For students & educators

Camp Fire
MINNESOTA

My nature connection

BAFFLING BOTANISTS

GRADE: 3-8

HOW IS A CUCUMBER A FRUIT, A BANANA A BERRY, AND A TOMATO BOTH?

Botany is the study of plants, their structure, the physical environment, and the ways that we classify them. Humans have created a common culture around categorizing fruits and vegetables that is rooted mostly in opinion and little in botany and science.

WHAT YOU'LL NEED

2 or 3 examples of fruits and/or vegetables

Pencils/pen, markers, scissors, glue

OPTIONAL: butter knife and cutting board, & an adult if grades 3-6

ACTIVITY (30-40 MINUTES)

On the fifth and seventh page are two Venn Diagrams for categorizing fruits and vegetables. Complete the first one with only your current perspective or awareness prior to this lesson on fruits and vegetables. You can cut out and glue the plants, re-draw them, or write the plant names in the circles. Then we'll learn about the botanical way of thinking about fruits and veggies, and do the Venn Diagram again.

STUDENTS WILL:
Go on a virtual tour of the Tanadoona garden, learn about fruits and vegetables, and debunk conceptions about them through a hands-on experiment.

CULTURE VS. SCIENCE

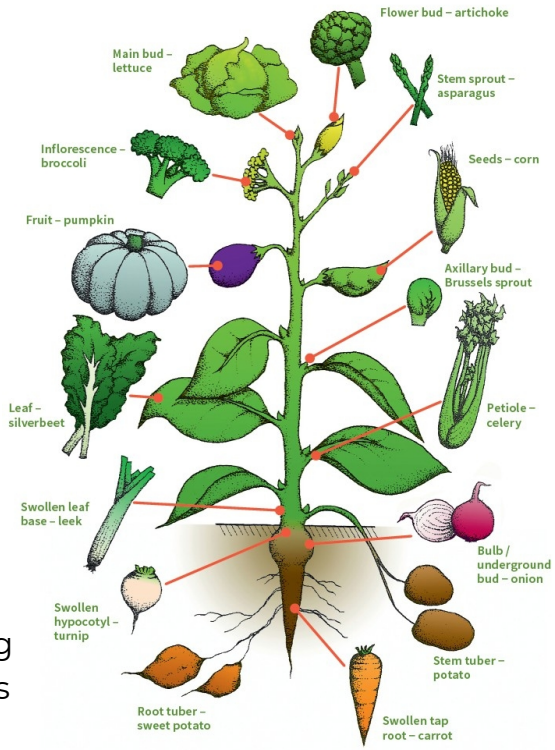
In the U.S., we often think about veggies as the savory produce and fruits as the sweet ones. But the answer isn't quite as straightforward because common cultural ideas and science don't always align. Below are the botanical definitions of each.

Fruits are the seed-bearing structures of a plant. They are the sweet surrounds to the seeds that develop or "fruit" from the ovary of a flower. Imagine some of the edible plants that you've enjoyed.

SETTING:
Space to look closely or cut into fruits and vegetables

Anytime that you bite into one and munch on seeds, you are eating fruit. Surrounding your seed with something sweet and delicious makes it more likely to get eaten and more likely for its seeds to spread. Knowing this, what did you categorize as "vegetables" on your diagram as fruits? Some uncommonly known fruits are cucumbers, green peppers, peanuts, avocados, corn, and eggplants.

Furthermore, thinking about berries can make this even more strange! Berries are fruits that come from a single ovary but have multiple seeds. Under this definition, grapes, bananas, and watermelons are all different types of berries.

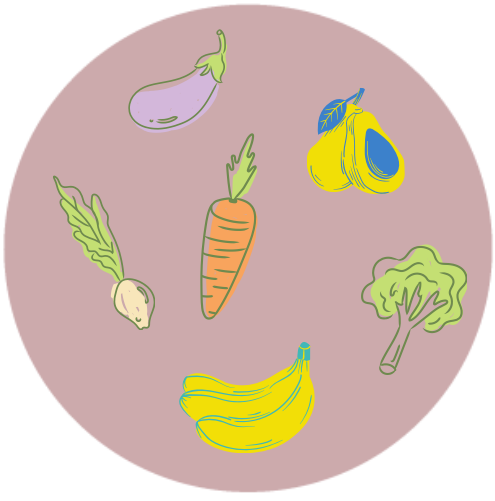


Vegetables are all of the other parts of a plant, including the roots, leaves, and stems. Carrots, beets, and radishes are the roots of plants, while asparagus, lettuce, swiss chard, and broccoli are the stems and leaves.

THE TOMATO MYSTERY

Tomatoes live somewhere in the middle of these two plant categories. This is because they are botanically a fruit, but **legally** a vegetable. You might be wondering how a plant could legally be one or the other.

In 1893, the U.S. Supreme Court heard a case called Nix v. Hedden that involved taxing tomatoes brought across borders in America. During this period, vegetables experienced higher import taxes than fruit. A tomato farmer who was thinking like a botanist argued that tomatoes are scientifically fruits with seeds (and should be taxed like fruits), rather than vegetables. The Court heard his case and eventually ruled that tomatoes are legally a vegetable because they are commonly cooked with other vegetables in the kitchen. So by law, tomatoes are vegetables, but by botanist's standards, they are fruits!



CAN YOU THINK LIKE A BOTANIST?

Now that you've learned a bit more about fruits and vegetables, dissect some fruits and vegetables at home. With an adult's help (3rd-6th grade) or on your own (7th-8th grade, and depending on comfort), cut into the middle of some fruits and vegetables and look for seeds.

Observe what you find. Count any seeds you discover, and record your observations in a journal or on the data collection sheet on page six. Remember that if you find seeds, you are likely actually working with fruit.

Then do the Venn diagram again. How do your answers compare to your 1st round?

WHY STUDY PLANTS?

Sorting plants into groups is a great first step in identifying and building a stronger relationship with them. Many people enjoy careers working with plants that are found in a variety of places, ranging from local grocery stores to diverse ecosystems. These plants are called natural resources because humans rely on them for many different uses. Scientists and farmers collaborate to grow nutrient-dense produce that keeps us healthy and strong. Foresters grow tall trees that provide us with paper and wood for shelter and heat.

All plants act as a "carbon sink" by storing carbon dioxide—a greenhouse gas that is released into the air when we burn fossil fuels—and turning it into the oxygen that we breath to survive. This is one of many reasons why folks who study climate change are interested in plant biology.

KEEPING SAFE

Wash your hands before working with fruits/veggies, so they are safe for cooking or snacking on later.
If you are not comfortable using cutting tools, ask an adult to assist you with this activity.

CONNECTING WITH QUESTIONS

How did you grow in your understanding of fruits and vegetables during this activity?

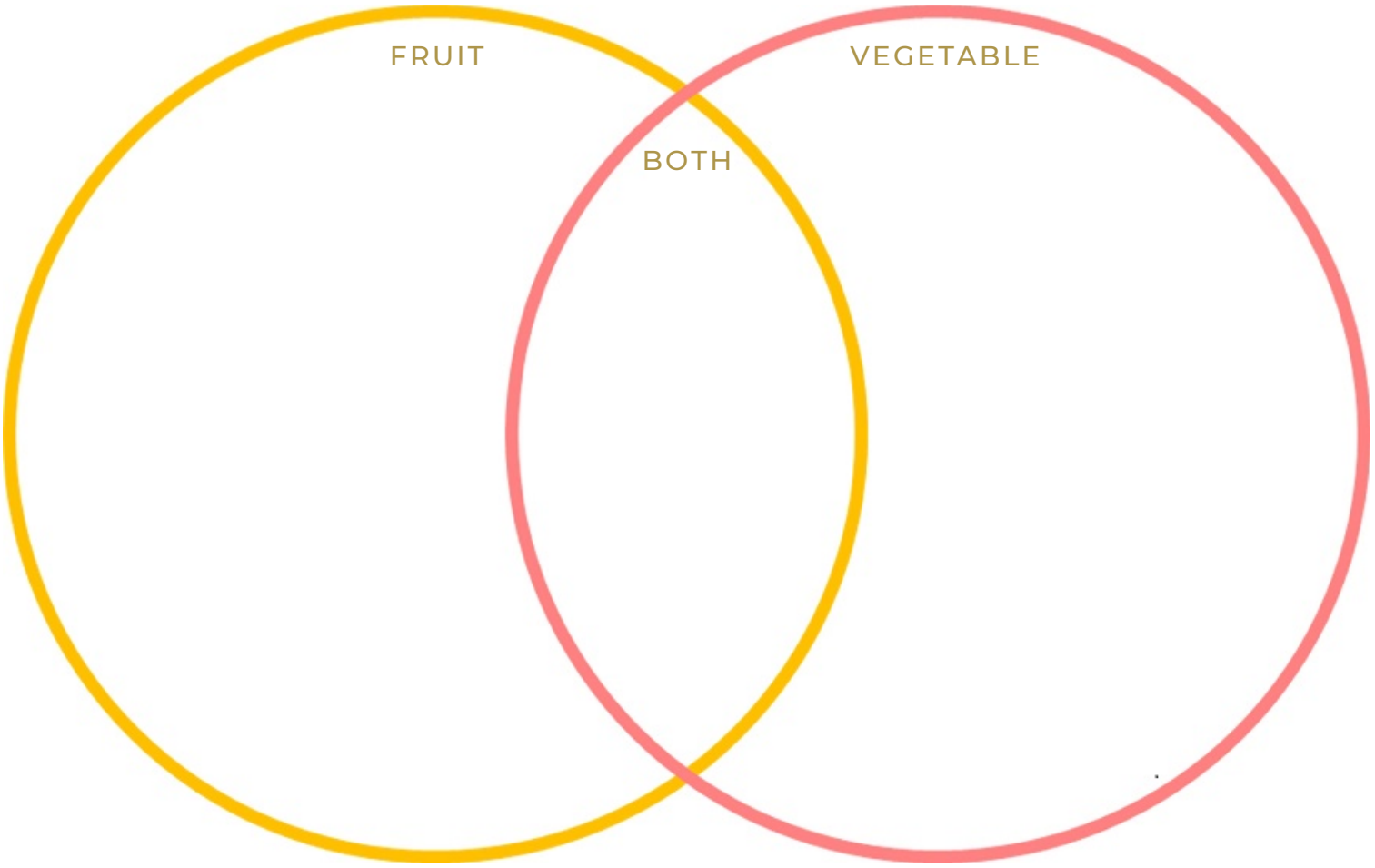
What did you learn that surprised you?

GRADES 7-8: Often times, people's opinions can conflict with science (like the case of the tomato). Can you think of another time when you experienced a situation like this and how you felt about it? (Ex: conversations on climate change)

ADDITIONAL RESOURCES

This written lesson is paired with a video lesson at the Camp Fire MN garden at Tanadoona. View for information on planting fruits and vegetables, soil types, and a tour of our community garden.

BAFFLING BOTANISTS: 1ST ROUND




ASPARAGUS


BLACKBERRY


PEANUT

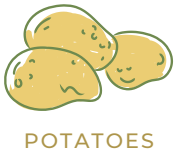

LETTUCE

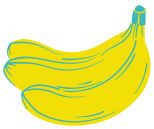

STRAWBERRY


GREEN PEPPER

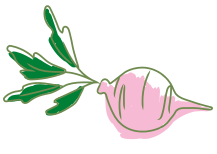

EGGPLANT

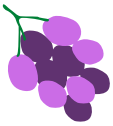

CARROT


POTATOES


BANANAS


PEAR


BEET


GRAPES


ORANGE


AVOCADO


TOMATO


CORN


APPLES


SWISS CHARD

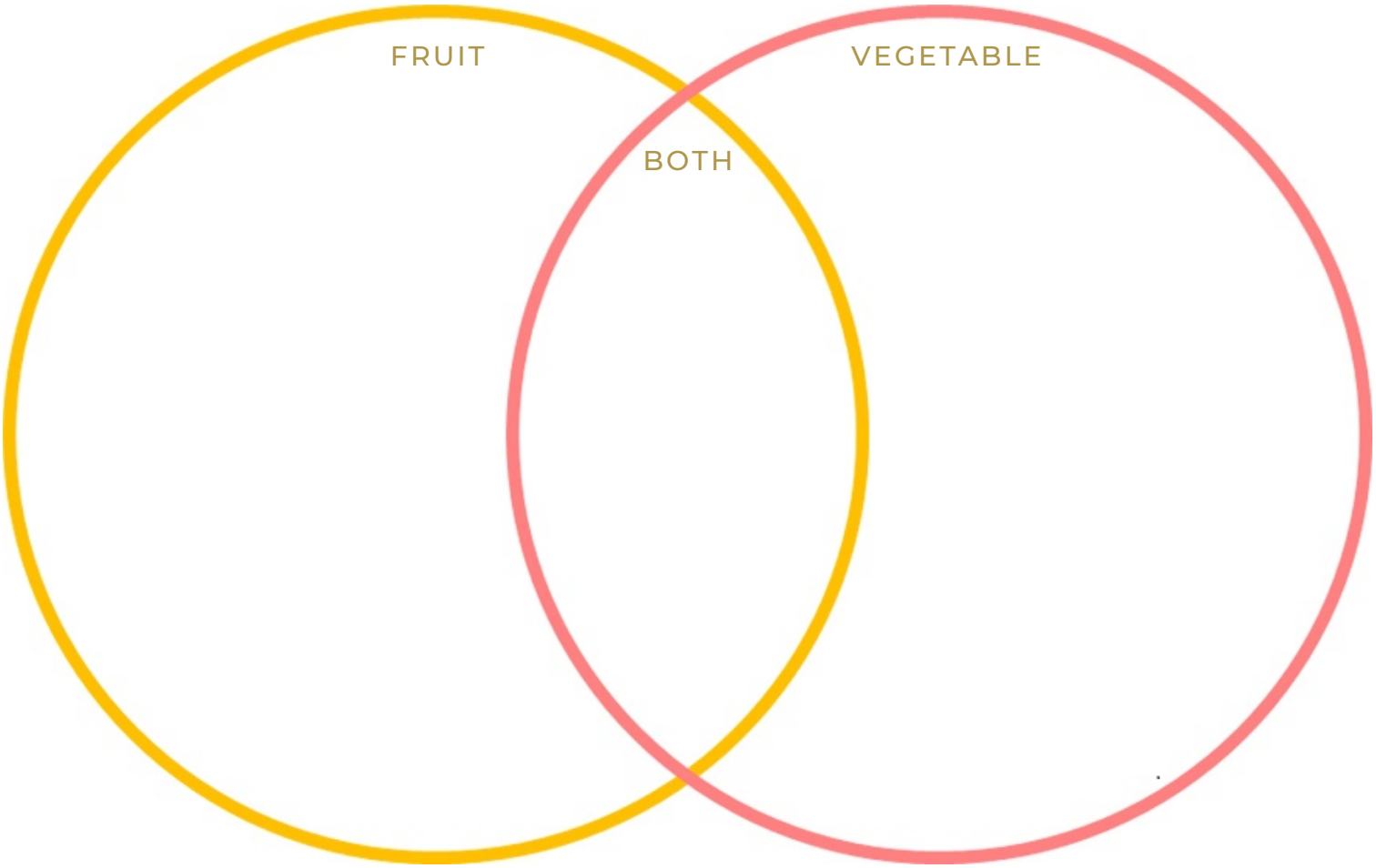

WATERMELON


PINEAPPLE

BAFFLING BOTANISTS: DATA COLLECTION

PLANT	NUMBER OF SEEDS	FRUIT OR VEGETABLE

BAFFLING BOTANISTS: 2ND ROUND




ASPARAGUS


BLACKBERRY


PEANUT

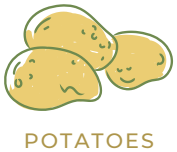

LETTUCE

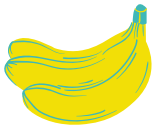

STRAWBERRY


GREEN PEPPER


EGGPLANT


CARROT

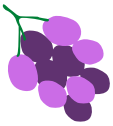

POTATOES


BANANAS


PEAR


BEET


AVOCADO


GRAPES


ORANGE


CORN


TOMATO

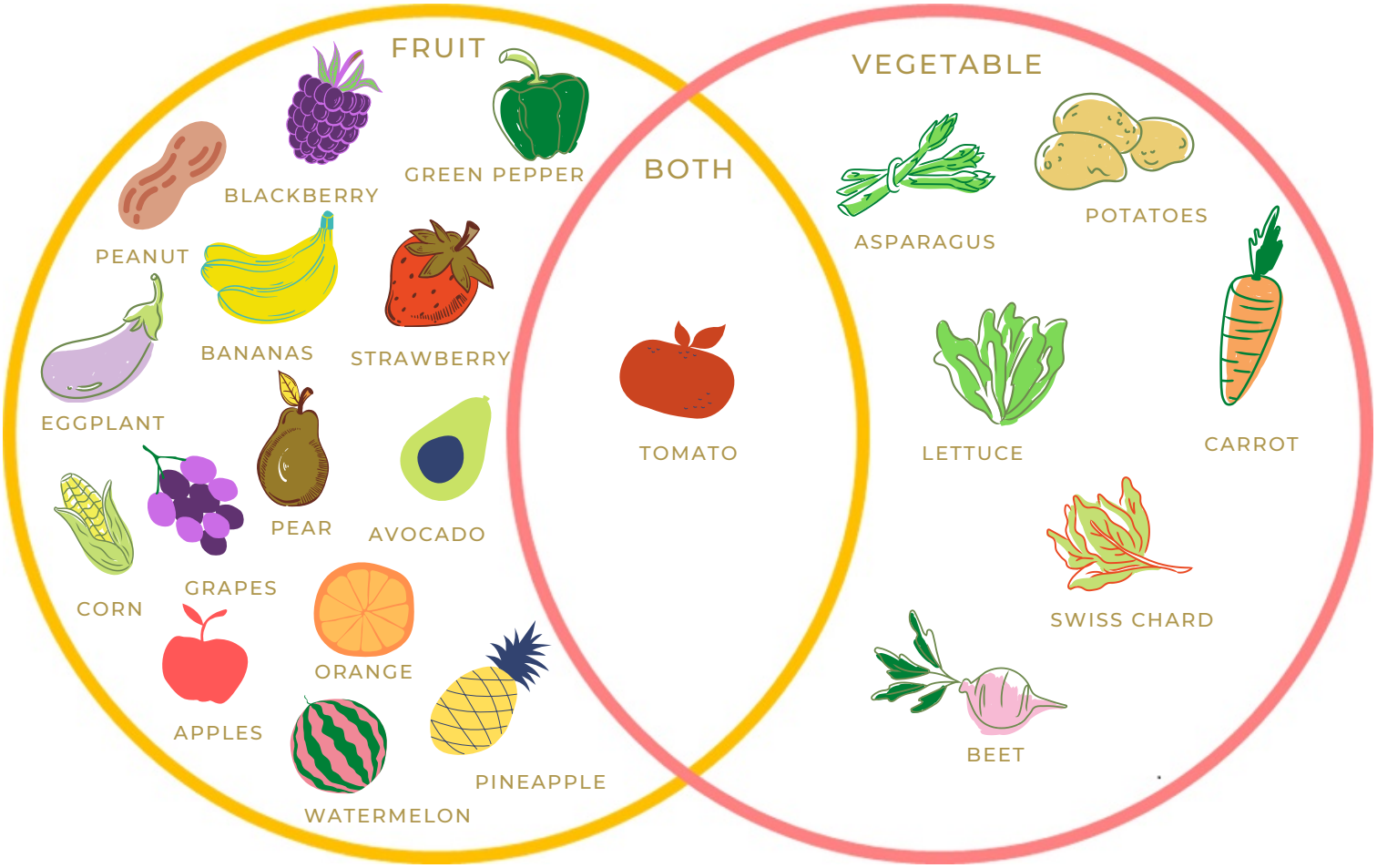

APPLES


SWISS CHARD


WATERMELON


PINEAPPLE

BAFFLING BOTANISTS: ANSWER KEY



Reminder: A tomato is considered "both" because is it botanically a fruit (with seeds inside its structure) but was legally ruled a vegetable by the Supreme Court.

EDUCATION STANDARDS

Social Emotional Learning Competency:

Grade Level	Science Education Standard
Grade 3	3.1.1.2.3 Maintain a record of observations, procedures and explanations, being careful to distinguish between actual observations and ideas about what was observed.
Grade 4	4.2.1.1.1 Objects have observable properties that can be measured.
Grade 5	5.1.1.1.3 Understand that different explanations for the same observations usually lead to making more observations and trying to resolve the differences.
Grade 6	6.1.2.1.4 Explain the importance of learning from past failures, in order to inform future designs of similar products or systems.
Grade 7	7.1.1.1.1 Understand that prior expectations can create bias when conducting scientific investigations.
Grade 8	8.1.1.1.1 Evaluate the reasoning in arguments in which fact and opinion are intermingled or when conclusions do not follow logically from the evidence given.