

# Oat Lesson

## Goals

Students will...

- Increase their familiarity with oats.
- Eat oats when offered them.
- Increase their awareness of the environmental benefits of composting.
- Increase their understanding of nutrition.

## Objectives

Students will be able to...

- a. Explain what part of a plant an oat is
- b. Explain the origin of oats
- c. Explain climate requirements for growing oats
- d. Identify where oats are grown in Maine
- e. Explain how diet affects health
- f. Write a paragraph about the importance of oats

## Lesson Activities

- Review points about safety, sanitation, and cooperation
- Introduce oats
- Background information on oats
- Lessons from the Farm
- Cook granola
- (Form groups of 4 to 6 students)
- Do compost activity while food is cooking
- (See compost lesson for mini-lessons)
- Eat
- Wrap-up
- Distribute copies of recipes and challenge sheets to students
- Clean-up

## Other Oat Activities

Nutrition science lesson

Global and regional mapping

Oat fact sheet

Oats Student Activity Sheet

Writing ideas

Additional recipes



## Background Information on Oats



### Did you know that...?

#### **Oats belong in the grass family**

Oats are a cereal grain from the grass family, and are used as food for both humans and livestock. The plant has slender stalks that can grow up to four feet high. The stalk ends in spikelets that contain flowers from which a husk-covered seed develops.

There are approximately 25 species of oats, most of which grow in cool, moist regions of the world (temperate regions) such as Maine. Oats even grow well in poor soils. Some species are cultivated for their grain (for human consumption as cereal and as feed for cattle and horses), some are grown for the green stems and leaves (for hay, silage and pasture), and some are cultivated for dry straw (bedding for livestock), and for covering crops such as strawberries during the winter.

Oats are an important rotation crop on livestock, grain, and potato farms in the northern United States, Canada and parts of Europe. Crop rotation is the practice of alternating crops in one location from one year to another. This practice helps to prevent soil-borne diseases that can harm a crop and prevent growth. Crop rotation also helps enrich the soil through the addition of organic matter and nitrogen from plant residues plowed into the soil. Crop rotation is important to help ward off soil-borne diseases that could destroy the plants or suppress their growth.

The United States produces 16% of the world's oats, while Russia is the world's largest oat producer, growing more than 40% of worldwide crops. In Maine, oats are mainly grown in Aroostook County, with a small amount grown in central Maine. They are grown primarily as a rotation crop with potatoes and are used as grain for animal feed. The crops are planted in the spring and harvested in mid to late summer. In 1997, 23,000 acres of oats were harvested in Maine.

#### **The part of the seed that we eat is called the groat**

Oat grain consists of a highly digestible seed called groat, which is found inside of an indigestible hull. The hulls are a source of furfural, an industrial chemical used as a solvent in the refining industry. The groat can also be roasted and used as a cereal for human consumption, but only about 5% of oats grown in the United States are used for this.

## **Background Information continued**



Oat flour contains many nutrients that our bodies need. It is high in protein and is a good source of thiamin and soluble fiber. The groat contains 8-14% protein, 63-65% carbohydrate and 2-3% fat. Oat flour also contains antioxidants, and is used in many foods such as peanut butter, butter, chocolate and doughnuts. Another use is as a preservative on the inner coating of paper used to package salted nuts, coffee and potato chips.

### **Oats were once considered weeds**

Farmers derived cultivated oats from wild oats about 4,500 years ago. An ancient form of wheat called “emmer” was cultivated widely throughout the Old World. Oats were a weed in emmer fields, but were not able to compete due to the warm climate. As farmers moved north into Europe and into the mountains, they brought emmer seeds with them, which were “contaminated” with oat seeds. Because the oats could tolerate the cool, moist climate and poor soil, they grew well in the newly planted emmer fields and eventually out competed wheat, replacing it as a crop.

Oats were first cultivated in northern Europe and are considered a relatively new crop compared to more ancient crops such as wheat and barley. Emmer is nearly extinct now.

## Lessons from the Farm - Oats



In the spring, oat farmers hook up a plow behind their tractors and drive them back and forth across the fields. The plow digs down about 6 to 8 inches and turns the soil. This helps break up the soil so it will be easier for planting. Next, a disc is pulled behind the tractor over the soil. The disc is made up of about 25 round metal blades, each about the size of a Frisbee. This cuts the soil up into small pieces so the field doesn't have any big clods that oats won't grow so well in.

The next thing the farmer does is spread some fertilizer on the soil. Fertilizer contains a lot of the nutrients that an oat plant needs to grow well. If an oat plant doesn't have enough nutrients (vitamins and minerals are considered nutrients), then the oat plant won't grow up to be very big. This means the plant will be a lot more likely to get sick from a plant disease. It's the same with people. If kids don't get enough of the right kinds of food when they are growing, then they won't grow so well, and might get sick more often. Anyway, this is why farmers add fertilizer on the soil, to give the oat plants all of the nutrients they need to grow up to be big and strong.

After farmers spread the fertilizer on the soil, they plant the oat seed with something called a grain drill. They pull the grain drill behind a tractor. The grain drill opens up a little slit in the soil and drops in oat seeds. Then it closes the slit and presses the soil around the seed. Just so you know, oat seeds are a little bit smaller than an apple seed. The oat seeds are usually planted in May.

The next important ingredients for growing oats are provided by Mother Nature herself, with rain and sunshine. All plants use water and sunshine to make their own food so they can grow. Have you studied about this in school? It's called photosynthesis. It's a big word, but without photosynthesis, we wouldn't have oat plants or even trees or grass on the earth.

Anyway, as the oats grow, they start to form little heads at the top of the plant. By September, the oat plants are about 2 feet tall and have turned from green to golden brown. This lets the farmer know that they are just about ready to harvest. When they are good and golden colored, they are harvested with a piece of equipment called a combine.

The combine has several special parts that all work together to harvest the oats. At the front, just above the ground level, is a cutter bar. This bar cuts the oat plant stalks. Right above the cutter bar is a big wheel with lots of little metal rods sticking out. It almost looks like the spokes on a bicycle wheel, except it would be a lot of bicycle spokes put together. So when the cutter bar cuts the oat plant, the big spoked wheels rake the cut plant up onto a moving rubber belt. Of course it's not like the belt you might use to hold your pants up; it's a lot wider than that. Then the oat plant is crushed, the seed is collected into a tray, and the stalks from the oat plants are dropped out the back of the combine.

Farmers take the oat seed and bag it up into big bags, and then take it to a mill where it is ground up to be used in things like oatmeal, oat bread, and all kinds of good healthy food.

Farmers can use some of the stalks, also called straw, that fall out the back of the combine to make beds for their barn animals. Enough straw is collected to use for a whole year (until next year's harvest). Farmers have to throw a lot of straw out every time they clean up the barn, so they have to save enough straw with that in mind.

Not all of the straw is used for bedding down the animals. Quite a bit of it is left out in the field. Returning the oat plant's straw back to the soil is a lot like recycling. It's good for the soil because it returns the nutrients in the stalk back to the soil. The next oat crop can then use these same nutrients again.

## Materials and Preparation

### Food needed for granola (for 4 groups)

- 4 cups rolled oats
  - 1 1/3 cups wheat germ
  - 1 cup shredded coconut
  - 1 cup sunflower seeds
  - 1 cup powdered milk
  - 4 tsp. cinnamon
  - 1/2 cup honey
  - 1/2 cup canola oil
  - 4 tsp. vanilla
- Drinks for students
- 1 container Crisco (nutrition science lesson)



### Materials needed (for 4 groups)

- Red food coloring (nutrition science)
- Compost bucket
- 4 large bowls
- 8 potholders
- 4 sets dry measuring cups
- 4 sets measuring spoons
- 8 cookie sheets
- 4 mixing spoons
- Serving spoons (1 per student)
- 4 metal spatulas
- Paper plates
- Plastic silverware and cups
- Cleaning towels, napkins
- Wax paper
- 2 pieces 1/2 inch clear plastic tubing (nutrition science lesson)
- Copy of recipes for each student
- Copy of challenge sheet for each student
- Copy of oats fact sheet for each student
- Copy of writing ideas sheet for each student

## **Materials and Preparation continued**



Each station should have the following:

### Food

- 1 cup oatmeal
- 1/3 cup wheat germ
- 1/4 cup coconut
- 1/4 cup sunflower seeds
- 1/4 cup powdered milk
- 1 tsp. cinnamon
- 2 Tbs. honey
- 2 Tbs. canola oil
- 1 tsp. vanilla

### Materials

- 1 large bowl for ingredients
- 1 mixing spoon
- 1 set dry measuring cups
- 1 set measuring spoons
- 2 cookie sheets
- Serving spoons (1 per student)
- 2 potholders
- 1 metal spatula
- Paper towels
- Cleaning towel
- Copy of recipe

**Use Maine oats and other products from Maine when possible.**

## Classroom Recipe for Granola

### Ingredients:

1 cup oatmeal  
1/3 cup wheat germ  
1/4 cup coconut  
1/4 cup sunflower seeds  
1/4 cup powdered milk  
1 tsp. cinnamon  
2 Tbs. honey  
2 Tbs. canola oil  
1 tsp. vanilla extract



**Use Maine ingredients whenever possible.**

### Student Cooking Activities

**Note:** This recipe requires the use of ovens.

Preheat oven to 350°F.

Combine oatmeal, wheat germ, coconut, sunflower seeds, powdered milk, and cinnamon in large mixing bowl.

Add honey and oil while stirring.

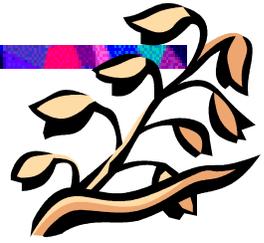
Add vanilla and stir.

Spread mixture on cookie sheet.

Bake 30 minutes at 350°F.

Yield: 6 servings (1/3 cup)

## Nutrition Science Lesson - Oats



### Clogged Arteries

#### Discussion

#### **What is an artery?**

An artery is a tube that brings nourishment in the form of blood to your body. Coronary arteries are those that bring blood to the heart muscle to keep it alive.

#### **Why is it important that arteries stay clean and clear?**

If fat and cholesterol stick to the inside of arteries and build up, blood will not be able to pass through as easily.

#### **What will happen if an artery becomes completely blocked?**

If an artery is completely blocked, blood will be stopped from reaching its destination, causing tissues to die. For example, if a coronary artery becomes blocked, blood will not reach part of the heart muscle, causing it to die.

#### **What causes blocked arteries?**

One cause of blocked arteries is eating too many foods with a lot of fat and cholesterol. Eating a balance between animal and plant foods such as oats can help prevent this from occurring. Regular exercise can also help prevent buildup.

#### Demonstration

Fill one 1/2 inch clear plastic tube with Crisco.

Hold up tube filled with Crisco and empty tube, representing clogged and clear arteries.

Hold tubes over a bowl and pour water mixed with red food coloring (representing blood) through the tubes at the same time.

Students will observe that water passes through the clear tube much faster and smoother than the clogged tube.

Draw conclusions about diet, fat, animal and plant foods and health from this demonstration.

## Oats Student Activity Sheet

Name \_\_\_\_\_

Think about the demonstration with the tubes with and without Crisco.

1. Describe what happened when the liquid was poured into each tube.

Tube with Crisco \_\_\_\_\_

Tube without Crisco \_\_\_\_\_

2. If these tubes were arteries, what does this show about the movement of blood in the body ?

\_\_\_\_\_

3. What types of foods would cause arteries to become clogged?

\_\_\_\_\_

5. How do our food choices affect our health?

\_\_\_\_\_

\_\_\_\_\_

6. What 2 things can you do to help prevent clogged arteries?

\_\_\_\_\_

\_\_\_\_\_

## Global and Regional Mapping

### Oats



#### World Map

Discuss with students the origin of oats. Have them find it on the map.

Oats ----- Originated as a weed in northern Africa and the Mediterranean coast, but was first cultivated in northern Europe (10°, 35°)

#### Local Harvest Calendar

Have students determine when oats are available in our area from the harvest calendar (Oats are harvested in September).

Discuss availability of oats throughout the year (Oats are available year round because they can be stored for long periods of time).

Discuss with students where in Maine oats are generally grown (Oats are produced mainly in Aroostook County, because they experience the best growth in a cool, moist climate).

Discuss with students the importance of oat crops in Maine (Oats are sometimes grown in rotation with potatoes).

Date \_\_\_\_\_

Name \_\_\_\_\_

## Oat Fact Sheet

1. What part of a plant is the oat?



2. Where did oats originally come from?

3. What country is the largest producer of oats?

4. Where are oats grown in Maine?

5. In what climate do oats grow best?

## Writing Ideas - Oats



1. What did you like or dislike about this lesson?
2. Write a paragraph about the importance of oats. Be sure to include three oat facts that you learned.
3. Cook the oat recipe for your family or friends. What did they think? Did they like it? Were they surprised?
4. Come up with your own ideas...



## **Additional Oat Recipes**

### **Almost a Pyramid Dessert**

#### **Ingredients:**

Nonfat or low-fat plain yogurt  
Fresh, canned or frozen fruit  
Granola



#### **Student Cooking Activities (1 serving)**

Put 1/2 inch of granola in bottom of clear plastic cup.  
Add 1/2 inch to 1 inch of yogurt.  
Add 1/2 inch to 1 inch of fruit.  
Repeat first 3 steps for a delicious layered dessert!

### **Raspberry Bars**

#### **Ingredients:**

1 cup firmly packed brown sugar  
3/4 cup butter, softened  
1 1/2 cups oats (quick or old fashioned, uncooked)  
1 1/3 cups all-purpose flour  
1/2 cup wheat germ  
1/2 tsp. baking soda  
1/2 tsp. salt (optional)  
1 10 oz. jar raspberry spreadable fruit

#### **Student Cooking Activities (24 servings)**

**Note:** This recipe requires the use of an oven.

Preheat oven to 400°F.  
Lightly spray 13x9 inch baking pan with cooking spray or grease lightly.  
Beat brown sugar and butter until fluffy.  
Combine dry ingredients and add to brown sugar and butter. Mix well.  
Press half of crumb mixture into bottom of prepared pan.  
Spread with fruit spread.  
Sprinkle with remaining crumb mixture.  
Bake 20 to 25 minutes or until golden brown.

## Raisin Spice Cookies

### Ingredients:

1 cup firmly packed brown sugar  
1/2 cup granulated sugar  
1/2 cup butter, softened  
1/2 cup apple butter  
1 egg and 2 egg whites  
2 tsp. vanilla  
1 3/4 cups all purpose flour  
3/4 cup wheat germ  
1 tsp. baking soda  
1 tsp. ground cinnamon  
1/2 tsp. salt (optional)  
1/4 tsp. nutmeg  
2 1/2 cups oats (quick or old fashioned, uncooked)  
1 cup raisins



**Note:** This recipe requires the use of an oven.

### Student Cooking Activities

Preheat oven to 375°F.

Beat sugars and butter until creamy.

Add apple butter, egg, egg whites and vanilla. Beat well.

Add combined flour, wheat germ, baking soda, cinnamon, salt and nutmeg. Mix well.

Stir in oats and raisins. Mix well.

Drop by rounded measuring tablespoonfuls onto ungreased cookie sheet.

Bake 10 to 12 minutes or until light golden brown.

Yield: 50 cookies

## **Peachy Cherry Cobbler**

### **Ingredients:**

2 16 oz. cans sliced peaches (topping)  
20 oz. can cherry pie filling (topping)  
1 cup oats (quick or old fashioned, uncooked)  
1 cup all purpose flour  
2 Tbs. sugar  
2 tsp. baking powder  
1/4 tsp. salt (optional)  
1/4 cup butter (chilled)  
1/4 cup egg substitute or 2 egg whites  
1/4 cup skim milk



**Note:** This recipe requires the use of an oven.

### **Student Cooking Activities**

Preheat oven to 400°F.

Combine peaches and pie filling in 8-inch square glass baking dish.

Bake fruit filling 20 minutes or until bubbly.

Meanwhile, prepare topping in large bowl: combine oats, flour, sugar, baking powder and salt. Mix well.

Cut in butter with pastry blender or two knives until mixture resembles coarse crumbs.

Add egg substitute and milk. Mix with fork until dry ingredients are moistened.

Drop by rounded tablespoonfuls over hot filling.

Bake additional 15 minutes.

Yield: 9 servings

## **Banana-Orange Oatmeal Muffins**

### **Ingredients:**

1 1/2 cups oats (quick or old fashioned, uncooked)  
1 1/3 cups all purpose flour  
1 tsp. baking powder  
1/2 tsp. baking soda  
1/2 tsp. ground cinnamon  
1/4 tsp. salt (optional)  
1/3 cup chopped dates or raisins  
1 8 oz. carton plain nonfat or low-fat yogurt  
3/4 cup mashed ripe banana  
2 egg whites or 1 egg (slightly beaten)  
2 Tbs. vegetable oil  
1 1/2 tsp. grated orange peel



**Note:** This recipe requires the use of an oven.

### **Student Cooking Activities**

Preheat oven to 400°F.

Line 12 muffin cups with paper baking cups or spray with cooking spray.

Combine dry ingredients including dates. Mix well.

Add combined yogurt, banana, egg whites, oil and orange peel. Mix just until dry ingredients are moistened.

Fill muffin cups almost full.

Bake 20-22 minutes or until golden brown.

Yield: 12 muffins

**Use Maine ingredients if available.**