Name _____ Date _____ Per _____ Due

Lab #3

Create a Species

Describing a New Imaginary Species

You are a famous biologist returning from a far and remote location. During your travels, you discovered a new species of life. Upon your return, you prepare a scientific report on the newly discovered life form to present to your research peers.

1. PURPOSE

In this activity you will apply many ideas and concepts of ecology, classification, and biological diagrams in a creative manner to describe a new imaginary species in a *pseudo*-scientific report.

2. PROCEDURE

a. Carefully review your "Characteristics of Living Things", "Necessities of Life", and "Species" notes. Although this is an activity designed to inspire your creativity, your organism **must** have each of the 6 characteristics of every living thing.

b. Begin to imagine some creature that you would like to create.

- It can be a member of any one of the four kingdoms of **Domain Eukarya** described in the background information.
- It might be easier to begin with a sketch of your creature than by trying to describe it in a report. Let your imagination go wild!
- Try keeping it within the confines of what we know about living organisms.

c. Be sure to **review** the other sections of the **colored background information packets** on your lab table before beginning your report, as you will have to apply concepts from each of the following sections in your report/diagrams.

- THE THREE DOMAINS OF LIVING THINGS and BINOMIAL NOMENCLATURE (pink)
- FOOD CHAINS AND FOOD WEBS (beige)
- SAMPLE STUDENT ANSWER PACKET (white)

d. Include the required written information in each section in your student answer packet. Use lined paper if additional space is needed.

e. Draw your biological diagram and your food web diagram, according to the instructions given in your student answer packet, in the space provided.

f. Use colored pencils to make your diagrams neat, easy to read, and colorful.

g. You will have about 3-4 class periods to work on this activity. It is scheduled to be due on Tuesday, 11/2.

h. Review the scoring guide/grading rubric to further understand how your grade will be determined.

Name _____ Due_____

_____ On time

_____ Neat

Lab #3 – Create a Species

Describing a New Imaginary Species

~ Student Grading Rubric ~

	Excellent	Good	ok	Poor	Missing
Written Report – Sections A - J completed; describing all aspects of the new species	50	40	35	30	0
Biological Diagram – Clear, accurate, colored and neatly drawn diagram - 5 species adaptations identified and labeled following the rules for a biological diagram. - Scientific name in correct format.	20	15	12	10	0
Food Web Drawing - Clear, accurate, colored and neatly drawn diagram - New species and its ecological interaction with 5 other species within its ecosystem or biome. - Arrows pointed right direction	20	15	12	10	0
Comments (Best/worst of lab experience) – *Write it here*	10	8	7	6	0
Total Points					

Name _____ Date _____ Per _____ Due _____

Lab #3 – Create a Species

Describing a New Imaginary Species

~ Student Answer Packet ~

NEW SPECIES DESCRIPTION REPORT

A. NAME OF SCIENTIST (you): _____

B. TITLE OF SCIENTIST: _____

-Your academic credentials (Do you have a Ph.D. in extra-terrestrial organism studies or…?)

C. PROPOSED SCIENTIFIC NAME OF ORGANISM: _____

-Use Latin-sounding names by adding the suffixes –a, -um, or –us to the end of the words

- Refer to "Shape Island" activity for prefix and suffix suggestions.

D. CLASSIFICATION OF YOUR ORGANISM:

Domain: _____

Kingdom: _____

Genus: _____

species: _____

E. PHYSICAL DESCRIPTION /CHARACTERISTICS *(what it looks like)*

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____

F. BEHAVIORAL CHARACTERISTICS: *(How it acts)*

1. _____
2. _____
3. _____
4. _____
5. _____

G. ADAPTATIONS:

(Inherited physical or behavioral characteristics that help the organism survive in its environment over generations)

1. _____
2. _____
3. _____
4. _____
5. _____

H. MEANS OF ENERGY INTAKE/FEEDING STRATEGIES:

*(Don't forget to mention **autotroph** or **heterotroph** in your description – use your food web info)*

I. REPRODUCTIVE STRATEGIES: *(Is it asexual or sexual? Has live young, lays eggs or….?)*

J. DESCRIPTION/CHARACTERISTICS OF ORGANISM'S HABITAT AND ENVIRONMENT:

(Provide characteristics such as; average temperature of the environment, the average amount of rainfall, amount of light, etc. Also, what type of biome (tropical rainforest, desert, tundra, tidal pool, etc…)

Lab #3 Name _____

BIOLOGICAL DIAGRAM OF ORGANISM:

In the space below; draw, color and label a diagram of your organism.

- Show and label the five adaptations you described in part G.
- Follow the rules of a biological diagram *(refer to handout given with the **Bald Faced Hornet** diagram lesson).*
- *Don't forget the Scientific and common names (in the proper format)*

DIAGRAM OF ORGANISM INTERACTING IN ITS **FOOD WEB**:

In the space below neatly draw, color and label a food web for your organism.

- Be sure to show the arrows in the food web, indicating the **flow of energy**. Your food web diagram must include pictures/diagrams of at least five (5) other organisms in your biome/ecosystem.

Background Information – Keep on Lab Table

THE THREE DOMAINS OF LIVING THINGS

Today, the most generally accepted classification system of living organisms consists of three domains: Bacteria, Archaea, and Eukarya. The first two domains consist of prokaryotes, which are unicellular and do not have hereditary material (DNA) enclosed in a nucleus. They do not have membrane-bound organelles. The third domain, Eukarya, are eukaryotic, which have a membrane-bound nucleus and membrane-bound organelles.

Domain Bacteria. ***(single celled with NO nucleus)*** Most of the members of the domain Bacteria are pathogenic (case disease) and are what people typically think of as bacteria. Their growth is inhibited with antibiotics. Bacteria have cell walls. They cannot survive in temperatures greater than 100°C. Scientists have evidence that bacteria were the earliest life forms on Earth. They first appeared about 3.5 BYA.

Domain Archaea. ***(single celled with NO nucleus)*** Members of the domain Archaea share similar traits with the domain Bacteria but live in such extreme environments in which few other organisms can survive. They are capable of surviving extremely high and low temperatures and extremely salty conditions. Antibiotics do not inhibit their growth.

Domain Eukarya. ***(single or multi celled, all cells have a nucleus)*** This domain consists of organisms that are eukaryotes. They have a membrane-bound nucleus and membrane-bound organelles. This domain consists of the kingdoms Protista, Fungi, Plantae, and Animalia. Some of the organisms that obtain energy by making their own food are called autotrophs. This name makes sense because the prefix auto means self and the root word "troph" means food. Organisms that cannot make their own food are called heterotrophs. The prefix hetero- means other. Heterotrophs may eat autotrophs in order to obtain food or they may eat other heterotrophs. But all heterotrophs ultimately rely on autotrophs for food. Scientists have evidence that Monerans (*single celled, no nucleus organisms*) were the earliest life forms on Earth. They first appeared about 3.8 billion years ago.

Kingdom Protista. ***(single celled with a nucleus)***The cell of a Protist has special structures that perform specific functions for the cell. Protists are unicellular but include some species that live together in large colonies that give the appearance of being multicellular. A number of Protists are capable of animal-like movement but also have some distinctly plantlike characteristics. Specifically, some Protists are green in color from chlorophyll, and can use the energy of light to make their own food from simple substances. However, they are neither plants nor animals. Protists were the first kind of cells that contained a true nucleus. Ancient types of Protists that lived millions and millions of years ago are probably the ancestors of fungi, plants, animals and the modern Protists. The Protozoa — a group of organisms commonly studied in life science that includes *Amoeba, Paramecium* and *Euglena* — are classified in this kingdom.

Kingdom Fungi. ***(multi celled with a nucleus, lives on food source)*** These are multicellular organisms that lack photosynthetic pigments and absorb nutrients directly from their surroundings. Mushrooms and toadstools are fungi. Molds that sometimes grow on leftover foods also belong to this kingdom. The mildews that may appear as small black spots in damp basements and bathrooms are also fungi. For many years, fungi were classified as plants (some out-of-date textbooks call them "non-green plants"). However, they are quite different from plants in some basic ways. Their cell wall, a tough protective layer that surrounds the cell, is made of chitin rather than cellulose, the material that composes the cell wall of plants. And most importantly, unlike plants, fungi are not able to make their own food (heterotrophic versus autotrophic).

Kingdom Plantae. ***(multi celled with a nucleus, perform Photosynthesis)*** Plants make up this kingdom. These organisms are multicellular autotrophs. You are probably quite familiar with members of this kingdom, which includes flowering plants, mosses, ferns and trees.

Kingdom Animalia. ***(multi celled with a nucleus, do not make their own food)*** Animals are multicellular heterotrophic organisms with specialized tissues that reproduce sexually and must take in oxygen to respire. Animals are heterotrophs, obtaining the nutrients and energy they need by feeding on organic compounds that have been made by other organisms. Animals are multicellular, which means that their bodies are composed of more than one cell. Animal cells are eukaryotic, containing a nucleus and membrane-enclosed organelles. Unlike plant, fungus and bacterial cells, animal cells do not have cell walls. Additionally, animals reproduce sexually (by exchanging sperm and eggs); some animals can also reproduce asexually.

BINOMIAL NOMENCLATURE

Binomial nomenclature is standard notation for naming species. Every species can be unambiguously identified with just two words, the combination of the genus and the species. The genus name is always capitalized while the species name is all lower case. In print format the scientific name is always in italics but when hand written the scientific name is underlined. Using this format, the identifying name for the human species is *Homo sapiens*, or Homo sapiens.

Background Information – Keep on Lab Table

FOOD CHAINS AND FOOD WEBS

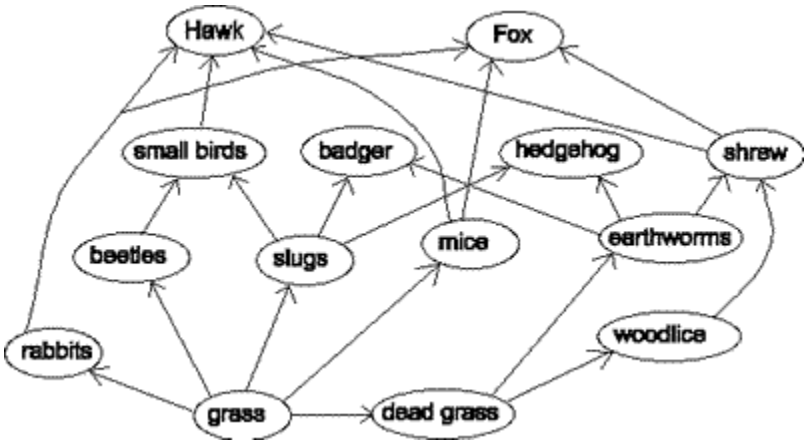
Within an ecosystem, there is a **pathway of energy flow** that always begins with the **producers**. Energy stored in organic nutrients, *synthesized* (made) by the producers, is transferred to consumers when the plants are eaten. Herbivores are the **primary consumers**, or first-level consumers. The carnivores that feed on the herbivores are **secondary consumers**. For example mice feed on plants and are primary consumers. The snake that eats the mouse is a secondary consumer, while the hawk that eats the snake is a tertiary consumer, or third-level consumer. Since many consumers have a varied diet, they may be second-, third-, or higher-level consumers, depending on their prey. Each of these feeding relationships forms a food chain, a series of organisms through which food energy is passed.

A simple food chain, with **arrows showing the direction of energy flow**, can be shown as:

grass → field mouse → great horned owl

In this example, the grass is a producer, the field mouse is a primary consumer, and the owl is a secondary consumer.

Feeding relationships in an ecosystem are never just simple food chains, however. There are many types of organisms at each feeding level, and there are always many food chains in an ecosystem. Usually, each organism is part of several different food chains. These food chains are *interconnected* to form a **food web**. A simple food web could be shown as:



At every level in an ecosystem, there are organisms that act as **decomposers**. The decomposers make use of the wastes and remains of all organisms in the system. They use the energy they find in these materials for their own metabolism (life processes). At the same time, they break down organic compounds into inorganic compounds and make substances available for reuse. The decomposers are the final consumers in every food chain and food web.

Name _____*Date* _____ *Per* ___

Lab #3 – Peer Review

	Name	**Bio Diagram** (why)	**Food Web** (why)
1			
2			
3			
4			
5			
6			
7			