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| **Regents**  **Biology**  Off Site  Learning Packet  Assignment #1: \_\_\_\_\_  Assignment #2: \_\_\_\_\_  Assignment #3: \_\_\_\_\_  Assignment #4: \_\_\_\_\_  Assignment #5: \_\_\_\_\_  Assignment #6: \_\_\_\_\_  Assignment #7: \_\_\_\_\_ | **North Salem High School**  **MISSION**: *Engage students to continuously learn, question, define and solve problems through critical and creative thinking.*  **Biology as a Science**  *(pp.13 - 18)* | |
| ***If you have any problems – please sign up for extra help after school.*** | | **Collea**  **Room W-19** |

**Assignment #1**

**Directions**: Base your answers to each of the following questions on your **Course Information Sheet.**

**1.** What is the name of Mr. Collea’s website for this class? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**2.** In your *opinion*, which 2 *Helpful Suggestions* are the most important and why?

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**3.** Which 2 days does Mr. Collea have extra help? \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_

**4.** Which 2 days does Ms. Sharpe have extra help? \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_

**4.** List the supplies you will need for this class.

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**5.** What will be the 4 sections of your Biology Binder.

**(1)** \_\_\_\_\_\_\_\_\_\_\_\_ **(2)** \_\_\_\_\_\_\_\_\_\_\_\_ **(3)** \_\_\_\_\_\_\_\_\_\_\_\_ **(4)** \_\_\_\_\_\_\_\_\_\_\_\_

**6.** Late homework is never accepted. True or False

**7.** Exams will make up approximately what percentage of your quarter grade? \_\_\_\_\_\_\_\_\_

**8.** Homework, quizzes and labs will make up the remaining \_\_\_\_\_\_\_\_% of your grade.

**9.** According to the New York State Regents, \_\_\_\_\_\_\_\_ minutes of successful lab work is

required for you to take the Living Environment Regents Exam in June?

**10.** What is Mr. Collea’s and Ms. Sharpes definition of being *tardy*?

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**11.** Cell phones are never to be used during class.True or False

**12.** Mr. Collea and Ms. Sharpe can’t stand \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**13.** Make one *observation* of your science classroom or science teachers and then make an inference based upon that observation.

|  |  |
| --- | --- |
| **Observation** | **Inference** |
|  |  |
|  |  |

**Assignment #2**

**Directions**: Answer each of the following questions as completely and as accurately as possible in COMPLETE SENTENCE format using your textbook pp. 13 - 18.

**Complete sentence format means:**

**a)** all sentences must begin with a CAPITAL letter and end with a form of punctuation.

**b)** you must incorporate PART OF THE QUESTION in your response.

**Example:**

**Question** – What are all living things made of?

**Incorrect Response** – cells **Correct Response** – All living things are made of cells.

*The only time you do NOT have to use a complete*

*sentence is if the question requires you to list (as in question # 1).*

**1.** According to your textbook, **LIST** the features / steps to the scientific method.

**(1)** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**(2)** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**(3)** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**(4)** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**(5)** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**(6)** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**2.** What are scientific theories?

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**3.** What is a scientific law?

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**4.** In the table below, LIST as many scientific theories and laws you can thinks of?

|  |  |
| --- | --- |
| **Scientific Theories** | **Scientific Laws** |
|  |  |

**5.** State the scientific theory will we focus on this year? *(Done in class.)*

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**6.** State a scientific law we will study this year? *(Done in class.)*

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**Assignment #3**

Several of the labs that you will do this year will require you to design an experiment that will provide the answers to scientific questions. In designing an experiment, it is important to understand the importance of using a **control** or **control group**. A **control** or **control group** is an *established point of reference*. It allows you to make *comparisons* that generate valid information. In designing a *valid* experiment it is

important that only one variable is changed relative to the control. The one thing that is changed is the **independent variable**. What you measure to see if the change has any effect is the **dependent variable**.

In this assignment you will be provided with data collected from a series of experiments designed by Mr. Birdsall to maximize the reproduction rates of his earthworms. You see, Mr. Birdsall is a vermiculturalist who raises earthworms because he likes their taste; whether they are deep fried in chocolate or fresh out of the topsoil. Mr Birdsall is interested in increasing the number of egg cases his worms lay in a 24 hour period. He has identified the following variables he would like to investigate to see what can make his earthworms reproduce at their optimum rates.

• % moisture in the soil

• % sand in the soil

• the amount of food (g)

• whether the soil is covered or not

Below is a table of the current conditions on Mr. Birdsall’s worm farm with the averaged results of the # of egg cases per 24 hour period per worm. This information will represent his **control group** because you will use this information to *compare* the other results to see if there is an effect.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CONTROL GROUP** | **Moisture** | **Sand** | **Food (g)** | **Soil Covered** | **# Egg Cases** |
| 20% | 15% | 10 | NO | 54 |

Mr. Birdsall decided to design and perform an experiment to determine the effect of changing the conditions on his worm farm. The table below contains the results of his first experiment.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Trial 1** | **Moisture** | **Sand** | **Food (g)** | **Soil Covered** | **# Egg Cases** |
| 25% | 10% | 15 | YES | 92 |

**1.** Look closely at the first trial and COMPARE the results to that of the control group to determine what SPECIFICALLY caused the significant increase in the number of egg cases produced.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**2.** Was Mr. Birdsall’s first experiment a good one that produced valid results? Explain

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After looking at the results of his first experiment, Mr. Birdsall realized that it was impossible to identify what *specifically* caused the *significant* increase in egg production because he changed too many things or there were **too many independent variables**. ALL good experiment must have only ONE independent variable. So the tireless worm farmer decided to perform four more experiments or trials in order to determine which variable had the greatest impact. The control group along with the results of his four additional experiment are found in the data tables below.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CONTROL GROUP** | **Moisture** | **Sand** | **Food (g)** | **Soil Covered** | **# Egg Cases** |
| 20% | 15% | 10 | NO | 54 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Trial 2** | **Moisture** | **Sand** | **Food (g)** | **Soil Covered** | **# Egg Cases** |
| 20% | 10% | 10 | NO | 52 |
|  |  |  |  |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Trial 3** | **Moisture** | **Sand** | **Food (g)** | **Soil Covered** | **# Egg Cases** |
| 20% | 15% | 15 | NO | 64 |
|  |  |  |  |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Trial 4** | **Moisture** | **Sand** | **Food (g)** | **Soil Covered** | **# Egg Cases** |
| 25% | 15% | 10 | NO | 50 |
|  |  |  |  |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Trial 5** | **Moisture** | **Sand** | **Food (g)** | **Soil Covered** | **# Egg Cases** |
| 20% | 15% | 10 | YES | 82 |
|  |  |  |  |  |  |

Note that in each of his four additional experiment or trial only one variable at a time is changed. The one thing that is changed in an experiment is the independent variable. This makes it possible to determine the effect of that specific variable by *comparing* it to the **control group**. In other words, a scientific experiment must have a control and test only one variable at a time.

**3.** List two more characteristics of any good experiment.

**a)** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**b)** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**4.** List two ways you can improve or modify any valid experiment.

**a)** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**b)** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**5.** According to the results of his four additional experiments, which variable had the greatest increase in the number of egg cases produced?

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**6.** According to the results of his four additional experiments, which variable had the greatest decrease in the number of egg cases produced?

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**Assignment #4**

**Directions**: Go to Collea’s Corner to watch the below mentioned Ted-Ed video and

then answers the questions below.

***Questions No One Knows the Answers To***

- Chris Anderson

**Background Information:**

*This TED-Ed video is designed to catalyze curiosity. TED Curator Chris Anderson shares his boyhood obsession with quirky questions that seem to have no answers.*

**1.** List three questions Chris Anderson asked himself as a child.

**(1)** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**(2)** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**(3)** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**2.** List 2 questions you often ask yourself and would like to find the answers to.

*(Be prepared to share at least one of these with the class.)*

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Assignment #5**

**Directions**: Go to Collea’s Corner to watch the below mentioned Ted-Ed video starring Myth Buster Adam Savage and then answers the questions below.

***How Simple Ideas Lead to Scientific Discoveries***

- Adam Savage

**Background Information:**

*Adam Savage walks through two spectacular examples of profound scientific discoveries that came from simple, creative methods anyone could have followed -- Eratosthenes' calculation of the Earth's circumference around 200 BC and Hippolyte Fizeau's measurement of the speed of light in 1849.*

**1.** What everyday observation prompted a young Richard Feynman to discuss inertia with his father?

**(A)** His dad falling asleep during synagogue services.

**(B)** A ball rolling to the back of a wagon.

**(C)** The motion of his body while riding on a bus that was making a sharp turn.

**(D)** Getting knocked out by a baseball.

**2.** What prompted Eratosthenes to contemplate the circumference of a spherical Earth in the third century BC?

**(A)** A letter he received from a resident of the city of Swenet.

**(B)** A dream his wife had.

**(C)** A lunar eclipse.

**(D)** His correspondence with Archimedes.

**3.** What’s remarkable about Eratosthenes’s measurements of the Earth?

**(A)** Egypt’s leader, Ptolemy III, forced him to renounce his claim that the Earth wasn’t flat.

**(B)** His work went unacknowledged during his own lifetime and was only rediscovered in the 1800s.

**(C)** His calculations came within 1% of the actual diameter of the Earth.

**(D)** He had to invent a whole new unit of distance because the distance was so long.

**4.** Armand Fizeau improved upon Galileo’s -

**(A)** telescope design. **(C)** documentation of the moon’s craters.

**(B)** argument for a sun-centered universe. **(D)** calculation of the speed of light.

**5.** Fizeau did this with simple equipment that included -

**(A)** three convex lenses, a candle and a tub of water.

**(B)** a light source, a notched wheel and a mirror.

**(C)** a sundial, a string and a pocket watch.

**(D)** duct tape, some rope and a crazy dream.

**6.** Savage says, “We’re all bags of meat and water” and that “we all start with the same tools.” Scientists like Feynman, Eratosthenes and Fizeau, he argues, just think a little harder about a question and are a little more curious.

Do you agree with Savage that scientists are basically the same as anybody else?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

In your opinion, what other personality traits would be helpful to be a scientist?

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**Assignment #6**

**Bikini Bottom Experiments**

The Bikini Bottom gang loves their Regents Biology class and wanted to do a little research. Read the description for each experiment and use your knowledge of the scientific experiments to answer the questions below.

**1. Flower Power**

SpongeBob loves to garden and wants to grow lots of pink flowers for his pal Sandy. He bought a special Flower Power fertilizer to see if will help his plants produce more flowers. He plants *two* plants of the same size in separate containers with the same amount of potting soil. He places one plant in a sunny window and waters it every day with fertilized water. He places the other plant on a shelf in a closet and waters it with plain water every other day without fertilizer.

**(a)** The independent variable in this experiment is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**(b)** The dependent variable in this experiment is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**(c)** What did SpongeBob do wrong in this experiment? Explain.

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**(d)** What *should* SpongeBob do to test the effectiveness of Flower Power fertilizer?

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**(e)** List 2 ways SpongeBob can *modify* his experiment to more reliable/valid results?

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**2. Super Snails**

Gary is not the smartest snail in Bikini Bottom and *believes* he can improve his brain power by eating Super Snail Snacks. In order to test this hypothesis, he recruits SpongeBob and several snail friends to help him with the experiment. The snails ate one snack with each meal every day for three weeks. SpongeBob created a test and gave it to the snails before they started eating the snacks as well as three weeks after eating the snacks.

**(a)** State Gary’s hypothesis as an If…then…statement.

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**(b)** Using a ruler and pencil,create a data table based upon Gary’s Methodology in the space below and fill in the data table with data that supports Gary’s hypothesis.

**3. Patty Power**

Mr. Krabs wants to make Bikini Bottoms a nicer place to live. He has created a new sauce that he thinks will reduce the production of body gas (*flatulence*) associated with eating crabby patties from the Krusty Krab. He recruits 100 customers with a history of gas problems. He has 50 of them (Group A) eat crabby patties with the new sauce. The other 50 (Group B) eat crabby patties with sauce that looks just like new sauce but is really just mixture of mayonnaise and food coloring (*placebo*). Both groups were told that they were getting the sauce that would reduce gas/flatulence production. Two hours after eating the crabby patties, 30 customers in group A reported having fewer gas problems and 8 customers in group B reported having fewer gas problems.

**(a)** Which people are in the **control group** and why?

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**(b)** Identify the **independent** variable in Mr. Krabs’ experiment?

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**(c)** Identify the **dependent** variable in Mr. Krabs’ experiment?

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**(d)** What should Mr. Krabs’ conclusion be?

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**Assignment #7**

**Directions**: Answers each question while watching the movie *Medicine Man*.

**1.** What is Dr. Campbell’s field of study? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**2.** According to Dr. Campbell, what is the principle cause of death among the Indians of the tropical rain forest?

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**3.** What sport does Dr. Campbell enjoy playing? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**4.** Where is Dr. Crane from? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**5.** What do Dr. Campbell and Dr. Crane see when they reach the rainforest canopy?

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**6.** According to Dr. Campbell, what is science all about?

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**7.** Who was the eager beaver doctor responsible for the swine flu epidemic that resulted in the death of thousands of rain forest Indians?

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**8.** What does the medicine say about the flower?

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**9.** What decision does Dr. Crane make regarding the sick boy?

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**10.** Do you agree or disagree with her decision? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What would you have done?

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**11.** Why do you think peak 37 finally appears?

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Was the medicine man right? \_\_\_\_\_\_\_\_\_\_

**12.** What may prevent Dr. Campbell from finding the cure for cancer in the rain forest?

**13.** List some of the many benefits tropical rain forests serve for mankind and the planet.

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