Name: _____ Period: _____ Date: _____

Unit 1 – Lab Skills Review Guide – Teacher Edition

I. Core Vocabulary

Identify the term that is being described in each statement. Choose from the word bank below. Write the answer on the blank.

Word Bank

conclusion	data	experimenting	hazard
hypothesis	inference	interpretation	laboratory
laboratory equipment	measuring	meniscus	observation
outlier	prediction	variable	scientific method

_____ 1. It is the systematic way of solving a scientific problem.

_____ 2. The final claim of the scientist made upon analyzing the experimental data.

_____ 3. Information such as observations or measurements collected from the experiment.

_____ 4. A series of steps that is conducted to test the hypothesis.

_____ 5. The educated guess which is a tentative answer to the scientific problem.

_____ 6. The logical explanation of data collected in the experiment.

_____ 7. A special facility where experiments are conducted.

_____ 8. Any object or event that can cause harm to an individual.

_____ 9. The curve seen at the top of the liquid in response to its container.

_____ 10. Various tools used by scientists working in a laboratory.

_____ 11. The process of gathering information about a certain object or event using senses or measuring instruments.

_____ 12. The process of finding out the specific length, mass, or volume of an object.

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II. Multiple Choice Questions

1. Which is an example of a quantitative observation?

   a) The table is hard.
   b) The table is long.
   c) The table is brown.
   d) The table is 1-m high.

2. Which of the following is **not** a measuring equipment?

   a) Bunsen burner
   b) platform balance
   c) graduated cylinder
   d) stopwatch

3. What does a flame symbol on a chemical container indicate?

   a) The substance is fragile.
   b) The substance is flammable.
   c) The substance is corrosive.
   d) The substance is poisonous.

4. Chemical Y has the following safety symbols: skull and X. Which of the following statement is **true** about the chemical.

   a) Chemical Y is both safe to ingest and not an irritant.
   b) Chemical Y is both not safe to ingest and is an irritant.
   c) Chemical Y is safe to ingest but can cause irritation.
   d) Chemical Y is not safe to ingest but does not cause irritation.

5. Which lab equipment is best to use in transferring small amounts of liquids to another container?

   a) beaker
   b) test tube
   c) pipette
   d) graduated cylinder

6. Which lab equipment must be used to transfer liquid or solid substances in a narrow-mouthed container?

   a) beaker
   b) Erlenmeyer flask
   c) funnel
   d) petri dish

7. In order to read the volume of liquid in the graduated cylinder, where should you look at?

   a) lower meniscus
   b) between lower and upper meniscus
   c) upper meniscus
   d) neither lower nor upper meniscus

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8. Which of the following lab safety symbol means corrosive?

a)

b)

c)

d)

9. Which lab safety symbol is often seen in electrical equipment?

a)

b)

c)

d)

10. What should you do when transferring liquids in a test tube?

a) hold the test tube at an eye level

b) hold the test tube near your eyes

c) hold the test tube lower than the eye level

d) hold the test tube higher than the eye level

11. Which of the following is **true** about Bunsen burner?

a) It uses denatured alcohol to produce flame.

b) It uses electricity to produce luminous flame.

c) It produces both luminous and non-luminous flame.

d) It produces only luminous flame using liquefied petroleum gas.

12. What is the first thing to do before measuring an object in a triple beam balance?

a) Put the object on the empty pan.

b) Check if the pointer is aligned with the zero mark.

c) Add the total mass of the three riders.

d) Move the three sliders to the leftmost positions of the balance.

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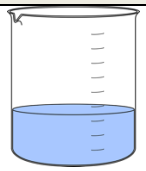
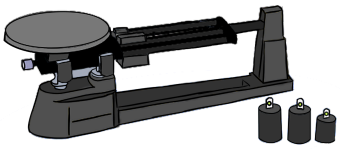
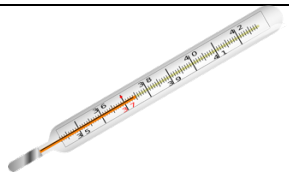
III. Identification

Identify the laboratory equipment. Then, briefly describe its use.

Laboratory Equipment	Name	Use
		
		
		

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IV. Measuring

A. Indicate the symbol for the following units of measurement. Then, identify whether it is an SI unit or U.S. Customary Unit.

Physical Quantity	Unit	Symbol	System of Measurement
length	kilometer		
mass	pound		
temperature	Fahrenheit		
time	second		
volume	liter		

B. Compare the values of the following metric measurements. Inside the box, write <, >, or =.

1. 15 cL ☐ 150 mL
2. 0.65 g ☐ 6500 mg
3. 300 cm ☐ 3 km
4. 36 m ☐ 360 km
5. 760 s ☐ 660 min
6. 65^0C ☐ 75^0C

C. Convert into the given units of measurement.

1. 45 km = _____ m
2. _____ kg = 2200 lbs (1 kg = 2.2 lbs)
3. 45 ^{0}C = _____ ^{0}F
4. 7.6 kL = _____ L
5. 163 m = _____ ft (1 m = 3.28 ft)
6. 180 ^{0}F = _____ ^{0}C

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V. Planning and Writing Up an Investigation

Write down a plan of investigation based on the given problem below.

How does the temperature of water affect the rate of dissolving of sugar cubes?

1. What hypothesis can you formulate based on the given problem? **Use the If and then format in formulating your hypothesis.**

   _____

   _____

   _____

Below is the list of equipment that you have access to in doing this investigation:

Equipment List

- ✓ beaker (250 mL)
- ✓ cold water source
- ✓ hot water source
- ✓ sugar cubes
- ✓ stopwatch

2. Based on the list of materials, identify the variables in this investigation.

Independent Variable	Dependent Variable	Controlled Variables
(1)	(2)	(3)
		(4)
		(5)

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3. How will you measure the dependent variable in this experiment?

_____

_____

_____

4. Write a **step-by-step method** which describes how to carry out this investigation.

_____

_____

_____

_____

_____

_____

_____

_____

_____

5. The data you obtained in this investigation are as follows. On the space below, draw a table to organize the given data.

first trial: cold water = 75 seconds *hot water: 55 seconds*

second trial: cold water = 80 seconds *hot water: 57 seconds*

third trial: cold water = 77 seconds *hot water: 56 seconds*

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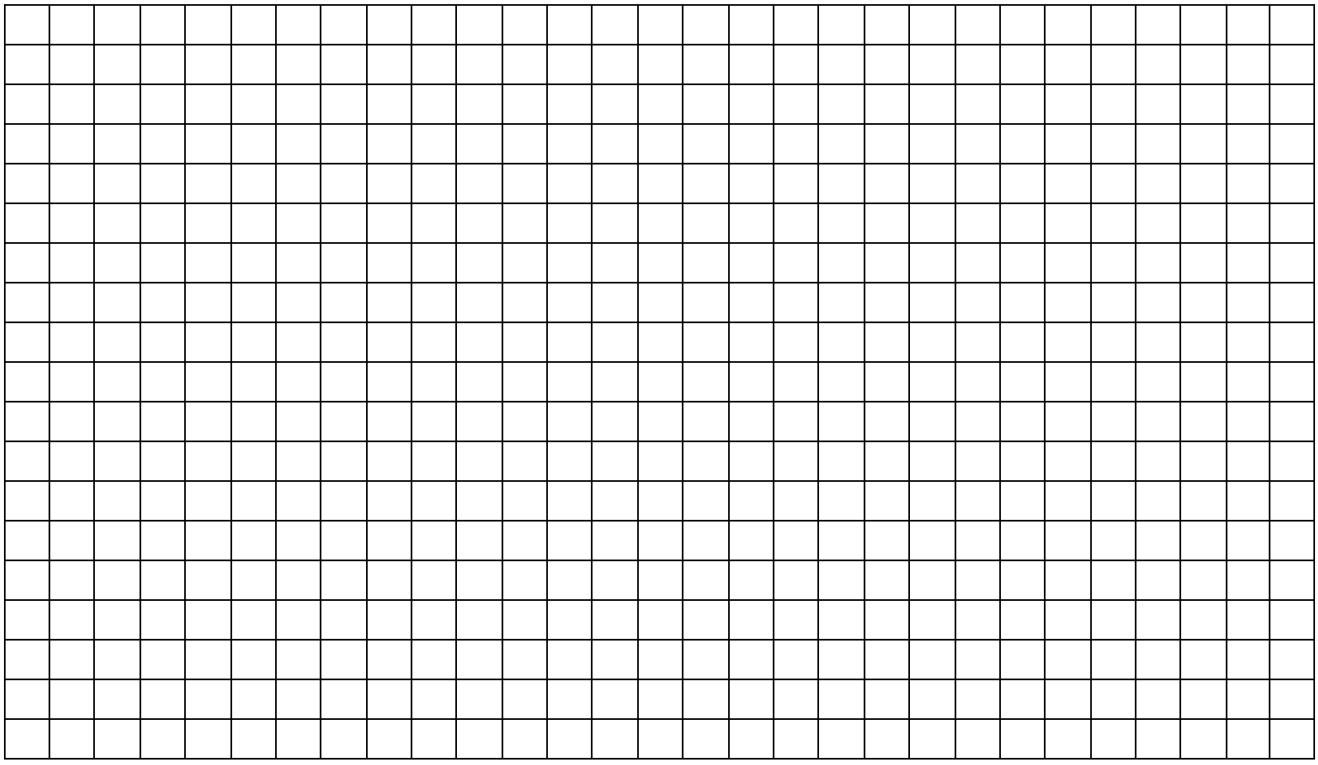
6. Draw a line graph to show the relationship between the temperature of water and the rate of dissolving of sugar cubes.



7. Write a conclusion based on the given data.

_____

_____

_____

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Answers

I. Core Vocabulary

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outlier	prediction	variable	scientific method

scientific method	1.	It is the systematic way of solving a scientific problem.
conclusion	2.	The final claim of the scientist made upon analyzing the experimental data.
data	3.	Information such as observations or measurements collected from the experiment.
experimenting	4.	A series of steps that is conducted to test the hypothesis.
hypothesis	5.	The educated guess which is a tentative answer to the scientific problem.
interpretation	6.	The logical explanation of data collected in the experiment.
laboratory	7.	A special facility where experiments are conducted.
hazard	8.	Any object or event that can cause harm to an individual.
meniscus	9.	The curve seen at the top of the liquid in response to its container.
laboratory equipment	10.	Various tools used by scientists working in a laboratory.
observation	11.	The process of gathering information about a certain object or event using senses or measuring instruments.
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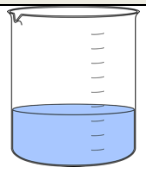
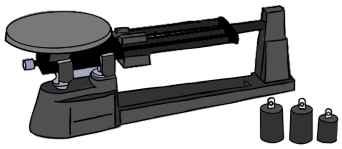
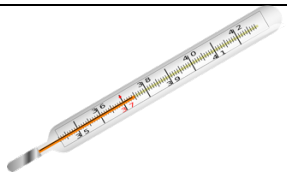
Laboratory Equipment	Name	Use
	beaker	for mixing and pouring liquids
	petri dish	for holding growth medium in which cells can be cultured
	triple beam balance	for measuring mass very precisely
	graduated cylinder	for measuring volumes of liquids
	thermometer	for measuring temperature of substances that are used in an experiment
	microscope	for viewing the specimens that are relatively small in size

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IV. Measuring

A. Indicate the symbol for the following units of measurement. Then, identify whether it is an SI unit or U.S. Customary Unit.

Physical Quantity	Unit	Symbol	System of Measurement
length	kilometer	km	SI
mass	pound	lbs	U.S Customary Unit
temperature	Fahrenheit	F	U.S Customary Unit
time	second	s	SI / U.S Customary Unit
volume	liter	L	SI

B. Compare the values of the following metric measurements. Inside the box, write <, >, or =.

1. 15 cL [=] 150 mL
2. 0.65 g [<] 6500 mg
3. 300 cm [<] 3 km
4. 36 m [<] 360 km
5. 760 s [<] 660 min
6. 65^0C [<] 75^0C

C. Convert into the given units of measurement.

1. 45 km = 45000 m
2. 1000 kg = 2200 lbs (1 kg = 2.2 lbs)
3. 45 ^{0}C = 113 ^{0}F
4. 7.6 kL = 7600 L
5. 163 m = 534.64 ft (1 m = 3.28 ft)
6. 180 ^{0}F = 82.22 ^{0}C

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V. Planning and Writing Up an Investigation

Write down a plan of investigation based on the given problem below.

How does the temperature of water affect the rate of dissolving of sugar cubes?

1. What hypothesis can you formulate based on the given problem? **Use the If and then format in formulating your hypothesis.**

   If the temperature of water is high, the rate of dissolving of sugar cubes is faster.

   If the temperature of water is low, the rate of dissolving of sugar cubes is slower.

Below is the list of equipment that you have access to in doing this investigation:

Equipment List

- ✓ beaker (250 mL)
- ✓ cold water source
- ✓ hot water source
- ✓ sugar cubes
- ✓ stopwatch

2. Based on the list of materials, identify the variables in this investigation.

Independent Variable	Dependent Variable	Controlled Variables
(1) temperature of water	(2) rate of dissolving of sugar cubes	(3) amount of water
		(4) amount of sugar cubes
		(5) time the sugar cubes were dropped in water

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3. How will you measure the dependent variable in this experiment?

   Measure the time it will take for the sugar cubes to completely dissolve in water.

4. Write a **step-by-step method** which describes how to carry out this investigation.

   a. Get two beakers. Measure 250 mL of hot water and cold water in each beaker.

   b. Label beakers as hot water and cold water.

   c. Place 1 sugar cube in each beaker. Make sure to drop the sugar cube in each beaker of water at the same time.

   d. Start the timer once the sugar cube reached the water. Record the time it takes for it to completely dissolve in water.

   e. Repeat this trial thrice to get an accurate result.

5. The data you obtained in this investigation are as follows. On the space below, draw a table to organize the given data.

   first trial: cold water = 75 seconds *hot water: 55 seconds*

   second trial: cold water = 80 seconds *hot water: 57 seconds*

   third trial: cold water = 77 seconds *hot water: 56 seconds*

Water Source	Rate of Dissolving Sugar (in seconds)		
	Trial 1	Trial 2	Trial 3
Cold	75	80	77
Hot	55	57	56

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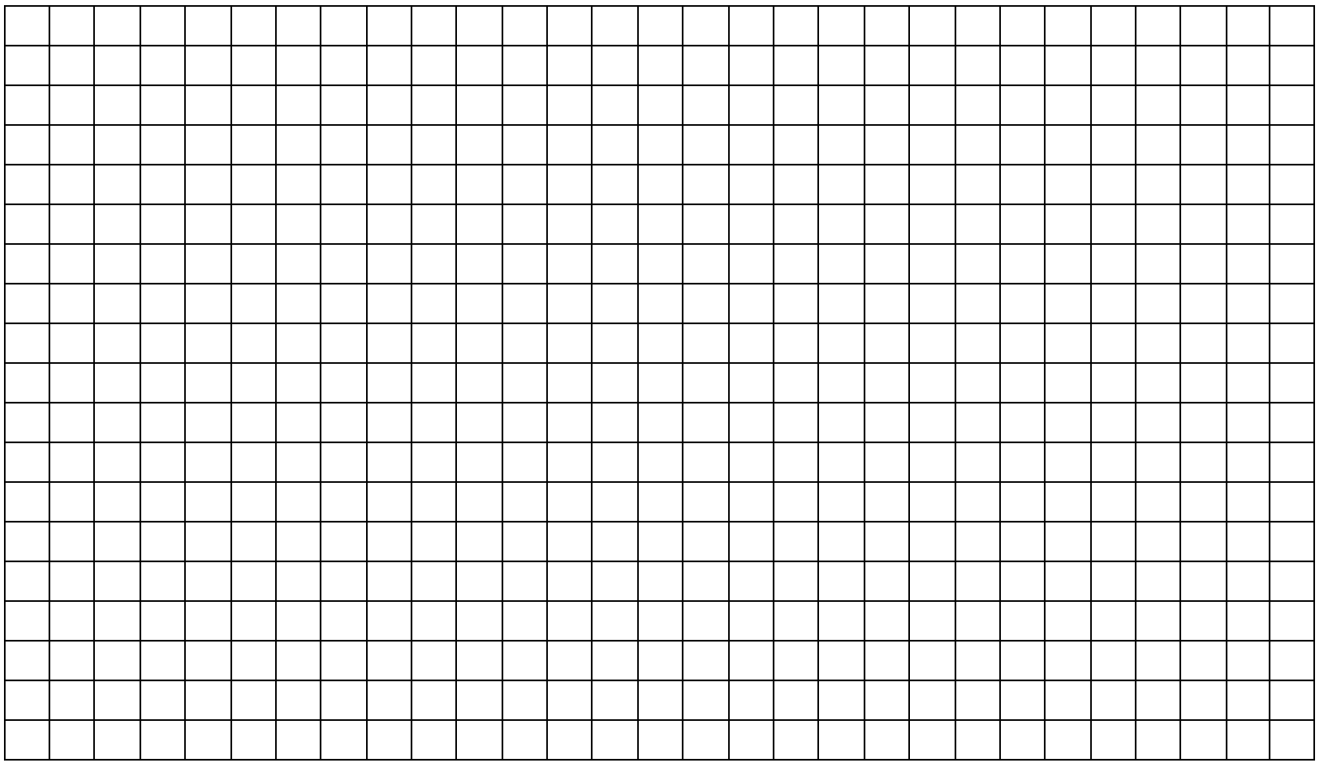
6. Draw a line graph to show the relationship between the temperature of water and the rate of dissolving of sugar cubes.

   Graph should have the following attributes:

   - Appropriate title
   - Labels for both axes
   - Appropriate size
   - Ruled axes and lines
   - Even scales



7. Write a conclusion based on the given data.

   The higher the temperature of the water, the faster the sugar cube dissolves in it.

   The lower the temperature of the water, the slower the sugar cube dissolves in it.

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