

What is Science?

What are the basic assumptions of science?

Science is a _____ and _____ attempt to determine an _____ in the _____.

Basic Assumptions of Science

The Universe _____; There is physical _____.

The Universe is _____. The order is _____ throughout space and _____.

The order is _____ through rational, human _____.

YOUR CHALLENGE

_____ !

The Scientific Method – A Systematic Approach to Problem Solving

Describe the steps of the scientific method and give examples of each

Steps of the Scientific Method

1. State the _____ – Must first recognize and understand the problem. Stated in the form of a _____.

2. Gather _____ – Collect all possible _____ related to the problem.

3. Form A _____ – Use known facts to predict what is likely to occur. Involves _____, hunches, or _____. It is a complete _____ and is an “if” – “then” statement.

4. _____ – Test a hypothesis. Experiments can only include one _____ variable. Independent Variable – The one _____ you have control over in an experiment.

5. Record and Analyze _____ – Shows the _____ of an experiment. Usually presented on a _____, table, or _____.

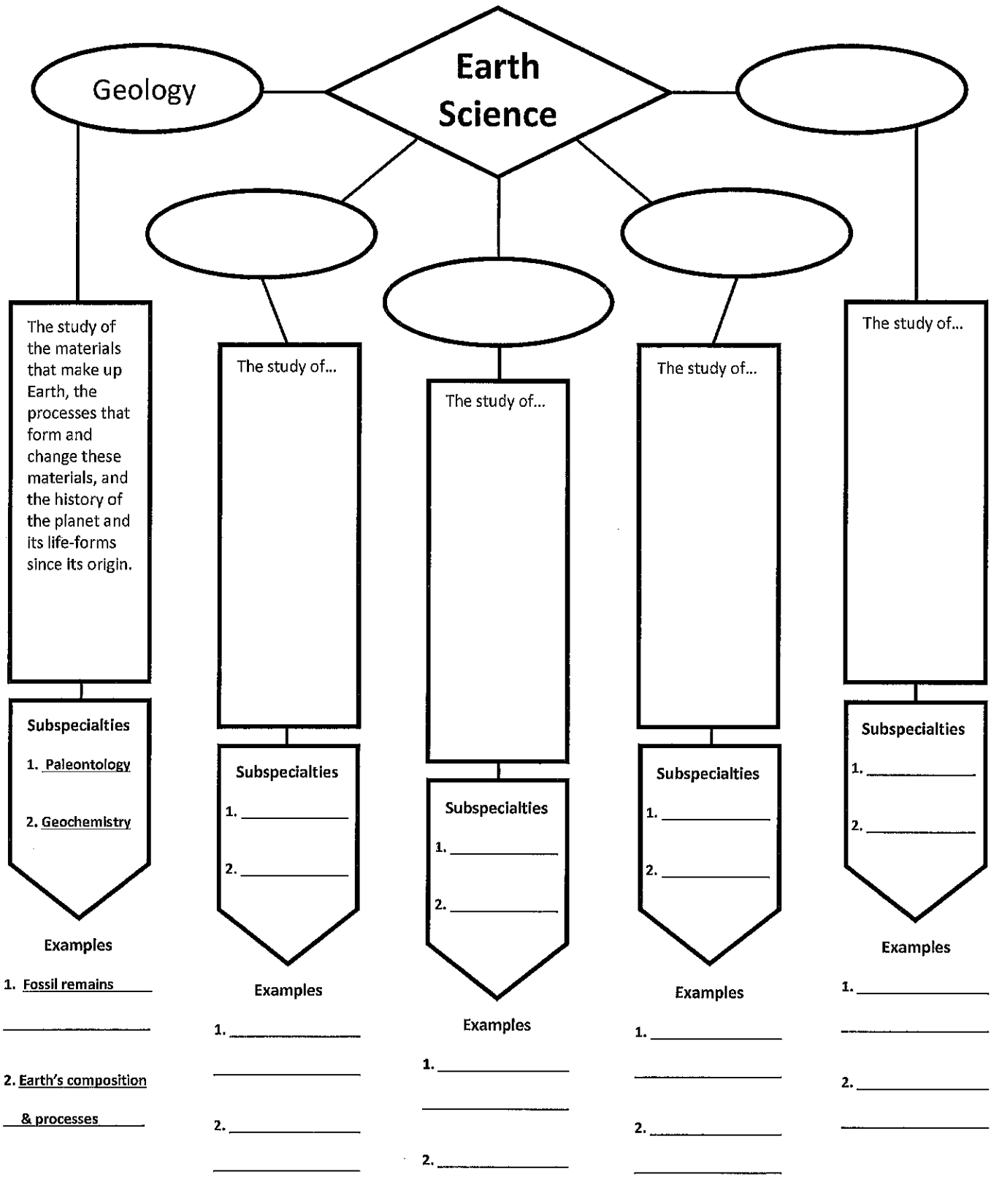
6. State Your _____ – Tells results of _____. States whether your hypothesis was _____ or _____, or if more testing was needed.

_____ – A truth about _____; can be questioned or changed.

_____ – Most logical explanation for _____ that occur in Nature.

_____ – A _____ which is generally accepted as being _____.

What is Earth Science? Pg. 6-7



Metric Units

Unit	Description	Base Unit	Symbol

Define Other Key Terms

1. Geosphere _____

2. Atmosphere _____

3. Hydrosphere _____

4. Cryosphere _____

5. Biosphere _____

6. Scientific Notation _____

7. Scientific Model _____

Writing Hypotheses –

Name _____

For each of the following problems write a hypothesis in the form of an 'if – then' statement. Write a complete sentence. Include what additional information would need to be collected. (worth **20 points**)

1) Why have fossils of tropical marine animals been found in the mountains of Northern Canada?

If _____

then _____

What additional information would you collect? _____

2) Why do 50% of all dogs but only 20% of all cats in a certain town have fleas?

If _____

then _____

What additional information would you collect? _____

3) Why do areas at or near the equator have 12 hours of daylight and 12 hours of darkness?

If _____

then _____

What additional information would you collect? _____

4) When a bar magnet is suspended horizontally from a string, why does one end of the magnet always point north?

If _____

then _____

What additional information would you collect? _____

5) Why do some clouds drop rain or snow and others do not?

If _____

then _____

What additional information would you collect? _____

Metrics

Circle the most sensible measurement.

1) Height of a man	160mm	160cm	160m	160km
2) Width of a room	8mm	8cm	8m	8km
3) Width of a desk	75mm	75cm	75m	75km
4) Length of a football field	90mm	90 cm	90m	90km
5) Volume of a car gas tank	80 mL		8 L	
6) Volume of a cup	250 mL		250 L	
7) Volume of a bathtub	400 mL		400 L	
8) Volume of a can of soda	500 mL		500 L	
9) Mass of a dog	8 mg	8 g		8 kg
10) Mass of a pencil	5 mg	5 g		5 kg
11) Mass of a raisin	1 mg	1 g		1 kg
12) Mass of a man	50 mg	50 g		50 kg
13) Temperature of boiling water	100°C	50°C		212°C
14) Temperature of ice	0°C	32°C		60°C
15) Temperature of a room	22°C	55°C		72°C
16) Body temperature	97°C	37°C		310°C

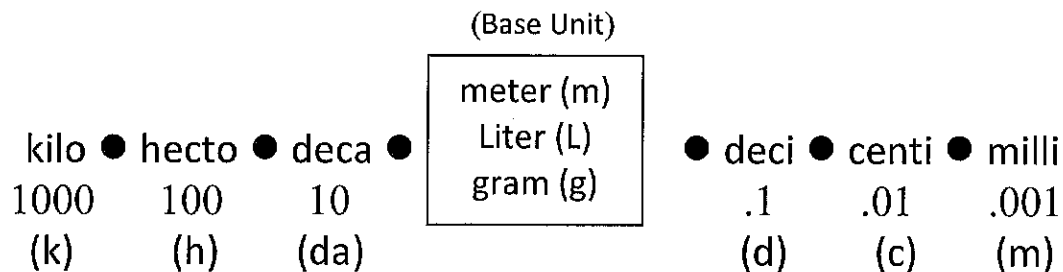
Identify something in your home that fits each description.

- 17) Something that can hold 250 mL of liquid. _____
- 18) Something that has a mass over 20 g. _____
- 19) Something that is 1.5 m above the ground. _____
- 20) Something that is below 32°C _____

Metric Conversion Chart

Directions:

- Use this chart to help you make conversions within the metric system.
- Find the beginning unit on the chart, and count the number of dots between that unit and the unit you wish to convert to.
- That number will be the number of places you should move the decimal.



➡ From a larger unit to a smaller unit, decimal moves right

From a smaller unit to a larger unit, decimal moves left ←

Metric Conversion

Name _____

Period# _____

I) Convert the following to *meters (m)*.

1) 100 mm =

2) 100 cm =

3) 100 dm =

4) 10 cm =

5) 5 km =

6) 50 hm =

7) 40 dam =

8) 25 dm =

9) 365 hm =

10) 56.5 cm =

11) 4.2 dam =

12) .5 km =

II) Convert the following to *centimeters (cm)*

13) 25.5 mm =

14) 2 m =

15) 5 km =

16) 26 hm =

17) .25 dm =

18) .03 m =

III) Convert the following to *kilometers (km)*.

19) 2,486 cm =

20) 24,675 mm =

21) 25 hm =

22) 5,492 m =

23) 248 dam =

24) 5 dm =

IV) Convert the following to *Liters (L)*.

25) 632 cL =

26) 42 daL =

27) 5 hL =

V) Convert the following to *grams (g)*.

28) 6,245 mg =

29) 8 kg =

30) 42 mg =

DENSITY

$$D=m/V$$

$$m=D \times V$$

$$V=m/D$$

Directions: Find the density using the information given & the formula above.

Round answers to the nearest hundredth.

1) $m=16 \text{ g}$
 $V=4 \text{ mL}$
 $D=$

2) $m=27 \text{ g}$
 $V=9 \text{ cm}^3$
 $D=$

3) $m=148 \text{ g}$
 $V=52 \text{ mL}$
 $D=$

4) $m=96 \text{ g}$
 $V=12 \text{ cm}^3$
 $D=$

5) $m=920 \text{ g}$
 $V=26 \text{ mL}$
 $D=$

6) $m=725 \text{ g}$
 $V=1,000 \text{ mL}$
 $D=$

7) $m=108 \text{ g}$
 $V=542 \text{ cm}^3$
 $D=$

8) $m=465.7 \text{ g}$
 $V=823 \text{ mL}$
 $D=$

9) $m=57.85 \text{ g}$
 $V=106 \text{ mL}$
 $D=$

10) $m=1,200 \text{ g}$
 $V=1,405 \text{ mL}$
 $D=$

Find the mass by using the information given and the formula above.

Round answers to the nearest hundredth.

11) $D=.78 \text{ g/mL}$
 $V=320 \text{ mL}$
 $m=$

12) $D=1.5 \text{ g/mL}$
 $V=86 \text{ mL}$
 $m=$

13) $D=3.91 \text{ g/mL}$
 $V=500 \text{ mL}$
 $m=$

14) $D=1 \text{ g/mL}$
 $V=723 \text{ mL}$
 $m=$

15) $D=.46 \text{ g/mL}$
 $V=805 \text{ mL}$
 $m=$

Find the Volume by using the information given and the formula above.

Round answers to the nearest hundredth.

16) $m=1600 \text{ g}$
 $D=2.45 \text{ g/mL}$
 $V=$

17) $m=72 \text{ g}$
 $D=.56 \text{ g/mL}$
 $V=$

18) $m=1,537 \text{ g}$
 $D=4.7 \text{ g/mL}$
 $V=$

19) $m=235.67 \text{ g}$
 $D=.85 \text{ g/mL}$
 $V=$

20) $m=693.07 \text{ g}$
 $D=5.69 \text{ g/mL}$
 $V=$

Intro to Earth Science Review Questions

True or False.

- _____ 1. Oceanography is a branch of earth science.
- _____ 2. A hypothesis must be tested before any observations can be made.
- _____ 3. Comparing some aspect of an object with a standard unit is called measurement.
- _____ 4. A gram is a standard unit of measurement.
- _____ 5. Scientific methods are guides to scientific problem solving.

Choose the one best response.

- _____ 6. The study of the solid earth is called
a. geology. b. oceanography. c. meteorology. d. astronomy.
- _____ 7. The earth scientist most likely to study storms is
a. a geologist. b. an oceanographer.
c. a meteorologist. d. an astronomer.
- _____ 8. Which of the following would an astronomer most likely study?
a. a comet's path through the solar system
b. the height of tides during a full moon
c. an iridium-laden rock layer produced by meteorites
d. the amount of solar energy absorbed by a tree
- _____ 9. Usually the first step in scientific problem solving is to
a. form a hypothesis. b. state the problem.
c. gather information. d. state a conclusion.
- _____ 10. A possible explanation for a scientific problem is called
a. an experiment. b. an observation.
c. a theory. d. a hypothesis.
- _____ 11. A statement that consistently and correctly describes some natural phenomenon is
a. hypothesis. b. observation. c. law. d. control.

Complete the statement.

12. A theory that is well established through research and experimentation is most likely to become a scientific _____.



Critical Thinking

Read each question or statement and answer it in the space provided.

13. A meteorite lands in your backyard. Which earth scientist would you call to study the meteorite? Why?

14. A scientist observes that each eruption of a volcano is preceded by a series of small earthquakes. The scientist then makes the following statement:
If volcanic eruptions are preceded by earthquakes, then earthquakes cause volcanic eruptions.
Is the scientist's statement a hypothesis or a theory? Why?

Data Collection:

- 1) Create a **line graph** by plotting the average monthly temperatures of both Dallas, Texas and Denver, Colorado. Plot both lines on the same graph. Make each line a different color. Show a legend.

		Average Monthly Temperatures											
Dallas, TX		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
°F	46	50	56	65	73	81	85	85	85	78	68	55	48

		Average Monthly Temperatures											
Denver, CO		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
°F	28	32	36	46	56	66	73	72	72	63	51	38	32

- 2) Create a **bar graph** using the average monthly temperatures of both Fargo, North Dakota and Los Angeles, California. Draw bars for both cities on the same graph. Use a different color to represent each city. Show a legend.

		Average Monthly Temperatures											
Fargo, ND		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
°F	7	11	25	42	55	65	71	69	69	59	46	28	13

		Average Monthly Temperatures											
Los Angeles, CA		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
°F	54	55	57	59	62	65	69	69	69	68	65	61	57

- 3) Create a **circle graph** showing the distribution of solar radiation that reaches the earth. Draw a circle. Calculate how many degrees of the 360° would represent each section. Use a protractor to measure each section. Label each section.

Absorbed by the atmosphere - $20\% = 0.2 \times 360 =$ _____ degrees

Reflected or refracted back to space - $30\% = 0.3 \times 360 =$ _____ degrees

Absorbed at earth's surface - $50\% = 0.5 \times 360 =$ _____ degrees

NEATNESS COUNTS!

IF YOU HAVE ANY QUESTIONS — ASK!!!

