Who Am I? An Elemental Investigation NAME: _____

Directions: Listen to your peers' present information about the elements located on the PEROIDIC TABLE then place the proper element into each blank.

1. I am the lightest metal on the PT and am able to float on water. I can easily be cut with scissors and can be used in batteries to store energy. I am _____.

2. In my pure form I am a silvery metal and rarely seen, but I make chalk and am in milk to strengthen your bones. I am _____.

3. I make up 78% of the Earth's atmosphere as a gas, but will be a liquid at -196 degrees C. I am _____.

4. I react violently with most things. I have an atomic number of nine and am a yellowish gas, but my ion form is used to help tooth decay. I am _____.

5. I am a colorless gas that interacts with starlight to form nebulas. Our sun burns me to produce light and heat for Earth and 75% of the universe is made of me. I am _____.

6. I explode when exposed to water when in my metallic form, but I can be found in bananas and used to prevent cramping. I am _____.

7. I am found in common mineral called borax, but very brittle in my pure form. My melting point is 2075 degrees C. I am _____.

8. I make up about 10% of the entire universe. Being a gas, I turn a pale peach when electricity is passed through me. I am _____.

9. I am used to make parts for spacecraft and missiles. I am expensive but strong and lightweight. I am _____.

10. I am a metal used to wrap foods while they cook or to keep them while they are in the freezer. I am often called "tin" foil, but I am _____.

11. I make up 21% of the Earth's atmosphere and you can't live without me. At -183 degrees C I am a beautiful blue color. I am _____.

12. My symbol is P and I am a part of every matchstick. The fourth of July would not be the same without me. I am _____.

13. The crust of the Earth contains some of me. I am a silvery metal sometimes used in sandpaper. My atomic number is 14. I am _____.

14. I am a red gas and used in lights in most cities for signs. My atomic weight is 20.1797. I am _____.

15. I am found in most foods, but the pure form of me will explode when I meet water. My symbol is S and my boiling point is 883 degrees C. I am _____.

16. Diamonds are made from me and so is the "lead" in your pencil called graphite. I am needed by plants and people too. I am _____

17. I am a pale yellow gas used to purify drinking water and swimming pools. When I combine with Na, I make salt. I am _____.

18. I am another silvery metal, used for lightweight racecar components and fire starters. My melting point is 650 degrees C. I am _____

19. I am a bright blue gas when hit with electricity and also used in lighted signs. My symbol is Ar and I am labeled noble and inert. I am _____.

20. I am found pure in nature, which is rare. Volcanoes produce me and I am known to be smelly. Onions and garlic have my compounds in them. I am _____.

Energy

Cut and past all the items in the box behind the type of energy it describes.

- Combination of potential and kinetic energy.
- Energy traveling by waves in all directions.
- Energy stored in chemical bonds.
- Energy stored in the nucleus of atoms.
- Total kinetic and potential energy.
- Energy of electrical charges.
- Example: Lightening, Batteries
- Example: Ice cream melting in your hand
- Example: Car moving across the road
- Example: Sun
- Example: Microwaves, X-rays
- Example: Matches, food

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Temperature

Temperature is how hot or cold something is. Temperature is really a measure of how fast the atoms and molecules that make up a substance are moving (this movement is sub-microscopic; you cannot see it).

Thermometers Are Used to Measure Temperature.

Temperature Scales

Fahrenheit is a measure of temperature that is abbreviated F. Water freezes at 32°F and boils at 212°F. This scale was developed by Gabriel Daniel Fahrenheit in 1714. The Fahrenheit scale is used in the USA but not in many other countries. The degrees in Fahrenheit are smaller than those in Celsius, making weather-related temperatures more easily written (without having to use a decimal point).

Celsius (also called Centigrade) is a measure of temperature that is abbreviated C. Water freezes at 0°C and boils at 100°C. This scale was developed by Anders Celsius in 1742.

Kelvin is a measure of temperature that is abbreviated K. Kelvin is a temperature scale designed so that 0K is defined as absolute zero, and the size of one unit is the same as the size of one degree Celsius. [Absolute zero is a hypothetical temperature at which all molecular movement stops. All actual temperatures are above absolute zero. Absolute zero would occur at -273.16°C, -459.69°F, or 0 K.] Water freezes at 273.16K; water boils at 373.16K. Many scientists use this scale (because all the temperatures are positive, making calculations simpler) or the Celsius scale. This temperature scale was designed by Lord Kelvin (William Thomson).

Temperature	Fahrenheit	Celsius	Kelvin
Water Boils	212°F	100°C	373K
Water Freezes	32°F	0°C	273K
Normal Human Body Temperature	98.6°F	37°C	310K
Room Temperature	68°F	20°C	293K
Absolute Zero (the lowest temperature possible, when molecules have the lowest possible energy)	-459.69°F	-273.16°C	0K

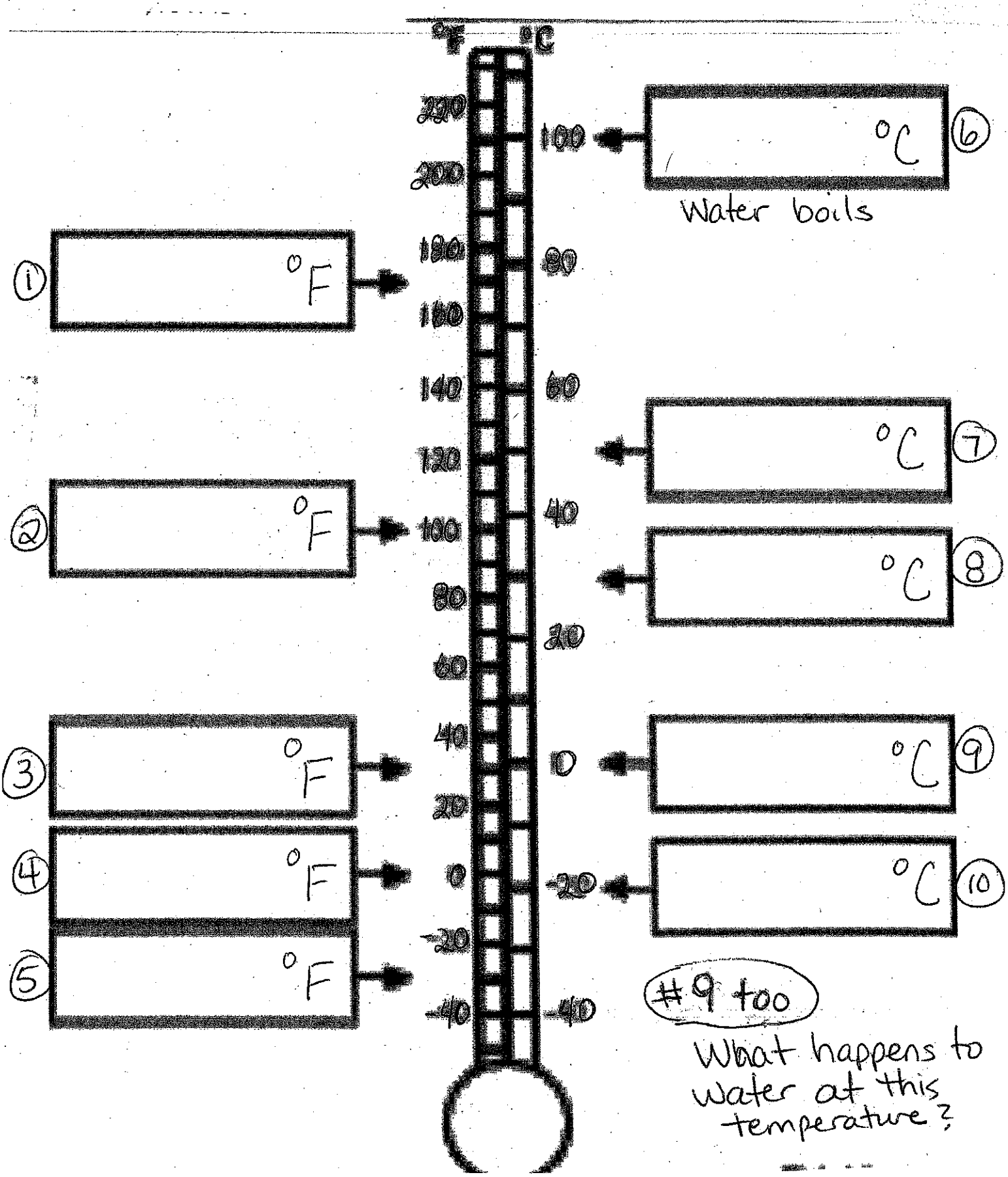
Conversion Formulas

If you know the temperature in one temperature scale you can use a formula to figure out what it is equivalent to in other scales. The conversion formulas are in the table that follows.

Celsius to Fahrenheit (and Fahrenheit to Celsius):	Kelvin to Celsius (and Celsius to Kelvin):
F = 1.8C + 32 C= (F - 32)/1.8 (A degree Celsius is 1.8 times bigger than one degree Fahrenheit.)	C = K - 273 K = C + 273 (Converting between Celsius and Kelvin is easy because the size of a degree Celsius is the same as the size of a kelvin.)

QUESTION: If a refrigerator is set at about 50 degrees F, what is the temperature in both Celsius and Kelvin? Show your work on a scrap sheet of paper.

A. On your white paper, label a section A, then number 1→10. Place the answers to the temperatures indicated by the thermometer below.

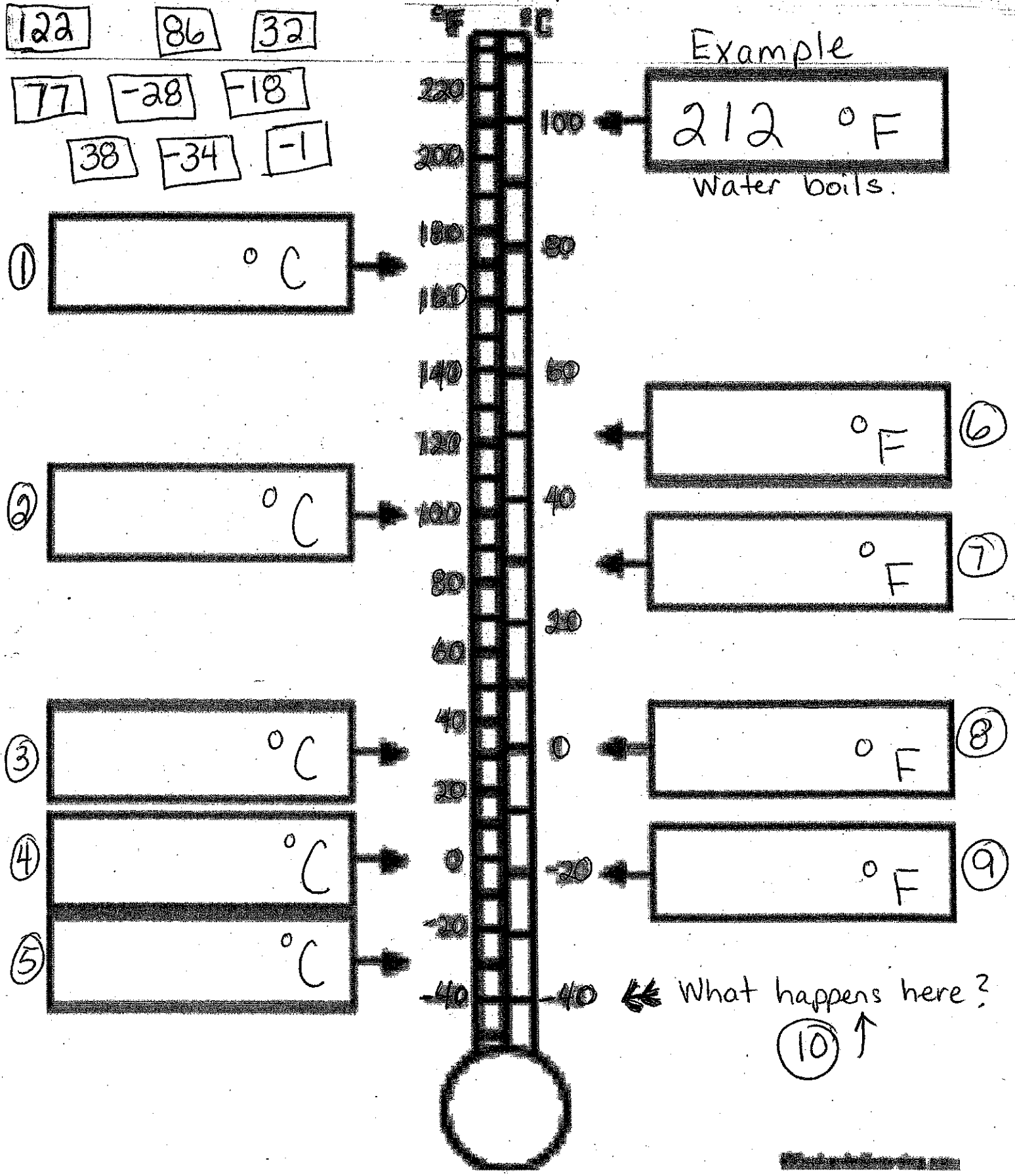


B. Read and Convert using your created table and the following numbers for help. 1→10 on White paper. [B]

122 86 32

77 -28 -18

38 -34 -1



Example

212 °F

Water boils.

① ____ °C

② ____ °C

③ ____ °C

④ ____ °C

⑤ ____ °C

⑥ ____ °F

⑦ ____ °F

⑧ ____ °F

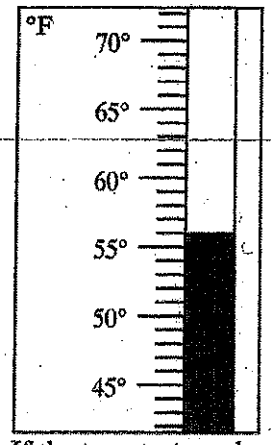
⑨ ____ °F

What happens here?

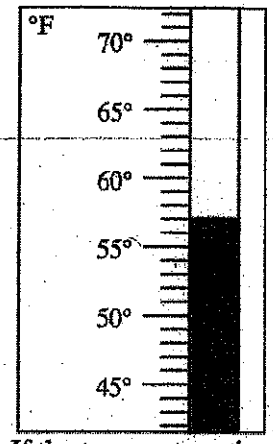
⑩

C. Again 1-10 in section labeled C, Answer the following questions. Focus

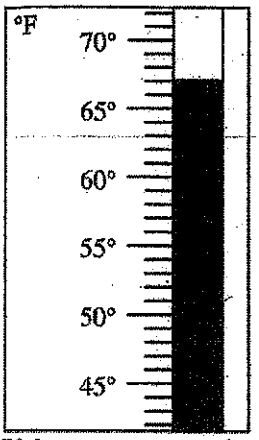
Use the temperature shown to answer each question.



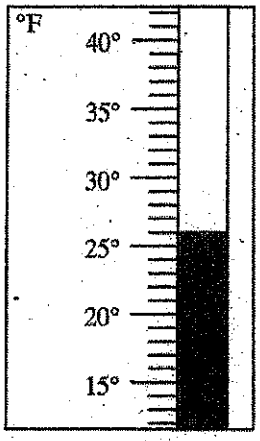
1) If the temperature shown dropped 5°, what temperature would it be?



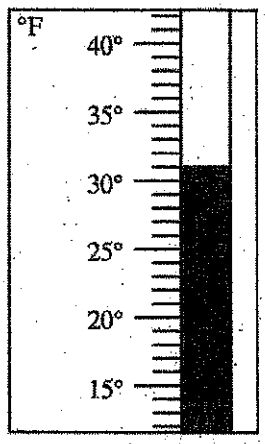
2) If the temperature shown rose 3°, what temperature would it be?



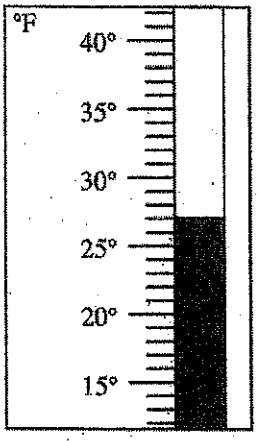
3) If the temperature shown were 4° colder what temperature would it be?



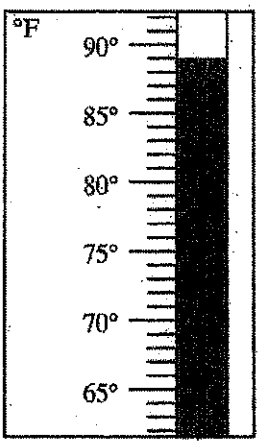
4) If the temperature shown were 4° warmer what temperature would it be?



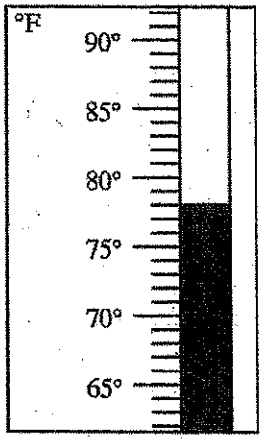
5) If the temperature shown dropped 8°, what temperature would it be?



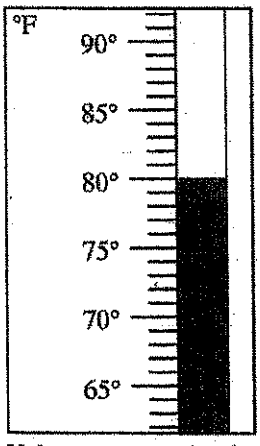
6) If the temperature shown rose 9°, what temperature would it be?



7) If the temperature shown was 7° cooler what temperature would it be?



8) If the temperature shown was 8° hotter what temperature would it be?



9) If the temperature shown dropped 4°, what temperature would it be?

Answers

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____

10. Which thermometer is closest to 0°C.?

Name(s):
Core:
Date:

Molecule Movement?

Directions: Please follow the Scientific Method procedures we learned to work through today's lab.

1. Question: How does the temperature affect the movement of atoms in a substance?

2. Hypothesis: (I believe... because.)

3. Procedure: Once supplies are at your table, you will be recording temperatures of the 3 different types of substances in each cup using a thermometer. You will have to track the temperatures of each substance every 5 minutes and record these in the table.

4. Results: Please place your results in the data table below.

TRIAL	**Start Time** (Check Clock)	**Cup of Ice**	**Room Temperature Water**	**Hot Water**	**End Time** (Check Clock)
1					
2					
3					
4					
5					

5. Analysis: Do your answers make sense? Yes or No, and explain why?

6. Conclusion: What did you learn from this lab? (Refer to your hypothesis and your results)

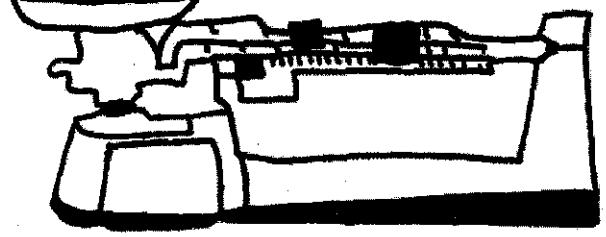
7. Further Questions: What phase change is happening in the cup with ice in it.

8. Draw: Draw how the atoms would appear in each square during each phase.

Solid	**Liquid**	**Gas**

MASS

the amount of **matter** in an object



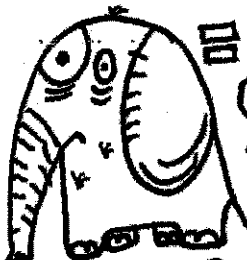
MATTER any substance that has mass and occupies space

GRAMS (g) — Metric units of MEASURE

KILOGRAMS (kg)

Hmm... A PAPERCLIP IS ABOUT ONE GRAM

A PINEAPPLE IS ABOUT ONE KILOGRAM WOW!



The mass of one elephant is that of approximately three cars.

1 KG = 1,000 GRAMS

1 KG = 2.205 POUNDS

CONSERVATION OF MASS

Matter is not created or destroyed

It can only be transferred from one state to the next.

SOLIDS ⇄ Liquids ⇄ Gases

Mass vs. Weight

Mass	Weight
matter inside	force of gravity
stays the same in space	changes in space

Same mass → Less gravity = Less weight

*Gravity the force of attraction BETWEEN Two Masses

HOW DOES MASS RELATE TO FORCE AND ACCELERATION?

Practice Questions

Fold between each strip.
Glue into the margin of a notebook.

Mass Practice

Use your MASS sketch notes to help you answer these practice questions. Write your answers to the right of each question.

1. What is the definition of mass?
2. What is the tool used to measure mass?
3. What is the metric unit of measure used for mass?
4. What is the approximate mass of a pineapple?
5. What is the approximate mass of a paperclip?
6. How many grams are in a kilogram?
7. If you traveled to the moon would your weight change? Explain.
8. What is the law of conservation of mass?

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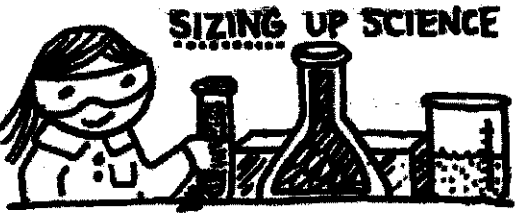
VOLUME

SIZING UP SCIENCE



the amount of space an object takes up

3D

100mL

$1cm^3$ is 1/100 the size of a HOCKEY PUCK

CUBIC CENTIMETER

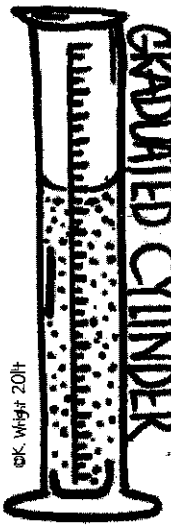
Standard metric unit of measure

1 Liter = 1000mL = 1,000cm^3 or cc

The method for finding volume depends on the SHAPE!

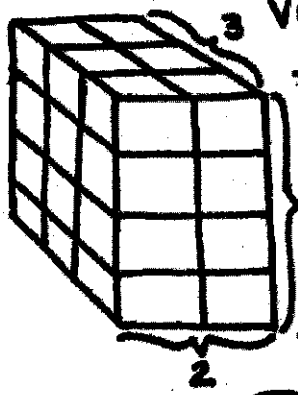
liters or milliliters

GRADUATED CYLINDER



REGULAR SOLID ⇒ meters^3 or centimeters^3

LIQUID



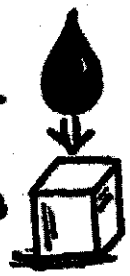
Volume = length × width × height

$V = l \times w \times h$

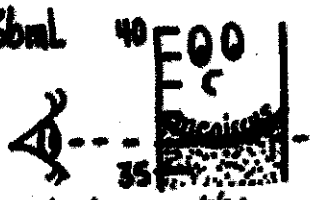
$3cm \times 2cm \times 4cm$

$V = 24cm^3$

1mL ↓ equals ↓ $1cm^3$



3mL



read from the bottom of the curve!

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Other Formulas (plus many more)

$V =$ $\frac{4}{3}\pi r^3$ SPHERE

$V =$ $\pi r^2 h$ CYLINDER

$V =$ $\frac{1}{3}\pi r^2 h$ CONE

FIXED VOLUME?

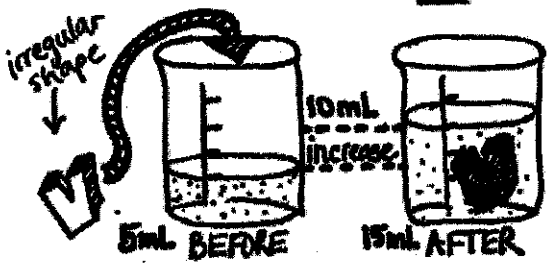
- ☑ Solid
- ☑ Liquid
- ☐ Gas

PRESSURE AND TEMPERATURE IMPACT GAS VOLUME!!!!

IRREGULAR SOLID

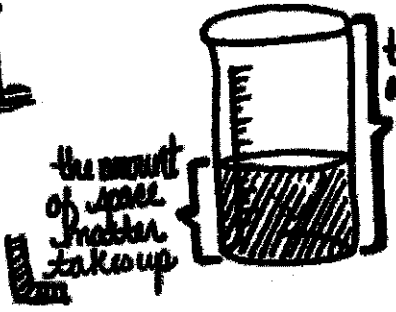
EUREKA!

ANCIENT GREECE



DISPLACEMENT

VOLUME VS. CAPACITY



Practice Questions

Trim between each strip.
Glue into the margin of a notebook.

Volume Practice

Use your VOLUME sketch notes to help you answer these practice questions. Write your answers to the right of each question.

1. What is the definition of volume?
2. What tool is used to measure liquid volume?
3. What are the metric units of measure used for volume?
4. What is the approximate volume of a drink box?
5. What is the correct method for finding the volume of a rectangular prism ?
6. What is the correct method for finding the volume of an irregular solid?
7. How does the volume of a gas vary from the volume of a solid or liquid?
8. Who is the Ancient Greek Scientist that discovered how to use displacement to calculate the volume of a gold crown?

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