

Make Your Own Salad Dressing Using Canola Oil!

TEACHER GUIDE (Grades 5 & 7)

DESCRIPTION

In this activity, students will explore how to make a simple emulsified salad dressing using you guessed it...canola oil! Students will explore new vocabulary words like *emulsion*, *soluble* and *emulsifying agent* while learning about how simple ingredients can be combined to make a delicious, healthy dressing. This activity uses all of the senses and physical movement to reinforce concepts around properties of and changes in substances and the particle theory of matter

CURRICULUM CONNECTIONS

Grade 5 Science	
5-0-8e	Describe hobbies and careers related to science and technology.
5-1-03	Describe the types of nutrients in foods and their function in maintaining a healthy body. Include: carbohydrates, proteins, fats, vitamins, minerals
5-2-01	Use appropriate vocabulary related to their investigations of properties of and changes in substances. Include: characteristics, property, substance, physical change, reversible and non-reversible changes, raw material.
5-2-02	Identify characteristics and properties that allow substances to be distinguished from one another. Examples: texture, hardness, flexibility, strength, buoyancy, solubility, colour, mass/weight for the same volume...
5-2-03	Investigate to determine how characteristics and properties of substances may change when they interact with one other. <i>Examples: baking soda in vinegar produces a gas; adding flour to water produces a sticky paste</i>
5-2-09	Explore to identify reversible and non-reversible changes that can be made to substances. Examples: reversible - folding paper, mixing baking soda and marbles; non-reversible - cutting paper, mixing baking soda and vinegar
5-2-10	Recognize that a physical change alters the characteristics of a substance without producing a new substance, and that a chemical change produces a new substance with distinct characteristics and properties.
5-2-11	Observe examples of changes in substances, classify them as physical or chemical changes, and justify the designation Examples: physical - bending a nail, chopping wood, chewing food; chemical - rusting of a nail, burning wood, cooking food
5-2-14	Research and describe how raw materials are transformed into useful products. Examples: food processing, oil refining, paper milling, plastic moulding, gold smelting
Grade 5 and 6 Human Ecology: Food and Nutrition	
5.1.4.2 6.1.4.2	Identify ingredients that are required in a recipe.
5.1.6.1 6.1.6.1	Identify functions of various ingredients (e.g., flours, liquids, fats, eggs, leavening agents, etc.).
Grade 7 Science	
7-2-01	Use appropriate vocabulary related to their investigations of the particle theory of matter. Include: boiling and melting points, pure substance, scientific theory, particle theory of matter, temperature, heat, conduction, convection, radiation, mixture, solution, mechanical mixture, homogeneous, heterogeneous, solutes, solvents, solubility, concentration, dilute, concentrated, saturated, unsaturated, terms related to forms of energy
7-2-13	Differentiate between pure substances and mixtures by using the particle theory of matter. Include: a pure substance is made up of one type of particle; a mixture is made up of two or more types of particles.

CURRICULUM CONNECTIONS (CONT.)

7-2-14	Differentiate between the two types of mixtures, solutions and mechanical mixtures. Include: solutions — homogeneous; mechanical mixtures — heterogeneous mixtures.
7-2-15	Classify a variety of substances used in daily life as pure substances, solutions, or mechanical mixtures
7-2-17	Describe solutions by using the particle theory of matter. Include: particles have an attraction for each other; the attraction between the particles of solute and solvent keeps them in solution.

Grade 7 and 8 Human Ecology: Food and Nutrition

7.1.4.2 8.1.4.2	Identify ingredients that are required in a recipe and those that are optional.
7.1.6.1 8.1.6.1	Describe functions of various ingredients (e.g., flours, liquids, fats, eggs, leavening agents, etc.).

MATERIALS NEEDED

- A small glass jar or plastic container (with tight-fitting lid) – 1 per student
- Measuring spoons (9 or more tablespoons and 3 or more teaspoons)
- Dressing ingredients (per student):
 - 2 tbsp (30 mL) canola oil
 - 1 tbsp (15 mL) acid of choice (lemon juice, apple cider vinegar, balsamic vinegar, red wine vinegar, or white wine vinegar are all great choices!)
 - 1 tbsp (15 mL) emulsifier of choice (such as your favourite mustard or honey!)
 - 1 tsp (5 mL) fresh herbs (oregano, basil, thyme... any herb would be delicious!). You could even chop up some shallots or red onion for extra flavour
 - Pinch of salt and pepper
- Optional: Squeeze bottles for the canola oil, acids, emulsifiers
- Cut veggies so students can taste their creations (carrot sticks, cucumber slices, salad ingredients – you choose!)
- 1 printed [Student Activity Booklet](#) for each student

Ingredient	Recommended Quantities for 10 students
Canola Oil	500 mL
Acids	250 mL
Emulsifiers	250 mL
Seasonings	90 mL

Squeeze bottles help keep the mess to a minimum.



In order to not overwhelm students with too many choices, we suggest teachers supply **only 2 or 3 choices each for acids, emulsifiers and seasonings.**

Note: Coloured ingredients will better show off the difference between the oil, acid and emulsifier.

Acids (any two)

balsamic vinegar
red wine vinegar
apple cider vinegar
white wine vinegar
white vinegar
lemon juice

Emulsifiers (any two)

Dijon mustard
whole grain mustard
yellow mustard
honey

Seasonings (any two)

oregano
basil
thyme
rosemary
ground mustard
chopped garlic or garlic powder
chopped onion

GLOSSARY

Canola Oil: Canola oil is perfect for making salad dressing. Its neutral flavour means it can be mixed with any ingredients. It's low in saturated fat and contains omega-3, making it a healthy choice!

Acid: Any type of vinegar or citrus can be used for salad dressings. Try balsamic, red wine, white wine, or apple cider vinegar! You can also use the juice from a lemon, lime or orange.

Emulsifier: An emulsion is a homogenized mixture of two or more liquids that are not dissolved into one another. Vinegar and oil don't mix, that is why we need something to keep them together. Mustard or honey work perfectly.

ADVANCE PREPARATION

1. Print/photocopy the **Student Activity Booklet** – 1 per student.
2. Assemble all the materials needed to make the dressing (containers, measuring spoons, canola oil, acids, emulsifiers, seasonings, etc.) and the veggies (carrot sticks, cucumber slices, etc.) for sampling the dressing.
3. Create 4 stations or tables.

Station	Materials
1	2 bottles of canola oil, 2 (or more) tablespoons, and a sign that says, 'Add 2 tablespoons of canola oil'
2	Bottles of the acids you chose to provide, 2 to 3 (or more) tablespoons, and a sign that says, 'Add 1 tablespoon of your choice of acid'
3	Bottles, jars, or dishes of the emulsifiers you chose to provide, 2 to 3 (or more) tablespoons, and a sign that says, 'Add 1 tablespoon of your choice of emulsifier'
4	Dishes or jars of the seasonings you chose to provide, 2 to 3 (or more) teaspoons, salt and pepper, and a sign that says, 'Add 1 teaspoon of your choice of seasoning, plus salt and pepper if you wish'

LESSON PLAN

1. Hand out a **Student Activity Booklet** to each student and have them complete the first section, **"Let's review the basics"**.
2. Discuss their answers as a class.
3. Give each student a container with a tight-fitting lid.
4. Divide the students into 4 station groups.
5. Explain to students that they will rotate through each of the 4 stations (canola oil, acid, emulsifier, and seasoning stations) to create their salad dressing.
6. Time to make their salad dressing creation! Send a student group to each table to add that ingredient to their jars. Rotate the students about every 5 minutes until all groups have visited each station.
7. Have students put the lids on their containers. Make sure the lids are on tight.
8. Students must now shake the jar vigorously to emulsify the dressing.
9. Time to taste! Provide each student with a carrot stick or other vegetable to dip into their dressing, or drizzle the dressing over a salad. Enjoy!
10. Students go back to their **Student Activity Booklet** and complete the **"Your creation"** section. Each student could even take a turn sharing which ingredients they chose and why!



TAKE A CLOSER LOOK

Make up a larger demonstration jar with a tight-fitting lid. Pour 100 mL of canola oil and 50 mL of a coloured vinegar into the jar. When the students shake their jars (see Step 8 above), let the students know that you are “shaking up the demo jar that contains only canola oil and vinegar with no emulsifier, so we can compare it to your salad dressings that do have an emulsifier.” Let the students taste their dressings (*Step 9 above*). Then instruct them to put the lids back on their jars and let their dressings sit. After 5 minutes, 10 minutes, and 15 minutes, compare the demo jar to their dressing jars and observe any differences.

What should students see? In the demo jar, the oil and vinegar will have separated, but in their salad dressing, there will be much less separation. Here’s why:

EMULSIFIERS ARE THE HAND-HOLDERS OF THE SALAD DRESSING WORLD!

You may have heard that oil and water don’t mix. That’s true for oil and vinegar, too. They are made up of different molecules that are attracted to their own kind, and not to each other. Vinegar has ‘water-loving’ (*hydrophilic*) molecules and oil has ‘water-fearing’ (*hydrophobic*) molecules.

Emulsifiers contain molecules that have both hydrophilic and hydrophobic regions. They can attract and “hold hands” with ‘water loving’ and ‘water fearing’ molecules simultaneously. When the molecules are pulled together in this way, they form a special type of mixture called an emulsion. That is how the emulsifier can hold the vinegar and oil molecules together, and keep them from separating for a long time – or at all.

Grade 5 teachers could also discuss the concepts of reversible and non-reversible changes, and physical and chemical changes.

Grade 7 teachers could also discuss the particle theory of matter, and the concepts of soluble and insoluble solutions and mechanical mixtures.

➔ ACT IT OUT

You could physically demonstrate these concepts by using two differently coloured pinnies, arm bands, or an equivalent. (For this example, I am going to use yellow for oil molecules and green for vinegar molecules). Give half the students yellow pinnies and the other half green pinnies. Use any defined space such as a circle or square large enough for the students to run around in to represent the ‘jar’. Ask the yellow ‘oil molecule’ students to stand together at the top of this ‘jar’ space and the green ‘vinegar molecule’ students stand at the bottom. Tell the students that oil and vinegar molecules are each attracted to their own kind of molecule but not to each other.

When the students shook their salad dressing, they added kinetic energy to the oil and vinegar molecules, making the molecules speed up, break free from their attraction to their own kind, and move in every direction. Tell the students to ‘shake it up’ by running everywhere in the ‘jar’.

Once the students are well mixed say, ‘Stop or freeze.’ Explain that when the students stopped shaking their jar, they stopped adding kinetic energy and the molecules slowed down. The attraction to

molecules of their own kind and away from molecules that are different slowly pulls the yellow ‘oil molecules’ back together and the green ‘vinegar molecules’ together. Have the yellow students walk back to where they started and the green to where they started.

Now have some of the yellow and green students take off their pinnies and be emulsifiers ($\frac{1}{2}$ of the students should be emulsifiers, $\frac{1}{3}$ should be yellow ‘oil’, and $\frac{1}{3}$ should be green ‘vinegar’). Part of the emulsifier molecule is attracted to oil molecules, and the other part is attracted to vinegar molecules. When you say ‘shake it up’ this time, the yellow ‘oil’ and the green ‘vinegar’ students are to run everywhere. The job of the students acting as emulsifier molecules is to find and hold hands with one yellow ‘oil’ and one green ‘vinegar’ molecule and then move as a group of three.

Say, ‘Shake it up.’ Once the students are all in groups of three, say, ‘Stop.’ Ask them how easy it is now for the yellow ‘oils’ and the green ‘vinegars’ to move back to their starting places when they are being held together by the emulsifiers.

Of course, the yellow ‘oils’ and the green ‘vinegars’ are still trying to get back with their own kind, so eventually the emulsifier gets tired of holding on to them, and, over time, each type of molecule slowly drifts back to its own group.

EXTENSION ACTIVITIES

Want to explore emulsifiers, soluble and insoluble liquids and other salad dressing properties more deeply?

Check out Investigations 1 to 3 in the **Little Green Thumbs Salad Dressing** activity below:

<https://www.littlegreenthumbs.org/salad-dressing-activity/>