**Absolute & Relative Dating – SKITTLES DATING LAB**  **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.

3. For absolute dating, we need to think back to when we talked about atoms and elements. Get out a book (pg. 540) and define the following terms.

**Relative Dating:**

**Radiometric Dating (absolute dating):**

Keep reading starting on page 540 and answer the following questions:

4. What is half-life?

5. Why would you want to use different radioactive isotopes for dating older versus newer fossils?

6. What radioactive element is commonly used to date recent fossils?

5. What is the most common isotope of carbon?

6. How do carbon isotopes become part of living organisms (both plants and animals)?

7. What is the half-life of carbon-14?

Use the internet or your notes to answer the remaining questions:

8. What is the difference between carbon isotopes? What is the same between carbon isotopes?

9. As radioactive isotopes decay what happens to them?

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

11. What does radioactive carbon decay into?

12. USE YOUR BRAIN NOW. Using the information you’ve gathered so far, if you have 1000 milligrams (mg) 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?

**SKITTLE 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 non-radioactive 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.**

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.

3. Repeat step 2 with your remaining Skittles and record your results in 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:



**Years that have passed. Every half life = 600 years**

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

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

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

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

 **0**

 **100** 

**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.**



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

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POST-LAB QUESTIONS

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

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

Draw some Pie graphs for the questions below

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

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