

THE FOOD PIT

SUMMARY

Student groups will be dealt a hand of cards which they must then trade with other groups until they have a complete food web.

OBJECTIVE

1. To reinforce the concepts of energy transfer through a trophic pyramid and the loss of energy at each subsequent level of trophism.
2. To develop an understanding that one of the relationships between living things is the transfer of energy.

BACKGROUND

Within an ecosystem, such as a forest, energy is constantly travelling from one trophic level to another and then being recycled back into the system. It is important for students to understand how this energy is passed along in the ecosystem and that there cannot be infinite trophic steps because of the energy lost from one step to another. At each stage of the trophic pyramid, energy is lost through metabolism, growth, reproduction, waste production and other aspects of living. This energy cannot be passed on to the next level; therefore, the living thing at the next level must acquire more of the living thing at the previous level to survive. By the time you reach the level of the keystone predator, the animal occupying the highest trophic level must spend considerable amounts of time and energy acquiring food which it will convert to energy because of the loss of energy which has occurred as the energy was passed up the trophic levels.

KEY CONCEPTS

| | | |
|------------------|------------|-----------------|
| Source of Energy | Population | Predator |
| Producer | Survival | Trophic pyramid |
| Consumer | Food Web | |
| Decomposer | Food Chain | |

MATERIALS

The following materials will make enough cards for four teams competing against each other. Enough of these cards are included in the packet, plus blank cards to make more, or if you wish to have the students create the objects on the cards themselves.

One deck of 62 playing cards:

4 cards labeled "sun"

24 cards labeled "producer"

In the deck these have a deciduous tree, dandelion and pine cone picture

16 cards labeled "herbivore"

In the deck these have a rabbit, cardinal and squirrel picture

8 cards labeled "carnivore/omnivore"

In the deck these have a fox, opossum, blue jay and skunk picture

4 cards labeled “keystone predator”

In the deck these have a great horned owl, coyote, bobcat and hawk picture

4 cards labeled “decomposer”

In the deck these have a worm picture

1 card labeled “people”

1 card labeled “pollution”

STRATEGIES

Engage

Ask students to describe a time when they were in competition with someone else. What was the goal? Do they think that this happens in the natural world? How might it look in the natural world?

Today’s Question: How does competition affect an animal’s ability to get energy?

Explore

Divide the class into four groups. Explain that they will be playing a game and the object of the game is to create a set of cards consisting of: the sun, six producers, four herbivores, two carnivore/ omnivores, one keystone predator, and one decomposer. If you wish to make the challenge greater, you could require the students to have working food chains within the trophic pyramid.

Shuffle cards and deal each group cards until they are all gone (some groups may have more cards than other groups due to the odd number of cards). Students in each group should secretly look at their hand and determine which cards they want to trade. One group representative then goes to the designated trading area to trade with another group. **NO ONE MAY SHOW HIS OR HER CARDS.** Each group can only trade with a group that wants to trade the same number of cards. As the swaps take place, neither group knows what they are getting until the trader returns to the group and the group looks at the new cards together. When a group has a set, they shout, “Food Pit!” and all trading stops. The group must prove to the others that they have a complete pyramid. If not, the game resumes.

The winning team gets 100 points, and there should be several rounds of play. You may decide to keep score on the board.

The “people” and “pollution” cards are special. If a group has the people card, they may use it as a wild card to replace any card that they are missing. **BUT**, they must be careful about hanging on to this card because if another group completes their food web first, 50 points will be deducted from the score of the team with the people card in possession. Should the group with the people card complete a food web without needing to use the people card, they pick up an extra 100 points.

The pollution card is always bad, and whichever group has the card when the game is done loses 50 points. Both cards may be traded just like any other card.

Explain

At the completion of the activity ask the students to share what they thought was going on as they competed for cards. Why did they need so many producers? Were there certain types of cards which were more difficult to acquire? Why? What advantage does an omnivore have over a carnivore?

Explain that when an animal eats another animal it gets energy from that animal. However, not all of the energy goes to the next animal, this makes a what we call a trophic pyramid. Can they take the cards and make them into a trophic pyramid? Why do they think that some of the energy does not go on to the next level? Is it lost? (No, used) Why do only the producers use the sun's energy?

What about the animals? Were they all the same? What makes some predators and some prey? Why doesn't the pyramid have as many predators? Are herbivores predators? (yes, prey on plants) Where do the decomposers get their energy?

This development of an understanding of the passing of energy from one trophic level to the next is key to the development of the next concepts. Often we stop right here with our discussions on the interrelationships of living things, but there is so much more to these interrelationships that students should understand. Many interrelationships are based on energy transfer.

Elaborate/Evaluate

Have student choose an ecosystem that they like and try to create a trophic pyramid using animals that can be found in the system. Would they likely find more of the herbivores and omnivores in the system than predators? Could they test this in some way?

Evaluation Rubric

| Proficient | Some Proficiency | Acceptable | Needs Work | Student does not understand concept |
|---|---|---|--|--|
| Student can construct a trophic pyramid containing all levels with multiple individuals at each level | Student constructs a pyramid with all levels, but may not have more than one organism at each level | Student constructs a pyramid that shows energy flow, but does not have all levels | Student constructs pyramid, but is missing more than one level or constructs the pyramid in an incorrect order | Student shows little understanding of pyramid structure and animals that fall in each category |

PRODUCER



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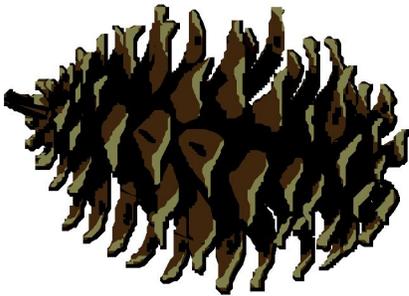
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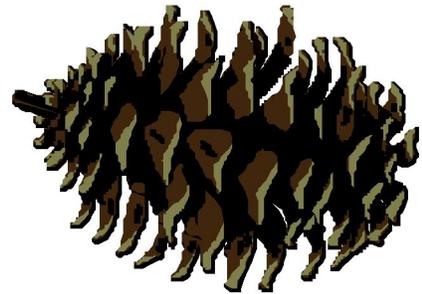
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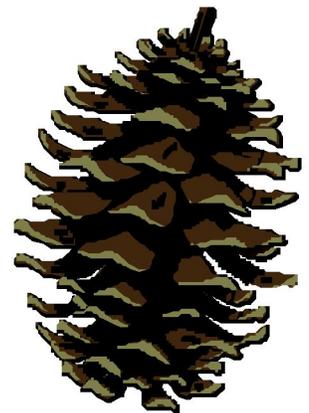
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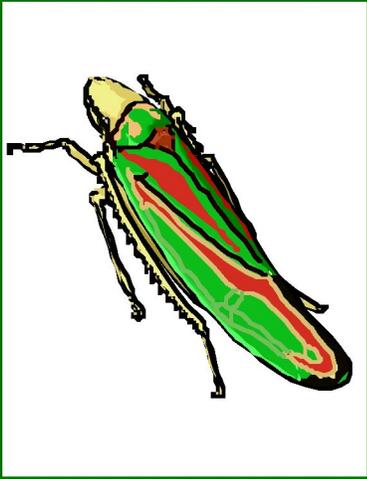
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HERBIVORE



HERBIVORE

HERBIVORE



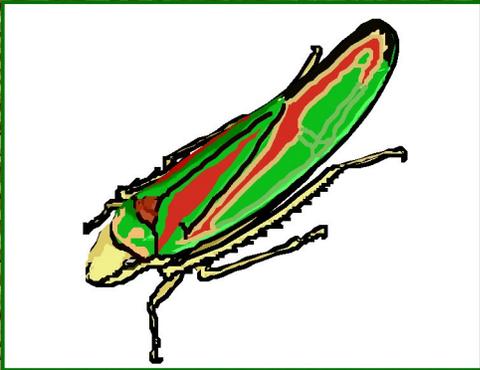
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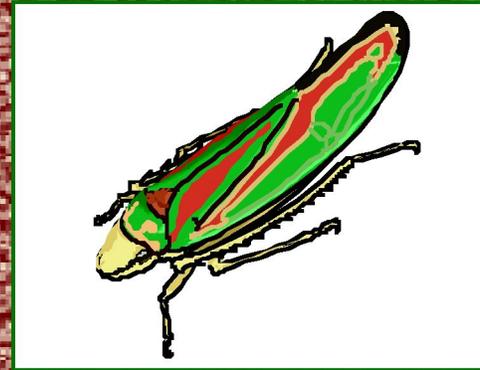
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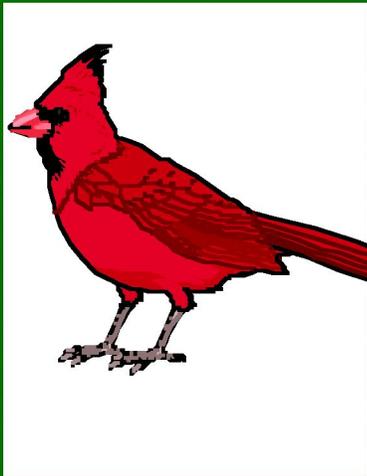
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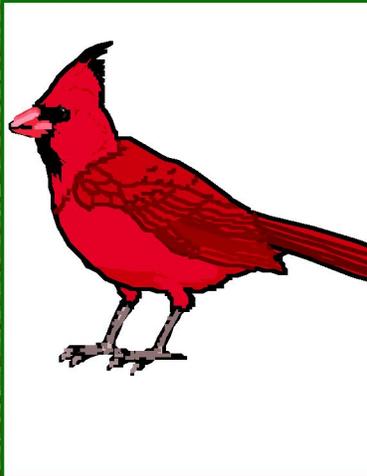
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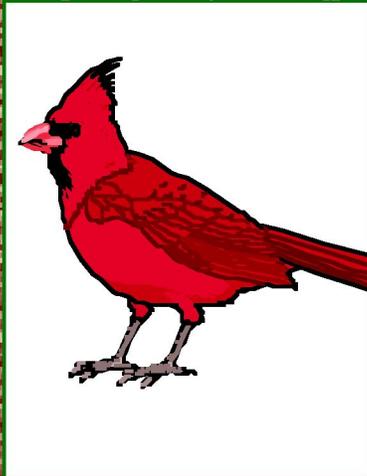
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CARNIVORE



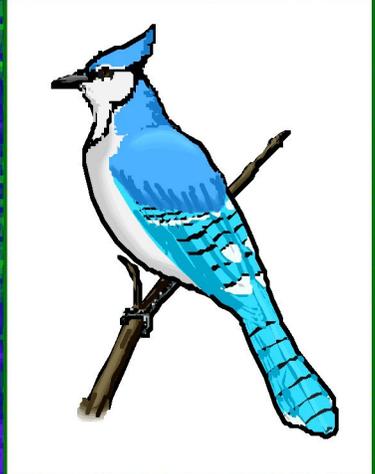
OMNIVORE

CARNIVORE



OMNIVORE

CARNIVORE



OMNIVORE

CARNIVORE



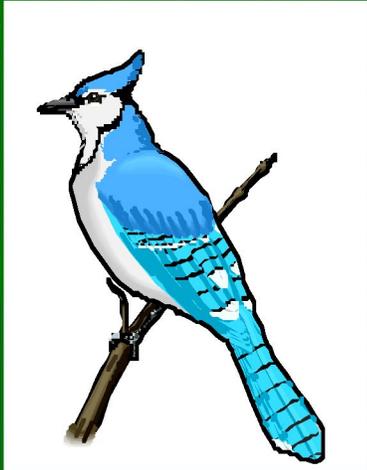
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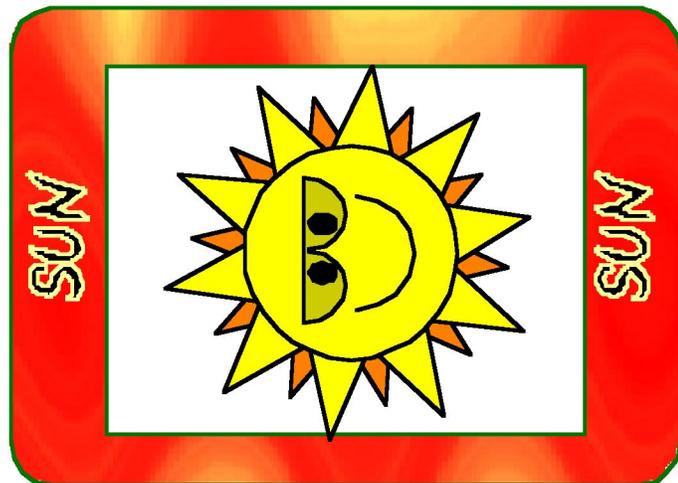
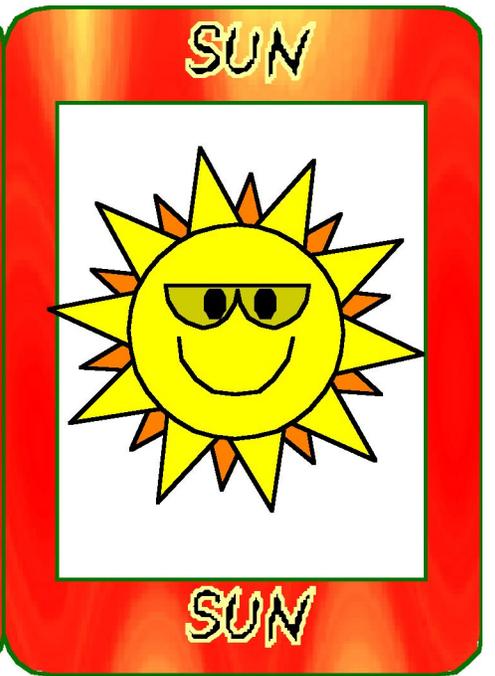
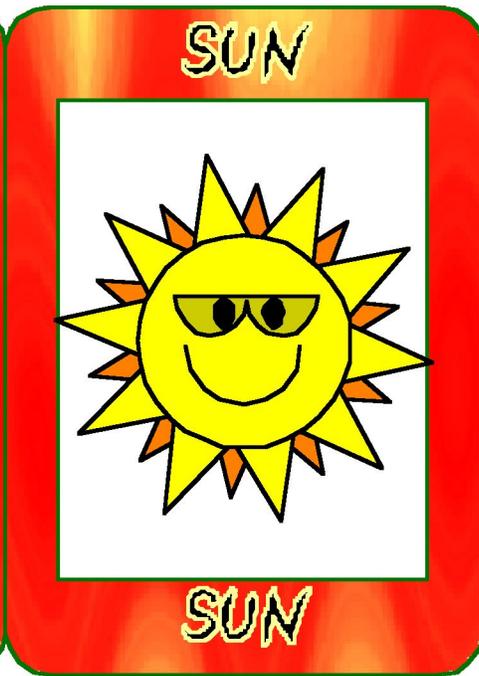
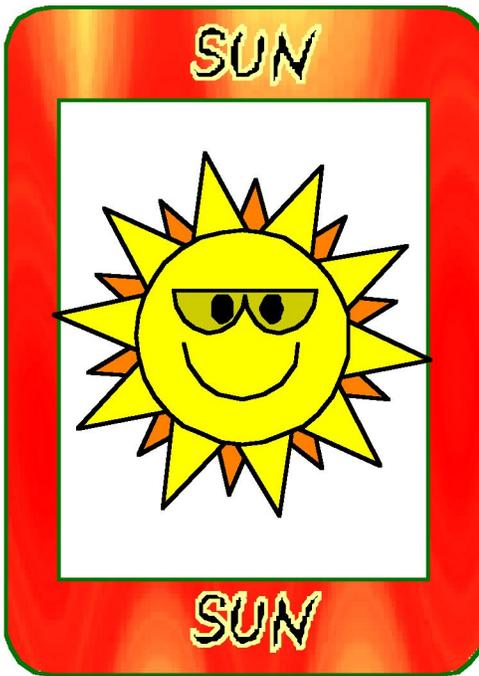


OMNIVORE

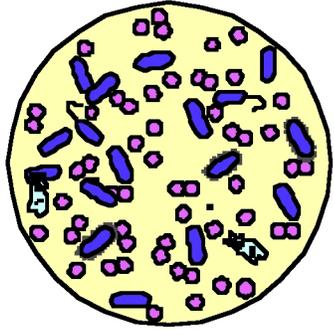
CARNIVORE



OMNIVORE

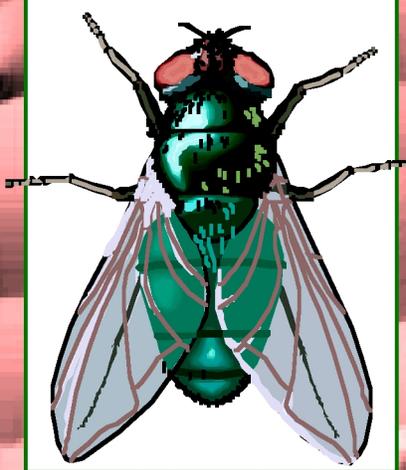


DECOMPOSER



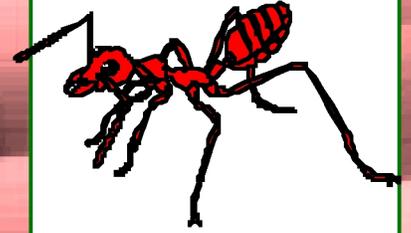
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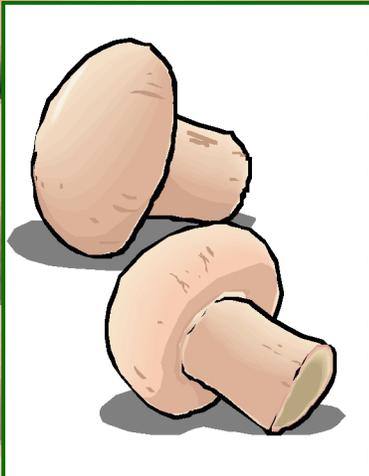
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DECOMPOSER

PEOPLE



PEOPLE

POLLUTION



POLLUTION