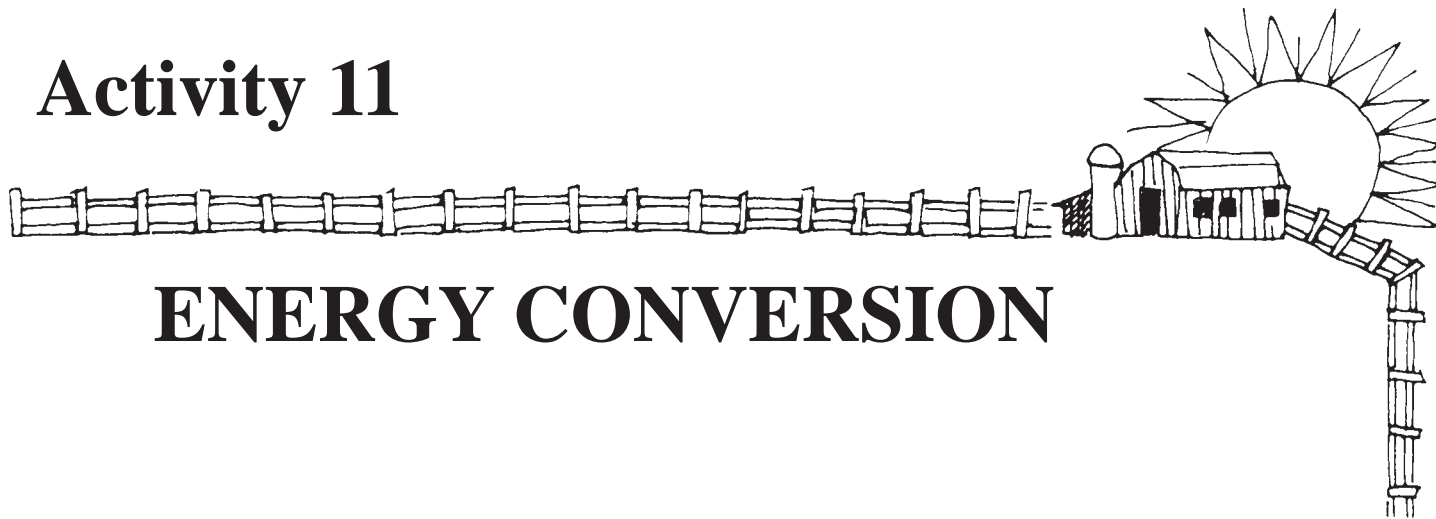


Activity 11



ENERGY CONVERSION

STUDY QUESTION: I have seen a model of a food chain. If the farmer produces my food, how does he fit into the model?

THE ACTIVITY: Students match farming activities with food chain components.

CURRICULUM FIT:

SCIENCE

- Matter and Energy.
- Chemical changes in matter.
- Energy resources.
- Conservation of energy resources.

MAJOR CONCEPTS

- Responsible use of energy.
- Examples of energy forms and uses.

LESSON CONCEPTS

- Farming practices have a direct influence on the process of energy conversion.
- Many farm activities support our food chain.

AGRICULTURE CONCEPTS: Production, Processing and Marketing System

PURPOSE:

- To show how man manages the food chain for his benefit.
- To understand how farming practices are related to the food chain and the energy flow.

MATERIALS REQUIRED: Supplied in this lesson.

TIME REQUIRED: 2 class periods.

BACKGROUND - For the Teacher

All living things depend on energy in one form or another. The primary source of energy on earth is the sun. The sun generates what is called solar energy. All other forms of energy in living systems originate with solar energy.

Gas, oil and coal are fossil fuels that had their beginning millions of years ago. They were once expansive forests that died, decayed, and were finally compressed by millions of years of overlying deposits. But not all energy conversion processes take millions of years. The simple food chain can be completed in a few hours.

The food chain is the result of solar energy being progressively changed from one form of energy to another to provide nutrition for plants and animals. Through photosynthesis, plants are able to use solar energy directly to manufacture food which is, in turn, suitable for some animals. These animals, which we call herbivores, convert this high fibre energy into higher quality protein food that is required by other animals, carnivores, and by humans. Because we eat both plants and animals, people are often called omnivores.

Man's increasing need for both plant and animal energy sources has led him to take a hand in the food chain. Efforts to increase the efficiency of this natural cycle have resulted in one of the world's oldest and most essential industries - agriculture.

The fact that all living things are interdependent makes it necessary for man to participate in the natural cycles which affect his life. In this exercise you will discover which farming activities are directly related to the production of energy.

PROCEDURE

Part 1

Introduction

1. Introduce the concept of energy production and use.
2. Ask the students to name as many different kinds of energy that they can think of.
3. Focus the discussion on food energy. How is solar energy changed into a useable fuel for people?
4. Borrow the film "Sun Changers" from the Alberta Agriculture, Food and Rural Development film library and show it to your class.

Part 2

Understanding Ideas

5. Discuss the film and the following ideas:
 - a) What is a food chain? (Give several examples.)
 - b) Is man a part of a food chain? Does man eat food? Then he must be a part of a food chain.
 - c) How does man influence his food chain by farming? (Raising plants and animals for food.)
 - Farmers help the food chain by helping plants and animals to grow and mature.
 - Some plants provide food for animals.
 - Some plants provide food for man.
 - Some animals provide food for man.

6. There are many kinds of farmers in Alberta. On the board, make a list of farm operations. This may include the following:
 - Dairy farmers raise and milk cows to give us milk and milk products.
 - Poultry farmers raise chickens and other birds for meat and eggs.
 - Beef farmers raise cattle for meat production.
 - Grain farmers grow grains for cereal, bread, vegetable oil, beer, and animal feed.

Part 3

The Activity

7. Divide the students into four groups.
8. Give each group a copy of the Farming and the Food Chain worksheet.
9. Give each group one of the four farming operation fact sheets and ask them to decide which farming activities listed on their fact sheet support the links in the food chain.
10. Have students do the Farming and the Food Chain worksheet.
11. Have each group make a simple cartoon or flow chart to show the links in the food chain that their farmer is involved with.

Part 4

Conclusion

12. It is important to plan an effective conclusion to this lesson. Using the flow chart of the farm operation, explain how the various activities affect energy production. The points where energy is actually converted to a new form are designated.
13. Ask the students what the consequences would be of omitting one or more of the steps. Students should be able to see that most of the steps influence the quantity and quality of the end product.

FOR DISCUSSION

1. Is there any way that we influence the food chain in our daily lives?
2. How is energy conversion managed by a farmer?
3. How does this compare to a natural energy flow?

RELATED ACTIVITIES

1. Make a list of the by-products which are the result of agricultural production of food.
2. Grow four edible plants; two in the classroom and two outside. Take special care of the classroom plants and leave the others to nature. Which grows the best? Why?
3. Visit a well organized farm for a guided tour of typical farm activities.

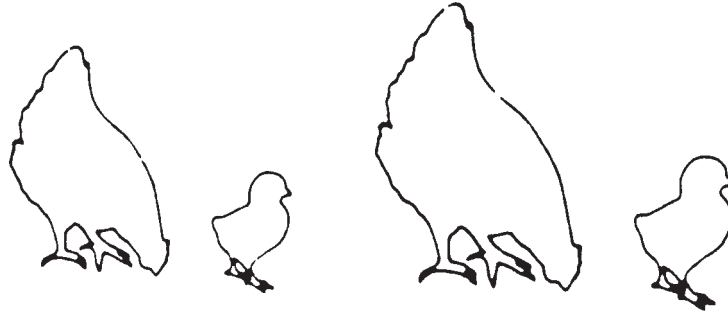
OPTIONAL RESOURCE MATERIALS

The film “The Sun Changers” available from the Department of Agriculture, Food and Rural Development.

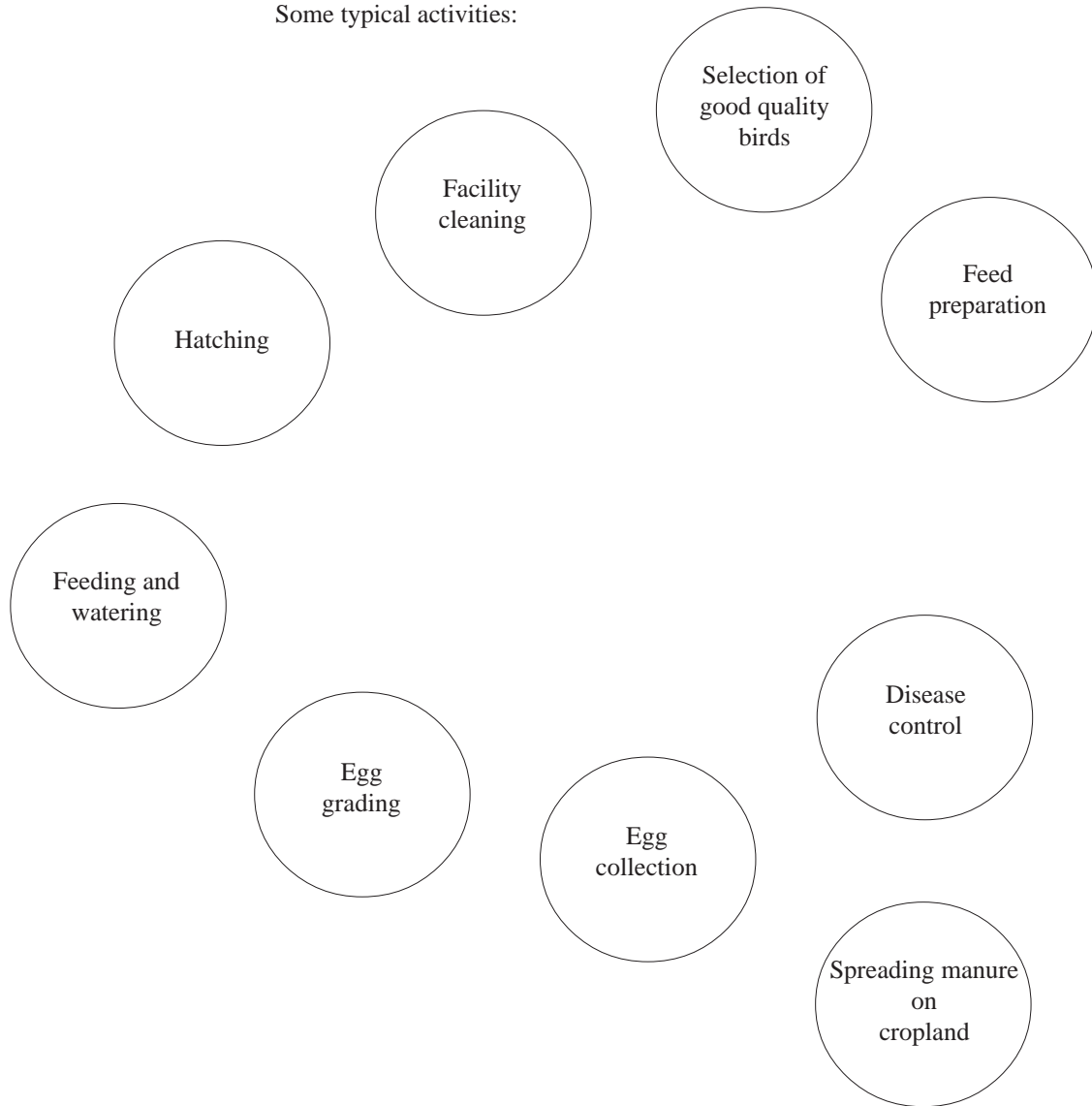


STUDENT RESOURCE

Egg Production



Some typical activities:



STUDENT RESOURCE

Ranching



Some typical activities:

Growing
feed for
winter

Fence
building

Weed
control

Selling
animals to
market

Winter
feeding

Supervision
during
calving

Health care

Watering

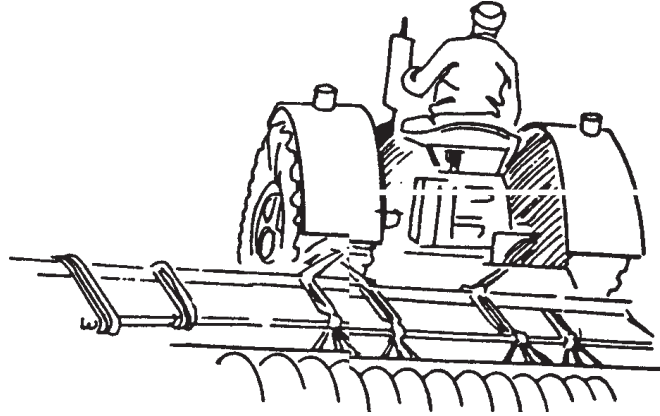
Selective
breeding

Herding stock
from pasture
to pasture



STUDENT RESOURCE

Grain Production



Some typical activities:

Weed control

Seed selection and cleaning

Disease control

Machinery repair

Seeding the crop

Harvesting

Cultivation of the land

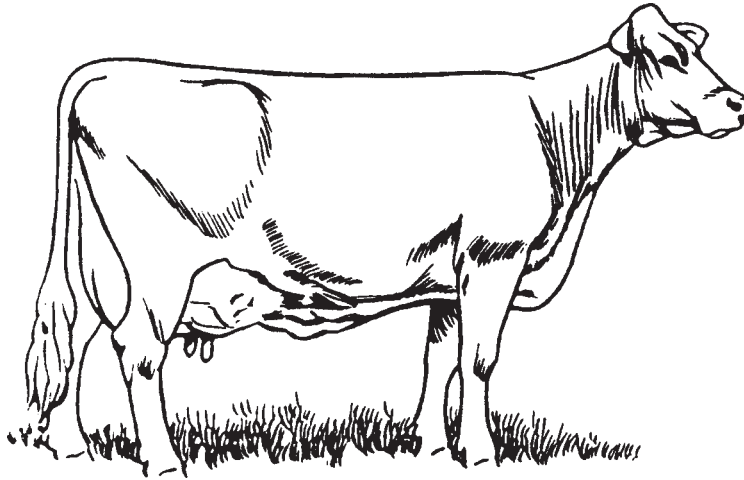
Pest control

Irrigation

Fertilizing the land

STUDENT RESOURCE

Dairy Operation



Some typical activities:

Care and raising of young animals

Selective breeding

Growing hay and grain for feed

Milking

Feeding and watering

Cleaning milking equipment

Cleaning barns and yards

Spreading manure on crop land

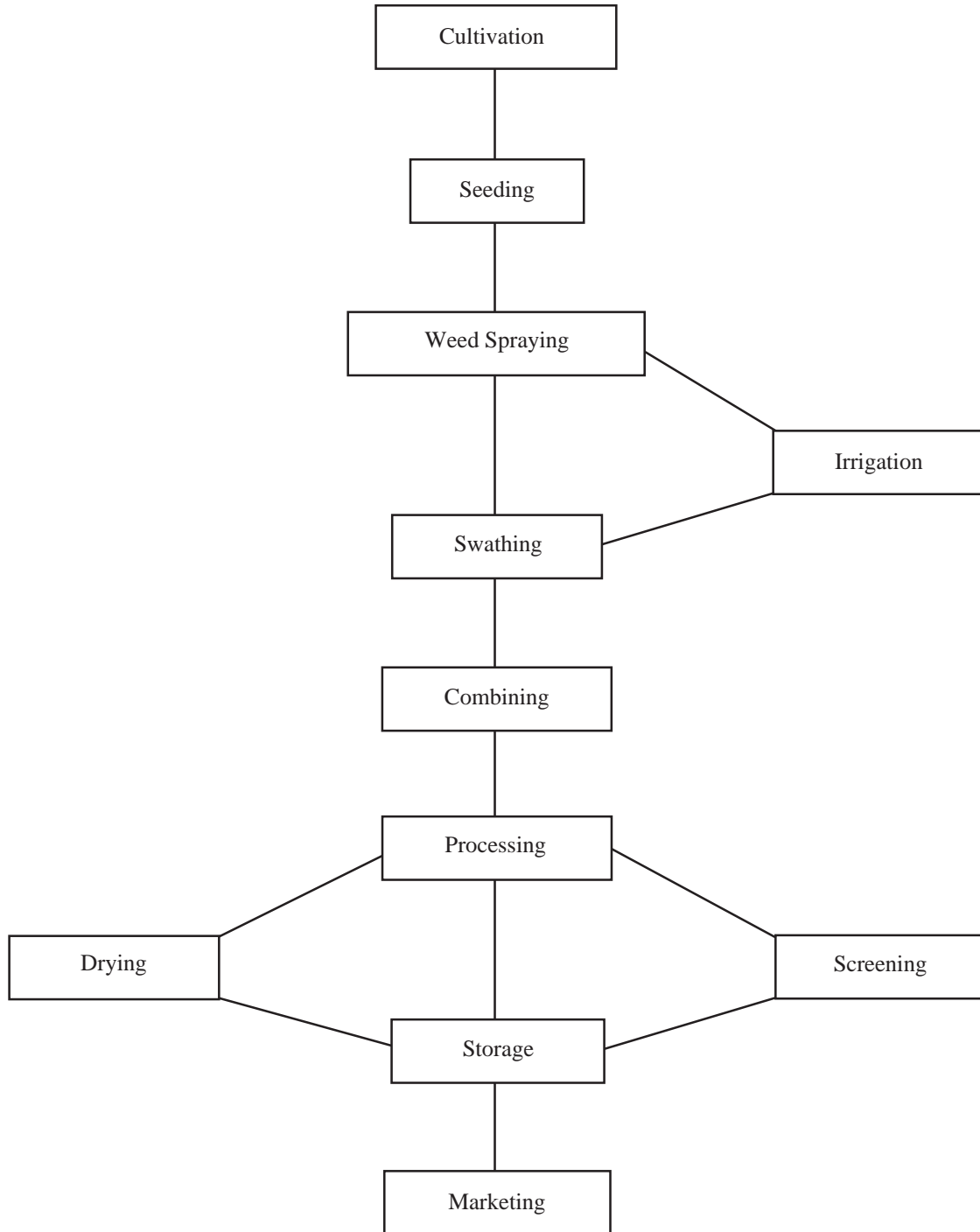
Health care

Supervision of calving



STUDENT RESOURCE

From feed to seed

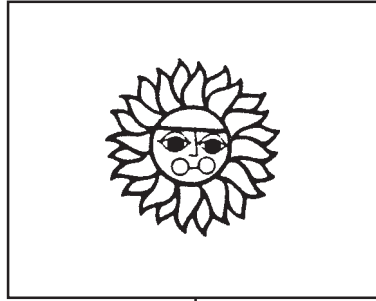


STUDENT RESOURCE

Food Chain

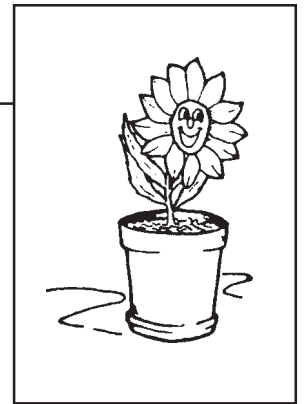


Sun



Earth

Green
Plants



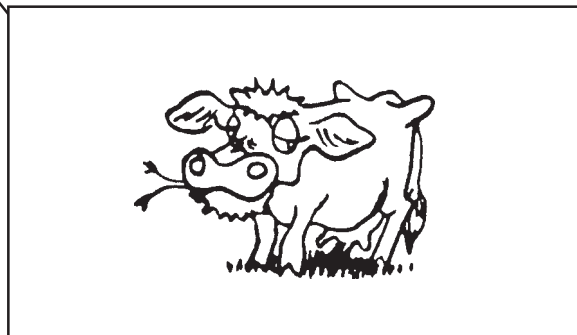
Death, Decay
& Wastes

Death
Decay

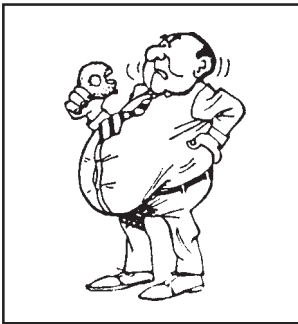


Death, Decay
& Wastes

Herbivores



Carnivores
(meat eaters)



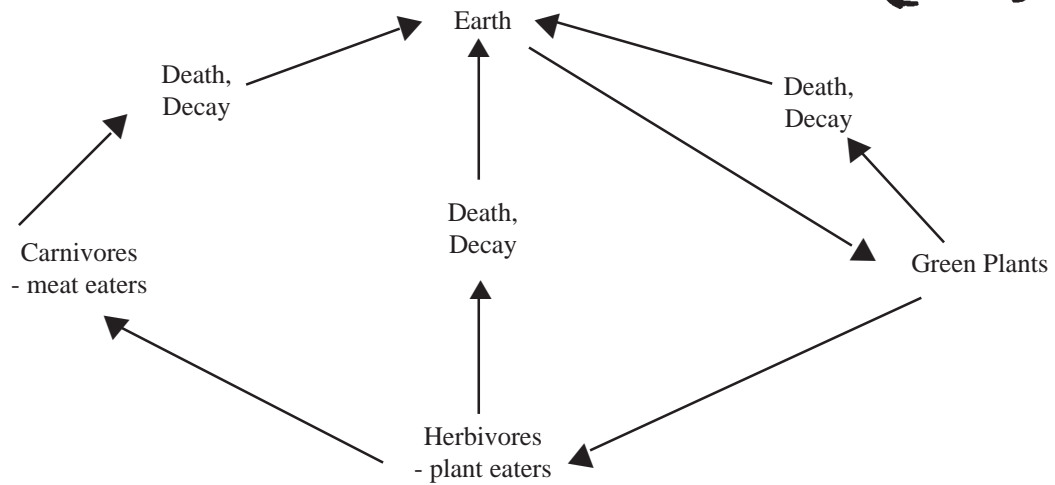
STUDENT RESOURCE

FACT SHEET --

Farming and the Food Chain



Simple Food Chain



This information will help you to complete your worksheet. Read carefully and then start to fill in the blanks on your worksheet.

UNDERSTANDING HOW FARMERS HELP THE FOOD CHAIN

Food Chain Link	Activity Example
1. Earth	- irrigation - cultivation - fertilization
2. Green Plants	- seeding - growing crops - harvesting - weed and pest control
3. Herbivores - plant eating animals	- feeding and watering - hatching - disease control - animal care - breeding
4. Carnivores - meat eaters	- milking - collecting eggs - marketing animals



Farming and the Food Chain

Type of farm operation _____

Fill in the farm activities on your farm operation that support the following food chain links.

NOTE

Your operation may not support all of the links.

Food Chain Link

Farm Activities

1. Earth

2. Green Plants

3. Herbivores (plant eaters)

4. Carnivores (meat eaters)



From Seed to Feed