# The Scientific Method Lab

When scientists are asked questions, they may not know the answers. They think of possible answers, called hypotheses, and experiment to find the correct answer. Using the results of the experiment, they may need to form another hypothesis and test it. This way of solving a problem is called the scientific method.

#### Strategy

You will predict whether or not blue cabbage juice will remain blue when chemicals are added to it. You will test your prediction (hypotheses) with an experiment You will observe what happens and record your observations.

You will draw conclusions based on your observations.

# Materials

3 pipets per group
10 - numbered liquid holding trays
20 mL of blue cabbage juice
Small flask with chemical X
Small flask with chemical Y
Small flask with chemical Z
(CAUTION: Do not spill chemicals X, Y, or Z on clothes and skin.)

## Procedure

- 1. In the space below, predict what will happen to the blue cabbage juice when chemicals X, Y, and Z are added to it.
  - X : \_\_\_\_\_ Y : \_\_\_\_\_
  - Z :
- 2. Using the pipet inside the beaker of blue cabbage juice, add 10 drops of blue cabbage juice to numbered bowls 1, 2, 3, & 4.
- 3. Add 15 drops of chemical X into bowl number 1. Immediately record color change in the table.
- 4. Add 15 drops of chemical Y into bowl number 2. Immediately record color change in the table.
- 5. At this time, please send your team leader with the flask labeled "Z" up to the teacher. The teacher will be giving you a little bit of chemical "Z" at this time.
- 6. Add 15 drops of chemical Z into bowl number 3. Immediately record color change in the table.
- 7. Do not add anything into bowl number 4.
  \*\* This is the control. The control is the part of an experiment that is NOT TESTED!!
- 8. Record the color in bowl number 4 in the table.
- 9. After about 5 minutes, go back and examine the colors in all 4 bowls. Record new color, if any, into the data table.

Record you observation in Data Table below.

BOWL	SUBSTANCE ADDED	COLOR	COLOR AFTER 5 MINUTES
1			
2			
3			
4	NOTHING/ CONTROL		

#### **Questions and Conclusions**

1. (a) Was your prediction correct?
(b) What part of the scientific method is predicting?
2. Do all chemicals have the same effect on blue cabbage juice?
3. Why did you record the color changes?
4. What steps in the scientific method did you use?
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5. What is the purpose of the control in an experiment?
6. Why is a hypothesis called an educated guess?
7. Was your experimenting a way of proving you hypothesis?
8. How did your hypothesis change after experimenting?
9. Why was it important to make sure that every bowl received the exact amount of drops? What
were we trying to minimize?

#### **Strategy Check**

- \_\_\_\_\_ Did you make a prediction?
- \_\_\_\_\_ Did you test your prediction and record what happened?
- Can you draw conclusions based on your observations?
- \*\* If you checked all 3 of these, then your on your way to thinking like a scientist!! 😳

### **TEACHER PREP:**

- Boil cabbage a few nights before, if use filtered water then you will get the blue colored water.
- Keep cabbage juice refrigerated until day of use.
- Chemical X : 50/50 solution of vinegar and water.
- Chemical Y: 50/50 solution of ammonia and water OR 500 ml water with 3 spoonfuls of calcium bicarbonate
- Chemical Z: Hydrogen peroxide ( pure)

Color changes:

Chemical X/Bowl 1: Pinkish/Red ; same after 5 min. Chemical Y/ Bowl 2: Teal/blue green; same after 5 min. Chemical Z/ Bowl 3: Purplish; grayish after 5 min. Control: No color change.