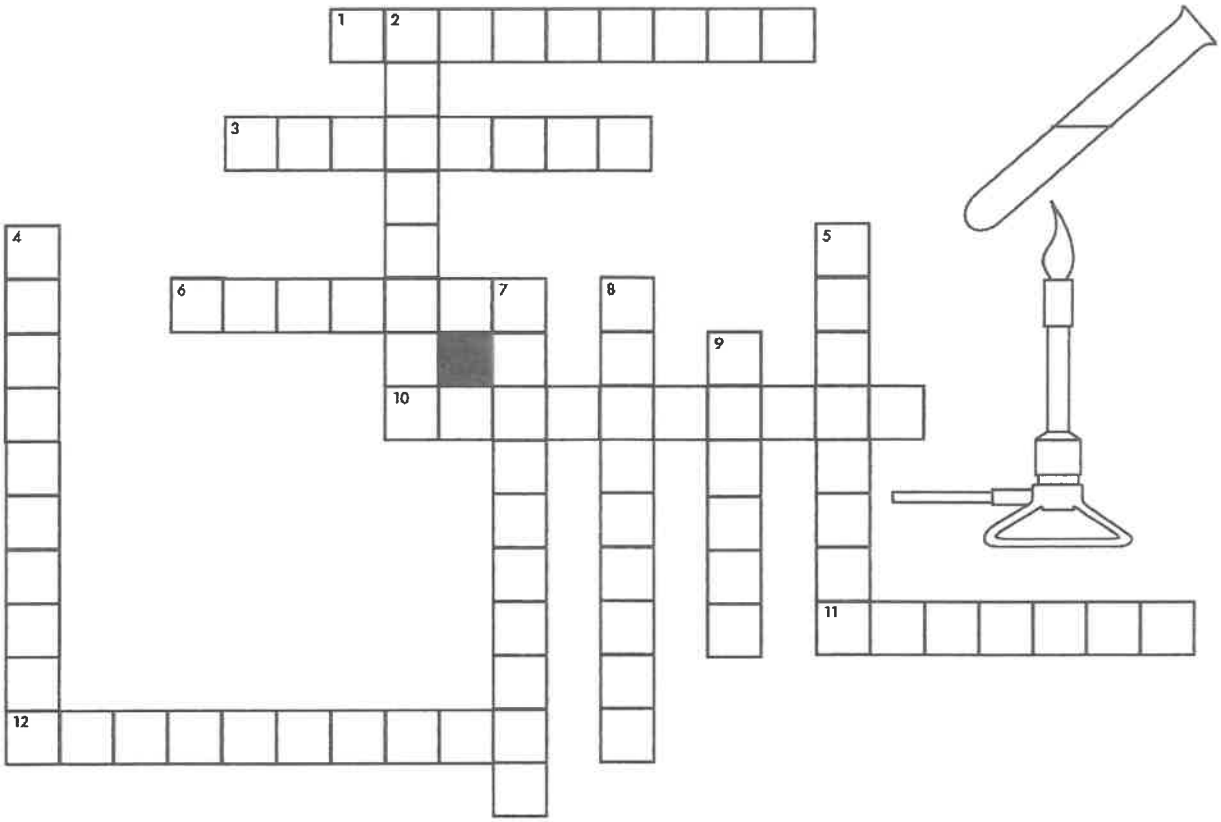
Directions: *Circle the terms in parentheses that best complete the sentence.*

8. Problems that deal with ethics (can, cannot) be solved using scientific methods.
9. Ethics deals with (moral values, scientific facts).
10. There (are, are no) limits to what science can explain.

+_____ / 8

Vocabulary Crossword

Use the clues at the bottom of the page to fill in the crossword puzzle.



Across

1. A sequence of steps involved in performing an experiment
3. The inquiry or problem relating to a topic that can be answered by conducting an experiment
6. To notice what occurs during an experiment
10. An educated guess or reasonable assumption
11. Following the rules of being fair and honest
12. The result or outcome of something

Down

2. To conduct an investigation into current information about something
4. A method of doing research that includes the steps of identifying a problem, gathering data, forming a hypothesis, testing a hypothesis, and drawing a conclusion
5. Something that can change or influence the results of an experiment
7. A test or trial performed in order to discover something
8. To explain or give meaning to
9. To write accurate information abut what occurs during and experiment

Word Bank

PROCEDURE
QUESTION
OBSERVE
HYPOTHESIS
ETHICAL
CONCLUSION
SCIENCTIFIC
RESEARCH
EXPERIMENT
INTERPRET
RECORD
VARIABLE

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Name _____ Date _____ Class _____

Chapter Test

The Nature of Science

I. Testing Concepts

Directions: *Match the description in the first column with the item in the second by writing the correct letter in the space provided. Some items in the second column may not be used.* None will be used more than once.

i	1. variables that do not change in an experiment	a. hypothesis
	2. an educated guess that can be tested	b. Earth science
	3. standard to which experimental results are compared	c. variable
	4. rule that describes behavior of nature	d. constant
	5. deals with morals and values	e. control
	6. the use of knowledge to make products or tools	f. technology
	7. a slanted view	g. scientific theory
	8. an explanation backed by results from repeated testing	h. scientific law
k	9. a variable that can change in an experiment	i. independent
	10. study of Earth and space	j. ethics
		k. dependent
		l. bias

Directions: All the statements below are false. Rewrite them to make them true.

FALSE 11. Ethics deals with morals and values and can be measured and tested using the scientific method.

_____

_____

_____ 12. Until proven incorrect, there are no "wrong" hypotheses.

Skip this question.

FALSE 13. The more variables you can test in an experiment, the better the results.

_____

_____

_____ 14. Earth science is the study of rocks and trees only.

Skip this question.

FALSE 15. Bias, or personal opinions, never influence scientific results.

_____

+_____ / 11

Name_____

Observation – Inference – Prediction

Purpose: To practice distinguishing between observations, inferences and predictions.

Scientists spend a great deal of time observing the natural and built world. When a scientists **observes** he or she *takes in information using the five senses*. Often **tools** such as microscopes are used to extend the senses and make the observations more precise and accurate.

Observations may be **qualitative** or **quantitative**. Qualitative observations are those *that describe qualities, properties or characteristics of objects or phenomena*. Color, texture, smells, sounds are all examples of qualitative observations. Quantitative observations are those that can be measured in numbers. Mass, volume, speed, temperature are a few examples. Tools are often used to make quantitative observations.

Observations in science should always be **facts** (a statement that can be proven true or false), not **opinions** (an expression of a person's feelings that cannot be proven).

Observations lead to **inferences**. An inference is an educated guess or *reasonable conclusion drawn from the observation*. It is a possible explanation for the observation.

Predictions can be made from inferences. A scientific prediction is an educated guess *about a future event*. It can be made without knowing whether it is correct; it may be an incorrect guess. That's ok. Scientists learn from incorrect guesses as much as correct ones.

For example, a student wakes up to thunder one morning.
He may **observe** the thunder – using his sense of hearing, he made a factual, qualitative observation.
The sound of the thunder led to the **inference** that it was raining – it might not have been raining.
The student then **predicted** that they would not go outside during school that day because of the rain.

Look at the photo below and use it to make one observation, one inference and one prediction:

Observation -

_____

_____

Inference -

_____

_____

Prediction -

_____

_____

+_____ / 3

Read the following sentences carefully. Identify if the sentence is an observation (O), an inference (I) or a prediction (P). Record your answer on the line to the left of the sentence.

1._____ It must have rained because the grass is wet.

2._____ It is 95 degrees today.

3._____ Today is Friday, so I think we will have fish sticks in the cafeteria for lunch.

4._____ The fish swim to the top of the aquarium when I come near.

5._____ The fish expect food when I come near the aquarium.

6._____ The river is flowing very fast.

7._____ The blowing sand in the desert will wear away the rocks.

8._____ The mountain is making rumbling noises deep inside.

9._____ The mountain is a volcano.

10.____ The volcano is going to erupt soon.

+_____ / 10