Fire Colours

Sections

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

Scouts VICTORIA

Last updated: Jan. 9, 2024, 10:05 p.m.

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

Create interesting, coloured flames by adding different compounds to fire.

Plan

1. Watch this intro video from SciScouts to understand the background behind campfire chemistry

You can do this experiment on a traditional campfire or using one of the variations suggested in this document. Start by deciding which type of fire you will use and collect the equipment you will need to create the fire as well as the equipment from this list:

- Heat-proof gloves
- Fire blanket and fire extinguisher
- Metal teaspoons (make sure they are cleaned between each chemical you add)
- The household chemicals listed in the table on the next page. Each experiment/demo will use about a teaspoon, if you are adding it directly to the fire.

Read through the safety instructions and make sure you have adult supervision and then you are ready to do your experiment!

Do

1. Whilst this experiment can be done at any time of the day, it works best when the room is a little darker, or outside after the sun has set.
2. Light the fire, and with heat proof gloves on, carefully sprinkle about a teaspoon of one of the chemicals into the flame. Watch the flame change colour! You can find some ideas for what chemicals cause what reactions in the fire colours supplementary.
3. Try each of the other chemicals in the same way.

Review

Try some of the different techniques suggested in the variations and compare which gives the most obvious flame colour. Does changing the temperature or type of flame change your results?

Safety

- Make sure you have an adult handy to supervise this experiment. Keep the fire blanket and extinguisher close in case of emergencies.
- For safety wear cotton clothing, where possible, and remove your scarves so they don't drop in the flame. Make sure your hair is tied back.
- Wear safety goggles and gloves, especially when handling Borax.
- Make sure the area you are using is well ventilated, outdoors works well!
- Never cook on a fire after you have added any chemicals.
- If you are using the spray bottle option, ALWAYS SPRAY AWAY FROM OBSERVERS.
- If you are using a bowl of methylated spirits for your fire, the safest way to put the fire out is to simply wait for all of the fuel to be used up. If you need to put it out quickly, place a ceramic plate upside down on top of the bowl, completely covering it. This will stop oxygen getting to the flame and put the fire out in a few seconds.
- Make sure you wash your hands thoroughly before and after handling the chemicals.

Variations

- You can create a small methylated spirits fire in a heat proof container such as a ceramic bowl or the empty shell from a tealight candle. Add two teaspoons of your chosen chemical to two teaspoons of methylated spirits and mix together. Light the fuel and watch until you see the flame change colour.
- Another way to introduce the chemicals to the flames is to make a saturated solution of the chemicals and put them into spray mist bottles. Spraying these solutions into the flame can make for flashier colours. To make a solution, put some water into the bottle, add a spoonful of the chemical powder to the bottle and shake well. If the powder dissolves completely, add some more powder and repeat until the powder doesn't dissolve anymore. It doesn't matter if there is some powder sitting at the bottom of the bottle. You need a separate bottle for each chemical.
- A final alternative is to soak some wood in the chemical solutions (make the saturated solutions the same way as above). Make sure you soak each piece of wood in only one chemical. The wood needs to be completely dry before you use it, so make it well in advance or oven dry it. When you have your campfire just add the sticks to a hot fire to see the colours. This is a safer option for Joeys and Cubs.