Eighth-Grade Summer Reading Assignment

Dear Rising Eighth Grader,

Over the summer, I would like you to read **one** of the books listed below.

- *High Heat* by Carl Deuker
- *A Night Divided* by Jennifer Nielsen

I would **also** like you to select and read a **second book** of your own choosing.

Then complete the work on the attached pages. Please submit the completed work to me on the first day of school.

You'll notice that I have also included an optional challenge assignment. This challenge assignment is not mandatory, but it makes you eligible for the highest possible grade on the assignment. Please make sure to use proper spelling, capitalization, and punctuation on all work.

Have a wonderful summer, and happy reading!

Miss Marshall
Middle-School ELA teacher 2021-2022
St. Joseph's School

Summer Reading Written Response - There are TWO parts!

All responses should be neatly typed and double-spaced. If you are unable to type your response, it should be neatly written in blue or black ink. Please make sure to include a heading that contains your full name (first and last).

PART ONE. *High Heat* by Carl Deueker OR *A Night Divided* by Jennifer Nielsen

Directions:
Please respond to *FOUR* of the six prompts below. Please make sure that all the work that is done is your own, and please clearly identify which prompts and book you are responding to by including the number and bold heading of the choice as well as the title of the book. Each paragraph should consist of **6-8 sentences.**

1. **Most Important Sentence**- What is the most important sentence in the entire novel? Copy it and write a paragraph in which you explain why you think this sentence is so important. (Remember to put quotation marks around the sentence.)

2. **Character Development** - Write a paragraph in which you provide a character trait of the main character. This character trait should describe a personality trait of the main character based on the things he says, thinks, does, and says. Include at least two pieces of text evidence to support your claim. Follow the Mini RTL structure I taught in class.

3. **Conflict** - Write a paragraph in which you describe the primary conflict (problem) in the story. Explain how the conflict begins and how the main character deals with it . Also explain what the end result is. Provide at least two pieces of text evidence to support your answer. (Make sure you answer all parts of this question.)

4. **Theme** - Write a paragraph in which you identify a main theme (life lesson) of this novel. Why do you think this? Provide at least two pieces of text evidence to support your answer. Follow the Mini RTL structure I taught in class.

5. **Reader's Review** - Write a review of the novel. Explain whether you enjoyed it and why you feel this way. Also explain who else (what kind of person) might enjoy reading this novel and why. Provide at least two specific pieces of evidence from the text to support your position.

6. **Setting:** The setting of the story is the time and place in which it occurs. Write a paragraph in which you explain why the setting of this novel is important. How does it impact the main character or the plot (events of the story)? Include at least two pieces of text evidence to support your position. Follow the Mini RTL structure I taught in class.

PART 2.* Book *of Your Choosing (This should be a book you have not read before.)
For the book of your choosing (the one you selected on your own), please create a drawing using crayons, colored pencils, or markers. The illustration should depict a scene from the book that inspired you or stood out in some way. On the bottom or back of the drawing, please do the following:

- Write your name (first and last)
- Write the title of the book (underline it) and the author
- Place a quote from the book that inspired your illustration. (Important: Put your quote in quotation marks.)
- In a sentence or two, explain why the quote was important to you.
- Please do this on an 8 $\frac{1}{2}$ x 11 inch paper

CHALLENGE: (optional)
Write a four-paragraph compare and contrast essay in which you compare and contrast one of the assigned novels with the book you selected on your own. This should consist of an introduction, a paragraph comparing the two books, a paragraph contrasting the two books, and a conclusion. You must receive a 4 on the assignments above in order to be eligible to receive a 5 on this assignment.

Summer Work - Rubric

Category	Level 4	Level 3	Level 2	Level 1
Novel Work 60%	Work was done thoroughly and completely. The student completed 4 prompts and wrote at least 6-8 sentences for each response. The student clearly demonstrated a thoughtful approach to completing the work. .6 x 4 =2.4 pts	Most of the work on the novel was done thoroughly and completely. The student may not have written 6-8 sentences for each response but responded to 4 prompts and demonstrated a mostly thoughtful approach to the work. .6 x 3 = 1.8 pts	The student completed some of the prompts but did not complete 4 of them. The student also may not have written 6-8 sentences for each response. The student's work demonstrates a partial attempt to respond to the questions. .6 x 2 = 1.2 pts	The student's work does not demonstrate a careful and thoughtful approach to the work. The student responded with answers that demonstrated minimal thought and effort. .6 x 1 = .6 pt
Second book of your choosing-- Picture Assignment 20%	All aspects of the assignment were completed. The student clearly demonstrated a thoughtful approach to the work and a careful attention to details. Picture was carefully drawn and colored and the quote was properly written, punctuated, and explained. .2 x 4 =.8 pts	Most of the work on the assignment was done thoroughly and completely. Work appears to have been done carefully. Student may be missing one of the requirements. .2 x 3 = .6	Student completed part of the assignment but did not complete 2 parts. The student's work demonstrates a partial attempt to complete the assignment .2 x 2 = .4 pt	Student's work does not demonstrate a careful and thoughtful approach to the work. The student demonstrated minimal thought and effort. Picture may have been drawn with minimal attention to detail and may be sloppy in appearance. The quote and explanation were missing. .2 x 1 = .1 pt
Mechanics 15%	Spelling, punctuation, capitalization, and word usage are correct throughout both assignments. Student clearly proofread his/her writing. .15 x 4 = .6 pts	Most of the spelling, punctuation, capitalization, and word usage are correct throughout both assignments. Student may have made one or two errors in a few areas. The errors did not impede meaning. .15 x 3 = .45 pts	There were multiple errors in spelling, punctuation, capitalization, and word usage that may have made it difficult to construct meaning. .15 x 2 = .3 pts	Student's work was filled with errors in spelling, punctuation, capitalization, and word usage. It was very difficult to construct meaning. .15 x 1 = .15
Timeliness 5%	Student's work was submitted the first day back from summer break. .05 x 4 = .2 pts	Student's work was submitted within the first three days of school. .05 x 3 = .15 pts	Student submitted work the second week of school. .05 x 2 = .1 pt.	Student submitted work well past the second week of school. .05 x 1 = .05

Operations with Integers

Adding Integers

- Negative + Negative: Add the absolute values of the two numbers and make the answer negative.

  ex: $-5 + (-9) \rightarrow 5 + 9 = 14 \rightarrow$ answer: -14

- Negative + Positive (or Positive + Negative): Subtract the absolute values of the two numbers (larger minus smaller) and take the sign of the number with the greater absolute value.

  ex: $-7 + 12 \rightarrow 12 - 7 = 5 \rightarrow 12 > 7$, so answer is positive $\rightarrow$ answer: 5

  ex: $6 + (-9) \rightarrow 9 - 6 = 3 \rightarrow 9 > 6$, so answer is negative $\rightarrow$ answer: -3

Subtracting Integers

- Keep the first number the same, change the subtraction sign to an addition sign, and change the sign of the second number. Then use the integer addition rules.

  ex: $-3 - 9 \rightarrow -3 + (-9) = -12$

  ex: $15 - (-8) \rightarrow 15 + 8 = 23$

  ex: $-6 - (-4) \rightarrow -6 + 4 = -2$

Multiplying & Dividing Integers

Ignore the signs and multiply or divide as usual. Then determine the sign of the answer using the following rules:

- Negative · or ÷ Negative = Positive
- Negative · or ÷ Positive (or Positive · or ÷ Negative) = Negative

  ex: $-3 \cdot (-5) \rightarrow 3 \cdot 5 = 15 \rightarrow$ neg · neg = pos $\rightarrow$ answer: 15

  ex: $48 \div (-6) \rightarrow 48 \div 6 = 8 \rightarrow$ pos ÷ neg = neg $\rightarrow$ answer: -8

Order of Operations

Parentheses
Exponents
Multiplication & Division (left to right)
Addition & Subtraction (left to right)

Find the sum or difference.

1. $-80 + 77$
2. $77 + 160$
3. $-64 + (-33)$
4. $104 - (-92)$
5. $-105 - (-122)$
6. $185 - (-154)$
7. $-53 - (-59)$
8. $-6 + (-35)$
9. $15 - (-26) - (-39)$
10. $-93 + 191 + (-179)$
11. $18 + (-34) + 52$
12. $-50 - (-93) + (-17)$

Find the product or quotient.

13. $60 \div 12$
14. $-194 \div (-2)$
15. $88 \cdot (-2)$
16. $-12 \cdot 10$
17. $-10 \cdot (-11)$
18. $90 \div (-6)$
19. $3 \cdot (-59)$
20. $-7 \cdot (-2)$
21. $-28 \div (-88) \cdot (-22)$
22. $-56 \cdot 140 \div (-80)$
23. $108 \div (-11) \cdot (-11)$
24. $-84 \cdot (-17) \div 42$

Evaluate the numerical expression. (Be sure to use the order of operations!)

25. $-78 + (-2) \cdot (-56)$
26. $-65 + 6 \div (-3) + 40$
27. $-94 - (84 - 10)$
28. $43 + (-23) - (-57)$
29. $-15 - (-11) + 5 \cdot (-4)$
30. $-26 - (-64) + (-93)$
31. $-84 \div 4 + (-20)$
32. $-56 + (-50) + (-10) \cdot (-9)$

Operations with Rational Numbers

Adding & Subtracting Rational Numbers

Determine whether you should add or subtract using integer rules. Then add or subtract.

- Decimals: Line up the decimal points. Then add or subtract and bring the decimal point down. Use integer rules to determine the sign of the answer.

ex: $-9.8 + 6.24 \longrightarrow$ neg + pos: subtract $\longrightarrow$ $\begin{array}{r} 9.80 \\ -\ 6.24 \\ \hline 3.56 \end{array} \longrightarrow$ answer: -3.56

- Fractions/Mixed Numbers: Find a common denominator and then add or subtract. Borrow or convert an improper fraction answer, if necessary. Use integer rules to determine the sign of the answer.

ex: $5\frac{3}{4} - \left(-3\frac{7}{8}\right) \longrightarrow 5\frac{3}{4}\ \ 3\frac{7}{8} \longrightarrow$ pos + pos: add $\longrightarrow$ $\begin{array}{r} 5\frac{3}{4} = \frac{6}{8} \\ +\ 3\frac{7}{8} = \frac{7}{8} \\ \hline 8\ \ \frac{13}{8} \end{array} \longrightarrow$ answer: $9\frac{5}{8}$

Multiplying & Dividing Rational Numbers

Determine the sign of the answer using integer rules. Then multiply or divide.

- Multiplying Decimals: Ignore the decimal points. Multiply the numbers. Then count the decimal places in the problem to determine the location of the decimal point in the answer.

ex: $-9.23 \cdot (-1.1) \longrightarrow$ neg · neg = pos $\longrightarrow$ $\begin{array}{r} 9.23 \\ \times\ 1.1 \\ \hline 923 \\ 9230 \\ \hline 10153 \end{array} \longrightarrow$ answer: 10.153

- Dividing Decimals: Move the decimal in the divisor to the end of the number. Move the decimal in the dividend the same number of places and then bring it straight up in quotient.

ex: $-5.2 \div 0.2 \longrightarrow$ neg ÷ pos = neg $\longrightarrow$ $02.\overline{)\,52.}^{\,26.} \longrightarrow$ answer: -26

- Multiplying Fractions: Convert mixed numbers to improper fractions. Then cross-simplify. Multiply the numerators and multiply the denominators. Simplify if necessary.

ex: $-1\frac{3}{4} \cdot \frac{6}{14} \longrightarrow$ neg · pos = neg $\longrightarrow$ $\overset{1}{\cancel{7}}\,\overset{3}{\cancel{6}} \cdot \frac{3}{\cancel{14}_{2}} = \frac{3}{4} \longrightarrow$ answer: $-\frac{3}{4}$

- Dividing Fractions: Convert mixed numbers to improper fractions. Then flip the second fraction to its reciprocal and multiply the two fractions. Simplify if necessary.

ex: $-\frac{1}{2} \div \left(-\frac{3}{8}\right) \longrightarrow$ neg ÷ neg = pos $\longrightarrow$ $\frac{1}{\cancel{2}_{1}} \cdot \frac{\cancel{8}^{4}}{3} = \frac{4}{3} \longrightarrow$ answer: $1\frac{1}{3}$

Find the sum, difference, product, or quotient.

33. $38.61 + 36.841$

34. $1.755 - 1.23$

35. $0.71 \cdot 9.2$

36. $13.12 \div 0.1$

37. $3.651 - (-12.63)$

38. $-3.9 + (-7.6)$

39. $17.6 \cdot 4.3$

40. $6 \cdot (-16.7)$

41. $26.474 - 14.527$

42. $-2.1 + 3.78$

43. $-6.15 \div (-8.2)$

44. $-12.8 \cdot (-4.88)$

Find the sum, difference, product, or quotient.

45. $15\ 1/2 + 15\ 1/4$

46. $18\ 11/20 - 17\ 1/2$

47. $2\ 1/4 \cdot 1\ 4/5$

48. $3\ 1/2 \div 1\ 3/7$

49. $3\ 1/3 - 5\ 1/9$

50. $5 \cdot (-1\ 2/5)$

51. $-4\ 2/3 + (-1\ 3/4)$

52. $-\ 5/6 \div (-2\ 1/6)$

53. $9 \div (-4\ 1/2)$

54. $-18 + 3\ 4/5$

55. $-5\ 2/3 \cdot (-2\ 5/6)$

56. $-5\ 3/4 - (-3\ 7/8)$

Solving Equations

Solving One-Step Equations

- Cancel out the number on the same side of the equation as the variable by using the inverse operation. (Addition/Subtraction; Multiplication/Division). Be sure to do the same thing to both sides of the equation!

ex: $6x = -18 \rightarrow \frac{6x}{6} = \frac{-18}{6} \rightarrow$ answer: $x = -3$

ex: $y + 23 = -9 \rightarrow y + 23 = -9 \rightarrow$ answer: $y = -32$
$-23 \quad -23$

ex: $\frac{h}{3} = 4 \rightarrow 3 \cdot \frac{h}{3} = 4 \cdot 3 \rightarrow$ answer: $h = 12$

ex: $w - 13 = -5 \rightarrow w - 13 = -5 \rightarrow$ answer: $w = 8$
$+13 \quad +13$

Solving Two-Step Equations

- Undo operations using inverse operations one at a time using the order of operations in reverse. (i.e.: undo addition/subtraction before undoing multiplication/division)

ex: $7x - 4 = -32 \rightarrow 7x - 4 = -32 \rightarrow \frac{7x}{7} = \frac{-28}{7} \rightarrow$ answer: $x = -4$
$+4 \quad +4$

ex: $\frac{j}{5} + 13 = 15 \rightarrow \frac{j}{5} + 13 = 15 \rightarrow 5 \cdot \frac{j}{5} = 2 \cdot 5 \rightarrow$ answer: $j = 10$
$-13 \quad -13$

ex: $\frac{b + 7}{3} = -2 \rightarrow 3 \cdot \frac{b + 7}{3} = -2 \cdot 3 \rightarrow b + 7 = -6 \rightarrow$ answer: $b = -13$
$-7 \quad -7$

Solve the one-step equation.

57. $19 + j = -34$

58. $m - 26 = 13$

59. $\frac{x}{5} = -3$

60. $12f = 216$

61. $g - (-31) = -7$

62. $\frac{h}{9} = 13$

63. $b + (-3) = -9$

64. $-4w = -280$

Solve the two-step equation.

65. $5m - 3 = 27$

66. $7 + \frac{y}{2} = -3$

67. $4 + 3r = -8$

68. $\frac{1}{2}p - 4 = 7$

69. $\frac{k+8}{3} = -2$

70. $\frac{f}{5} - (-13) = 12$

71. $-15 - \frac{g}{3} = -5$

72. $-8 + 4m = 2$

73. $-18 - \frac{3}{4}v = 3$

74. $\frac{-5+n}{4} = -1$

75. $3.5m + 0.75 = -6.25$

76. $2y + 3 = 19$

Proportions and Percent

Solving Proportions

- Set cross-products equal to each other and then solve the one-step equation for the given variable.

ex: $\frac{5}{b}=\frac{4}{10} \longrightarrow 5 \cdot 10 = 4b \longrightarrow \frac{50}{4}=\frac{4b}{4} \longrightarrow$ answer: $b = 12.5$

Solving Percent Problems with Proportions

- Set up and solve a proportion as follows: $\frac{\%}{100}=\frac{\text{part}}{\text{whole}}$

ex: 25 is what percent of 500? $\longrightarrow \frac{x}{100}=\frac{25}{500} \longrightarrow$ answer: $x = 5\%$

ex: What is 15% of 88? $\longrightarrow \frac{15}{100}=\frac{x}{88} \longrightarrow$ answer: $x = 13.2$

ex: 18 is 30% of what number? $\longrightarrow \frac{30}{100}=\frac{18}{x} \longrightarrow$ answer: $x = 60$

Solving Percent Problems with Equations

- Translate the question to an equation and then solve. (Be sure to convert percents to decimals or fractions.)

ex: 20 is 40% of what number? $\longrightarrow 20 = 0.4x \longrightarrow$ answer: $x = 50$

ex: 8 is what percent of 32? $\longrightarrow 8 = 32x \longrightarrow x = 0.25 \longrightarrow$ answer: 25%

ex: What is 25% of 88? $\longrightarrow x = 0.25 \cdot 88 \longrightarrow$ answer: $x = 22$

Real-World Percent Problems

(This is just one way of many to solve real-world percent problems)

- Tax: Find the amount of tax using a proportion or equation. Then add the tax to the original amount to find the total cost.

- Discount: Find the amount of the discount using a proportion or equation. Then subtract the amount of discount from the original price to find the sale price.

Solve the proportion.

77. $\frac{h}{6} = \frac{20}{24}$

78. $\frac{5}{7} = \frac{c}{14}$

79. $\frac{6}{8} = \frac{21}{b}$

80. $\frac{30}{j} = \frac{26}{39}$

81. $\frac{5}{k} = \frac{15}{20}$

82. $\frac{32}{112} = \frac{a}{14}$

83. $\frac{16}{7} = \frac{18}{g}$

84. $\frac{w}{60} = \frac{15}{200}$

Solve the percent problem.

85. Find 15% of 85.

86. 6 is 75% of what number?

87. 40 is what percent of 320?

88. What is 20% of 45?

89. 70 is what percent of 350?

90. Find $33.\overline{3}$% of 81.

91. A $58 camera is on sale for 20% off. Find the sale price.

92. Find the total price of a $14.00 shirt including the 7% sales tax.

Geometry

Geometry Basics

- Perimeter is the distance around a polygon
- Circumference is the distance around a circle
- Area is the space inside a figure
- Volume is the capacity of a 3-dimensional figure
- Surface Area is the sum of the areas of all the faces on a 3-dimensional figure

2-Dimensional Geometry Formulas

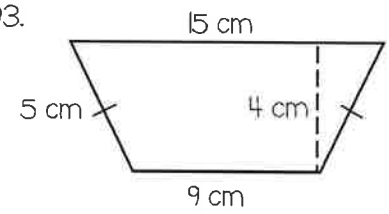
- Perimeter of Any Figure: sum of side lengths
- Circumference = $\pi \cdot$ diameter
- Area of Parallelogram = base $\cdot$ height
- Area of Triangle = $\frac{1}{2} \cdot$ base $\cdot$ height
- Area of Trapezoid = $\frac{1}{2} \cdot$ height(base$_1$ + base$_2$)
- Area of Circle = $\pi \cdot$ radius^2

3-Dimensional Geometry Formulas

- Volume of Rectangular Prism = length $\cdot$ width $\cdot$ height
- Volume of Cylinder = $\pi \cdot$ radius$^2 \cdot$ height
- Surface Area of Rectangular Prism = 2 $\cdot$ length $\cdot$ width + 2 $\cdot$ length $\cdot$ height + 2 $\cdot$ height $\cdot$ width
- Surface Area of Cylinder = $2 \cdot \pi \cdot$ radius$^2 + 2 \cdot \pi \cdot$ radius $\cdot$ height

Find the perimeter (or circumference) and area. Use 3.14 for pi.

93.



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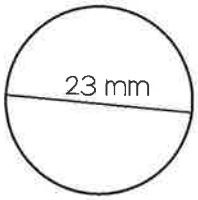

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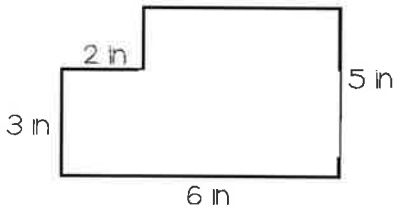

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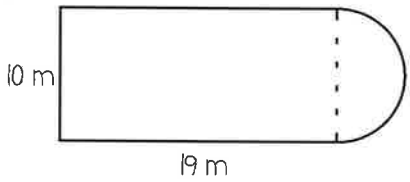

Find the surface area and volume.

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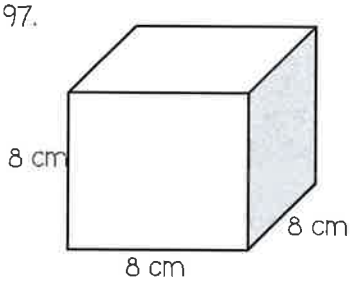

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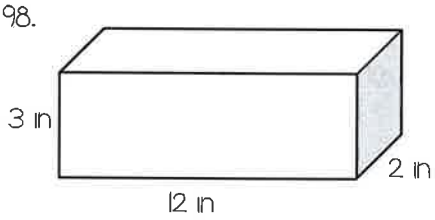

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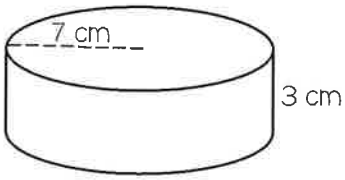

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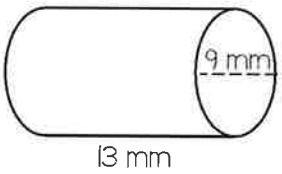
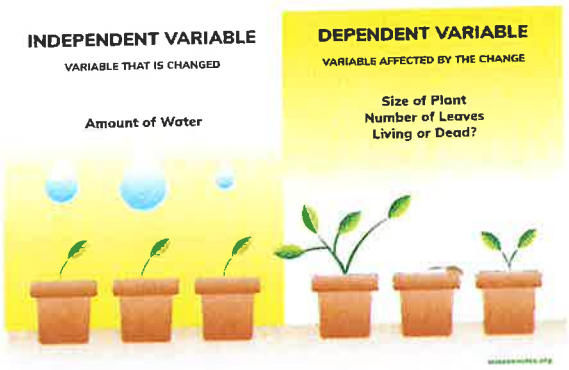


Name:_____ General Science Review Packet

Scientific Method

Scientists use a method called the **scientific method** in order to help answer questions or solve problems that arise. The steps consist of the following:



1) Stating the problem
2) Gathering information
3) Forming a hypothesis
4) Running experiment
5) Analyzing data
6) Conclusion
7) Rerunning experiment

(To remember the steps, I always learned: **S**ome **G**orillas **F**rom **R**ussia **A**ttack **C**razy **R**accoons.)

Controlled experiments always have 2 ***variables***, or factors in an experiment, that they think may be related. They are factors being experimented with, and they *vary,* or can change, depending on the situation.

For example, the relationship between *exercise* and *heart rate*. Both could be variables.

The two variables are called the **independent variable** and the **dependent variable**. The *independent* variable you are *in* control of. You can manipulate and change it. The *dependent* variable is an unknown number -- it will *depend on* your results. This is the one you're measuring. Other than the variables, everything else must be kept the same, or constant.

EXAMPLE:

Which type of bottled water will cause the most plant growth?

I am in control of the **bottled water**. I control that, I can try different ones -- so this is my **independent variable**.

I *do not know* what the plant growth will be yet, that will *depend* on my results. I will have to measure that and find out; plant growth is the *dependent variable*.


Cat like reflexes

Let's Practice!

A student wants to see if receiving more hours of sleep will affect a person's reflexes in the morning. A student has each volunteer go to bed at different times each night, and then tests their reflexes that same morning when they wake up.

The independent variable is the:_____

The dependent variable is the:_____

Back to the original question: Which type of bottled water will cause the most plant growth?

I set up 5 different pots of plants. Each pot has the *same* amount and type of soil, the *same* amount and types of seed, the *same* amount of sunlight, and the *same* amount of water. These are all constants. **Constants** are factors in an experiment kept the same. In this case, the only thing that should change is the type of bottled water, and how tall the plants grow. If you change anything else, you don't really know if the bottled water will affect the plant growth, or if a different factor will affect the plant growth.

***** You can only test one independent variable at a time *****

There should always be a **control** and **experimental group**. The control group does not have the variable. So there should be one group without bottled water that uses, say, tap water. You'll use it as a basis of comparison for the other plants to see if they grow more or less than the control group. The other pots with the bottled waters will be considered the experimental group.

Let's Practice!

Jonie wants to know if temperature can affect how quickly blueberries mold. Joaie gets a box of blueberries of the same brand, and puts the same number of blueberries in the fridge, under a heated lamp, and at room temperature. She picks blueberries that are all the same size.

Which is the control group?

_____

Which is the experimental group?

_____

Name at least one constant. _____

Hypotheses are educated guesses about how an experiment will turn out. They are similar to a prediction, except you are making a specific statement regarding the variables. It is set up as an IF/ THEN and BECAUSE statement. For the example listed above with the blueberries, a valid hypothesis could be:

If blueberries are put in a colder temperature, **then** they will take longer to mold **because** mold grows better in warm environments.

The "IF" part always describes the independent variable, the THEN part always describes the dependent variable, and the BECAUSE is the reasoning for the prediction.

Let's Practice!

Make a hypothesis for the following situation:
Abigail wants to see which SPF sunscreen will cause her skin to color the least after being in the sun. She gets 3 containers of Banana Boat sunscreen. They are each the same brand, but the difference is that one has an SPF of 10, one an SPF of 30, and one an SPF of 50. She knows that higher SPF sunscreens have more ingredients in them that can block UV radiation.

A possible hypothesis is: If the SPF of the sunscreen _____(increase or decrease?), then the skin tanness from the sun will (increase or decrease) _____ because

_____

_____

.

Observation vs. Inference:

Observation- using one or more of your five senses to gather information. Your senses include sight, hearing, touch, taste, and smell. Sometimes technological devices, like microscopes, are used to help. Observations can be either quantitative or qualitative. Observations are always factual.

Quantitative observations- involve numbers, or an amount. Seeing that you have 2 text messages on your phone is a quantitative observation. Watching me drink 23 cups of coffee is a quantitative observation.
Qualitative observations- involve descriptions that cannot be expressed with numbers. Noticing that a a bike is blue or that a grape tastes sour are qualitative observations.

When you explain the things you observe, you are inferring, or making an inference. **Inferences** are based on reasoning from what you already know. You make inferences all the time. Because your brain processes observations and other information so quickly, you may not even realize when you have made an inference.

For example, if you see your friend smile after getting back a test, you might infer that she got a good grade. Inferences are not always correct, however. Your friend's smile may have nothing to do with the test.

EXAMPLE: At the aquarium, Ms. Guele comes across a tank with axolotls. She smiles wide, tears run down her face, and she screeches out, "They're so PRECIOUSSSS!"

Observations: Ms. Guele smiled when she saw an axolotl. Ms. Guele cried when she saw an axolotl. She said, "They are precious!" in a high-pitched voice.

Inference: Ms. Guele really loves axolotls and has an obsession.

Let's Practice!

Make one observation and one inference about the picture to the left:

Observation: _____

_____

Inference: _____

_____

Which is a **quantitative observation**?

A) There are two children present.
B) The girl is wearing a pink cardigan
C) The boy has his fists clenched.
D) The boy is about to run for his life.

Which is a **qualitative observation**?

A) There is one Easter Bunny sitting in the picture.
B) There are six easter eggs painted on the wall.
C) There are two children.
D) The boy is wearing blue jeans.

Overall Assessment:

1. Bill wants to test to see if eating more Smarties candy will increase student test scores. The independent variable is:

   A) number of smarties candy students eat
   B) student test score percentage
   C) how many students volunteer
   D) Bill

2. A student wants to see if plants with water grow better than plants without water. The student sets up two pots with one sunflower seed in each pot, each pot has the same amount of soil, and each pot gets the same amount of sunlight. The only difference is the amount of water one pot has over the other. In this case, the constant is:

   A) the different amounts of water
   B) the height of the plants
   C) the amount of sunlight
   D) Ms. G's obsession with axolotls

3. Based on number 2 (previous question), the control group is the:
A) Plant with water.
B) Plant without water.
C) The sunlight.
D) Both plants.

4. Based on number 2 (previous question), the experimental group is the:
A) Plant with water.
B) Plant without water.
C) The sunlight.
D) Both plants.

5. Based on number 2, a quantitative observation would be:
A) The color of the leaves
B) The texture of the soil
C) The type of seed it was
D) How much inches the plants grew

6. Which of the following is an example of an inference?
A) The rabbit has ears that are 5 inches long.
B) The apple browned after 3 days and the person threw out the apple.
C) There is hand sanitizer on the desk and it has a fruity smell.
D) Bob is frowning; he is probably upset his guardian said no to getting a pet.

7. Annie wants to see if eating chocolate causes more pimples. The pimples are the:
A) Independent variable
B) Dependent variable
C) Constant
D) Control group

8. Based on the previous question, if Annie writes down the color and appearance of the pimple, this would be a(n):
A) Independent variable
B) Dependent variable
C) Qualitative observation
D) Quantitative observation

Validity

Experiments are **valid**, or well-founded, when they avoid **bias**; have a **large sample size**, and can be repeated and still obtain similar results.

Sample size is referring to the number of "test subjects" in your experiment. For example, if you want to see if the number of hours studying helps increase student test scores, you would need a large number of students.

Testing only a couple of people isn't a big enough group, and doesn't make your data reliable. The more numbers or data you have, the better.

For instance, a sample size of **500 students** would be a lot better and show more results than a sample size of **10 students.**

Bias is when your results are skewed in your favor and not random. Let's say you want to do an experiment of how much the **average person** hikes on Long Island. If you only survey people who are in Hiking Groups on Facebook, your data will be biased, because you are only surveying hikers, and the hikers are going to report more hours. You would need to randomly pick different people to get more accurate data that represents Long Island.

Lastly, data should be consistent. If I run an experiment to see if apples last longer in the refrigerator, and my results are all over the place, my data is not consistent. If half the apples stay preserved in the fridge, and the other half rot, this is inconsistent. If all the apples stay preserved in the fridge for the first experiment, but a second one they all rot right away, this is inconsistent and needs to be studied more.

Let's Practice!

Direction: Circle or highlight in each row what would make the experiment more valid.

Experiment Topic: A psychologist wants to survey to see how many people in a community like going to the gym. The psychologist hypothesizes that more people in a community prefer the gym than not.

They survey 400 volunteers.	They survey 40 volunteers.
They select volunteers from the gym.	They select shoppers at a supermarket.
Rerunning the same survey to see if results are similar.	Running the survey once and then selecting a different question or experiment to do.
Selecting students who are in sports after school.	Going door to door in a local neighborhood to ask residents

Assume they collect data from 500 people, and 256 say they don't like going to the gym, and the other 244 say they do enjoy the gym. Although there is a small difference where technically more people do not like going to the gym, these numbers are not drastically different, and are almost the same. This would *not* prove the hypothesis.

If, say, 100 people did not like the gym, and 400 did, this would be a significant difference.

Let's Practice!

Directions: There is a two column chart below. Write a check next to each statement if you believe the data is enough to support a hypothesis. Write an X if there is no significant difference.

A scientist studies the effect of hand sanitizer against killing bacteria. They collect 500 samples of bacterial swabs and treat 250 with sanitizer, and the other 250 without. It turns out that 246/250 of the experimental group did decrease the bacterial count, whereas the count increased for 244/250 of the control group.	
Lilly wants to know if foods high in fat can increase heart rate. She collects 75 volunteers and measures their heart rate before and after eating the same food high in fat. Out of 75, she finds that 58 all have an increased heart rate after eating.	
Pablo is interested if students with higher grades have better reflexes than students with lower grades. They have 50 volunteers of students with A+ averages and 50 volunteers of students with F averages. He holds a ruler above each person's hand and times to see how quickly they can catch it. The average reaction rate for the A+ students is 6.18 seconds, and the average reaction rate for F students is 6.79 seconds.	