Name: _____ Period: _____

How to Date a Fossil

Obviously this is something you already know: How to date! You simply ask the person out, they say yes, and then you go to the movies or dinner. But what should you do if that person is a fossil!? Now, I don't mean an old person, but an actual fossil! This is a bit more complicated! The first thing you have to know about is radiometric decay. All fossils contain certain isotopes, and these isotopes have some very nifty properties that help us date them. Each isotope will slowly over lots of time decay, or change into, a different isotope. Here's a quick explanation. Let's say you are going to look at the isotope Carbon 14. Carbon 14 is unstable, so it will start to break down, or lose mass, until it becomes Nitrogen 14. This happens at a very consistent rate, so we can use the amount of each isotope to date the fossil! Neat, huh!?

Alright, so the point of this is that you need to date quite a few fossils. You will be given a chart showing the half life of three different isotopes. You will need to create a graph that shows the change over time, one for each isotope. Then, you will take each fossil and using the amount of the parent isotope that is in the fossil, you will decide how old that fossil is. Finally, and the easiest part, you will put those fossils in order. Whew! Who knew dating a fossil would be so time consuming!?

Cadmium-51 (Cd-51): Half-life of 72,000,000 years

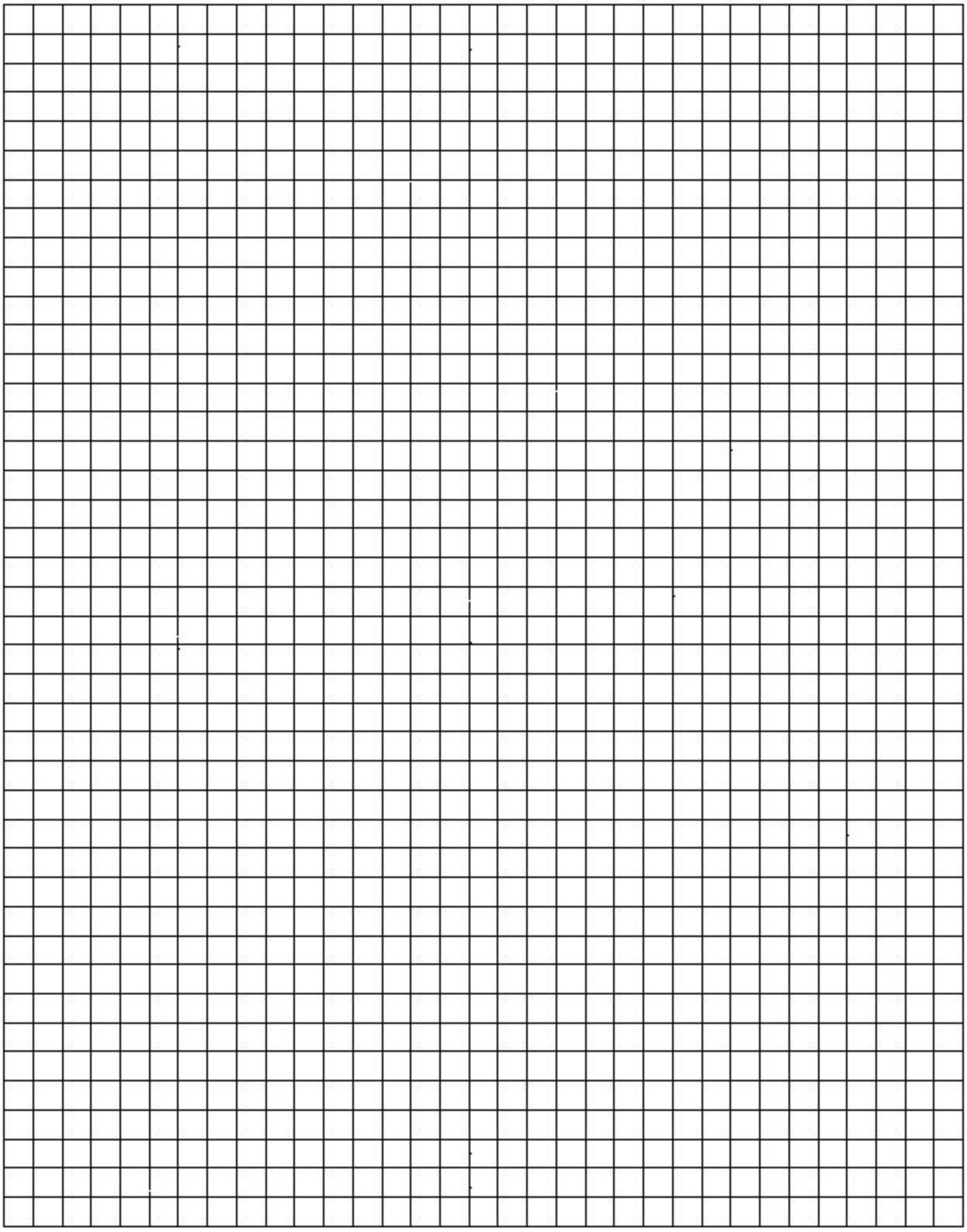
Strontium-42 (Sr-42): Half-life of 4,500,000 years

Carbon-14 (C-14): Half-life of 5730 years

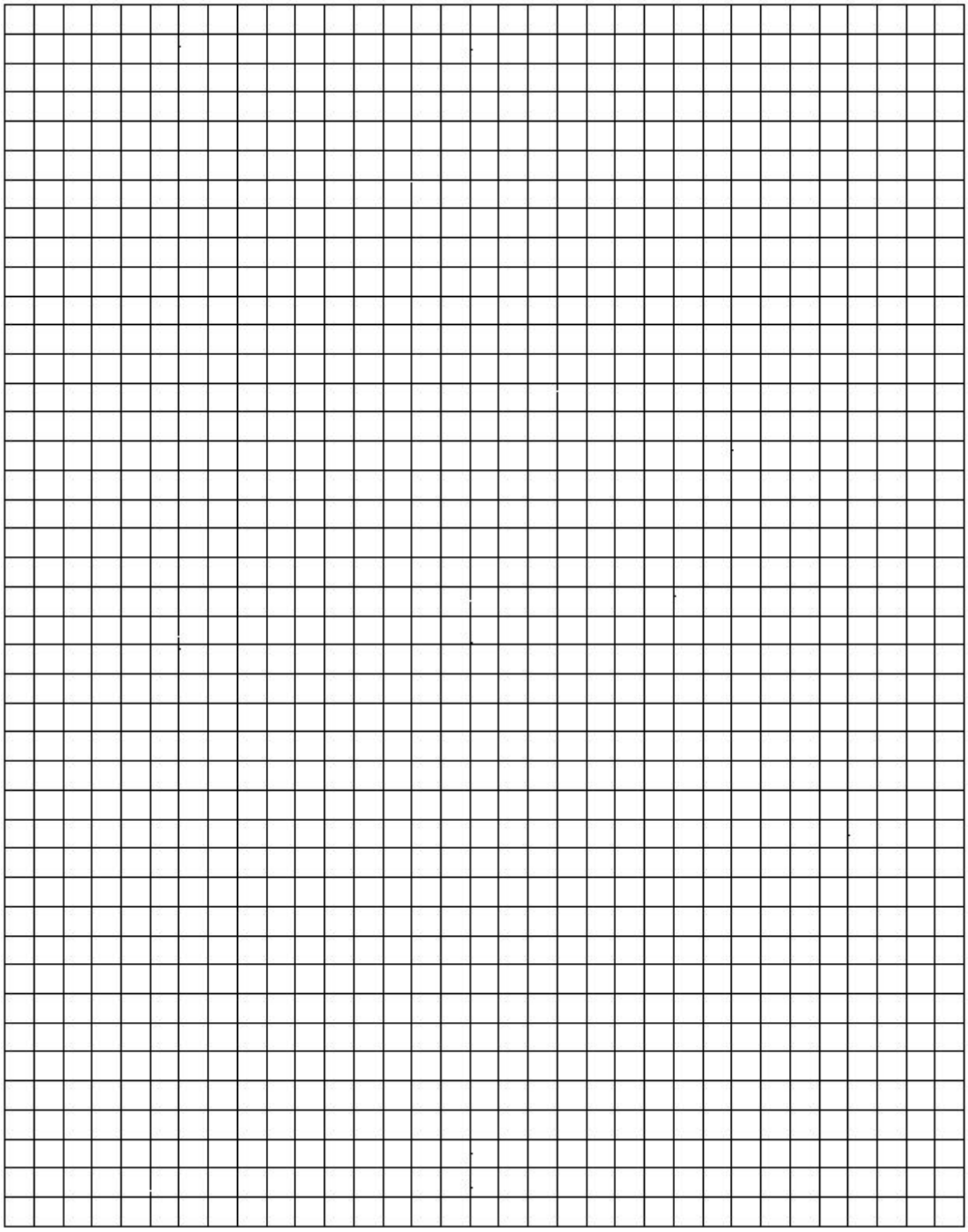
% of Parent Isotope	% of Daughter Isotope	Cd-51 Half-Life (in years)	Sr-42 Half-Life (in years)	C-14 Half-Life (in years)
100%	0%	0	0	0
50%	50%	72,000,000	4,500,000	5,730
25%	75%	144,000,000	9,000,000	11,460
12.5%	87.5%	216,000,000	13,500,000	17,190
6.25%	93.75%	288,000,000	18,000,000	22,920

A. Create three separate graphs to show the half life of each element. Be as precise as possible! You will be using these to find the age of fossils!!

Title:_____



Title: _____



Title:_____

B. Look at the following fossils. They each say how much of the parent isotope was found in the fossil. Using this information, and your graphs, decide how old each fossil is.

Fossils:

Crayfish: 46% of Strontium-42

Sea star: 7% of Cadmium-51

Sea star: 7% of Cadmium-51

Trilobite: 45% of Strontium-42

Mysterious Object:

99.9% of Carbon-14

Ammonite: 56% of Cadmium-51

Twig-like Bryozoan Fossils:

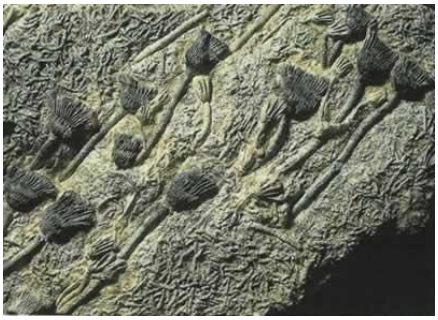
14% of Cadmium-51

Odontochelys semitestacea (Turtle):

20% of Cadmium-51

Dinosaur: 11% of Cadmium-51

Conifers: 9% of Cadmium-51



Sea Lilies: 43% of Strontium-42

Equisitium: 32% of Carbon-14

C. Now, cut out each fossil and **put them in order from oldest to newest**. Glue them on the provided sheet and record the age and name by each fossil.

Name of fossil and % of parent isotope	**Age of fossil**	**Period fossil was made (pg 366)**

D. Answer the following questions, and you are done!!!

1. What do all three of these graphs show?

   _____

2. Why did we use line graphs instead of bar graphs?

   _____

   _____

3. What type of growth did the three graphs show? (check out the two types of growth discussed in Chapter 14.4)

   _____

4. *Compare and Contrast* your three graphs. (how are they similar, how are they different)

   _____

   _____

   _____

5. Could you have used the percent Carbon to find the age of each fossil? *Explain*.

   _____

   _____

   _____

6. *Define* radiometric decay?

   _____

   _____

   _____

7. What is an isotope?

   _____

   _____

   _____

8. Why do isotopes degrade into other elements?

   _____

   _____

   _____

9. *Predict* why scientists would want to find out how old a fossil is.

   _____

   _____

   _____

10. *Explain* how you could find the age of a fossil if you knew only the percent of the daughter element.

    _____

    _____

    _____