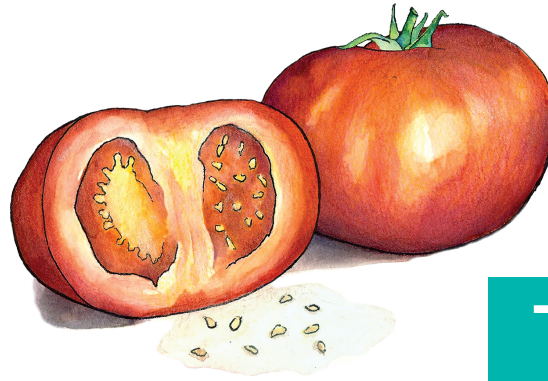


HARVEST of the MONTH in the CLASSROOM



TOMATOES

HISTORY

Tomatoes are a member of the family Solanaceae, along with eggplants, peppers and potatoes. They are native to Central America and Mexico; their dissemination throughout the globe was sparked by the Spanish's colonization of the Americas

FUN FACTS

In Massachusetts, over 500 farms produce 6.5 million pounds of tomatoes every year.

Tomatoes are classified as a fruit because they develop from a flower and have seeds.

Tomatoes are in the nightshade family along with eggplants, peppers, and potatoes.

There are over 25,000 varieties of tomatoes, from tiny currant tomatoes to giant beefsteak tomatoes.

FARMER BIO



Dean Landale is a former ironworker who built big buildings but now grows 20 acres of mixed vegetables at Bar's Farm in Deerfield, Massachusetts on land that has been farmed since 1800. This season they're growing 5,000 jalapenos that they will make into hot sauce and sell to a distillery in Boston. Bar's Farm grows a variety of other vegetables including winter squash, zucchini, green beans, lettuce, cauliflower, flowers and tomatoes. Dean says that their customer's favorite variety of tomato is BHN 589, which is a beefsteak that grows well in hoop houses (see photo!).

Photo credit: Bars Farm



Tomato Seed Saving Through Fermentation

OBJECTIVES

- Save tomato seeds through fermentation
- Explain the fermentation process

MA STATE FRAMEWORK(s)

- 8.MS-LS1-5. Construct an argument based on evidence for how environmental and genetic factors influence the growth of organisms.
- Grades 9–10 Speaking and Listening Standards [SL] 112.1. Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9–10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.

ESSENTIAL QUESTIONS

- Why is fermentation an effective method to save tomato seeds?
- What is the role of the gelatinous covering of tomato seeds?

MATERIALS NEEDED

Tomatoes
Bowl
Plastic wrap
Wire strainer with fine mesh
Wax paper
Paper towels
Toothpicks

WARM UP

Challenge students to cut open a tomato and try to pick out a single seed. Ask students to describe why this is so difficult.

Students will notice that the tomato seeds are coated in a gelatinous substance that makes them very slippery and difficult to handle. Here is a detailed resource > <http://tomatosphere.letstalk-science.ca/Resources/library/ArticleId/4659/seeds-and-germination.aspx> to project for students that shows a magnified tomato seed and names the different parts.

Ask students to brainstorm the role of this gel coating. Create a master list of their ideas. Ask students what seeds need to germinate. Do they think a tomato seed could germinate inside a tomato without this coating?

Share this interesting fact to get students to extend their thinking: Did you know that tomato seeds can pass through the digestive tract of an animal and still germinate? Can all seeds do that? (No, not all seeds can do that.)

When a ripe tomato falls off the plant, it rots on the ground and the seeds are left to germinate, but what if you want to save the tomato seeds and replicate the rotting process in your classroom or home?

LESSON

Tell students they will be removing the coating of the tomato seeds through a process of fermentation.

Give the class the following instructions:

1. Scoop or squeeze the seedy pulp out of the tomatoes provided and place into bowl.
2. Add water equal to the volume of the tomato pulp.
3. Cover bowl with plastic wrap and poke several holes in the top. You may use jars instead of bowls if preferred.
4. Place in a warm location, and let sit for 3-5 days.

Ask students to make observations each day while the mixture transforms. They should notice that yeast in the air will settle on the fruit and there will be a layer of white scum floating on top. This mixture will not smell good! Let students know that the rotting smell is actually good for the seeds– it will help them be healthy.

Here is a video that walks through the process > <https://youtu.be/-83SfeEiowg>. This blog post has photographs of this process to share with students > https://www.chicagobotanic.org/blog/how_to_you_say_tomato_i_say_science_project. After a film has grown on their seeds, students should remove the film and throw it away. If they can't skim all of it, it will rinse off in the next step. Remove any floating seeds, too—they are not viable.

After 3-5 days:

5. Pour the mixture into a wire strainer with fine mesh and rinse well, shaking the seeds around gently to remove any remaining gel and seed coatings.
6. Pour the seeds onto wax paper and carefully separate the seeds with a toothpick or other clean utensil.
7. Let the seeds air dry on the wax paper in a protected place for about a week, and then store the completely dried seeds in an envelope until you are ready to use them.

Note: Be sure to use non-hybrid tomatoes when doing this activity, unless you are looking to experiment with hybrid varieties. When using non-hybrid tomatoes, the seeds will produce plants just like their parent plant. If you want to experiment with hybrid tomatoes (plants produced by crossing two genetically different parent plants), keep in mind that the seeds may not germinate or may revert back to the original parent varieties.

EXTENSIONS AND VARIATIONS

Examine the tomato seeds under a microscope. The cleaned and dried seeds are coated with tiny white hairs. These hairs were holding the gel on the fresh seeds. The hairs also help the seeds soak up moisture when they are planted.

These tomato seeds can be used for any germination lab that you would like to offer or, if your school has one, give them to the Farm to School team for the school garden.