

- The teacher will read Mistakes That Worked by Charlotte Foltz Jones to the class and discuss how results are not always what was expected and how that is part of being a scientist.

## Creating a Salad Dressing

---

**Recommended Age Groups:** Later Elementary and Middle School

This lesson was developed by [Reach Out!](#)

---

### Guiding Questions

1. What is the scientific process?
2. Can I make a new salad dressing recipe?
3. How can the scientific process help me to make my new recipe?

---

### Objectives

#### Concepts

- The scientific process is the steps someone takes to find the answer to a problem.
- By going through the steps of a scientific process, a scientist is able to record the observations and results so that someone else could find the answer to the problem in the future.

Steps



#### Principles

of a scientific process:

1. Question – a problem that needs to be answered
2. Hypothesis – a guess of the answer to the problem
3. Procedure – a list of the steps needed to answer the problem
4. Experiment – physically following the procedure step by step to arrive at an answer

5. Data – [observations](#) made while performing the experiment
6. Results – observations made after performing the experiment
7. Conclusion – What do the results tell you? Was your hypothesis (guess) correct?

Picture courtesy of the Kraft Interactive Kitchen ([www.kraftfoods.com](http://www.kraftfoods.com)).

## Facts

- Scientists have to take the time to think logically when they are investigating a question or problem. They break things down into many steps that make sense.
- Scientists develop a question and a guess. They describe it well so they can make sure they stick to what they originally planned to do and don't venture off on other paths.
- Experiments are made up of several steps that a scientist must record so others can try the same experiment. These steps are sort of like a recipe with what you need, what you do, and what to look for during the process.
- A key to experiments is observing what happens and writing it down. Gathering information or data and documenting it so it is readable and makes sense to others is really important.
- Once scientists complete an experiment, they often repeat it to see if they get the same findings and results. This is really what we call a verification, or checking things out to make sure everything was valid and will happen again and again.
- Scientists share their experiments and findings with others. So, writing a [report](#) that includes the whole process, the recipe, and the findings is critical. Because they share their experiments and findings, scientists can learn from each other and often use someone else's experiences to help them with what they are studying or doing.

## Skills

- Making Observations
- Making Comparisons
- Documenting Findings
- Communicating Findings

## Materials

Each person or pair needs access to the following:

1. Salad oil
2. Cider or wine vinegar
3. Sugar
4. Salt

5. Pepper
6. Sage
7. Rosemary
8. Oregano
9. Garlic powder or salt
10. Lemon, lime or other juices
11. Measuring spoons
12. Glass or plastic jar with lid to put ingredients in.
13. Paper towels for spills and drips
14. [Handout](#)

## Room Preparation

Need ample elbow room. Spills may happen.

## Safety Precautions

None

---

## Activity

1. Pass out the [handout](#) and go over the steps for creating their own salad dressings.
2. What is the *problem*? – Give examples of the questions they might write, such as “Can I come up with a sweet salad dressing?” or “Can I develop a tangy salad dressing?”
3. What is their *hypothesis*? – Tell the children to guess about how they can make their salad dressings taste a certain way.
4. What is their *procedure*? – Review the need to write down the ingredients they choose to use for each experiment or recipe. Emphasize the importance of careful measuring and documenting the amount of each ingredient on their handouts. If this isn’t precise, we cannot duplicate the recipe or experiment — the recipe will be lost!
5. *Experiment!* – Start to make the salad dressings following the procedures (recipe) they have already created.
6. Write down the *data* – What happens while following the recipe? What does the dressing look like? They might want to taste it to check out flavors during the experiment.
7. What are the *results*? – When they taste their final concoction, they should use plenty of adjectives to describe the result. Have them use many senses — smell, sight, taste.
8. What are the *conclusions*? – Did they make the recipe that they were expecting to make? If their concoction isn’t what they started out to make, have them describe what seems to be off. For example, is it too sweet or bitter? Do they think they used too much sugar or other ingredients? This information is key to starting over again and trying to learn from previous experiments.

9. Once they like their salad dressings, choose names for them. You have your recipe for what could be a new salad dressing invention!

---

## Evaluation

Ask again the guiding questions:

1. What is the scientific process?
2. Can I make a new salad dressing recipe?
3. How can the scientific process help me to make my new recipe?

Listen for evidence that they have come to a better understanding about the scientific process. If possible, have them share this lesson and experiment with others. When we “teach” something, we definitely come to understand it! This is a fun experiment to share with friends.

---

## Extension Ideas

1. It is fun to take someone else’s recipe and try it out. This is a great way to test another person’s documentation.
2. Cooking and baking are fun ways to learn about and experience first hand the scientific process. You may want to provide a variety of ingredients and let them come up with their personal recipes for cookies, muffins, ice cream, soup, and so on. You might pull together these “experiments” to make a recipe book!

---

## Careers Related to the Lesson Topic

- Chef
- Chemist
  - [Tour](#) - U of M Chemistry Department
  - [Wizard](#) - Whiz-Bang Chemistry
- Dietitian
- Nutritionist

---

## Prerequisite Vocabulary

Observations

Carefully examining and checking something out. Keeping track of and noting details about what you see, including measurements and what you think about something.

Report

A well-organized written document that lists and describes the specific problem, the hypothesis, all the procedures for the experiment, plus the results and conclusions.

---

## A Way to Solve a Problem

### Create a Salad Dressing Using the Scientific Method Evaluation Form

A completed Lab Report should include the following sections:

**Heading, Title, Problem, Hypothesis, Materials, Procedures, Data, Conclusion, and Conclusion Questions.**



**This Lab Report Is Completed To The Best Of My Ability.**

X \_\_\_\_\_

(Student Signature)

Name: \_\_\_\_\_

Teacher: Mrs. Vredenburg

Title of Experiment: \_\_\_\_\_

Date Submitted: \_\_\_\_\_

Lab Partner(s): \_\_\_\_\_, \_\_\_\_\_

<u>Teacher</u>	<u>Criteria</u>	<u>Student</u>
0, 5, 10	Clear and Appropriate <b>HEADING, TITLE, PROBLEM,</b> and <b>HYPOTHESIS.</b>	0, 5, 10
0, 5, 10	All <b>MATERIALS</b> listed and a summary of <b>PROCEDURE.</b>	0, 5, 10
0, 10, 20	Appropriate presentation of <b>DATA</b> and observations including graph(s), chart(s), drawing(s), etc. Accuracy of data.	0, 10, 20
0, 10, 30, 40	Clear and concise <b>CONCLUSIONS.</b> Conclusion addresses problem and states knowledge gained. Answers to all <b>QUESTIONS.</b>	0, 10, 30, 40
0, 5, 10	Overall- <b>NEATNESS, GRAMMAR,</b> adheres to <b>FORMAT,</b> etc.	0, 5, 10
0, 5, 10	Appropriate <b>GROUP PARTICIPATION,</b> including input and cooperation during experiment.	0, 5, 10
_____	<-----Total points earned = Lab grade----->	_____

**Student Comments;**

## Collaborative Work Skills: Using the Scientific Method to Create a Salad Dressing

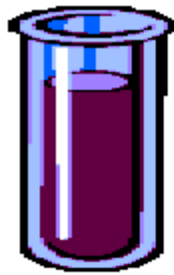
Teacher name: Mrs. Vredenburg

Student Name \_\_\_\_\_

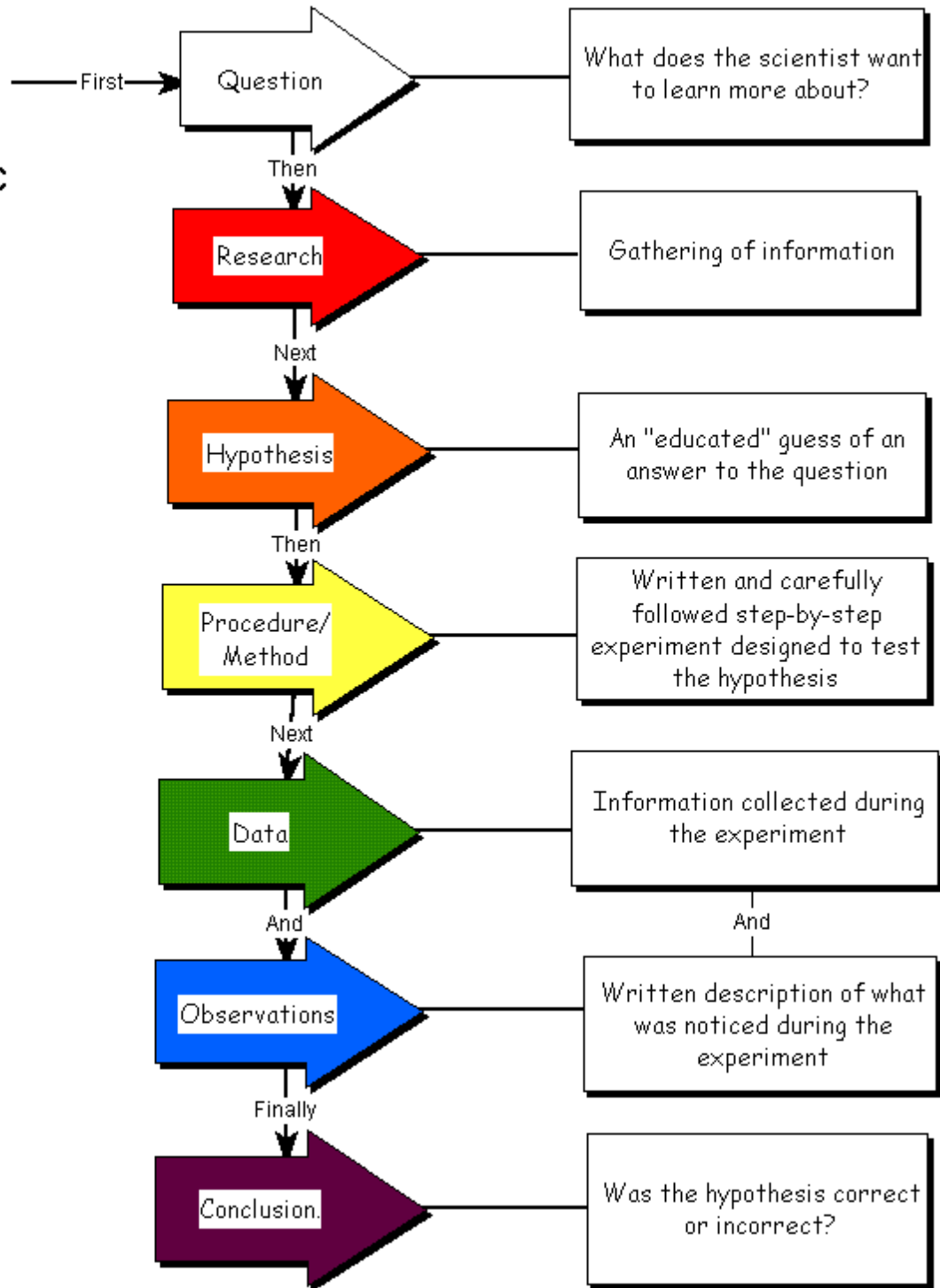
CATEGORY	Exceeds Standard	Meets Standard	Partially Meets the Standard	Fragmented Understanding
<b>Quality of Work</b>	Provides work of the highest quality.	Provides high quality work.	Provides work that occasionally needs to be checked/redone by other group members to ensure quality.	Provides work that usually needs to be checked/redone by others to ensure quality.
<b>Working with Others</b>	Almost always listens to, shares with, and supports the efforts of others. Tries to keep people working well together.	Usually listens to, shares with, and supports the efforts of others. Does not cause "waves" in the group.	Often listens to, shares with, and supports the efforts of others, but sometimes is not a good team member.	Rarely listens to, shares with, and supports the efforts of others. Often is not a good team player.
<b>Monitors Group Effectiveness</b>	Routinely monitors the effectiveness of the group, and makes suggestions to make it more effective.	Routinely monitors the effectiveness of the group and works to make the group more effective.	Occasionally monitors the effectiveness of the group and works to make the group more effective.	Rarely monitors the effectiveness of the group and does not work to make it more effective.
<b>Focus on the task</b>	Consistently stays focused on the task and what needs to be done. Very self-directed.	Focuses on the task and what needs to be done most of the time. Other group members can count on this person.	Focuses on the task and what needs to be done some of the time. Other group members must sometimes nag, prod, and remind to keep this person on-task.	Rarely focuses on the task and what needs to be done. Lets others do the work.

Date Created: August 2, 2001

Copyright 2001, High Plains Regional Technology in Education Consortium

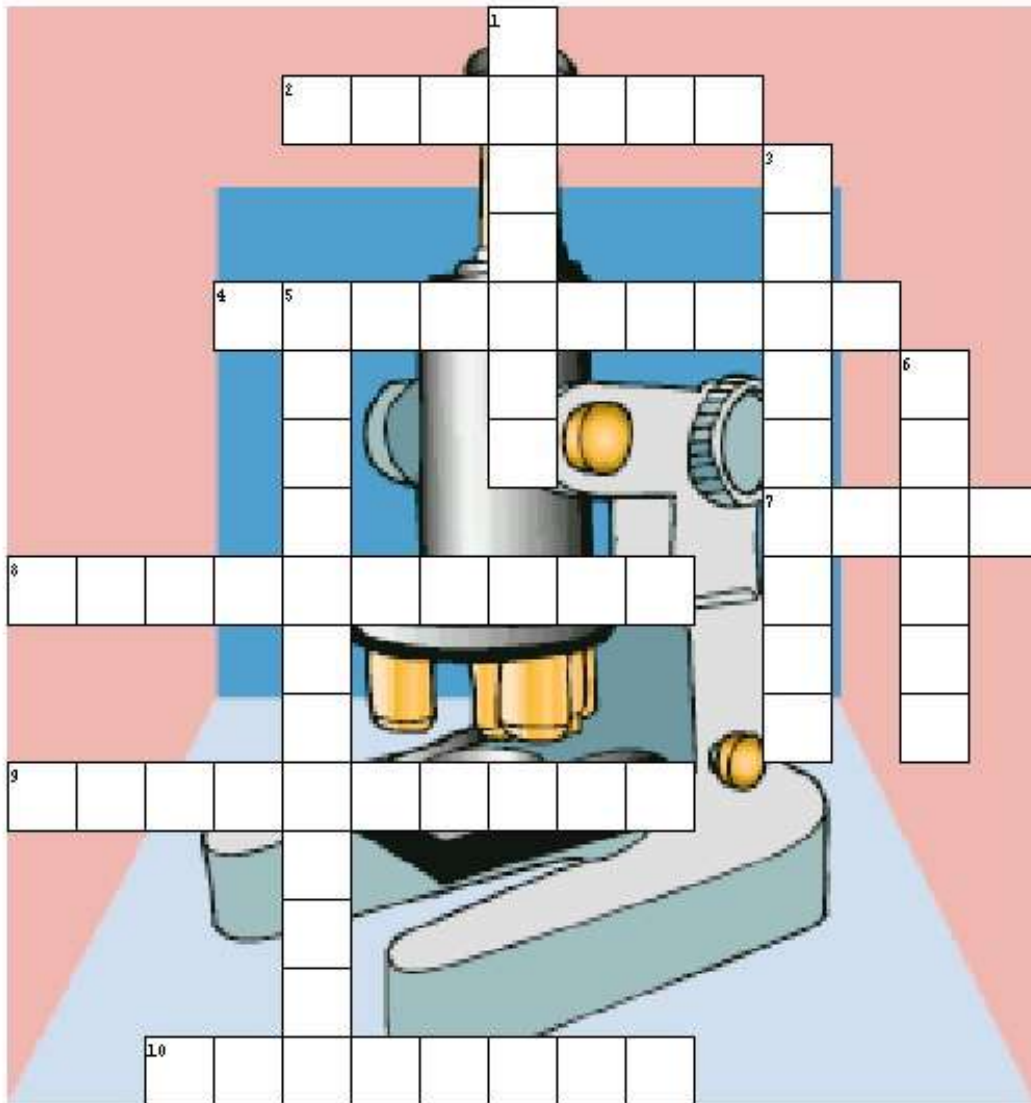


# Scientific Method









**ACROSS**

- 2) A way of thinking about the world around us
- 4) Was your hypothesis correct or incorrect?
- 7) Information you collect during your experiment
- 8) Tests your hypothesis
- 9) An educated guess of the answer to your question
- 10) Gathering of information

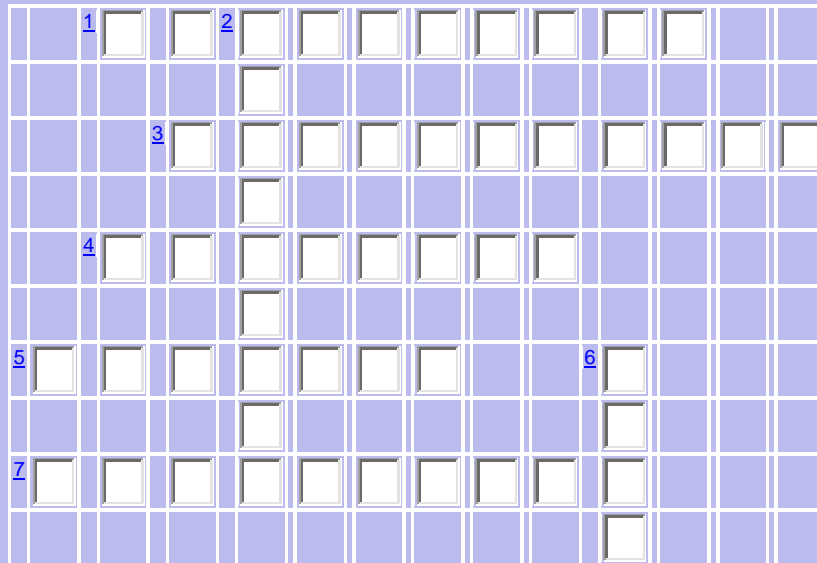
**DOWN**

- 1) Observations made after performing the experiment
- 3) Another name for a method
- 5) What you notice during your experiment
- 6) Like a recipe, it is a step-by-step set of directions

# The Scientific Method - A Way to Solve a Problem

## Crossword

Top of Form



### Across:

- 1 An educated guess of an answer to your question
- 3 Was your hypothesis correct or incorrect should be included here.
- 4 What do you, the scientist, want to learn more about?
- 5 Observations made after performing the experiment
- 7 Activity designed to help find an answer to your question

### Down:

- 2 Written and carefully followed experiment designed to test your hypothesis
- 6 Information collected during the experiment

