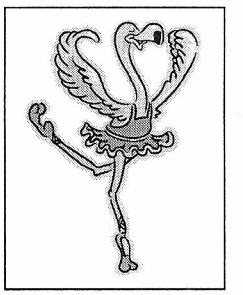
Adaptation Artistry

Task: Your task is to create a **new** species of bird or fish that is very well suited to an environment that you will create. Prior to designing your organism you must decide if you will design a bird OR fish. Once you have decided, then you must educate yourself on bird or fish adaptations.



Fish:

- Read textbook Chapter 11, Section 2 (pages 374-380)
- Complete Section 2 Assessment on page 380
- Answer questions 1-16 in your workbook pages 156-158

Bird:

- Read textbook Chapter 12, Section 1 (pages 406-413)
- Complete Section 1 Assessment on page 413
- Answer questions 1-19 in your workbook pages 169-171

Designing your animal: Before designing your organism, there are certain things you must consider:

- **Habitat**: Describe, in detail, the habitat of your animal. Where does it make its home? Is your animal competing with other organisms for space to live? If so, where has your organism carved out a niche for itself? What biome will your organism live in?

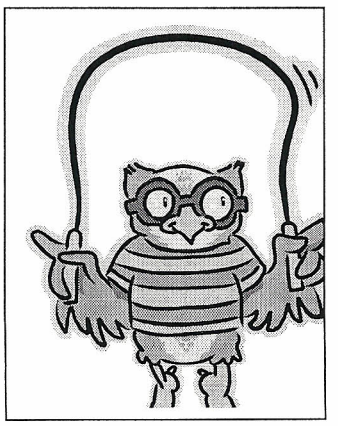
- **Climate**: Describe the climate and or conditions where your animal lives. What is the temperature? Precipitation? Is it windy, high altitude, cloudy, rainy? Does it have strong currents? Is there fresh water, salt water, no water?

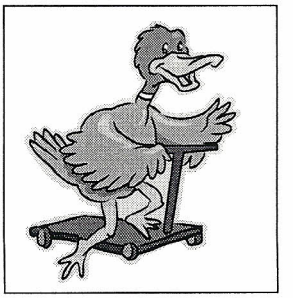
- **Food Source**: What will your animal eat? Is your animal competing with other organisms for that food source? If so, how will your animal ensure it gets its share of the food? What special features help your animal capture, eat, and/or digest this food source?

- **Predation**: What organism preys on your animal? How does your animal avoid being eaten?

- **Reproduction**: How does your organism attract a mate? How is the young protected while developing? Does your animal give birth, lay eggs or reproduce asexually? Is your animal a male or female?

Based on the answers to these questions, you must decide the adaptations that are necessary for your animal and record them on this worksheet. Once the chart has been completed your teacher must review before you begin creating your bird or fish.





Feature	*Description*	*Adaptations Necessary*
Habitat		
Climate		
Food Source		
Predation		
Reproduction		

Creating Your Animal
Once you have completed the table and it has been approved by your teacher, you may begin designing your bird or fish.

STEP 1:

- Sketch out what your bird will look like with its adaptations and its habitat
- Your colored sketched must be approved by your teacher

STEP 2: GATHER

- Collect all necessary materials you will need to build your 3-D bird or fish. Remember REDUCE, REUSE, RECYCLE and be creative.

STEP 3: CREATE

- Build your 3-D bird or fish

STEP 4: WRITE YOUR STORY

- Write a creative story that describes your bird or fish and its adaptations that will allow it to survive.

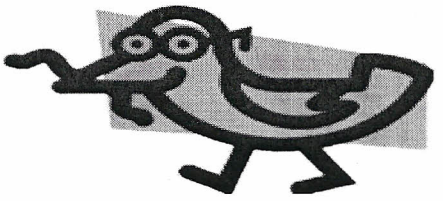
- It must be typed or written neatly using black ink. Your story should be typed using 12 point font, double spaced. It should not exceed 2 pages typed.

STEP 5: PREPARE AND PRACTICE

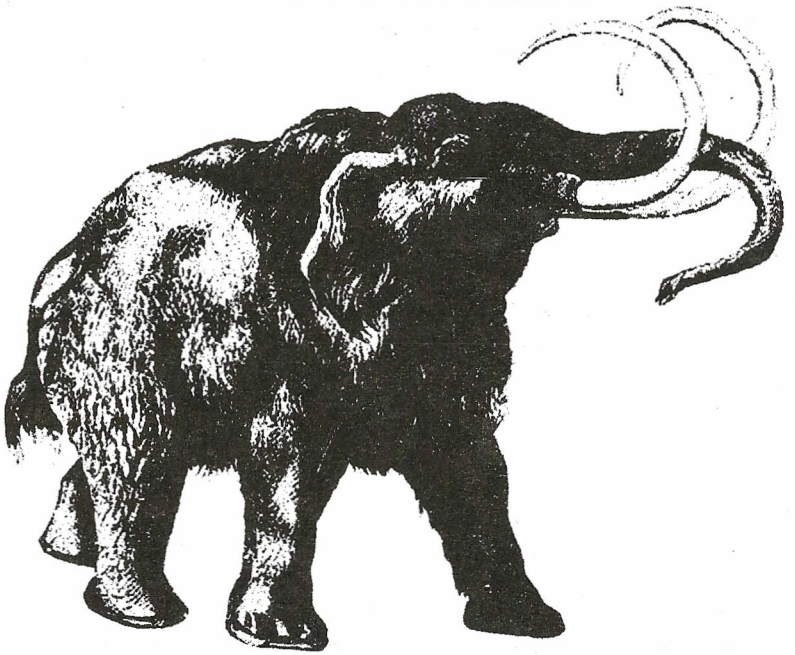
- Use the given index card to prepare a brief (1-2 minutes) oral report that you will present to the class about your bird or fish.
- You will not be allowed to read your story to the class; therefore, familiarize yourself with the information from your story.

STEP 6: TURN IN PROJECT

- Turn in your completed project March 11, 2013



How Old is that Fossil??



Fossils are the solidified **remains** or **imprints** of once-living organisms. Most fossils are found in **sedimentary rock**. The older a fossil is, the further down in the rock layers it is. Organisms that resemble the living creatures of today are mostly found in the top layers, while more ancestral forms are found lower in the rock layers. We can find an ACCURATE AGE of a fossil using **RADIOACTIVE DATING**: Rocks contain **radioactive** chemicals that **break down**. The **Half-life** is the amount of time it takes for **HALF** of the **chemicals** in a rock to **decay**, and turn into **another chemical**. We analyze a sample of the chemical from a radioactive rock found near the fossil to determine how old the fossil is.

Half-life Activity

Background: Different chemicals have different half-lives. For our example, we are going to use carbon-14. Carbon-14 is a radioactive element. This means that it is an unstable substance. The atoms of carbon-14 change to another element, Nitrogen. It takes about 5,700 years for half of the atoms in a sample of carbon-14 to change to stable nitrogen. This period of time is known as the half-life of carbon-14. All living things contain carbon-14. Plants take-in carbon dioxide during photosynthesis and therefore also take-in carbon-14. When animals eat the plants, the carbon-14 is transferred to the animals. When a plant or animal dies (they are no longer taking in carbon), the carbon within it begins to change (decay) to nitrogen. After a while, all of the carbon-14 will decay to nitrogen.

1. Start with 100 dots in the first box. After 5,700 years, if it is cut in half, how many dots should I have left? Draw the new amount of dots in the second box.

1	2	3
4	5	6

For each half-life draw the number of dots that would be left as you go through each box.

2. What would happen after another 5,700 years (box 3)? Would all the dots be gone?

3. Then after 5,700 more years (box 4) how much would be left?

4. a. If something died 5,700 years ago how much of a percentage is left?

b. If it has been 11,400 years how much is left?

c. 17,100 years?

Notice how after a little while it becomes so small that we can hardly see it anymore. That is the point at which carbon dating is no longer useful. So we need to find something with a longer half-life to date older things. We use ones with VERY long half-lives to date the earth.

You have recently discovered the fossilized remains of a wooly mammoth. **On the piece of paper in front of you, draw your best woolly mammoth.** Be sure to fill up the whole piece of paper. This will represent all of the carbon-14 that was present in the wooly mammoth when it died. Cut the sample in half. Continue cutting one-half of your mammoth in half, again and again until the box is so small that it is not possible to make another cut. **Each time you make a cut, make a mark in the box below.**

Conclusion Questions

1) What is the total number of times you were (practically) able to cut the sample in half?

2) Each cut represents the half-life period of carbon-14. What is the length of time represented by each cut?

3) Multiply the number of cuts by the half-life period of carbon-14. What is the total amount of time represented by all of your cuts?

4) If an animal lived millions of years ago, could carbon-14 be used when it died? Why or why not?

5) If an animal lived near and died in the LaBrea Tar Pits (found now in Los Angeles, California) 40,000 years ago, could carbon-14 be used to determine when it died?

6) If the initial amount of carbon-14 in the mammoth was 8 grams, how many half-lives have passed if the fossil sample has 1 gram left? How may years have passed since the mammoth's death?

Evolution Pre-Assessment

1. Who is the father of the evolution?
   a. Gregor Mendel
   b. Charles Darwin
   c. Carolus Linneaus
   d. Robert Hooke

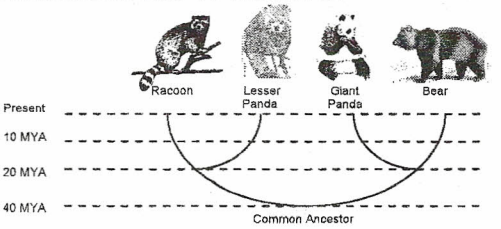
2. Which statement BEST describes the process of evolution?
   a. Populations can survive in different locations
   b. Populations can grow when resources are plentiful
   c. Conditions limit the number of species on Earth
   d. The characteristics of a species can change over time

3. Why did the population of peppered moths in England change from light to dark after the Industrial Revolution?
   a. Light moths were killed by soot
   b. Dark moths were produced by industrial processes
   c. The birds that ate dark moths were killed by the soot
   d. Light moths were more obvious against the soot-stained trees

4. In your own words, describe the adaptation that allowed the finches to survive on the Galapagos islands.

5. A population of cockroaches lives in your kitchen. You use a pesticide to get rid of this pest. Most of the cockroaches die, but a few are resistant to the pesticide. Explain how the population of cockroaches will change over time.

6. Based on the branching tree, which conclusion can be reached?



   a. Giant pandas have a different ancestor than bears do.
   b. Raccoons are more closely related to bears than to giant pandas.
   c. Giant pandas are more closely related to bears than to lesser pandas.
   d. Lesser pandas and bears share a more recent common ancestor than giant pandas and bears do.

7. A scientist practiced selective breeding in pigeons. What does this mean?
   a. He observed them closely to identify their traits
   b. He determined the relative ages of pigeon fossils
   c. He allowed only birds with desirable traits to breed
   d. He transferred genetic material from one bird to another.

8. How is selective breeding different from natural selection?
   a. Selective breeding is controlled by humans
   b. Selective breeding allows only certain organisms to reproduce
   c. Selective breeding can change the traits of a species over time
   d. Selective breeding involves inserting genetic information into organisms

9. Provide an adaptation that bears developed in order to live and survive in the Arctic?

10. An organisms has sharp canine teeth. How might this be an adaptation that helps the organism to survive?

a. It makes the organism a successful carnivore (meat eater)
b. It helps the organism to stay warm in low temperatures
c. It enables the organism to live in water
d. It protects the organism as it hibernates

11. According to the theory of natural selection, why do species evolve over time?

a. Only the fittest organisms survive to reproduce
b. Members of a species work together to survive
c. Organisms cause changes to their environments
d. Organisms produce only organisms that can survive.

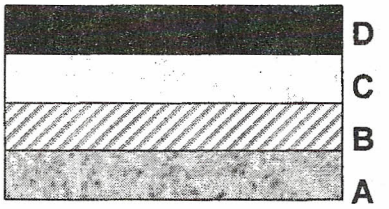
12. One theory suggests that giant wooly mammoths became extinct when the climate became warmer. Why might this change have led to their extinction?

a. Their traits changed to match the new climate
b. Their traits were favorable only in a cold climate
c. There was no food available in the warmer climate
d. Larger organisms suddenly appeared as the climate changed

13. Most fossils formed in

a. Igneous rock
b. Sand
c. Sedimentary rock
d. Metamorphic rock

14. If fossils were found in each layer below, what is logical to conclude:



a. Fossils in layer A would be older than those found in layer C
b. Fossils in layer D would be older than those found in layer B
c. Fossils in layer B and C are the same age
d. Fossils in layer B were formed before fossils in layer A

15. What percentage of a radioactive sample is left after 3 half-lives?

a. 12.5%
b. 25%
c. 50%
d. 87.5%