



# Parsnip Pancakes

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**Theme:** Science, Cooking, Math

**Grade Level:** 4th - 5th

**Subject Area:** Science, Math, ELA

**Summary:** Students learn about solids, liquids, and gases using the ingredients of parsnip pancakes and learn about the metric system, conversions and math through measurements of ingredients in this recipe. Students can also have an opportunity to use their five senses, learn about the parsnip, and write about their observations of the cooking process. Then, they make and eat some pancakes!

## **Standards:**

### **Fourth Grade**

#### **ELA**

- CCSS.ELA-LITERACY.W.4.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

#### **Common Core Math**

- CCSS.MATH.CONTENT.4.MD.A.1 Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), ...
- CCSS.MATH.CONTENT.4.MD.A.2 Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.

#### **NGSS**

- 4-PS3-2. Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.

**Preparation:** Collect and organize ingredients for baking the recipe, print worksheets off, grate parsnips.

**Teaching Time:** 1 hour

**Cooking Time:** 40 min

## **Materials:**

- For exploration of flour:
  - Flour

- Water
- Magnifying glass (one for each group)
- 2 ounce sample cups (two for each group)
- Spoons (one for each group)
- Parsnip Pancakes:
  - Hot plate and frying pan OR portable electric griddle
  - Spatula
  - Mixing bowls
  - Measuring cups
  - Liquid measuring cup
  - Grater
  - Mixing spoon
  - Oven mitt
  - Cutting mats
  - Napkins or plates
  - Ingredients:
    - 1 cup whole wheat pastry flour (or ½ cup whole wheat and ½ cup pastry flour)
    - 1 teaspoon baking powder
    - ½ teaspoon baking soda
    - ½ teaspoon salt
    - ¾ teaspoon ground cinnamon
    - ¼ teaspoon ground nutmeg
    - ¼ teaspoon ground ginger
    - 1 egg
    - 2 tablespoons packed Muscovado sugar or brown sugar
    - 1 cup buttermilk
    - 1 teaspoon vanilla extract
    - 2 cups finely grated parsnips
    - Butter or oil for frying the pancakes

### **Lesson Procedure:**

1. Have all students wash hands and clean desk spaces
2. Discuss the similarities and differences between solids, liquids and gases.
3. Begin mixing the ingredients for parsnip pancakes, having students come up to read the recipe and help measure the ingredients. While each ingredient is added, students follow along on their worksheet and determine if it is a solid, liquid or gas.
4. Discuss the differences between physical and chemical changes, and have students determine which change the cooking of the pancakes is considered. Make note of the combination of an acid (buttermilk) and base (baking soda) to create the chemical reaction.
5. Begin cooking the parsnip pancakes -- while these are cooking, have students conduct the flour experiment.
  - a. Give each group a magnifying glass, 2 2-ounce cups (one with flour and one with water).
  - b. Have students walk through the "Is flour a solid or a liquid" worksheet
6. Discuss results as a class and try the pancakes!

### **Wrap up:**

Flour acts like a fluid in some ways because it seems to sometimes take the shape of its container, such as how it fits easily into a flour bag. But if you take a magnifying glass and look at the flour or another powder up close, you can see that it is made of small, solid building blocks. Another way to test this is if you pour water onto a flat surface like a desk, it will try to take the shape of the desk (flat) by spreading out and

creating a puddle. If you pour flour onto a (dry) desk though, it forms a small mound, not taking the shape of the desk like a true liquid would do.

**Extended:**

While the pancakes are cooking, discuss metric conversions and the use of the metric system as a standard of measurement. Review the base units used when discussing mass (grams), volume (liters), and length (meters). Have students come up with a creative acronym to remember the main metric pre-fixes: kilo, hecta, deca, base, deci, centi, milli. As an example: Kittens Hate Dogs Because Dogs Can't Bark. These acronyms are much easier to remember if they are personal and funny to the student.

Once they have an acronym, write the letters out on the board as follows:

**K H D B D C M**

Make note that each letter is separated by a power of 10. When moving from one unit to another follow the simple rules:

- However many places you move, that's how many places your decimal will move
- Whatever direction you move, that is the direction your decimal will move

Example: millimeters to meters → move decimal three places to the left.

Do a conversion example with students, then have them complete the metric conversions for the recipes on their own.

NAME

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DATE

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## Parsnip Pancakes: Solid, Liquid or Gas?

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### 1. Draw a line to match the state of matter with the correct description:

- |        |   |
|--------|---|
| Solid  | is invisible                                |
| Liquid | becomes the shape of the container it is in |
| Gas    | does not change shape easily                |

### 2. Is flour a solid or a liquid?

- a. Try filling up a clear container with flour. Does flour become the shape of the container it is in?
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- b. Use a spoonful of flour to try to make a pile of flour on your table. Does the flour hold its shape or does it become flat like the table?
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- c. Compare flour to a liquid like water. Use a spoonful of water to try to make a pile of water on your table. Does the water hold its shape or does it become flat like the table?
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- d. When you look closely at flour, what do you see?
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- e. Is flour a solid or a liquid? Why?
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### 3. For each item listed below, circle if it is a solid, liquid or gas:

<b>Water</b>	Solid	Liquid	Gas
<b>Parsnips</b>	Solid	Liquid	Gas
<b>Flour</b>	Solid	Liquid	Gas
<b>Buttermilk</b>	Solid	Liquid	Gas
<b>Egg (before it is cooked)</b>	Solid	Liquid	Gas
<b>Egg (after it is cooked)</b>	Solid	Liquid	Gas
<b>Baking powder</b>	Solid	Liquid	Gas
<b>Baking soda</b>	Solid	Liquid	Gas
<b>Vanilla extract</b>	Solid	Liquid	Gas
<b>Sugar</b>	Solid	Liquid	Gas
<b>Butter (in the refrigerator)</b>	Solid	Liquid	Gas
<b>Butter (heated to 95°F)</b>	Solid	Liquid	Gas
<b>Salt</b>	Solid	Liquid	Gas
<b>Cinnamon</b>	Solid	Liquid	Gas
<b>Parsnip Pancakes</b>	Solid	Liquid	Gas
<b>Carbon Dioxide</b>	Solid	Liquid	Gas

### 3. Metric Conversions

a. What base metric unit of measurement is used when discussing mass?

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b. What base metric unit of measurement is used when discussing volume?

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c. If the recipe called for 50 g of flour to make parsnip pancakes, how many mg of flour would you need?

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d. If the recipe called for 100 mL of buttermilk, how many liters of buttermilk would you need?

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e. If the recipe called for 0.20 kg of sugar, how many grams of sugar would you need?

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