Jungle Detectives: Liquid Analysis

Sections

Joey Scouts | Cub Scouts | Scouts | Venturer Scouts | Rover Scouts

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Challenge Areas

COMMUNITY | CREATIVE | OUTDOOR | PERSONAL GROWTH

Scout Method Elements

COMMUNITY INVOLVEMENT | LEARNING BY DOING | NATURE AND THE OUTDOORS | PROMISE AND LAW | PERSONAL PROGRESSION | PATROL SYSTEM

SYMBOLIC FRAMEWORK | YOUTH LEADING, ADULTS SUPPORTING

SPICES Growth Areas

CHARACTER | EMOTIONAL | INTELLECTUAL | PHYSICAL | SOCIAL | SPIRITUAL

The Adventure

While exploring the jungle, you come across an ancient temple. On one of the walls of the room, you notice a collection of paintings, bottles of liquids, and waterways that suggest that one of the liquids will open a door to another room. Examine the liquids to work out which one will open the door.

Plan

1. Investigate acids and bases and their properties, and how the react with each other. What acids and bases do you encounter in your everyday life?
2. Investigate the pH scale as a way to measure the strength of acids and bases. What is the pH of a weak acid, strong acid, weak base, and strong base?
3. Read the safety information and discuss with your leaders or another appropriate adult what safety equipment, precautions, and supervision may be required. Ensure that you have these safety measures in place before starting the ‘Do’ section.
4. Gather all the equipment that you need to test the liquids. You will need the following equipment and ingredients: liquids prepared as per the Jungle Detectives Liquid Analysis Preparation document (this will require water, yellow and blue food colouring, a teaspoon, bicarbonate of soda, citric acid, mixing cups, and storage bottles), test tubes, a test tube rack, a small measuring cylinder, a permanent marker, and pH testing strips.

Do

1. Ensure that the samples have been prepared as per the Jungle Detectives Liquid Analysis Preparation by someone who will not be analysing the samples. They should know which sample corresponds to the liquid that will open the door but you should not.
2. Label your test tubes with "Liquid A", "Liquid B", and "Liquid C".
3. Place about 18 mL of Liquid A into the test tube marked with "Liquid A".
4. Repeat with Liquids B and C into their respective test tubes.
5. Record your observations of liquid colour for each liquid.
6. Take a pH testing strip and dip it into Liquid A. Try to cover about half the length of the strip with the liquid.
7. Repeat with Liquids B and C.
8. Record your observations of pH colour and compare to determine the pH of each liquid.
9. Compare your results to the properties of the liquid that will open the door as described by the person who prepared the samples or using the scenario liquid analysis features and decide which liquid will open the door.
10. Make sure to tidy up after your experiment.

Review

1. Did you successfully identify which liquid would open the door? Why or why not?
2. What did you enjoy most about this activity? What did you learn?
3. What other ways can you test pH?

Safety

- Bicarbonate of soda and citric acid may cause eye and skin irritation.

Variations

- This challenge card can pair well with other forensic science-based challenge cards such as other challenge cards such as the ‘Figuring Out Fingerprints’ series, Who Wrote It? Paper Chromatography, and other Challenge Cards from 'Jungle Detectives' to create a forensics program or a ‘Whodunit’ night.
- Other acidic or basic additives can be used if bicarbonate of soda or citric acid are not available. Vinegar and lemon juice are a good example of other good additives.
- Depending on the section, you can increase the difficulty of this activity by also having liquid that will open the door testable as a reference sample.
- Depending on the section and challenge area used, this challenge card can also be paired with a police station visit or some other law enforcement related community involvement.
- If you cannot access pH testing strips, there other methods for testing pH such as cabbage indicators.