



R A B B I T S : From the Animal's Point of View **3**



Rabbit Nutrition: What You Need to Know

Subject Overview and Background Information

This unit is designed for youth who are interested in learning about the nutrient requirements of rabbits. Like humans' food, whatever a rabbit eats will affect its overall health and energy level. Since domesticated rabbits cannot forage for food themselves, it is essential for their owners to be conscientious about what they are feeding their rabbits. A food pyramid like the one provided by the United States Department of Agriculture (USDA) as a dietary guide for humans is available for rabbits as well.

Rabbits have the same basic nutritional needs as humans. They require adequate amounts of carbohydrates, proteins, fats, fiber, vitamins, minerals, and water. However, too much or too little of any of the nutrients can cause problems for the rabbit.

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Rabbits are **herbivores**, which means that they eat plant material as the main part of their diet. They are able to get sufficient amounts of their basic nutrients from a **balanced diet** that includes hay, vegetables, fruits, and pellets. Pellets are a manufactured food that provides a good array of vitamins and minerals for rabbits. However, rabbit owners should not rely solely on pellets for feed since they are high in calories and can cause obesity. Remember, though, before you settle on your rabbit's diet, that it is important to determine the individual rabbit's specific nutritional requirements based on its age, gender, breed, and size.

Fiber is especially important in a rabbit's diet. Hay is a great source of fiber. Eating hay helps a rabbit's digestion by providing adequate roughage. Additionally, hay is important because it allows them to chew continuously. Rabbits' teeth are constantly growing, so this constant chewing is very important. It helps keep their teeth (particularly their incisors) sharp and worn down to a proper length. If rabbits do not chew enough, they may develop a painful dental disease called **malocclusion**, where the teeth are overgrown and do not match up properly.

One other very important aspect of rabbit nutrition is that they make and eat some of their own nutrients through a process called **coprophagy**. Rabbits eat these soft, nutritious pellets (called **cecotropes**), which they produce and secrete in the early morning. Cecotropes are important in helping the rabbit maintain proper levels of vitamin B. Coprophagy is a normal behavior and very important to the rabbit's overall health.

• Concepts and Vocabulary

Balanced diet, basic nutrients, cecotropes, coprophagy, essential nutrients, feces, herbivore, malocclusion

• Life Skills

Communication, contributions to group effort, cooperation, critical thinking, decision making, healthy lifestyle choices, keeping records, planning/organizing, problem solving, sharing, teamwork

• Subject Links

Science, Language Arts

• Overview of Activities

The first activity is entitled *Eat Your Vegetables!* In this activity, youth will look at a list of foods and categorize them according to the nutrients they provide. They will also be asked to create a list of the types of food they eat on a regular basis and to categorize them based on their nutrient content. They will compare these lists and determine whether the foods they eat provide their necessary daily nutrients.

In the second activity, entitled *Diet Detectives*, each group of youth will be given a scenario of the diet and common daily activities of a fictional person. They need to determine whether the person has received all of his or her necessary nutrients. If not, they will need to determine what nutrients are present in excess and what nutrients are lacking and tell how that might have affected the person's daily activities. They will also need to make recommendations regarding dietary improvements.

The third activity, *Herbivores: You Are What You Eat!*, has youth observing the diet of rabbits. The youth will be given a list of rabbit foods and will categorize the list, compare their categories to those generated by other youth, and, finally, compare it with a rabbit food pyramid. From the food pyramid, they will develop a shopping list of foods that will give rabbits a balanced diet.

References

- House Rabbit Society. Natural nutrition part I: The importance of fiber. Rabbit.org. <http://www.rabbit.org/journal/3-3/fiber.html>.
- Krepmpels, D. The mystery of rabbit poop. Bio.miami.edu. <http://www.bio.miami.edu/hare/poop.html>.
- Logsdon, A., and A. McDowell. Rabbit diet and nutrition. Zooh Corner Rabbit Rescue. Bunny.org. http://mybunny.org/infor/rabbit_nutrition.htm.
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Facts About Rabbits



NUTRITION

• Basic Facts

- Maintaining a rabbit's nutrition is very important. The number-one reason for diseases in rabbits is a poor diet.
- Rabbits are **herbivores**, meaning that they eat primarily plant material. However, rabbits can and will consume an **omnivorous diet** (plant and animal matter), including plants, fungi, roots, tree bark, fruit, snails, and worms.
- Because its eyes are directed out to the sides rather than to the front, a rabbit cannot actually see the food in front of it. Instead, it must use its sense of smell to determine what food has been presented to it and where that food is.
- A rabbit's digestive tract is unlike that of other mammals. The rabbit produces two types of droppings: fecal pellets (the round, dry pellets you see in the litter box); and **cecotropes**, which are made in a portion of the rabbit's digestive system called the cecum. The cecum contains bacteria and fungi that are essential for a rabbit's survival. The cecum also allows a rabbit to digest hay.
- An important part to a rabbit's diet is the production and ingestion of cecotropes in a process called

coprophagy. This is a normal and important behavior for rabbits because the cecotropes provide essential nutrients that rabbits cannot otherwise produce and that are necessary for their health. For this reason it is essential that rabbits have access to their waste in their litter box.

- Having the right diet is very important. If a rabbit develops a blockage in its digestive system, it can cause serious problems.
 - A rabbit's failure to eat for 12 to 24 hours is considered very serious. Take the rabbit to the veterinarian immediately!
 - Proper eating habits and exercise will help your rabbit live a happy, healthy, and long life.
- ### • Food!
- *Hay:* Hay is a good source of fiber and is very important in a rabbit's diet. The bulk of a rabbit's diet should be hay; it helps protect the intestines and prevent fur chewing, hairballs, and an overgrowth of normal bacteria in the cecum that can lead to severe diarrhea and even death. It is important that the hay be stored in a cool, dry place and discarded if it gets wet or moldy.

- *Vegetables:* Vegetables provide nutrients and water. Make sure vegetables are cleaned and rinsed before you feed them to rabbits. Try to provide dark-leafed vegetables, as they contain more nutrients. Some vegetables can cause rabbits to produce soft stools, so be sure to introduce new vegetables to the diet one at a time. Rabbits are like humans in that they enjoy different types of foods, so provide a variety of vegetables every day.
 - Here is a list of vegetables that can be given to rabbits, along with each vegetable's calcium content per cup (less calcium is better):
 - » *Beet greens:* 46 mg
 - » *Broccoli:* 42 mg
 - » *Carrots and tops:* 30 mg
 - » *Chicory greens:* 180 mg
 - » *Cilantro:* 16 mg
 - » *Collard greens:* 218 mg
 - » *Dandelion greens:* 103 mg
 - » *Kale:* 94 mg
 - » *Leaf lettuce:* 38 mg
 - » *Mustard greens:* 58 mg
 - » *Parsley:* 78 mg
 - » *Pumpkin leaves:* 24 mg
 - » *Radish and leaves:* 28 mg
 - » *Romaine lettuce:* 20 mg
 - » *Sweet peppers:* 6 mg
 - » *Turnip greens:* 105 mg
 - » *Watercress:* 40 mg
 - » *Rabbits also enjoy herbs like mint, basil, rosemary, anise, and others in small amounts.*
 - Here is a list of vegetables you should **not** feed to your rabbit:
 - » *Beans – None of them! (dried beans cause blockage, too)*
 - » *Beets*
 - » *Cabbage (can cause gas)*
 - » *Coffee or tea leaves or plants*
 - » *Corn (like beans, even dried corn can cause a blockage)*
 - » *Green beans*
 - » *Nuts (can cause blockages)*
 - » *Onions*
 - » *Packaged greens mixes in a bag (many contain spinach)*
 - » *Peas (dried can also cause a blockage)*
 - » *Potatoes*
 - » *Rhubarb*
 - » *Spinach (high calcium oxalate content)*
 - *Pellets:* Pellets were originally made for rabbits grown by agricultural producers, not for pet rabbits. The pellets were manufactured with lots of nutrients to make feeding easy and to promote fast growth. If you decide to feed pellets to your rabbit, make sure the pellets are fresh and of high quality. Even though pellets can be a part of a healthy rabbit diet (because they provide balanced vitamins and minerals), they should not form the bulk of the diet. Be careful not to overfeed with pellets: they are high in calories and can lead to health problems such as obesity.
 - *Fruits:* Fruits are the best treats to feed rabbits. High-fiber fruits are the best and should be fed in small quantities, and only as treats. If a rabbit eats too much sugar it can cause an imbalance in bacteria and fungi within the cecum. Here is of list of suggested fruits:
 - » *Apples (but NOT the seeds: they are toxic)*
 - » *Bananas and grapes (very limited amounts: they are very high in sugar)*
 - » *Papaya*
 - » *Peaches*
 - » *Pears*
 - » *Pineapple*
 - » *Raspberries*
 - » *Strawberries*
- Lastly, do not give your rabbit human treats, such as cereals, nuts, breads, chocolate, or grains or grain products (including crackers and pasta). Other treats to avoid are pet store products that contain high concentrations of dried corn and/or sugar.

• Basic Nutrients

- **Water:** This is the most important nutrient for rabbits. A rabbit must always have access to fresh, clean water. If a rabbit does not get enough water, it will not eat. There are different ways to hold water: a water bottle, a crock, or a bowl.
 - » *A water bottle is highly recommended because it keeps the cage clean and cannot easily be tipped over by the rabbit.*
 - » *A crock or bowl can also be used. Make sure they are secured down so they cannot spill.*
 - » *Clean and disinfect the crock or bowl occasionally to avoid bacterial problems.*
- **Carbohydrates:** Carbohydrates are used for energy. There are some carbohydrates that are essential to a rabbit's diet, but too much of some carbohydrates can make a rabbit sick. Sources include:
 - » *Grains*
 - » *Pellets*
 - » *Fruit*
- **Proteins:** Having enough protein is important because it allows the rabbit to maintain muscle, bone, hair, and eye health. However, too much protein can cause kidney damage, and not enough protein will make a rabbit sick. Sources include:
 - » *Grass hay: 8 to 15% protein*
 - » *Alfalfa hay: 17 to 23% protein*
 - » *Pellets: 13 to 20% protein*
 - » *Grains: 10 to 18% protein*
 - » *Cecotropes: 25 to 38% protein*
- **Fats:** Fats provide energy for rabbits and help with absorption of certain vitamins. However, an excess of fat can lead to obesity and heart disease in older rabbits. Sources of fat include:
 - » *Grains*
 - » *Nuts*
 - » *Pellets*
 - » *Oils (flax seed oils and vegetable oils)*
- **Fiber:** Fiber is crucial in a rabbit's diet. If a rabbit does not eat enough fiber, it can have many digestive problems. Too little fiber can eventually cause serious illness or even death. Sources of fiber include:
 - » *Indigestible parts of plants*
 - » *Hay, straw, and branches*

- » *Fruits and vegetables (but because their water content is so high, hay is a better source of fiber)*
- » *Pellets*

- **Vitamins:** Vitamins are an essential part of a rabbit's diet. They cannot make their own vitamins, so they must get them from the food they ingest (vegetables, pellets) and from cecal bacteria. Rabbits require all vitamins except vitamin C. An extreme excess of vitamin C can cause kidney damage. An excess of vitamin D can cause calcium deposits to form in tissues. Excess vitamin A can cause neurological and skin damage.
- **Minerals:** Minerals are essential to a rabbit's proper bodily function, too. Since plants usually have very high concentrations of minerals, rabbits that are fed adequate amounts of vegetables will not develop deficiencies. Pellets are another good source of minerals. When consumed in excess, most minerals are harmless. An exception is calcium. If consumed in excess, calcium can give a rabbit a condition called "bladder sludge." On the other hand, too little calcium may lead to bone loss and may affect bone strength.

• Requirements for Different Types of Rabbits

Much like humans, rabbits come in many different types. They vary in breed, age, size, and gender, and each type of rabbit has different nutrient requirements. The books listed in the References section provide a good overview of different types of rabbits, and particularly different ages of rabbits.

References

- American Animal Hospital Association. 2008. Rabbit nutrition. Healthypet.com. http://www.healthypet.com/library_view.aspx?ID=127&sid=3.
- Andrews, Connie. 2009. Rabbit fact sheet. HopperHome.com. http://www.hopperhome.com/rabbit_fact_sheet.htm.
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- Fayo, C. 2004. Rabbit diet information. Bucky's Bunny Barn. <http://buckysbunnies.tripod.com/Diet.html>.
- Harriman, Marinell. 2005. *House rabbit handbook: How to live with an urban rabbit*. Alameda, CA: Drolley Press.
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ACTIVITY 1



Eat Your Vegetables!

Background Information

Do you know why it's important to eat vegetables? Different kinds of foods provide us with different types of nutrients that allow our bodies to function properly. The **basic nutrients** that we acquire from the foods we eat include carbohydrates, proteins, fats and oils, calcium, vitamin C, vitamin A, and fiber. Some people are very conscious of the food they eat and the nutrients that it provides them, and some people are not. When we write down what we eat, it can help us determine whether we are getting the right nutrients in our daily diet.

• Time Required

30 to 45 minutes

• Concepts and Vocabulary

Basic nutrients. For rabbits, this includes carbohydrates, proteins, fats and oils, calcium, vitamin C, vitamin A, and fiber.

• Life Skills

Communication, critical thinking, healthy lifestyle choices, keeping records, problem solving, sharing

• Subject Links

Language Arts

• State Content Standards

Language Arts

- Third Grade:
 - » *Listening and Speaking Strategies – 1.5*
- Fourth Grade:
 - » *Listening and Speaking Strategies – 1.8*
- Fifth Grade:
 - » *Listening and Speaking Strategies – 1.5*

• Suggested Grouping

Pairs.

• Materials Needed

(* = *Materials provided in curriculum*)

- * General Source of Nutrients Worksheet
- * List of Familiar Foods for Humans
- Notebook paper
- Pen/pencil; markers
- Flip chart paper

• Getting Ready

- Make enough copies of the *General Source of Nutrients Worksheet* to provide each youth with *two* copies.
- Pass out one copy of the *List of Familiar Foods for Humans* to each pair.
- Provide each pair with flip chart paper and writing implements.

Opening Questions

1. **We've all heard our parents say, "Eat your vegetables!" Why do you think this might be important? What do you think makes vegetables and other plant-based foods such as fruit so important to our diet?** Ask the youth to share their ideas verbally or write their thoughts and ideas on the paper provided.
2. **What other foods do you think are important to eat? Explain why you think they are important.** Ask the youth to share their ideas verbally or write their thoughts and ideas on the paper provided.

Procedure (Experiencing)

1. Working in pairs, have the youth look at the *List of Familiar Foods*. Have them organize the foods and place each under the correct nutrient category (e.g., protein, carbohydrate) on the *General Source of Nutrients Worksheet*.
2. Additionally, because people come from so many different backgrounds and cultures, have each pair brainstorm and write down at least one food that is common in his or her home or culture and that is not on the *List of Familiar Foods*. Have them place the food item under the correct nutrient category.

Sharing, Processing, and Generalizing

Have the youth share their lists with the rest the group. Have them compare their lists to other groups' lists. What are the similarities? What are the differences, if any? If there are differences, discuss why. Have the youth also share information about their ethnic foods and compare them with those of other groups.

Each nutrient has an important function for the body and is easily obtained in food. Follow the lines of thinking developed through the general questions raised by the youth, and use these to draw out their thoughts and ideas; if necessary, use more specific questions as prompts to get to particular points. Examples might include

1. **What differences are there between how the groups categorized the foods?** Discuss these differences and work toward a consensus on categorization.
2. **Why do you think it is important to eat a variety of foods each day?** Ask the youth to share their ideas verbally or write their thoughts and ideas on the paper provided.
3. **Why do you think that certain foods are called “junk foods”? What do you think are the differences between junk foods and healthy foods?** Ask the youth to share their ideas verbally or write their thoughts and ideas on the paper provided.

Concept and Term Discovery/Introduction

At this point, volunteers need to ensure that the concept of **basic nutrients** has been introduced or discovered by the youth. (**Note:** The goal is to have the youth develop concepts through their exploration and define terms using their own words.)

Concept Application

1. Ask each youth to develop a list of foods that they eat frequently.
2. Working in pairs, ask the youth to categorize their lists under the correct nutrient category on the *General Source of Nutrients Worksheet*.
3. Have the youth discuss their food choices. If they believe that their diet is not balanced, have them decide on some alternatives they might choose in order to obtain different essential nutrients.

References

- Applegate, E., and M. Braun. 2004. Nutrition basics for better health and performance. Kendall/Hunt Publishing Company: Dubuque, IA.
- Netzer, C. T. 2000. The complete book of food counts. Dell Publishing: New York.
- United States Department of Agriculture. 2009. Inside the Pyramid. What are “oils”? MyPyramid.gov. <http://www.mypyramid.gov/pyramid/oils.html>.



List of Familiar Foods for Humans

apples



avocados

bananas

beef

broccoli

brown (whole grain) rice

butter

candy

canola oil



carrots

cheese

chicken

chili

chocolate

coconut oil

corn

cucumbers

deep-fried foods

donuts

eggs

grapefruit juice

grapes

green beans



ice cream

kidney beans

lemons

margarine

milk

oatmeal

oranges

pasta (processed)

pastries

peaches

peanuts

pork



potatoes

pretzels (processed)

salmon

soda

spinach

strawberries



syrup

tomatoes

tunafish

white bread (processed)

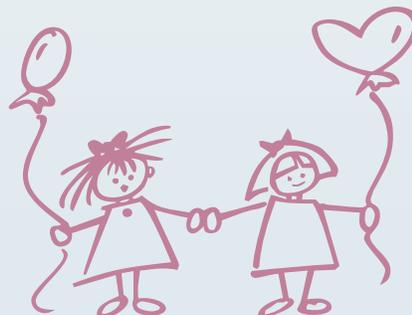
white rice (processed)

whole grain bagels

whole wheat bread

whole wheat pasta

yogurt (plain, low fat)



General Source of Nutrients Worksheet

PROTEIN

Protein is found in animal products, nuts, and beans.

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

CARBOHYDRATES

Carbohydrates are found in processed wheat and grains and in starchy vegetables.

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

FIBER

Fiber is found in whole grains, beans, oats, and bran.

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

CALCIUM

Calcium is found in dairy products and dark green vegetables.

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

VITAMIN C

Vitamin C is found in fruit, especially citrus fruit.

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

General Source of Nutrients Worksheet, Continued**VITAMIN A**

Vitamin A is found in animal products and reddish colored foods.

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

FATS AND OILS

Oils can be found in fish, nuts, and vegetable oils. Fats come from many animal foods (including butter) and processed vegetable oils (including margarine).

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

LIMITED NUTRITIONAL VALUE

These foods do not provide important nutrients. They include processed snack foods that are high in salt and sugar.

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

ACTIVITY 2



Diet Detectives

Background Information

What we eat can have a big influence on what we can do and how we feel. Dietary deficiencies in important nutrients such as carbohydrates, proteins, calcium, vitamin C, vitamin A, and fiber over a period of time can lead to problems like low energy, poor concentration, and illness. A **balanced diet** that contains all essential nutrients will help us keep our minds and bodies healthy, active, and strong.

• Time Required

40 to 60 minutes

• Concepts and Vocabulary

Balanced diet. Eating the right types and amounts of food to maintain a healthy body.

• Life Skills

Communication, contributions to a group effort, cooperation, critical thinking, healthy lifestyle choices, keeping records, problem solving, sharing, teamwork

• Subject Links

Science, Language Arts

• State Content Standards

Science

- Third Grade:
 - » *Investigation and Experimentation – 5d*
- Fourth Grade:
 - ◇ *Investigation and Experimentation – 6c*
- Sixth Grade:
 - » *Investigation and Experimentation – 7a, 7e*

Language Arts

- Third Grade:
 - » *Reading Comprehension – 2.2*
- Fourth Grade:
 - » *Reading Comprehension – 2.3*
 - » *Listening and Speaking Strategies – 1.7, 1.8*
- Fifth Grade:
 - » *Reading Comprehension – 2.4*
 - » *Listening and Speaking Strategies – 1.5*
- Sixth Grade:
 - » *Reading Comprehension – 2.3*
 - » *Listening and Speaking Strategies – 1.5*

• Suggested Grouping

Groups of 2 to 5.

• Materials Needed

- (* = *Materials provided in curriculum*)
- * *General Sources of Nutrients Key*
- * *USDA MyPyramid*
- * *Sample Diets*
- * *General Facts on Nutrients Handout*
- Flip chart paper
- Pencil/pen
- Notebook paper

• Getting Ready

- Make enough *Sample Diets* worksheets to give one to each group.
- Make enough copies of the *General Facts on Nutrients Handout* and *General Sources of Nutrients Key* to give one to each group.
- Make enough *USDA MyPyramids* to give one to each group.
- Pass out the materials to each group.

Opening Questions

- 1. When you hear the phrase “a balanced diet,” what does that mean to you?** Ask the youth to share their ideas verbally or write their thoughts and ideas on the paper provided.
- 2. What do you think might happen if we didn't eat enough of the types of foods that provide the proper nutrients?** Ask the youth to share their ideas verbally or write their thoughts and ideas on the paper provided.

Procedure (Experiencing)

(Facilitator Note: Please set this scenario up for the youth.)

Explain to them that they are “Diet Detectives.” Their job is to review different people's diets and use the resources provided to recommend changes to make the diets more balanced.

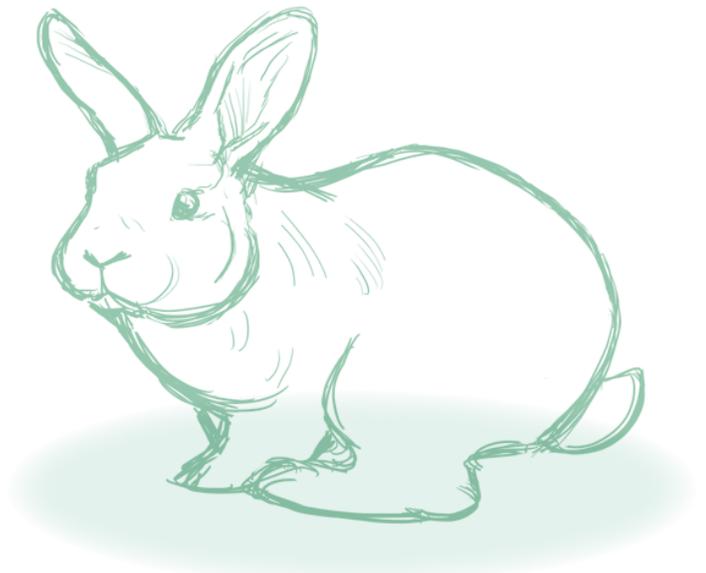
- 1.** A set of *Sample Diets*, a copy of the *General Facts on Nutrients Handout*, a copy of the *General Sources of Nutrients Key*, and a copy of the *USDA MyPyramid* will be distributed to each group.
- 2.** Each group will read the *Sample Diets*. From the information provided on the diets, the *General Facts on Nutrients Handout*, and the *Human Food Pyramid*, the youth will work together to determine the following:
 - » *Which nutrients, if any, do they believe are missing or present in excess from the different diets? Please have them record and explain their ideas on the flip chart paper provided.*
 - » *How can each diet be improved? What foods would they recommend be added to or removed from the diets to make them better balanced? Please have them record and explain their ideas on the flip chart paper provided.*

Volunteer Note: It may help to have the youth generate a chart to organize their thoughts.

Sharing, Processing, and Generalizing

After the youth have completed the procedure, have them share their thoughts and responses to the different scenarios. Follow the lines of thinking developed through the general thoughts, observations, and questions raised by the youth; if necessary, use more targeted questions as prompts to get to particular points. Specific questions might include

- 1. How, if at all, do your group's answers differ from those of other groups?** Compare the groups' answers and talk about how and why they differ. Ask the youth to record their thoughts and ideas on the paper provided.
- 2. What do you believe might happen if people who were missing an essential nutrient continued their diet unchanged for a long period of time?** Ask the youth to record their thoughts and ideas on the paper provided.
- 3. What are some ways you can make sure you have a balanced diet and get the proper nutrients?** Ask the youth to record their thoughts and ideas on the paper provided.



Concept and Term Discovery/ Introduction

At this point, volunteers need to ensure that the concept of a **balanced diet** has been introduced or discovered by the youth. (**Note:** The goal is to have the youth develop concepts through their exploration and define terms using their own words.)

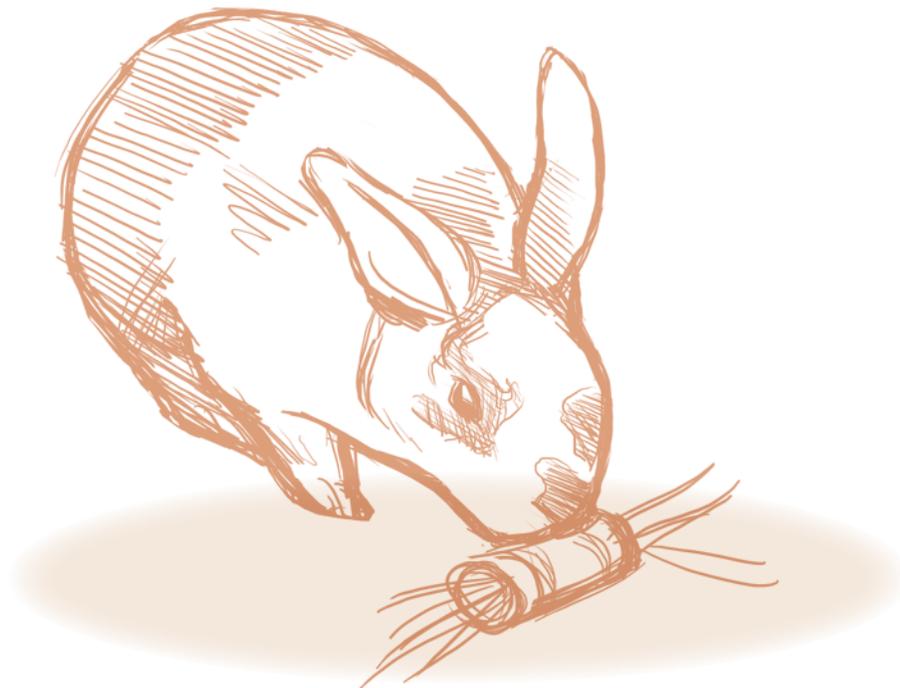
Concept Application

1. On their own piece of paper, ask each youth to write down everything they can remember eating in the last three days. Ask the youth in each group to share their lists with one another, then have the different groups share and compare their results.
2. Using the piece of flip chart paper provided, ask the groups to put the foods from their individual papers into categories based on food types. Then ask them to rank the categories, first in according to quantities consumed (how much of a given food type) and then according to importance for good health (healthy vs. not-so-healthy foods).
 - » (**Volunteer Tip:** *Encourage the youth to develop their own organizational scheme for categorizing the food.*)

3. Once all of the groups have completed steps 1 and 2, ask them to compare their results with the *USDA MyPyramid*. What are some of their observations?
4. Based on the foods that they eat, ask each group to prepare a three-day menu that complies with the recommendations of the *USDA MyPyramid*.
5. Ask the groups to share and compare their three-day menus.

References

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- United States Department of Agriculture. 2009. Dietary guidance. USDA Food guide pyramid resources. http://fnic.nal.usda.gov/nal_display/index.php?info+center=4&tax_level=3&tax_subject=256&topic_id=1348&level3_id=5715.
- University of Maryland Medical Center. 2009. Nutrition. <http://www.umm.edu/altmed/ConsModalities/Nutritioncm.html>.



General Source of Nutrients Key

Note: The examples for each category are common sources for each nutrient listed

PROTEIN

beef
cheese
chicken
chili
corn
eggs
kidney beans
milk
peanuts
pork
salmon
tunafish

CARBOHYDRATES

brown rice
corn
pasta (processed)
pretzels
white bread
white rice
whole grain bagels
whole grain pasta
whole wheat bread

FIBER

apples
broccoli
brown rice
chili
corn
kidney beans

oatmeal
oranges
peaches
potatoes
strawberries
whole grain bagels
whole grain pasta
whole wheat bread

CALCIUM

broccoli
cheese
low fat milk
spinach
whole milk
yogurt (plain, low fat)

VITAMIN C

apple juice
apples
broccoli
cucumbers
grapefruit juice
grapes
green beans
lemons
oranges
peaches
potatoes
spinach
strawberries
tomatoes

VITAMIN A

beef
broccoli
carrots
cheese
eggs
green beans
milk
peaches
spinach
strawberries
tomatoes

FATS AND OILS

avocados
butter
canola oil
coconut oil
margarine
peanuts
salmon

LIMITED NUTRITIONAL VALUE

chocolate
deep-fried foods
donuts and other pastries with
high sugar content
ice cream
other candy
soda
syrup

Reference

Nutrition Data: Know what you eat. NutritionData.com. <http://www.nutritiondata.com>

MyPyramid For Kids

Eat Right. Exercise Have Fun.
MyPyramid.gov

Grains	Vegetables	Fruits	Milk	Meat & Beans
<p>Make half your grains whole</p> <p>Start smart with breakfast. Look for whole-grain cereals.</p> <p>Just because bread is brown doesn't mean it's whole-grain. Search the ingredients list to make sure the first word is "whole" (like "whole wheat").</p>	<p>Vary your veggies</p> <p>Color your plate with all kinds of great-tasting veggies.</p> <p>What's green and orange and tastes good? Veggies! Go dark green with broccoli and spinach, or try orange ones like carrots and sweet potatoes.</p>	<p>Focus on fruits</p> <p>Fruits are nature's treats – sweet and delicious.</p> <p>Go easy on juice and make sure it's 100%.</p>	<p>Get your calcium-rich foods</p> <p>Move to the milk group to get your calcium. Calcium builds strong bones.</p> <p>Look at the carton or container to make sure your milk, yogurt, or cheese is lowfat or fat-free.</p>	<p>Go lean with protein</p> <p>Eat lean or lowfat meat, chicken, turkey, and fish. Ask for it baked, broiled, or grilled – not fried.</p> <p>It's nutty, but true. Nuts, seeds, peas, and beans are all great sources of protein, too.</p>
<p>For an 1,800-calorie diet, you need the amounts below from each food group. To find the amounts that are right for you, go to MyPyramid.gov.</p>				
<p>Eat 6 oz. every day: at least half should be whole</p>	<p>Eat 2 1/2 cups every day</p>	<p>Eat 1 1/2 cups every day</p>	<p>Get 3 cups every day: for kids ages 2 to 8, it's 2 cups</p>	<p>Eat 5 oz. every day</p>
<p>Oils Oils are not a food group, but you need some for good health. Get your oils from fish, nuts, and liquid oils such as corn oil, soybean oil, and canola oil.</p>				

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Sample Diets

MARK'S DIET

Breakfast: 3 pieces of white toast with butter
Lunch: White rice with chopped spinach
Dinner: White pasta with steamed carrots, apple juice

JENNY'S DIET

Breakfast: Eggs and sausage
Lunch: Hotdog on a white bun
Dinner: Steak with chicken, apple juice

MOLLY'S DIET

Breakfast: 2 pieces of whole wheat toast with butter, milk
Lunch: brown rice topped with peanuts, grapefruit juice
Dinner: whole wheat bagel with cheese, apple juice

SCOTT'S DIET

Breakfast: 2 donuts
Lunch: two orders of French fries, one candy bar
Dinner: deep-fried chicken, broccoli, soda

SYDNEY'S DIET

Breakfast: bacon, French toast (made with white bread)
with lots of butter and syrup
Lunch: fried chicken strips, French fries
Dinner: 4 slices of cheese pizza, chocolate cake



General Facts on Nutrients Handout

• Carbohydrates

- **Function:** Carbohydrates provide energy to the body, especially to the brain and the nervous system.
- **Types and sources of carbohydrates:**
 - » *Simple carbohydrates: Fruits, some vegetables, some dairy products, refined grains (processed flour), sugar, and corn syrup.*
 - » *Complex carbohydrates: Starchy vegetables, whole grains and cereals*
- **Possible effects:**
 - » *Too little: Fatigue or lack of energy, malnutrition, and increased fat intake.*
 - » *Too much: Obesity.*

• Protein

- **Function:** Protein is an important source of energy and is essential for growth and organ function.
- **Sources of protein:** Meat, fish, eggs, cheese, beans, lentils, tofu and nuts.
- **Possible effects:**
 - » *Too little: Muscle loss, decrease in growth, decreased immunity (easier to get diseases or illnesses).*
 - » *Too much: Can cause high cholesterol and different types of diseases, such as gout.*

• Calcium

- **Function:** Calcium is a very important mineral because it makes up structures like teeth and bones. It helps us grow and maintains our bodies. It also helps to prevent diseases like osteoporosis (weak bones).
- **Sources:** It is found in many types foods, but is very abundant in dairy products. It is also found in green leafy vegetables (e.g., broccoli), some seafood (e.g., salmon), almonds, and dried beans.

▪ **Possible effects:**

- » *Too much: Normally no side effects appear, but if calcium intake is high over a long period of time it can cause the development of kidney stones.*
- » *Too little: Deficiencies in calcium can lead to increased chance of broken bones or tooth decay.*

• Vitamin A

- **Function:** Vitamin A helps maintain healthy teeth, bones, soft tissue, and skin. It also helps promote good vision.
- **Sources:** Meats and animal products (milk, eggs), dark leafy green vegetables (e.g., spinach), and brightly colored vegetables (e.g., carrots) and fruits (e.g., cantaloupe).
- **Possible effects:**
 - » *Too little: Vision problems; decreased resistance to disease.*
 - » *Too much: Can cause Vitamin A poisoning when consumed in very large amounts.*

• Vitamin C

- **Function:** Vitamin C is essential for normal growth and development. It is needed to make skin, scar tissue, heal wounds, and repair bone, cartilage, and teeth. Since our bodies cannot make or store vitamin C, we must get it from foods we eat.
- **Sources:** Fruits and vegetables.
- **Possible effects:**
 - » *Too little: Damaged hair, bleeding gums, rough and dry skin, easy bruising, slow healing of wounds, and nosebleeds.*
 - » *Too much: Vitamin C toxicity can occur which can lead to upset stomachs and diarrhea.*

• Fiber

- **Function:** Fiber is important in the diet because it helps us feel full after eating, and that can help with weight control. It also helps with food digestion and prevents constipation.
- **Types and sources of Fiber:**
 - » *Soluble:* This type of fiber is digested slowly in the body and can lower cholesterol and help prevent heart disease. Sources of soluble fiber include oat bran, barley, nuts and seeds, beans, and some fruits and vegetables.
 - » *Insoluble:* This helps food pass through the stomach and intestines faster and adds bulk to the stool. Types of food high in insoluble fiber include wheat bran, vegetables, and whole grains.
- **Possible effects:**
 - » *Too little:* Constipation (difficulty passing bowel movements).
 - » *Too much:* Eating too much in a short period of time can cause gas, bloating, and cramps.

• Fats and Oils

- **Function:** Fats and oils are a source of energy. There are essential fatty acids that our body cannot make so we must get them from our diet. When stored in our bodies, fat is like an energy reserve, storing calories for when we do not have food to eat. Stored fat also helps insulate the body, maintains healthy hair and skin, and helps our body absorb different vitamins.

▪ Types of fats:

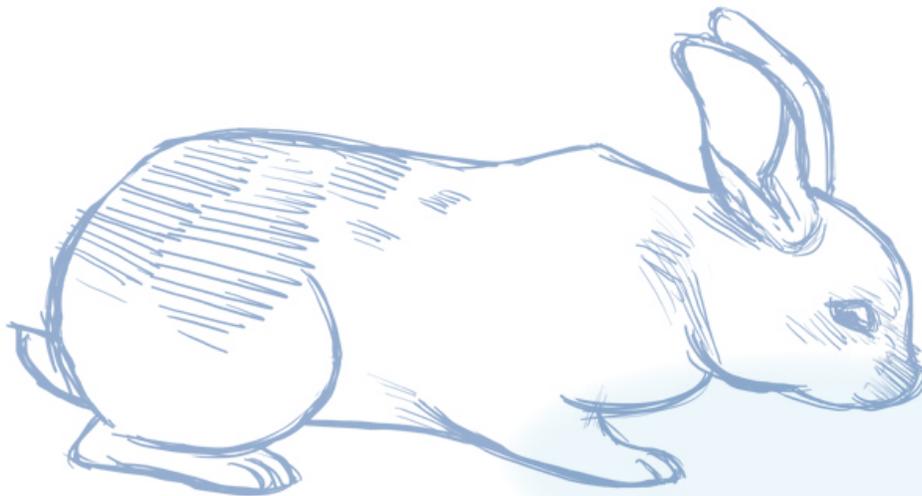
- » *Saturated fats:* These types of fat are referred to as “bad fats” and can increase “bad cholesterol” levels in a person’s blood. They are found in fatty meats and in some other animal products (e.g., butter, cheese, ice cream).
- » *Unsaturated fats:* These types of fat are referred to as “good fats” and can decrease “bad cholesterol” levels in a person’s blood. They are found in most liquid vegetable oils.

▪ Possible effects:

- » *Too little unsaturated fat:* Hair loss or dull hair, brittle nails, and lack of cushioning for organs.
- » *Too much saturated fat:* Possible heart disease, clogged arteries, and obesity.

• Sweets

- **Function:** Quick source of energy.
- **Sources:** Processed foods that have an excess of sugar (e.g., candy).
- **Possible effects:** Too much sugar can cause a “sugar high,” when a person gets a “rush” of energy for a period of time and then gets an energy “crash.” Dental decay, excess weight gain, and stomachaches can result from eating too much sugar.



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Sample Diets

- **Mark's diet:** Low in protein
- **Jenny's diet:** Low in carbohydrates
- **Molly's diet:** High in fiber
- **Scott's diet:** Too many sweets
- **Sydney's diet:** Too much saturated fat

ACTIVITY 3



Herbivores—You Are What You Eat!

Background Information

Rabbits are **herbivores**, consuming principally plant matter in their diets. In order for them to have a long and healthy life, they must receive a balanced diet from a variety of different types of plant matter that contain all of the **nutrients** they need.

The most important food for a pet rabbit is fresh hay. Hay provides the necessary fiber for a healthy digestive system and keeps the rabbit chewing. Normal chewing of their food wears down their teeth, keeping them at their proper length. Without proper chewing, their teeth may grow very long and cause a condition called **malocclusion** (also known as *buck teeth*). This may be painful for the rabbit and will make it difficult for the rabbit to eat.

Rabbits also need fresh water and vegetables. Although rabbits obtain a lot of their water from the plant matter they consume, fresh water should always be available. Fresh, moist greens like hay are important in helping maintain a healthy digestive system in rabbits. Additionally, fruit may be given to rabbits as a treat, but only in small quantities because they can become sick if they consume too much sugar.

Commercial rabbit pellets provide another potential source of nutrients. However, very little pelleted food is actually required for a healthy diet. Pellets lack water, are high in fat, and tend to promote obesity in adult rabbits; furthermore, if rabbits are fed too many pellets, they will often ignore the hay that is essential to their digestive system.

Rabbits produce two different kinds of solid waste. One kind, *hard feces*, is the waste from their digestion and should be removed from their cage. The other kind, *soft*

feces (**cecotropes**), is eaten by the rabbit directly from its anal opening in a process called **coprophagy**. Coprophagy allows the rabbit to get more nutrients out of its food by eating it twice.

- **Time Required**

30 to 45 minutes

- **Concepts and Vocabulary**

Cecotropes. A digestive product produced by rabbits, passed through the intestines, and re-ingested for its nutrients. Also called “night feces.”

Coprophagy (pronounced “kuh-prof-ug-ee”).

Feeding on a specific type of excrement (such as cecotropes) to gain nutrients.

Essential nutrients. Nutrients required by an animal's body that cannot be produced by the animal's body. Essential nutrients must be obtained through an animal's diet.

Feces. Undigested food and nutrients in the body that leave the body as waste matter.

Herbivore (pronounced “hur-buh-vohrr”). An animal that feeds on plants. Examples include rabbits, sheep, and horses.

Malocclusion (pronounced “mal-uh-kloo-zhuhn”).

A disease where teeth don't meet together properly.

- **Life Skills**

Teamwork, contributions to group effort, sharing, cooperation, communication, keeping records, planning/organizing, critical thinking, problem solving, decision making

• Subject Links

Science, Language Arts

• State Content Standards

Science

- Third Grade:
 - » *Investigation and Experimentation – 5a, 5c, 5d, 5e*
- Fifth Grade:
 - » *Investigation and Experimentation – 6g, 6h*
- Sixth Grade:
 - » *Investigation and Experimentation – 7d, 7e*

Language Arts

- Third Grade:
 - » *Listening and Speaking Strategies – 1.5*
- Fourth Grade:
 - » *Listening and Speaking Strategies – 1.8*
- Fifth Grade:
 - » *Listening and Speaking Strategies – 1.5*

• Suggested Grouping

Small groups of 3 to 5 individuals.

• Materials Needed

(* = Materials provided in curriculum)

- * *Examples of Rabbit Foods*
- * *Rabbit Dietary Facts*
- * *Rabbit Dietary Needs Worksheet*
- * *Rabbit Food Pyramid*
- A supply of flip chart paper or one large piece of butcher paper per group
- Colored markers (shared materials)

• Getting Ready

- Divide the youth into small groups of 3 to 5 individuals.
- Provide each group with adequate amounts of butcher paper or flip chart paper and markers.
- Give each group a list of *Examples of Rabbit Foods*.
- Give each group a *Rabbit Dietary Facts* handout.
- Give each youth a *Rabbit Dietary Needs Worksheet*.
- Make enough copies of the *Rabbit Food Pyramid* so each group can have one.

Opening Questions

- 1. Knowing what you do about the types of foods that humans need in order to be healthy, what do you know about the types of foods rabbits need? Please explain.** Ask the youth to share their ideas verbally or write their thoughts and ideas on the paper provided.
- 2. How do you think rabbits living in the wild obtain a proper diet? If you had a pet rabbit, what might you have to do to provide it with proper nutrition?** Ask the youth to share their ideas verbally or write their thoughts and ideas on the paper provided.

Procedure (Experiencing)

- 1.** Ask each of the groups to take the list of *Examples of Rabbit Foods* and organize the foods into as many different categories as possible.
- 2.** Then ask the groups to rank the foods in order of what they believe to be most to least important for a rabbit's health. Have each group try to create a food pyramid for rabbits.
- 3.** Once step 2 has been completed, ask the groups to share their different food categories and the food pyramids they have designed. How are they similar? How are they different? Provide each group with a copy the *Rabbit Food Pyramid* and a copy of the *Rabbit Dietary Facts* handout and make further comparisons.
- 4.** Using the *Rabbit Dietary Facts* handout and the *Rabbit Food Pyramid*, ask each group to develop a shopping list for a healthy rabbit.
- 5.** Once step 4 has been completed, ask the groups to share their shopping lists. How are they similar? How are they different?

Sharing, Processing, and Generalizing

Follow the lines of thinking developed through general thoughts, observations, and questions raised by the youth; if necessary, use more targeted questions as prompts to get to particular points. Specific questions might include

- 1. What are some important things you have learned about a rabbit's nutritional needs? Please explain.** Ask the youth to write their thoughts and ideas on the paper provided.
- 2. What might be some signs that a rabbit's nutritional needs are not being met? Please explain.** Ask the youth to write their thoughts and ideas on the paper provided.
- 3. How does a rabbit's food pyramid compare to the USDA MyPyramid? Please explain.** Ask the youth to write their thoughts and ideas on the paper provided.

Concept and Term Discovery/Introduction

At this point, volunteers need to ensure that the concepts of nutritional needs and a balanced diet for rabbits have been introduced or discovered by the youth. The terms **herbivore**, **malocclusion**, and **coprophagy** may need to be introduced if they were not used by the youth during the activity. (**Note:** The goal is to have the youth discover the concepts and terms on their own. It helps if they can define terms and concepts using their own words.)



Concept Application

- 1.** Many of a rabbit's nutritional requirements are based on age and body weight. If the youth have rabbits at home, have them find out the rabbits' ages before proceeding with this application activity. Once they know their rabbit's age, have them work out their rabbit's specific nutritional requirements (use the *Rabbit Dietary Facts*, *Rabbit Food Pyramid*, and *Rabbit Dietary Needs Worksheet* provided) and develop a feeding plan (using the list of examples of rabbit food) that has a variety of foods that meet their rabbit's needs.
- 2.** If some of the youth do not have a rabbit, assign them a fictional rabbit of a certain age (e.g., "Hoppy," a one-year-old female; "Bugs," a four-year-old male) and ask them to do the same exercise. Once completed, have the youth share their feeding plans.

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Rabbit Food Pyramid

DEFINITE NO-NO'S

These are foods that should not be given at any time.

- No Chocolate (poisonous!)
- Cookies
- Crackers
- Breakfast Cereal
- Yogurt Drops
- Pasta
- Bread
- Most "human" treats

Treats

Limit to very small amounts, 1 or 2 times per week; this includes fresh fruits. Consult with your rabbit's vet.



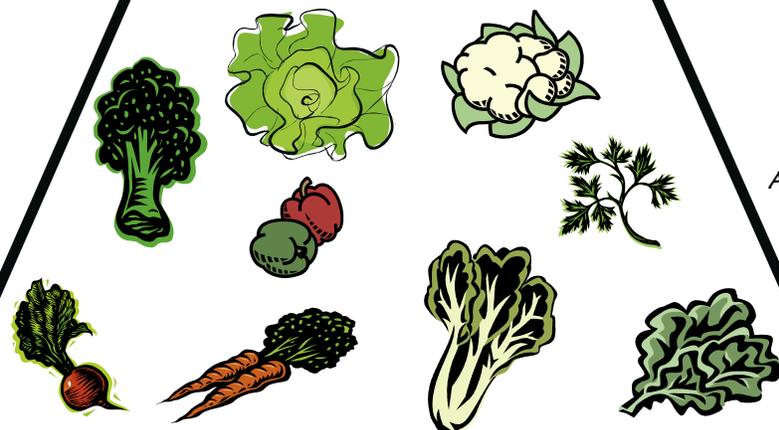
Pellets

Limited, high-quality pellets (no seeds or dried fruits) as directed by your rabbit's vet.



Vegetables

A variety of fresh greens, daily.



Timothy Orchard Grass Oat Hay Brome Hay

Only very small amounts of Alfalfa, if any. Check with your vet.

Unlimited Grass Hays

This is the staple of your rabbit's diet.



Be sure to consult with your veterinarian on the proper diet for your rabbit's optimum health.



Examples of Rabbit Foods

Alfalfa hay

Apples (*NOT the seeds: they are toxic.*)

Bananas and grapes

Beet greens

Broccoli

Carrots and tops

Chicory greens

Cilantro

Collard greens

Dandelion greens

Kale

Leaf lettuce

Mustard greens

Oat hay

Orchard grass

Papaya

Parsley

Peaches

Pears

Pellets

Pineapple

Pumpkin leaves

Radish and leaves

Raspberries

Romaine lettuce

Strawberries

Sweet peppers

Timothy hay

Turnip greens

Watercress



Rabbit Dietary Facts

• What are the basics of a good house rabbit diet?

A rabbit's diet should be made up of high-quality pellets, fresh hay (alfalfa, timothy, or oat), water, and fresh vegetables. Anything beyond that is a "treat" and should be given only in limited quantities.

• What makes a good pellet?

Pellets should be fresh and relatively high in fiber (18% minimum fiber). Do not purchase more than 6 weeks' worth of feed at a time; food older than that may spoil. Pellets should make up less and less of a rabbit's diet as he or she grows older, and hay should still be kept available 24 hours a day.

• What kinds of vegetables should I feed my rabbit?

When shopping for vegetables, look for a selection of different veggies. Look for both dark leafy veggies and root vegetables, and try to get a variety of colors. Stay away from beans and rhubarb.

• Is feeding hay important?

Hay is essential to a rabbit's good health, providing roughage that reduces the danger of hairballs and other blockages and lowers the risk of malocclusion. Twigs from an apple tree also provide good roughage.

• What NOT to feed a rabbit.

- Beans – None of them! (Dried beans can cause a blockage, too.)
- Beets
- Cabbage
- Coffee or tea leaves or plants
- Corn
- Green beans
- Onions
- Nuts
- Peas
- Potatoes
- Rhubarb
- Spinach
- Packaged greens mixed in a bag

• What quantities of food should I feed baby and "teen-aged" rabbits?

- Birth to 3 weeks: mother's milk.
- 3 to 4 weeks: mother's milk, nibbles of alfalfa and pellets.
- 4 to 7 weeks: mother's milk, access to alfalfa and pellets.
- 7 weeks to 7 months: unlimited pellets, unlimited hay (also see *12 weeks*, below).
- 12 weeks: Introduce vegetables (one at a time and in quantities of less than ½ oz).

• What quantities of food should I feed young adult rabbits? (7 months to 1 year old)

- Introduce timothy hay, grass hay, and oat hays; decrease alfalfa.
- Decrease pellets to ½ cup per 6 lb of body weight.
- Increase daily vegetables gradually.
- Fruit: A rabbit's daily ration of fruit should be no more than 1 to 2 oz per 6 lb of the rabbit's body weight (because of caloric content).

• What quantities of food should I feed to mature adult rabbits? (1 to 5 years old)

- Unlimited timothy, grass hay, oat hay, straw.
- ¼ to ½ cup pellets per 6 lb of body weight (depending on metabolism and proportionate to veggies).
- Minimum 2 cups of chopped vegetables per 6 lb of body weight.
- Fruit: Daily ration should be no more than 2 oz (2 Tablespoons) per 6 lb of body weight.

• What quantities of food should I feed to senior rabbits? (Over 6 years old)

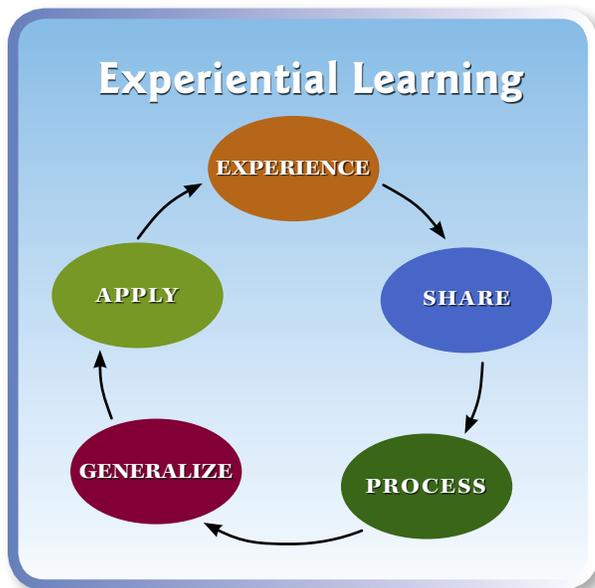
- If sufficient weight is maintained, continue feeding them an adult diet.
- Frail, older rabbits may need unrestricted access to pellets to keep their weight up. Alfalfa can only be given to underweight rabbits if their calcium levels are normal. Annual blood workups are highly recommended for geriatric rabbits.

Rabbit Dietary Needs Worksheet

BREED	NAME	AGE	WEIGHT	FOOD	AMOUNT	SOURCE

APPENDIX

The activities in this curriculum were designed around inquiry and experiential learning. Inquiry is a learner-centered approach in which individuals are problem solvers investigating questions through active engagement, observing and manipulating objects and phenomena, and acquiring or discovering knowledge. Experiential learning (EL) is a foundational educational strategy used in 4-H. In it, the learner has an experience phase of engagement in an activity, a reflection phase in which observations and reactions are shared and discussed, and an application phase in which new knowledge and skills are applied to a real-life setting. In 4-H, an EL model that uses a five-step learning cycle is most commonly used. These five steps—Experiencing, Sharing, Processing, Generalizing, and Application—are part of a recurring process that helps build learner understanding over time.



For more information on inquiry, EL, and the five-step learning cycle, please visit the University of California Science, Technology, and Environmental Literacy Workgroup's Experiential Learning Web site, <http://www.experientiallearning.ucdavis.edu/>.

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