

Classroom Bites

# Rye



## Did You Know

- Rye is a grass that is grown primarily as a cereal grain.
- Rye is a whole grain that contains lots of fiber and nutrients.
- The whole grains harvested from the rye plant are known as rye berries.
- In the United States, a lot of rye is grown as a cover crop. A cover crop is a plant grown to cover the soil, primarily to improve soil health, prevent erosion, suppress weeds, and enhance biodiversity. Cover crops are not harvested and consumed.



## Types of Rye

### Rye Berries

Whole rye kernels are usually referred to as “rye berries,” which is the whole grain form of rye (much like wheat berries are the whole grain form of wheat). Rye berries can be cooked and eaten whole in salads, grain bowls, soups or even in a rye version of risotto!

The rye berry has a nutty, earthy flavor and its texture is firm yet tender to chew when cooked.



### Cracked Rye or Rye Chops

Cracked rye is simply rye berries that have been cut or cracked into smaller, irregular-sized pieces that are quicker to cook than the completely intact rye berry. They are

often used in rye breads or cooked into breakfast porridge much like steel cut oats.



### Rye Flakes

Rye flakes are rye berries that have been steamed, flattened in a roller and dried, much like old-fashioned rolled oats. They can be eaten like porridge or used as an ingredient in muesli or granola.



### Rye Flour

Just like wheat flour, rye flour takes on different forms depending on how much of the bran and germ are removed during the milling process. Rye has many unique qualities. For example, rye flour has less gluten than wheat flour. The texture and flavor of rye breads improve after 24-36 hours (unlike wheat breads which are best eaten shortly after cooling).



## Agriculture

This rye field is part of several hundred acres grown at Vilicus Farms in northern Hill County, Montana. Doug Crabtree and Anna Jones-Crabtree (the people pictured standing in the field) are the farmers who own Vilicus Farms. While rye is not widely grown in Montana, it is a staple grain in countries such as Finland and Germany.

Rye thrives in Montana’s cold, dry climate. The crop grown here is winter rye, planted in autumn. It goes dormant during the harsh winter, resumes growth in spring, and is harvested by August.

**Buy local!** Purchasing Montana-grown grains like rye supports local farmers. It also means fresher food with more flavor, since it travels a shorter distance to reach your plate—and you know exactly where it comes from.



## Storage

Rye berries, cracked rye, and/or rye flakes should be stored at room temperature in an airtight container. They will keep for at least 6 months in a cool, dry spot. For longer storage, you can freeze the uncooked rye berries in an airtight container or freezer bag for up to a year. Cooked rye berries can be stored in an airtight container in the refrigerator for up to 5 days. For longer storage, transfer the completely cooled, cooked rye berries to a freezer bag. Tightly seal and freeze for up to 3 months.



## Cooking

### Cooking Rye Berries:

Rinse 1 cup of rye berries in a fine mesh strainer. Fill a medium saucepan with water and bring to a boil. Add ½ teaspoon of fine salt and the rye berries. Bring back to a boil and then reduce to a simmer. Cook until the rye berries are tender but still firm, about 45- 60 minutes. The only way to know that they are done to your liking is to taste them. If you would like them to be softer, keep cooking.



### Should I Soak Rye Berries Prior to Cooking?

Some recipes suggest soaking the rye berries overnight in a covered bowl of cold water prior to cooking. The idea is to reduce the cooking time and make them easier to digest and the nutrients more bio-available. Soaking is not necessary, but you certainly can if you are thinking ahead.

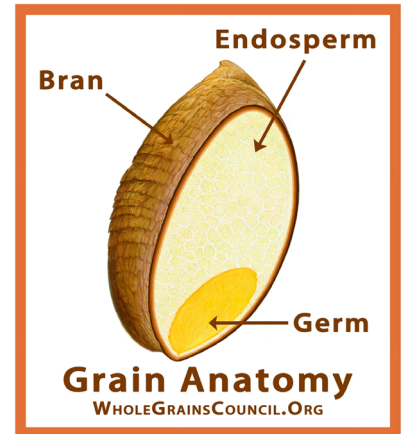
**Cooking Rye Chops or Flakes:** Bring 3 cups of water to boil. Add 1 cup of flakes or chops. Reduce to a simmer and cook until tender approximately 25-30 minutes for flakes, 35 minutes for chops. Add water as necessary to avoid sticking to the bottom of the pan.

**Baking with Rye Flour:** As a general rule, you can substitute up to one-third of the all-purpose flour in a recipe with rye flour and not have to make any significant modifications to the recipe or the baking process.

## Nutrition Information

Rye is high in fiber. If you eat one half cup of rye, it can provide up to 50% of what you need for the whole day! What is especially cool about rye is that it contains an abnormal amount of fiber in the endosperm, not just the bran. Rye is considered an excellent source of protein and is rich in vitamins and minerals.

Rye is low on the glycemic index. The rise of blood glucose after eating rye is less compared to that produced from wheat. Rye is much lower in gluten than wheat, but it is still not recommended for those with a gluten allergy.



## Activities

### Mystery Grain Challenge 🙌

Students take turns reaching into covered containers filled with different types of rye (rye berries, cracked rye, rye flakes, rye flour). Without looking, they describe what they feel—smooth, rough, big, small—and make a prediction about which rye is which. Afterward, reveal the answers and talk about what clues helped most.



## Grain Scientist Investigation

Using magnifying glasses, students closely observe rye berries and compare them with wheat, oats, or corn. They record observations about shape, size, and color, then decide: how is rye similar to other grains, and how is it different?

## Rye Mosaic Art

Students design their initials, geometric patterns, or simple scenes using white glue on construction paper. They fill in the lines with different types of rye to create textured mosaics, learning how natural materials can be used in art.

## Sound Science: Rye Instruments

Students create shakers or rain sticks by filling bottles or cardboard tubes with rye berries. They test how sound changes when they use more or less rye and explain why they think the sound changes.

## Plant Power: Growing Rye

Students plant rye berries in shallow soil and observe them over time. They keep a simple growth journal, drawing or writing about changes they notice and making predictions about what will happen next.

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## Grain Scientist Investigation

### Grade

4

### Time

20-30 Minutes

### Subject Areas

Science / Health / Agricultural Literacy

### Overview

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### Objectives

By the end of this activity, students will be able to:

- Observe grains closely using scientific tools
- Describe physical characteristics such as shape, size, and color
- Compare and contrast rye with other grains
- Record observations using words and/or simple drawings



### Materials

- Magnifying glasses (1 per student or per pair)
- Rye berries
- One or more comparison grains (wheat, oats, corn, or rice)
- Observation sheets or science notebooks
- Pencils
- Small trays, cups, or paper plates for grains

### Directions

1. Introduce the Investigation
  - Tell students they are going to be grain scientists using tools to study grains up close.
  - Review what scientists do: observe carefully, record what they see, and compare results.
2. Set Up Observation Stations
  - Place small samples of rye berries and other grains on trays or plates.
  - Give each student or pair a magnifying glass.
3. Observe the Grains
  - Students use magnifying glasses to look closely at each grain.
  - Encourage them to notice:
    - Shape (round, long, flat)
    - Size (big, small, thick, thin)
    - Color (light, dark, patterns)
4. Record Observations
  - Students draw the grains and write short descriptions in their notebooks or on observation sheets.
  - Remind them to record what they see, not what they think the grain is.
5. Compare and Discuss
  - Students compare rye to the other grains and answer:
    - How is rye similar to the other grains?
    - How is it different?
  - Discuss observations as a class and create a comparison chart if desired.
6. Reflect
  - Ask students:
    - Which grain was easiest to recognize? Why?
    - What details did the magnifying glass help you notice?
    - Why is careful observation important in science?

## Recipes

### Rye Meatballs

Yield: 14-16 (1.5 oz) meatballs

#### Ingredients

- 1 lb. Ground beef (93%)
- ½ C Precooked rye berries
- ¼ C Yellow onion
- 2 tsp Garlic clove
- ¼ C Oat flour (or AP)
- 1 ½ tsp Nutritional yeast
- ¼ tsp Black pepper
- 1 tsp Dried oregano
- ½ ¼ tsp Kosher salt

#### Preparation

1. Rough chop and then pulse the onion, cooked rye, and garlic in a food processor to the desired consistency, scraping the sides often.
2. In a mixing bowl, add the ground beef, onion mixture, flour, nutritional yeast, salt, pepper, and oregano. Knead until all ingredients are fully combined.
3. Portion into about 1.3 - 1.5 oz meatballs and arrange evenly onto a parchment lined sheet tray.
4. Bake at 400°F for 10 minutes. Remove from the oven and rotate each meatball. Cook for another 10 minutes or until the internal temperature reaches 160°F.



### Berry Porridge

Yield: 4-5 cups

#### Ingredients

- 3 C Water
- 1 C Cracked oats
- ½ C Precooked rye berries
- 2 C Gala apple
- ½ C Frozen berries
- 1 C Carrot
- 1 tbsp Brown Sugar
- 1 tsp Cinnamon
- ¼ tsp Kosher Salt

#### Preparation

1. Clean, core, and rough chop the apple. Clean, peel, and rough chop the carrots. Add the apple, carrots, and frozen berries to a food processor and pulse for a few seconds to get a more homogenous texture. Store in the refrigerator in an airtight container until ready to use.
2. In a medium pot, bring water and salt to a boil. Add the oats and fruit mixture to the pot.
3. Bring back up to a gentle simmer, then lower the heat, and cook uncovered for 10 minutes, stirring frequently, or until desired doneness.
4. Remove from the heat, stir in the brown sugar, cinnamon, and precooked rye, and allow to rest for 5 minutes before serving.

## Dig Deeper

For sources and photo credits along with more recipes, lessons, quick activities, resources, and guides, visit: [mtharvestofthemoth.org](http://mtharvestofthemoth.org).

Here are sources of the rye information in this handout

- [wholegrainscouncil.org](http://wholegrainscouncil.org)
- [ancientgrains.com/rye/rye-nutritional-benefits](http://ancientgrains.com/rye/rye-nutritional-benefits)
- [true-north-kitchen.com/the-essential-guide-to-cooking-and-baking-with-rye-with-recipes](http://true-north-kitchen.com/the-essential-guide-to-cooking-and-baking-with-rye-with-recipes)
- [ryerevival.org/rr-history](http://ryerevival.org/rr-history)
- [vilicusfarms.com](http://vilicusfarms.com)

## 4 Montana Harvest of the Month: Rye



The Montana Harvest of the Month Program showcases Montana grown foods in Montana communities. This program is a collaboration between Montana Farm to School, Montana Office of Public Instruction, Montana Team Nutrition Program, National Center for Appropriate Technology, Montana State University Extension, Montana State University, Montana Department of Agriculture, Montana Partnership to End Childhood Hunger, and Vilicus Farms. More information and resources are available at [mtharvestofthemoth.org](http://mtharvestofthemoth.org). This funding was made possible through the *Investing in Montana School Food-System Transformation to Reach 33 x 33 initiative* under The Montana Partnership to End Childhood Hunger.