**Absolute & Relative Dating**  **Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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**1**. Which set of rock above is the oldest?

2. Explain why, if you know the approximate age of the rocks above, you know the approximate age of the fossils in the rocks.

For absolute dating, we need to think back to when we talked about Atoms and Elements. Get out a book (pg. 362) and define the following terms.

**Relative Dating:**

**Radiometric Dating (absolute dating):**

Keep reading on page 362 and answer the following questions

4. What is similar about all isotopes of Carbon atoms?

5. What is different about all isotopes of Carbon atoms?

6. What type of Carbon atoms make up 98% of living organisms?

7. Some nuclei (nucleus) of atoms are unstable, or in other words they are radioactive. What does it mean to undergo radioactive decay?

8. As radioactive isotopes decay what happens to them?

9. What is a half-life? (be descriptive)

10. What types of environmental factors do not affect the half-life of an isotope?

11. What are two stable forms of Carbon? What is a radioactive form of Carbon?

12. What does Radioactive Carbon decay into and how many years does one half life take?

13. USE YOUR BRAIN NOW. Using the information in the question above, if you have 1000 milligrams of Carbon 14, how many milligrams of Carbon 14 will you have after one half-life?

How many milligrams of Nitrogen 14 will you now have?



STOP! Do these questions AFTER the lab:

14. Why is it important to have a big sample size?

15. What was the difference between your individual data and the class data?

Draw some Pie graphs for the questions below

16. About what percentage of original isotope/new daughter isotope will always remain after 1 half-life of any isotope?

17. About what percentage of original isotope/daughter isotope will always remain after 2 half-lives of any isotope?

**SKITTILE LAB**: In this lab, we’re going to shake and spill Skittles onto a plate. Using the information we just learned about unstable isotopes we will use skittles to represent radioactive isotopes of Carbon and newly formed unradioactive isotopes of Nitrogen. Skittles that land S - up will be considered to be RADIOACTIVE, and thus the S - down Skittles are a safe stable decay product.

YOU DO NOT WANT TO EAT RADIOACTIVE SKITTLES - SO NEVER EAT AN S- UP SKITTLE! Don’t eat any others until you know what you’re doing with them either.

Now that you know how long the half-life of Carbon is, the half lives of several radio isotopes are given in your Reference Tables.



Strontium

Argon

Lead

Nitrogen 14

5000 years

1.3 billion years

4 billion years

5730 years

PROCEDURE:

1. Get a bag of skittles and a plate to spill them out on. Assume that at one point all the Skittles were S-up on the plate. This represents a sample of 100% radioactive isotope and I’ve entered that data on the data table below.

2. Gently shake the cup of Skittles (make sure we have no flying Skittles) and gently spill them on to the plate. Carefully count and remove all the S- down Skittles, and record your results in the 2nd and 3rd columns on the table below in the 1ST Half Life row. The S - down Skittles you’ve counted are safe to eat now.

the 2nd Half Life row. The counted, recorded and removed S - down Skittles are OK to eat!

4. Do it again, recording your data in the 3rd half life row. Then do it again, and again, until all the S – up Skittles are gone.

DATA:



**Skittles with S-Down from decay of S-up Skittles**

**Cumulative number of new elements formed in column 3**

**Percent of original element (S-UP) remaining**

**Years that have Passed. Every Half Life = 600 years**

**Skittles with S-Up remaining from beginning**

 **0**

 **100** 

**My Three Little Pretty Graphs:**

In the first graph you will graph **original isotopes** as one line and **new daughter isotopes** as a second line. You will have two lines on this graph. Your **independent variable will be years**, and your **dependent variable will be Skittle Isotopes.** Graph 1



 In your second graph you will graph the **percentage of original isotope** that remains after each half-life. Your independent variable will be Half-lifes, and your dependent variable will be percentage of original isotope.



In your third graph you will graph **CLASS DATA** with original isotopes. You will have two lines on this graph. Your independent variable will be the number of half lives, and your dependent variable will be Skittle Isotopes****