Comparing Birds and Bird Food Preferences (Schoolyard and Lyon Arboretum)

Directions: Bird feeders are set up with different types of food. For the next 15 minutes, observe each feeder and fill out the table below.

Type of food in feeder	**What bird do you see? If you do not know what kind of bird it is, DESCRIBE it.**

Answer the following questions:

1) Which food type was the most popular? How many different kinds of bird did you see?

2) What did each of the birds like most?

3) What characteristics do the birds visiting each feeder have in common?

4) Do they have any special adaptations that allow them to eat a particular type of seed?

Comparing Birds and Bird Food Preferences (Schoolyard and Lyon Arboretum)

For teachers:

- In your schoolyard, you can set up bird feeders with different kinds of food. Have your students hypothesize what kinds of food the birds would like. For example:

Directions: Bird feeders are set up with different types of food. Before you make your observations, answer these questions:

1) Which type of food will be the most popular?

2) Do certain birds prefer specific kinds of food? Why or why not?

For the next 15 minutes, observe each feeder and fill out the table below.

Type of food in feeder	**What bird do you see? If you do not know what kind of bird it is, DESCRIBE it.**

- Have the students write conclusions after analyzing their data. You could also combine all the data into a single classroom dataset and have the students write conclusions.
- Have the students compare the different kinds of bird observed in your schoolyard and at Lyon Arboretum.

Material developed by Norine Yeung for the University of Hawaii-Manoa GK-12 program (NSF grant #05385500). www.hawaii.edu/gk-12/evolution. Duplication for educational purposes only.

Trees and Birds

Directions: Observe a tree for 15 minutes and answer the questions below.

1) What kind of tree are you observing? What are some characteristics of this tree? Sketch a part of this tree.

2) How many birds do you see visiting this tree? What are the birds doing? If you didn't see any birds, why do you think you didn't see any?

3) Some times, it is hard to see birds in the rainforest. However, you can hear them. Listen for 1 minute. How many birds do you hear?

4) Why do birds need plants to survive?

5) Why do plants need birds to survive?

It's an Invertebrate Hunt!

Directions: Find two different invertebrates. Put it in a Petri dish and answer the questions.

Invertebrate #1:
1) Where did you find it? Describe the area.

2) Describe and draw a picture of it.

3) What do you think is its role in the environment? Explain why.

Invertebrate #2:
1) Where did you find it? Describe the area.

2) Describe and draw a picture of it.

3) What do you think is its role in the environment? Explain why.

Plants and Animals at Lyon Arboretum

Directions: Make observations of the plants and animals you see throughout this field trip and answer the questions below.

1) Fill out the table below:

List three animals that live in the rainforest	**What do you think its role is in the rainforest? Explain why.**
1)	
2)	
3)	

2) List three adaptations that are needed to live in the rainforest.

_____

_____

_____

3) Sketch an animal you saw.

List three plants that live in the rainforest	**What do you think its role is in the rainforest? Explain why.**
1)	
2)	
3)	

4) List three adaptations that are needed to live in the rainforest.

_____

_____

_____

5) Pick a plant you saw and sketch a part of it.

What Do Birds Use Their Beaks For? Are All Beaks the Same?

- You will have three different types of beaks: chopsticks, spoon, and clothespin.
- There will be three different types of food: marbles, toothpicks, and flat metal weights
- Each of you will have a stomach: a cup
- Using ONLY your beaks, you will have TEN seconds to get as much food into your stomach. NO USING FINGERS!
- When the time is up, write down how many of each type of food you got.
- Do this for each food item.

	Type of Food			
	Marbles	Toothpicks	Flat Metal Weights	Total amount of food collected
Type of Beak				
Chopsticks				
Spoon				
Clothespin				

Answer the questions below:

1) Which type of beak ate the most of each food?

Marbles:
Toothpicks:
Flat Metal Weights:

2) Which was the best overall beak? Why?

3) Think of some real bird food that each of these materials might represent.

4) What kinds of food would each of the type of beaks be best in collecting?

5) If birds of all types flew to an island that only had marble-like foods to eat, which bird beak type would be the most successful? What do you think will happen to the other bird beak types?

Food Chains/Webs

(http://www.lalc.k12.ca.us/target/science/city_butterflies/food_chain.html)

Concepts: An ecosystem consists of a community of living things interacting with each other and the environment. Most ecosystems derive their energy directly or indirectly from the sun. Food chains and food webs represent the feeding patterns of the members of an ecosystem, as well as the flow of energy.

Materials:

- Namecards of plants, animals, and sun (enough for your class--list included at end of lesson)
- Ball of yarn

Procedure:

1) Pass out the namecards to the students. Give the sun the ball of yarn.
2) Review with them that the sun is the source of all energy on earth. Ask the student portraying the sun to whom he or she would throw the ball of yarn to begin the food chain (green plant, or producer). The sun holds onto the end of the yarn and tosses the ball of yarn to a student wearing the name of a plant. **Ask the students why the first step of the food chain is plants.**
3) Now ask the plant person who would get the ball of yarn next (plant eater, or **herbivore**). Have the plant toss the ball of yarn to a student wearing the namecard of a plant-feeding animal, such as a butterfly. Be sure the "plant" holds onto the yarn before tossing the ball.
4) The plant feeder now looks around for something that eats it, and tosses the yarn to that animal (**carnivore or omnivore**).
5) The game progresses as each member of the food chain takes a turn while holding onto the yarn. The sequence stops at the top of the food chain, a predator that has no enemies, such as a hawk.
6) Give the ball back to the sun and start the sequence again with the previous participants still holding onto the yarn. Those who participated before can have another turn, thereby illustrating the growth of a food web. An animal usually has more than one source of food. For example, a bird can eat seeds and insects; or a hawk can eat a rabbit or snake. The coyote and opossum eat nearly everything--plants, animals, and human foods.
7) Have one link in the chain drop the yarn indicating its death due to pesticide consumption. **Students should hypothesize what happens to the other ends of that yarn.** For example, the butterfly could have fed on a plant that was sprayed with insecticide. Then a bird that eats it in turn could possibly die as a result, or at least begin to build up some of the toxins in its system. The hawk that feeds on that bird will also start to accumulate the contaminant in its system. A similar series of events did happen with the peregrine falcon and bald eagle. The result of their consumption of pesticides led to the laying of eggs with less than viable shells, and therefore they become endangered species.

Food Chain Links (modified for Hawaii):

Plants	**Herbivores**	**Omnivores**	**Carnivores**	**Decomposers**
Grasses	Butterfly	Rats	Dragonfly	Bacteria
Ohia	Grasshopper	Feral pigs	Feral cat	Earthworm
Strawberry-Guava	Iiwi	Pigeon	Frog	Sowbug
Koa	Cockatoo	Ants	Io	Millipedes
Lilikoi	Native Snail	Pueo	Mongoose	Fungi
Tree fern	Koa bug	Wasps		
		Drosophila (pomace/fruit fly)		

Seed Dispersal

Purpose: Students will examine seeds and predict and test the means of dispersal.

Materials:
1. Wind-borne seeds
2. Seeds that float
3. Seeds that stick to animals
4. Seeds that are eaten
5. Other seeds you find
6. Small fan, or use wind
7. Towels or socks or stuffed animals
8. Container of water

Procedure:
1. Set up a display of the seeds. Divide them into sets which contain some from each dispersal method. Number each seed sample.
2. With the class, review the concept of dispersal, and make a list of the ways in which seeds disperse.
3. Have students work in groups to examine a set of seeds. Each group will examine a variety of seeds, and will be required to answer the questions on the data sheet for two different seeds (at least one of these will be assigned to each group, to assure all seed types are examined). This will include recording a description of the seed (flat, winged, hairy, heavy, thorny, etc.) and their prediction of the way it travels from one place to another (wind, water, sticks, eaten, other).
4. Ask the students how they could find out which of these methods the seeds actually use. Conduct the tests they suggest. Some possible tests:
    Does it float?
    Does it blow in the wind?
    Is it yummy?
    Does it stick to clothes?
5. For those which do not behave as predicted, students may try a second test.
6. Final question: Do you think your assigned seed got to Hawaii on its own? How else may it have gotten here? Each group will present information about their assigned seed to the class and try to answer the above question.

More lessons? How did different types of animals come to Hawaii (Hawaiian history)?

Seed Disperal Data Sheet

Seed Type 1

1. Describe the seed. Draw a picture if it helps.

2. How do you think this seed disperses?

3. What features of the seed made you think the seed disperses this way?

4. How can you test if the seed disperses this way?

5. What happened in your test?

Seed Type 2

1. Describe the seed. Draw a picture if it helps.

2. How do you think this seed disperses?

3. What features of the seed made you think the seed disperses this way?

4. How can you test if the seed disperses this way?

5. What happened in your test?

Build A Super-Invader!!!

Purpose: Students will apply what they have learned about seed dispersal and plant adaptation to create invasive plants

Materials:
Drawing paper
Markers
Suggestion cards to seed dispersal mechanism

Procedure:
1. List mechanism of dispersal for seeds and habitats.
2. Separate students into groups
3. Then challenge them to make their own seed and plant.
4. Share drawings, seed and plant characteristic to class

More lessons? Compare to real invaders or Hawaii

Examples of mechanism of dispersal and habitat"

Children and playground
Bee and rainforest
Bird and beach (coast)