Name _____ Date _____ Period _____

Lab: Interpreting Fossil Evidence

B I O L O G Y : C H A P T E R 1 2

Background: Like all science, biology is a process of inquiry. Science is a human process of trying to understand the world around us. There is no one method used by all scientists, but all scientific inquiry is based on the same principles. Scientific thinking is based on both **curiosity** and **skepticism**. Skepticism is the use of **critical** and **logical thinking** to evaluate results and conclusions. Scientific inquiry also requires **evidence**. One of the most important points of science is that scientific evidence may support or even overturn long-standing ideas.

In the following activity, you and the members of your team will play the roles of paleontologists working in Montana's famous fossil fields. You will simulate the process of uncovering the fossil remains of an ancient organism and work together to hypothesize the type of animal you have discovered during several days of "digging".

Procedure: Follow the instructions below. Obtain an envelope from your teacher and form a group of 2 - 4 students. *(Make sure you only remove the number of fossils indicated at each step and do not look at the others in the envelope.)*

One clear crisp afternoon in October, you find four well preserved and complete fossils.
Open envelope and randomly remove 4 fossils.

Day 1: That night in camp, after dinner, around a Coleman lantern, you and your colleagues begin to assemble the 4 bones you found earlier. Since the bones were all found together in an undisturbed layer, you assume that they are all from the same animal. You spend the rest of the evening trying different arrangements of the bones in hopes of identifying the animal before you get tired.
*Take 5 minutes to assemble the bones and make notes in your **data table #1**.*
What kind of animal do you think this is?

Day 2: You wake up to a beautiful Montana morning and you hurry back out to the dig site. The rock layers that hold your fossils are very hard and only give up three more specimens. As the day ends you make your way back to camp for another try at assembling the mystery animal.

Open envelope and remove 3 more fossils.
*Take 5 minutes to assemble all 7 bones and make notes in **data table #1**.*
What kind of animal do you think this is now?

Day 3: The next morning is cold. You can tell that winter is just around the corner and you know that this will be the last day of the digging season, and your last chance to find more fossils of the mystery animal. Just as the day is about to end, one of the members of your team finds 3 final bones.

***Open envelope and remove 3 more fossils**.*
*Take 5 minutes to assemble all 10 bones and make notes in **data table #1**.*
What kind of animal do you think this is now?

Day 4: Back in the lab, you meet up with some Paleontologist friends. They tell you they have spent the summer working in a different location but with the same geological period. You show them the skeleton you found, and they tell you they have a similar one, but it looks like they have some different bones that you don't have.

For 5 minutes, compare your fossils with those of a group near you, looking for clues that will help you assemble your fossils. Apply these clues to your interpretation of your skeleton. What type of animal do you think you have now?

Day 5: Obtain a **Skeletal Resource Manual** from the teacher with drawings of the skeletons of some existing animals. You notice some interesting similarities between some of the drawings and your unknown fossil. *Use the drawings to assist you in your final assembly of the fossil skeleton. Fill in the data table with your final interpretation of the skeleton.*

When you are finished, return the fossil bones back into the envelope and answer the conclusion questions.

DATA TABLE #1

	Day 1	**Day 2**	**Day 3**	**Day 4**	**Day 5**
What do your fossils look like					
What type of animal do you think it is?					
What about the fossils makes you think that?					

Conclusion Questions: Each person in your group must complete this worksheet ***individually***. **Answer all questions with complete sentences to receive credit.**

1. What does a **paleontologist** do?

2. What assumptions did you make at the beginning of the activity that made it more difficult for you to assemble your final interpretation of the fossils?

3. Did the discovery of new bones cause any conflict within your group? Why or why not?

4. Did any of your group members resist changing their interpretation in light of the new information? Why did they do this?

5. What information did you get from another group? How did it influence your assumptions?

6. Did the information in the resource book confirm your group's ideas, or did it cause you to rework your arrangement of the fossil parts? Explain how.

7. Do you think this scenario is typical of how scientists create and revise hypotheses? Explain.

8. What does your experience with this scenario tell you about the work of scientists?

9. From looking at the resource manual, what could you say about how and where this animal lived?

10. What do you think were the 3 main goals of this activity?