

Arthur & Polly Mays Conservatory of the Arts

Physical Science

Summer Packet 2018

HONOR & REGULAR



Name: _____

Due Date: _____

Period: _____

Score(%): _____

Welcome to Honors Physical Science! As you embark on this new 9th grade journey, I want to ensure that you are thoroughly prepared to be successful. This summer exercise packet is designed to have you acclimated to the level of rigor and expectations that you will soon embrace. The objective is to familiarize you with key concepts necessary for success, not only for this course, but also future science courses. This packet is due **First Week of August 2016..**

Materials covered in this packet will be tested shortly after I have reviewed them in class. Below are helpful links to websites that can assist you in completing this packet. This packet is your first grade in your Honors Physical Science class. At Arthur and Polly Mays Conservatory of the arts, WE believe in your success. You are part of our RAM Nation! I look forward to teaching and preparing you for inevitable success.

Regards,

Physical Science Teacher

Helpful Links: <http://sciencepage.org/>

<http://www.sikeston.k12.mo.us/gwilliams/sciencesites.html>

<http://www.nist.gov/pml/wmd/metric/unit-conversion.cfm>

<http://www.mdusd.k12.ca.us/northgate/Teachers/Muilenburg/Website2/Chemonline/conversion notes.htm>

PART I: What is Science? For this section, you must do research to answer the questions. You can simply Google some of this information.

What is *your* definition of science?

—
Define science.

What is technology?

—
Technology is often advancing. What are some examples of advances in technology?

—
Science and technology are interdependent. Advances in one lead to advances in the other. Give an example of this phenomenon.

— —
What is physical science?

Branches of Science:

1. Natural Science

a. Physical Science

i. Physics - is the study of

ii. Chemistry - is the study of

b. Earth & Space Science

i. Geology - is the study of _

ii. Astronomy - is the study of

c. Life Science

i. Biology – is the study of

ii. Zoology – is the study of

2. Social Science

PART II: The Scientific Approach

Put the following items in order of the scientific method.

Draw conclusions. Ask a question.

Develop a theory. Analyze data.

Make an observation. Experiment or test idea. Develop a hypothesis.

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

Define the following terms used in the scientific method.

8. Independent variable:

9. Dependent variable:

10. Control group:

11. Scientific law:

Read the following experiment and identify the steps in the scientific method.

Last year, Wendy planted seeds in a garden. She noticed that not all of the seeds became plants. This year, she asked herself, "On average, how many of the seeds in a package will grow?" She thought maybe 25% of the seeds in a package would not grow.

She bought three packages containing twenty-five seeds each. She planted each package of seeds in separate boxes so she could keep careful count of the number of seeds that would grow. She drew a diagram of the boxes and indicated where each seed was planted. As the seeds sprouted, she put a green X on the place in her diagram where the seed was planted. If the seed did not grow, she put a red X on the place in her diagram where the seed was planted. At the end of her investigation, she noticed that four seeds in the first box did not grow. The second box had six seeds that did not grow. In the third box, only five of the seeds did not grow. Wendy concluded that an average of five seeds in each package did not grow. For future gardens, Wendy assumed that eighty percent of the seeds in a package would grow.

12. What is the observation?

13. State the question.
14. What was her hypothesis?
15. Explain her experiment to test the hypothesis.
16. How did she collect her data?
17. What was Wendy's conclusion?
18. State the prediction she made.

PART III: Measurement and Conversions (You will need a calculator for this section). SI Units and SI Prefixes:

Scientists use a set of measuring units called SI, or the International System of Units. The abbreviation SI derives from the French name *Systeme International d'Unites*. The SI Unit system is used as a universal way to readily interpret data. The following table depicts the **SI base units. Quantity**

Length	Meter	m	
Mass	Kilogram	kg	
Temperature	Kelvin	K	
Time	Second	s	
The following table depicts the SI prefixes.	Symbol	Meaning	Multiply unit by
Prefix			
giga-	G	Billion (10 ⁹)	1,000,000,000
mega-	M	Million (10 ⁶)	1,000,000
kilo-	k	Thousand (10 ³)	1,000
deci-	d	Tenth (10 ⁻¹)	0.1
centi-	C	Hundredth (10 ⁻²)	0.01
milli-	m	Thousandth (10 ⁻³)	0.001

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milli-	m	Thousandth (10 ⁻³)	0.001
micro-	μ	Millionth (10 ⁻⁶)	0.000001
nano-	n	Billionth (10 ⁻⁹)	0.000000001

Conversions:

A conversion factor is a ratio of equivalent measurements that is used to convert a quantity expressed in one unit to another unit.

Common Conversions

There are 5280 feet in 1 mile

There are 0.034 ounces in 1 millimeter

There is 0.454 kg in 1 pound

There are 1.6 kilometers in 1 mile

There are 73 gallons in 2 barrels

There are 4 quarts in gallon

Do the following one-step unit conversions:

1. Convert 0.347 kilometers to miles.
2. Convert 870 kilograms to pounds.
3. Convert 84 ounces to milliliters.

4. Convert 82 miles to feet.
5. Convert 4 gallons to barrels.
6. Convert 45 quarts to gallons.

Do the following multi-step unit conversions:

7. Convert 746 days to centuries.
8. Convert 56 kilometers to inches (there are 12 inches in one foot).
9. Convert 120 barrels to quarts.
10. Convert 37 quarts to gallons

Unit conversions:

Example: $25\text{g} = \text{______} \text{kg}$

Therefore, $25\text{ g} = \mathbf{0.025\text{ kg}}$

Convert the following units.

11. $3470\text{ mL} = \text{______} \text{ L}$

12. $13.5\text{ cm} = \text{______} \text{ m}$

13. $0.65\text{ L} = \text{______} \text{ mL}$

14. $234\text{ mL} = \text{______} \text{ L}$

15. $238\text{ g} = \text{______} \text{ cg}$

16. $535.50\text{ g} = \text{______} \text{ kg}$

17. $542\text{ L} = \text{______} \text{ kL}$

18. $0.094\text{ kg} = \text{______} \text{ g}$

19. $125.4\text{ mg} = \text{______} \text{ g}$

20. $149\text{ cm} = \text{______} \text{ m}$

Temperature Conversions:

Kelvin is the SI basic unit for temperature. A thermometer is an instrument used to measure temperature. Temperature is measured in Fahrenheit (°F), Celcius (°C), or Kelvin (K). Below are the formulas used to convert from one scale of temperature to another.

From	To Fahrenheit	To Celsius	To Kelvin
Fahrenheit (F)	F	$(F - 32) * 5/9$	$(F - 32) * 5/9 + 273.15$
Celsius (C or o)	$(C * 9/5) + 32$	C	$C + 273.15$
Kelvin (K)	$(K - 273.15) * 9/5 + 32$	$K - 273.15$	K

Convert the following temperatures to the desired unit.

Example: Convert 22 °C into °F.

25. 11 °C into °F.

26. 0 °C into °F.

27. 27 °F into °C.

28. 137 °F into °C.

29. 15 ° C into K

30. 300 °F into K

Understanding Graphing Worksheet

Graphs appear not only in textbooks and scientific journals, but also in newspapers and popular magazines. They are useful because they clearly show relationships between two or more variables. Two of the most common graphs are bar and line graphs. Bar graphs compare several variables according to one characteristic. Line graphs, such as the one below, show a change in one or more variables over time. They can also illustrate a trend.

The independent variable is plotted along the horizontal axis. Independent variables are chosen or changed by the experimenter. The dependent variable is

plotted along the vertical axis. Dependent variables change when the independent variable changes. Graphs must also include titles and labels for the variables.

To practice making a bar graph, let's compare the number of students in several high schools. School A has 850, school B has 600, school C has 1200, school D has 900, and school E has 350.

1. In a bar graph of these data, what would be the independent variable
2. What would be the dependent variable and on which axis would it be plotted? We will have a fixed number of variables on the horizontal axis. However, we must establish an appropriate range of numbers for the vertical axis.
3. What is the highest and lowest number of students?
4. Considering the range of numbers, what would be appropriate numbers to use on the vertical axis?

Now, on a piece of the graph paper, draw this bar graph. Be sure to label the variables and give the graph a title.

Draw in the bars and set them at the levels listed above.

5. How is comparing school enrollment in a graph better than just listing the numbers in a sentence?

To practice making a line graph, let's say an optometrist has noticed an increase in the number of her patients requesting contact lenses. She wonders how this number compares with the number of people asking for glasses during the past five years. The chart below lists her raw data.

Years	Patients Wanting Glasses	Patient Wanting Contact Lenses
1984	37	42
1985	29	61
1986	32	74
1987	25	74
1988	17	

6. In a line graph for these data, what would be the independent variable and on which axis would it be plotted?

7. In a line graph for these data, what would be the dependent variable and on which axis would it be plotted?

8. Considering the highest and lowest number of patients for each year, what numbers would be the most appropriate to list on the vertical axis?

On the back side of the graph paper, draw the line graph. Be sure to label the variables and include a title. Use a legend to indicate each category of patient. Mark the points on the graph that show the number of patients who asked for glasses and number who requested contact lenses for each year.

Now connect the points that you have plotted in each category.

9. What trends does the graph indicate?

You have just constructed two graphs. Being familiar with the construction of graphs will not only help you when making your own, it will help you understand those you encounter in everyday life