

## Coca-Cola Distillation



### Annotation

Students will separate fractions of Coca-Cola by distillation. Distillation will separate volatile flavor chemicals, water, and concentrated cola syrup. This activity demonstrates a practical application of chemical boiling points and identifies some of the components of Coca-Cola.

### Primary Learning Outcome:

Students should identify distillation as a method of separating liquids with differing boiling points. Students should recognize relationship between boiling points of chemicals and the order of separation during distillation. Students should identify distillation as a physical process.

### Additional Learning Outcomes:

Students should recognize that foods are made up of a combination of chemicals.

### Assessed QCC:

Grade: 9-12

*Science*

Physical Science

### Non-Assessed QCC:

### Total Duration:

50 minutes

### Materials and Equipment:

Distillation apparatus.

100 mL Coca-Cola per lab station

100 mL Graduated Cylinder

Boiling Chips

Thermometer

Heat Source

Safety Goggles

### Procedures:

#### Step One

1. Add boiling chip to distilling flask.
2. Add 100 mL Coca-Cola to distilling flask.
3. Assemble distillation apparatus.
4. Heat Coca-Cola slowly. Do not exceed 100°C.
5. Observe odors as heating begins.
6. Continue heating until clear fraction is collected in collection flask and dark brown syrup is left in distilling flask.
7. Remove heat before syrup dries.
8. Complete discussion questions.
9. After glassware has cooled, dismantle distillation setup and clean glassware.

**Discussion:**

1. Odors detected early in the distillation from volatile (low-boiling point) flavor chemicals. The next fraction of chemical to come out of Coca-Cola is the clear liquid collected in the collection flask. What is this chemical? How does its boiling point help us to identify the chemical?
2. What is left in the distillation flask at the end of the distillation (look at the ingredients list for help)? How does this relate to the way that Coca-Cola is made (think of a restaurant soda fountain)?
3. Was this distillation a physical or chemical process? Explain your answer.
4. Define chemical. Are there chemicals in Coca-Cola?