<u>Insect Eco Web</u>

6th grade post-Sly Park Experience Activity

Content Standards:

- NGSS 5-LS2-1 Ecosystems: Interactions, Energy, and Dynamics. Develop a model to describe the movement of matter among plants animals, animals, decomposers and the environment.

Objectives:

- Students will be able to design and critique a model of how matter flows through an ecosystem.

Background Info for Teachers:

Ecosystems contain complex food webs with different plants and animals that fit ecological roles or niches. These roles are producers, consumers (herbivores, omnivores, carnivores) and decomposers. The interactions among these organisms creates the process of how matter and energy move through the ecosystem.

The interconnections among producers and consumers are visible all around us. For example a mouse living in our homes is eating domestic and wild food sources and in turn are eaten by cats and hawks. A series of organisms, each feeding on the preceding one forms a food chain. Within this food chain are the very important decomposers (fungus, bacteria and invertebrates) that break down organic material (the producers and consumers) back into soil. The decomposers also help liberate carbon dioxide, water and other nutrients needed by plants to make more plant material and maintian the cycle.

The Sun's energy is first captured by the plants and stored as matter. This energy and matter then moves up the food chain through the animals and then back down through the decomposers. However, the movement of energy and matter within an ecosystem is more complex and therefor is describe as a food web. Since many interactions are happening all at once.

NOTE: The following activity will focus on how matter moves through the food web. For an understanding of how energy moves through a natural system please see the "How to Feed a Mountain Lion" activity in the pre-activity section.

Vocabulary:

Ecosystem: A community of organisms occupying a given region within a biome. It also contains the physical and chemical environment of that community and all the interactions between organisms and organisms and their environment. (The community plus its habitat).

Biome: One of several immense terrestrial regions, each characterized by its plants, animals, climate and soil type.

Food Chain: An energy, matter and nutrient pathway through producers, consumers and decomposers.

Food Web: Complex interactions of food chains within an ecosystem

Producers: An organism in the ecosystem that can produce matter through the process of photosynthesis (light energy) or chemosynthesis (chemical energy).

Consumer: An organism in the ecosystem that feeds on the producers.

Decomposer: An organism in the ecosystem that breaks down non-living organic material. Ex. Fungus, bacteria, invertebrates.

Habitat: A specific region in which an organism lives. Habitats make up an ecosystem.

Niche: An organism's place the ecosystem: where is lives, what it eats, and how it interacts with biotic and abiotic factors.

Biotic: The living parts of an ecosystem: plants, animals, and microorganisms in complex communities.

Abiotic: The non-living components of an ecosystem: including chemical and physical factors such as nitrogen, temperature and rainfall.

Materials:

• Drawings/photographs of insects, plants, ecosystems, and other animals.
Use the provided drawings or go to: http://www.allfreeclipart.com. **Optional:** Instead of drawings use index cards and print the names of insects, plants, ecosystems, and other animals onto the cards.
• Ball of yarn or string • Scissors and tape • Paper • Pencils

Before you start: Cut string in 2-foot lengths and tape it to the back of the photos or cards so that the student can wear the card as a necklace.

Procedures:

Anticipatory set:

Without defining the word, write the word ecosystem on the board and ask the students (in pairs) to write a list of all the "things" they think make up an ecosystem. Once students have finished break down the word into Eco (ecological) and system. Define the word ecosystem with them. Have students come up to the board and begin adding what they think belong in an ecosystem.

When the system seems complete point out the biotic (living things) and abiotic (non-living things). To complete the ecosystem makes sure there are decomposers (FBI: fungus bacteria and invertebrates) and abiotic elements such as the sun, gases and nutrients.

Next have students explain how a simple food chain might work in a forest ecosystem. Once this is complete explain that food chains are much more complex in nature and begin the next activity.

Insect Eco Web

This activity demonstrates the interdependence that plants and animals have with each other. It has been modified to place more emphasis on insects. This is because the roles (niches) of insects are often misunderstood and it is an organism that can be observed both at school and at home.

1) Have students get into a circle.

2) Start the activity by asking students how the feel about insects. Next ask how insects might be helpful in a forest ecosystem. **For Example**: Dragon fly nymphs eat mosquito larva that help keep down the mosquito population. Insects provide food for birds, bats and other animals, even humans. Some insects pollinate flowers that provide food for humans such as tomatoes and apples.

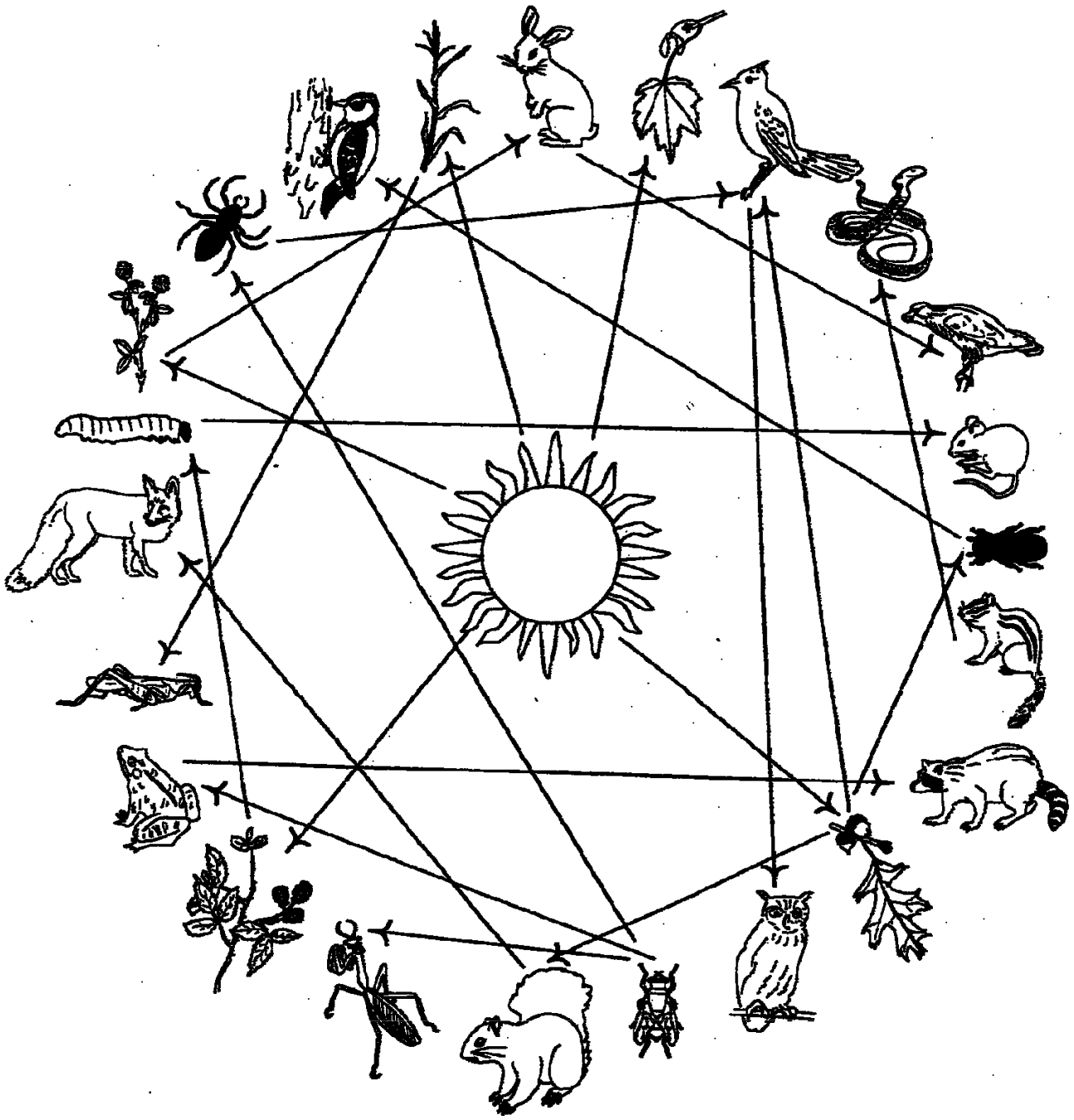
3) Go through the student's cards so that each student knows what type of plants, animals and ecosystems are available. Choose a volunteer to go first and explain how his/her nature card is connected to another one**. For example:** The bee gets nectar from the flower, or the owl eats the mouse. When a connection is made have the first student hold the string and then pass the string to the student where the connection was made. Next, the second student who is now holding the string makes a connection with his or her nature card to another student. Continue doing this with each student. You should begin to form a web as each student begins to make different connections. See Diagram 1. If you find that the string is not making a satisfactory web, then a student can be connected to more than once.

4) Once each student has had a turn. Tell the students to look at the web and see how everything is connected. Ask the students what might happen if things in the ecosystem begin to break down. For example, let's say all the bees are gone. Go to the student who is holding the bee card and have the kids pull the yarn/string taunt. Pluck the string and ask the students who felt his/her string vibrate to raise their hands. Any student who raised his/her hand was affected by the decline of the bees. Do this a couple more times with different students representing a different plant or animal. Finally, instead of pluck the string, have a student let go and watch the web fall apart. Reemphasize the connection of all living things including the importance of insects in the web of life.

Assessment:

Have teams of students demonstrate (by drawing or writing) how an ecosystem can be affected by human interactions.

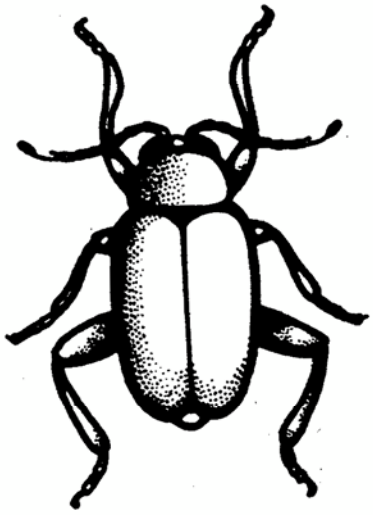
Diagram 1:



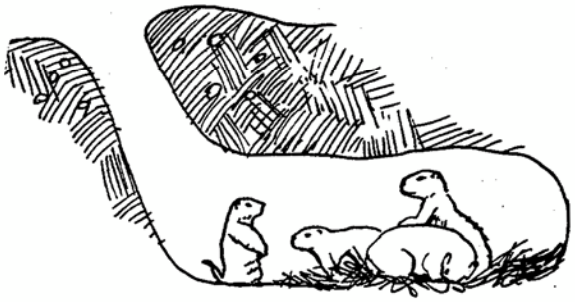
Owl

Bee

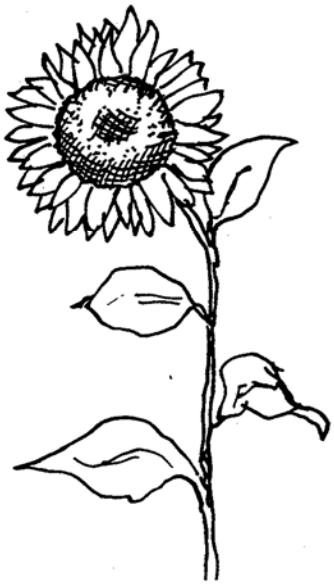
Mole



Beetle



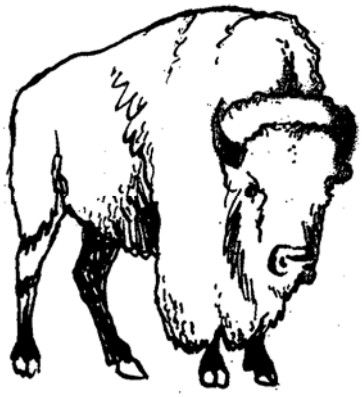
Prairie Dogs



Sunflower

Meadow lark

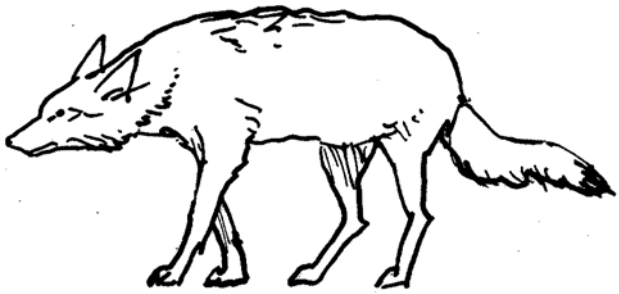
Quail



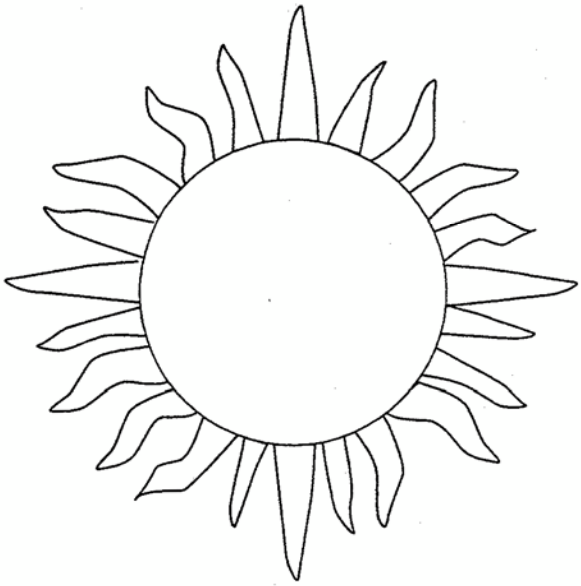
Bison

Butterfly

Aster



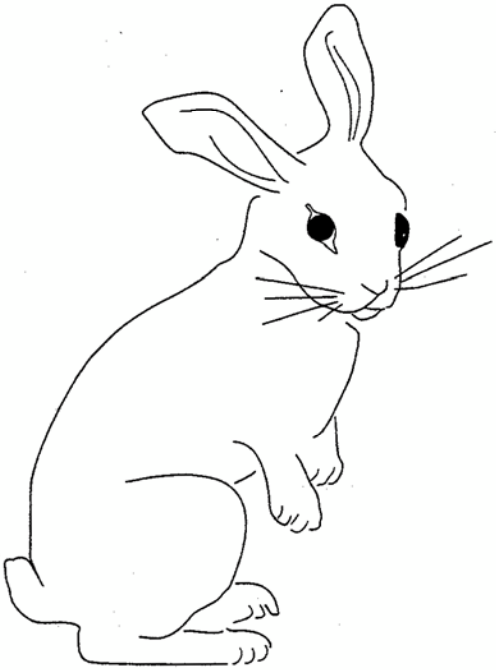
Coyote



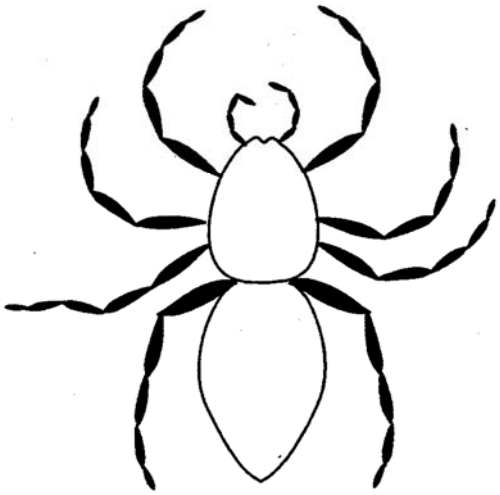
Sun

Orchard grass

Clover

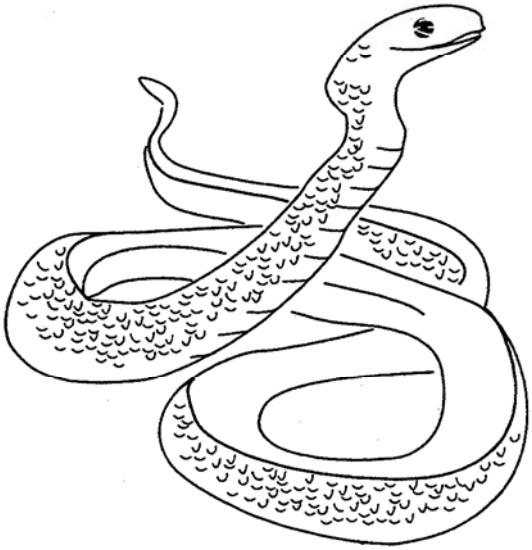


Rabbit

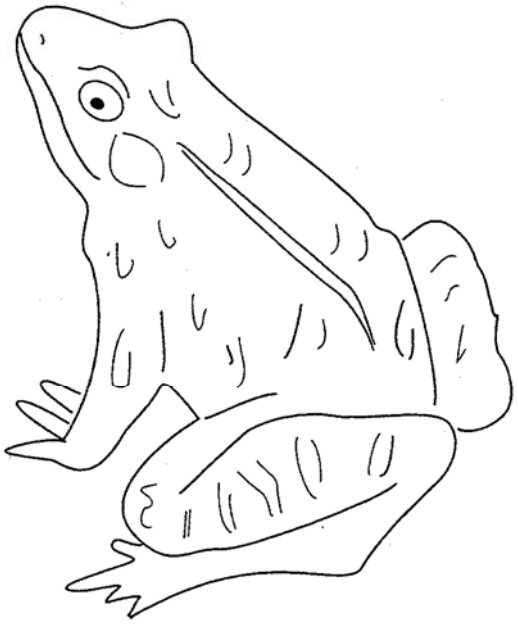


Spider

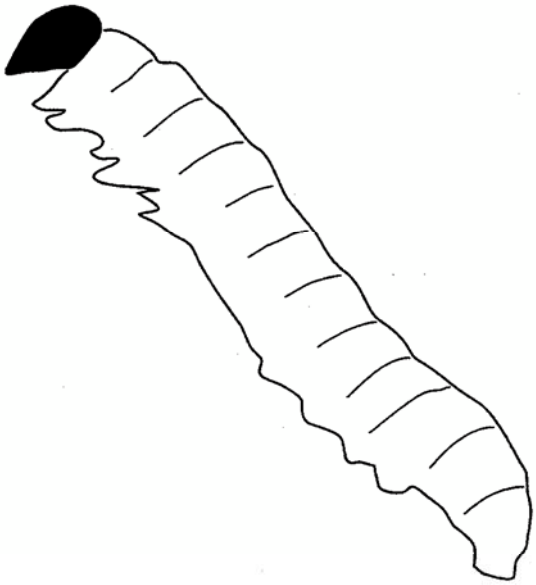
Hawk



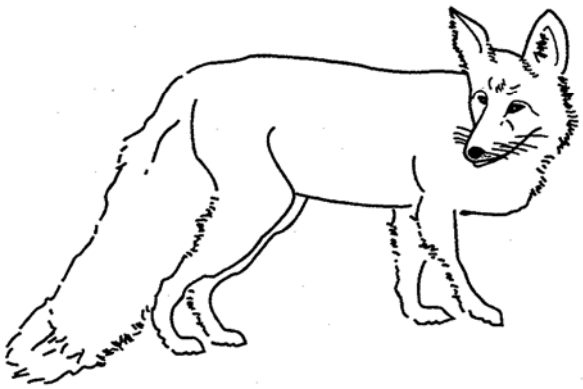
Snake



Frog

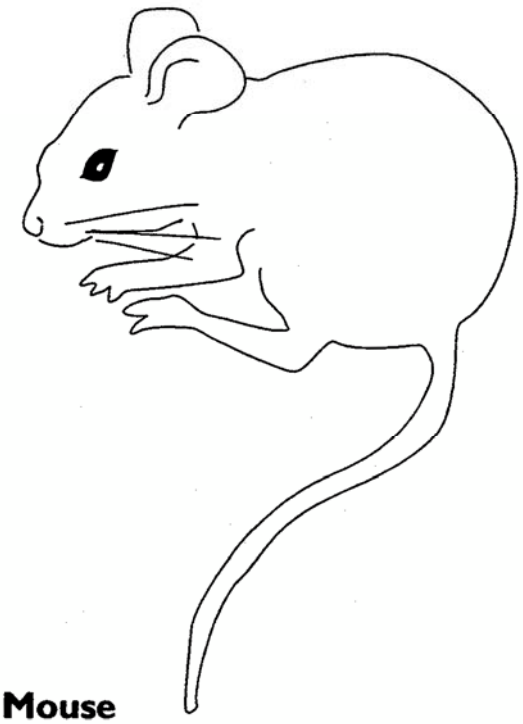


Caterpillar



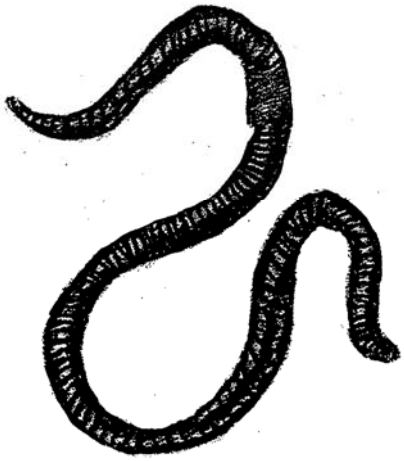
Fox

Grasshopper

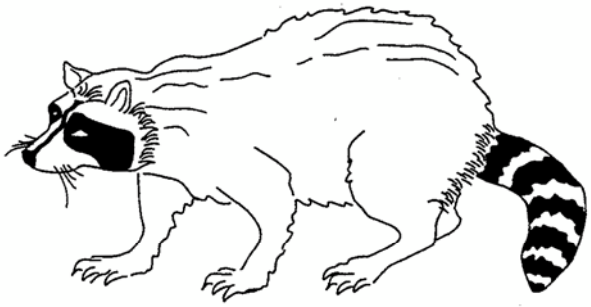


Mouse

Coneflower



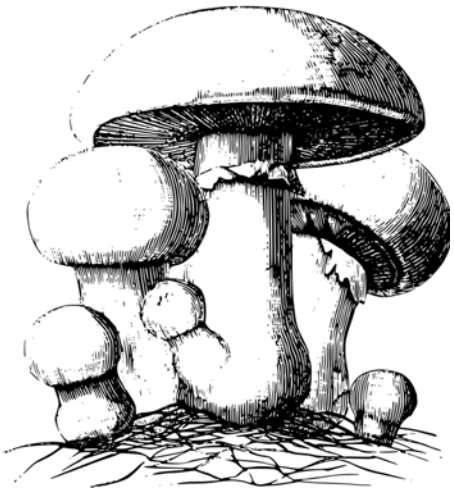
Worm



Raccoon

Black-eyed Susan

Ant

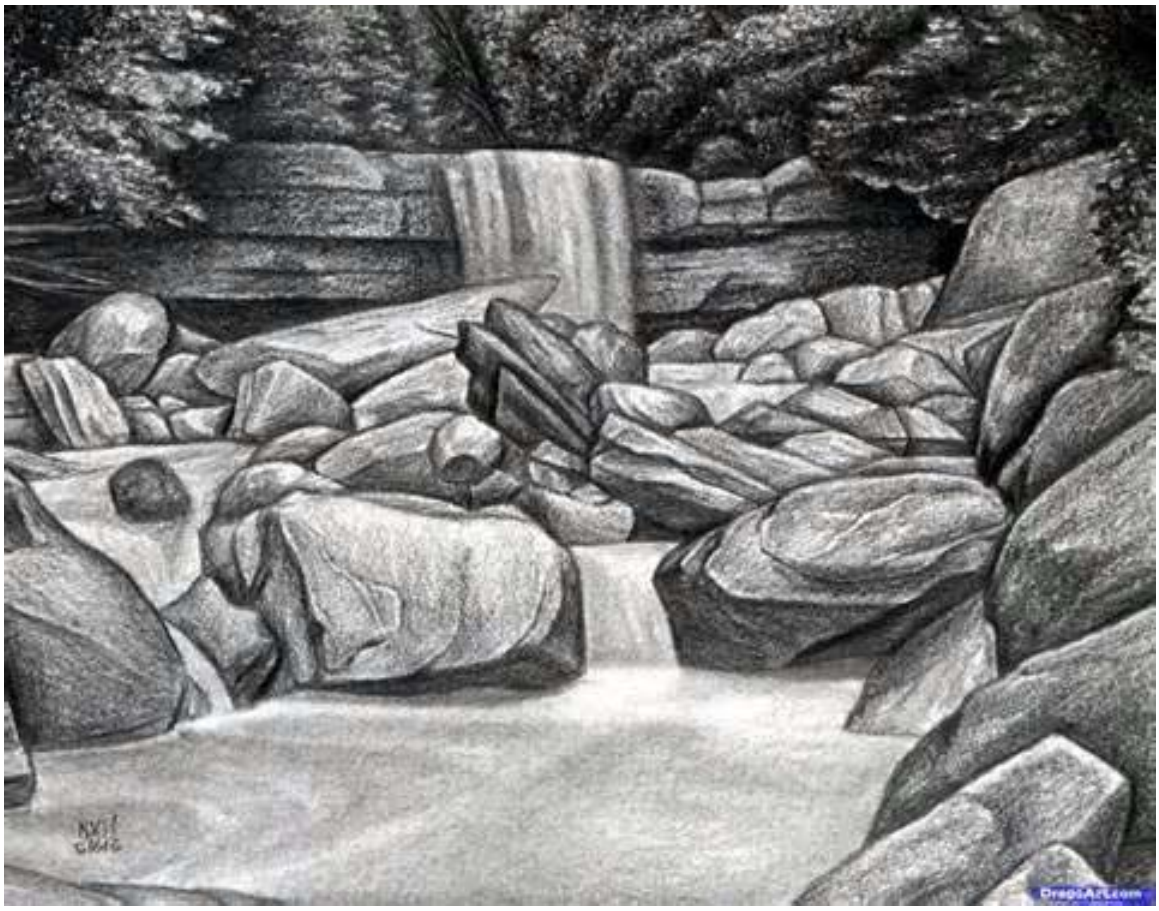


Fungus

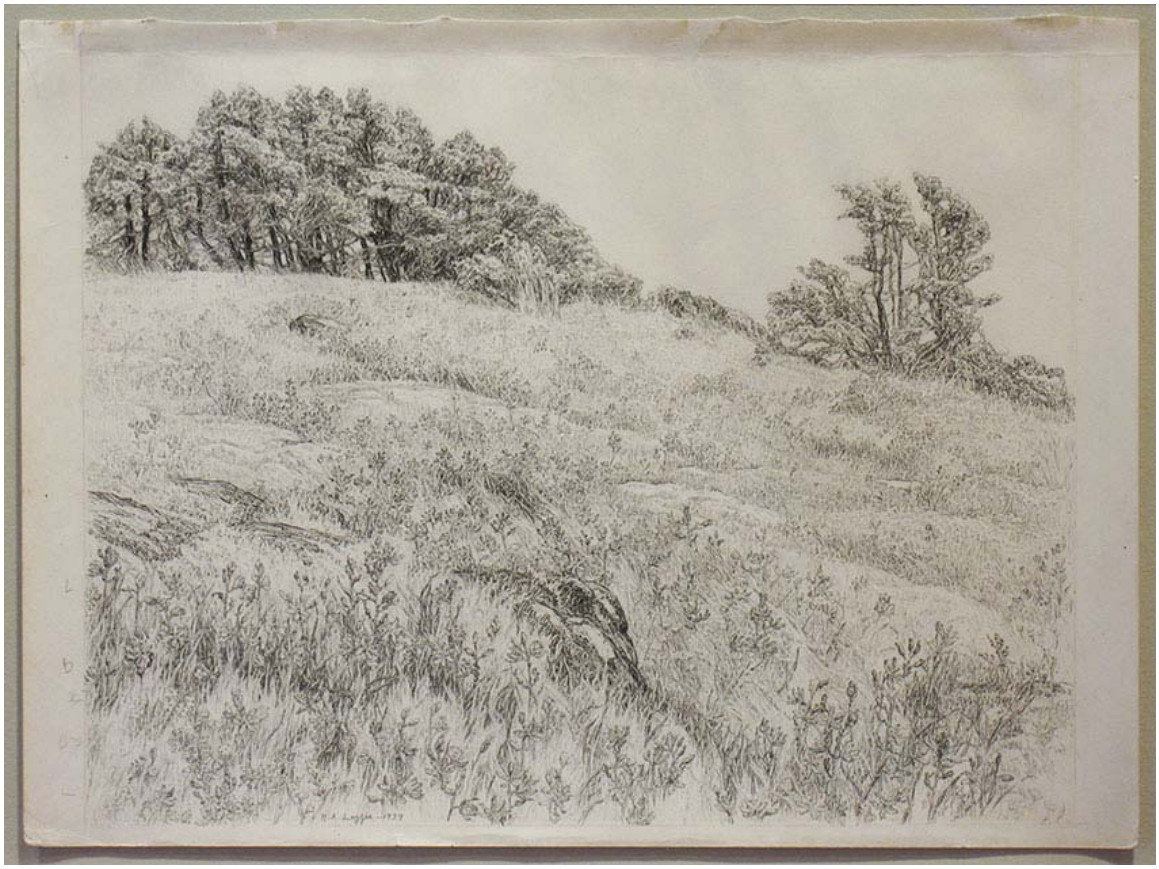
Crane Fly

Deer

Forest



Creek



Meadow

Lake