

# Science Meeting for Sparks or Brownies

## Opening (10 minutes) – Regular unit opening

### Introduction (5 minutes) – What is science?

Some Sparks may not be familiar with science as a subject, particularly 5 year olds, who will not have started having science lessons in school yet.

*Science is a special way of looking at things around us. We use science to try and understand what makes things work the way they do. Science can explain things like why the sky is blue or how we grow. People who study science are called scientists. There are so many things to learn about with science that one person could never learn it all, so they divide it up into parts. Today we are going to find out a little bit about three different parts of science – physics, chemistry, and biology.*

### Part 1 – Physics (15 minutes)

*Physics is the part of science that explains how things move – like how the wind blows, how airplanes fly, or why things fall to the ground when we drop them.*

#### Demonstration – Air can hold things up

##### Materials:

- Hair Dryer with "cool air" setting and (focuser? – make a paper cone to concentrate the air flow if your hair dryer doesn't have one of these)
- Ping Pong Ball

##### How To:

- Hold the hair dryer so the nozzle is pointing straight up and turn it on.
- Place the Ping Pong ball directly into the air stream 1 – 2 inches from the nozzle.
- Carefully release the ball. The air stream should support the ball, making it "float" a few inches above the hair dryer.
- Depending on the strength of the air stream, you may be able to do a few "tricks" such as moving the ball by gently moving the hair dryer, or passing your hand quickly over and under the ball to show there are "no strings attached".
- If the girls want to try this themselves, it is best to move the group on to the next activity, then bring them back one or two at a time.

## **Hands on Activity – Make a Spark Flyer (Paper Airplane)**

### Materials:

- Photocopies of Spark Flyer pattern (see attached) or plain 8.5"x11" paper (1 per girl)
- Crayons or markers
- Scotch tape

### How To:

- Have the girls colour their paper. Let them know that it will be folded to make the plane, so simple patterns like stripes are better than detailed pictures which might not show when it is finished. The area between the lines on the pattern will be hidden on the finished plane, so it doesn't need to be coloured.
- Assembling the Spark Flyer (some adult assistance required)
  - Fold the paper in half diagonally from corner to corner. (Fold 1)  
This will make a shape like two triangles side by side.
  - Make a second fold, parallel to the first, about ½" away. (Fold 2)
  - Fold this ½" section over itself to create a stiff edge. (Fold 3)
  - Bring the two ends of the folded section together to form a circle. Slip one end into the other, and add a piece of tape to hold.
  - Smooth out creases in the folded section with your fingers to make it as round as possible.
- To fly the plane, hold it by the fold with the join at the bottom. The two points should be above your hand. Throw with moderate force.
- These planes fly easily, and naturally make loops and turns for an interesting flight.

## **Part 2 – Biology (15 minutes)**

*Biology is the part of science that studies living things like plants, animals, or people.*

### **Demonstration – We can trick our eyes**

#### Materials:

- Copies of Optical Illusions (see attached sheets)  
1 copy for every 2-3 girls
- Pennies, nickels, or dimes (for size comparison) 1 set per sheet

#### How To:

- Show the girls each of the illusions, and ask the appropriate questions, such as: "Which circle is larger?" or "How many legs does the elephant have?"
- Use the answer sheet provided with the illusions to show them that what they see is not always what is there.

## Hands on Activity – Bird in Cage Illusion Toy

### Materials:

- Copy of bird and cage circles for each girl (see attached sheet)
- Lightweight cardboard such as an old file folder (enough to make one circle for each girl)
- String or yarn (two 3' pieces per girl)
- Single hole punch
- Crayons or markers
- Scissors
- Glue

### How To:

- Assemble the toy as outlined on the instruction sheet.
  - **For Sparks, it is easier if the cage and cardboard circles are pre-cut and glued together.**
  - Sparks can colour and cut out their bird circle, and glue it to the back of the cage circle.
  - Adult assistance is usually required to make sure the bird is glued on correctly (upside down relative to the cage), and to punch the holes and insert the string.
- To operate the toy:
  - Hold one string loop in each hand.
  - Twist the string by moving one hand in small circular motions.
  - Gently pull and release the strings to make the circle spin.
  - Watch carefully while the circle is spinning to see the bird in the cage.
- Explain why the bird appears in the cage: *While the circle is spinning, the pictures are changing so quickly that our brains can't keep up. Our eyes keep sending the message that we are seeing bird-cage-bird-cage, so our brain combines the images and makes us think we are seeing a bird in a cage.*

## Part 3 – Chemistry

*Chemistry is the part of science that explains what makes non-living things appear and act the way they do – such as why water pours when it is warm, turns to steam when it gets hot, and freezes when it gets cold.*

## Demonstration – Combining things can make something different (slime!)

### Materials:

- Cornstarch
- Water
- Pie plate or cake pan (not glass!)
- Measuring cup
- Spoon or Popsicle stick (for stirring)

### How To:

- Pour 1 ½ - 2 cups of cornstarch into a pie plate.
- Pass the pie plate around and talk about the properties of the contents (it is dry, powdery, white, if you push it into a pile, it stays there, etc.)
- Pour ½ cup of water into the measuring cup.
- Pass the water around and talk about its properties (it is clear, wet, can't be piled up, etc.)
- Mix the water with the cornstarch in the pie plate.
  - It should be difficult to move the stick or spoon through it quickly, but if you move slowly, it should pass through with little or no resistance.
  - Add cornstarch or water as necessary until the desired consistency is reached.
- Demonstrate that the new substance has some properties from each of the original ingredients.
  - Gently tip the pie plate to show that it will pour like water
  - The colour should be white like the cornstarch
  - Hit it sharply with a flat palm to show that it will not splash like water
  - Immerse a flat hand into the mixture, and pull it up quickly. The pie plate should lift a few inches of the table before releasing. This demonstrates a new property – polymer molecules

*Polymers are things that are made up of long twisty molecules (small little bits). Because the molecules are long and twisty, they can get tangled together. This is why they seem solid if we hit them or pull quickly. If we try to move them more slowly (pouring, etc.) the molecules have time to slide over each other and become untangled.*

## Hands on Activity – Make Slime

Materials: (Makes enough for 12 girls)

- 500 mL (2 cups) Elmer's White School Glue (best, but other white glue works too)
- Borax Powder (in the laundry soap section of the store)
- Water
- Food Colouring
- Bowl or paper cup (1 per girl)
- Popsicle stick or spoon for mixing (1 per girl)
- Two large containers for mixing the "ingredients"
- Measuring cup / measuring spoons
- Small ziplock bags or plastic containers with lids for storing the finished slime

How To:

- Mix slime as per the attached sheet
  - It is usually a good idea to have an adult add the food colouring for the Sparks
- Demonstrate some of the properties of the slime
  - It can be rolled or shaped like clay
  - If it is left to sit on the table, it will slowly "melt" into a puddle
  - If you pull quickly, it will snap
  - If you pull slowly, it will stretch
- Store the slime in a sealed ziplock bag when not in use