

Science Action Kindergarten Coordinator Notes: **Advance Preparation**

- You may need to purchase:
 - Paper plates (1 per student)
 - Napkins (2 per student)
 - Wide, clear plastic cups (e.g., punch cups – 1 per student)
 - Food coloring (dropper bottles for diluted solutions; 29 mL bottles of food coloring for the concentrated solutions)
 - Small plastic cups (1.25 oz/37 mL - 4 per student)
 - Popsicle/Craft sticks (1 per student)
 - Paper towels
 - Check supply bin inventory for Whatman filter paper (chromatography paper), pipettes, black Vis-à-vis markers (10), black Sharpie markers (10)
- Cut out one felt bear per student in advance. Use white polyester felt (can purchase at fabric store by the yard). Bear templates included in “K – Colors” supply bin.
- Assemble chromatography kits by using masking tape to secure filter paper to craft sticks. Cut filter paper strips to 3.5 inches x 1 inch. One per student. (see lab instructions for diagram)
- Prepare DILUTED colored water solutions in 16 oz. Rubbermaid squirt bottles (1 per group) according to the following:
 - Red: 16 oz. water + 6 drops red food coloring
 - Blue: 16 oz. water + 4 drops blue food coloring
 - Yellow: 16 oz. water + 15 drops yellow food coloring
- Prepare CONCENTRATED colored water solutions in 8 oz. Rubbermaid squirt bottles (2 per color, total) according to the following:
 - Red: 8 oz. water + 60 drops (6 mL) red food coloring
 - Blue: 8 oz. water + 40 drops (4 mL) blue food coloring
 - Yellow: 8 oz water + 80 drops (8 mL) yellow food coloring
- CONCENTRATED colored water solutions will be shared by the whole class and can be kept on a cart in the classroom. Parent volunteers can come up to the cart and get one of each of the CONCENTRATED solutions, transfer a small amount into the cups on their table, and then return the bottles to the cart for use by another group.
- 10 drops of food coloring = approx.. 1 mL. You will use approximately 15 mL red, 10 mL blue, and 20 mL yellow.
- Prepare 4 sets of materials; 1 for each table/group:
 - 1 square container for waste water
 - 4-16 oz. bottles (diluted red, blue, & yellow, plus plain water)
 - 20 small plastic cups
 - 5 pipettes
 - 3 plastic film/frames (red, blue, yellow)
 - 1 piece white cardstock
 - 5 paper plates
 - 10 napkins

Science Action

Kindergarten Lab #2: COLORS

- 5 large plastic cups
- 5 chromatography sets (filter paper attached to craft stick)
- 1-2 black Vis-à-vis markers
- 5 felt bears
- 1 sample bear
- 1-2 black Sharpie markers
- Put everything needed on a cart in the PTSA room.
- Encourage parents to wear shirts in solid primary colors or tie-dye shirts on lab day.
- In each classroom, break into 4 groups; each group with 1 parent volunteer & 4-5 students.
- On lab day, between classes:
 - Dry small & large plastic cups to reuse for next class
 - Dry square waste water bins
 - Replenish materials for each station:
 - Felt bears (5)
 - Plates (5)
 - Napkins (10)
 - Pipettes (5)
 - Chromatography paper/craft stick sets (5)
 - Check small & large cups – may need to replenish

OBJECTIVE

Students will:

- Learn about primary and secondary colors
- Have the opportunity to mix primary colors to make secondary colors
- See how colors can be separated by the use of paper chromatography
- Practice mixing primary colors to make secondary colors while making a “tie-dye” bear to take home

MATERIALS PER GROUP

Activity #1: Mixing Primary Colors

- Cellophane sheets in cardboard frames (red, blue, yellow)
- White cardstock
- Clear small plastic cups (20 – 4/student)
- Diluted color solutions (red, blue, yellow) in squirt bottles
- Pipettes (5 – 1/student) – *KEEP FOR ACTIVITY 3*
- Foam plates or plastic-coated paper plates (5 – 1/student) – *KEEP FOR ACTIVITY 3*
- Napkins (5 – 1/student)
- Container to collect waste water

Activity #2: Separating Colors (Chromatography)

- Plain water in squirt bottle
- 4” Tall Plastic cups (5 – 1/student) – *WIPE & KEEP FOR ACTIVITY 3*
- Chromatography sets (5 – 1/student - - filter paper taped to craft stick)
- Black Vis-à-vis markers (2)

Activity #3: Making a Tie-Dye Bear

- Plates from Activity 1
- White felt bears (5 – 1/student)
- Concentrated color solutions (red, blue, yellow) – 2 per color to share with class
- Plastic cups from Activity 2 – need 3 per group to share concentrated colors
- Pipettes from Activity 1 (5 – 1/student)
- Black Sharpie markers (2)

INTRODUCTION (*Coordinator addresses the whole class*)

- Do any of you like to mix colors together and see what you get?
- Today we will learn about primary and secondary colors.
- Primary colors are colors that cannot be made by mixing other colors together.
- Can anyone raise their hand and tell us how many primary colors there are? (3)
- Raising your hand again, can anyone tell us the name of one of the primary colors? (*red, blue, yellow*)
- Secondary colors are colors that are made by mixing two of the primary colors together. In the first part of our lab, we will explore what colors we get when we mix the primary colors.
- There is just one important rule in our science lab today: please be careful with the colors because they can stain our skin and our clothes.

Break into 4 groups of 4-5 students.

ACTIVITY #1:
PRIMARY COLORS -
Learning the Primary Colors and Mixing the Primary Colors

Talk to the children about primary colors (review):

- How many primary colors are there? (3)
- What are the primary colors? (*red, blue, yellow*)
- Why are the three primary colors so special? (*They cannot be made by mixing other colors. Primary colors are used to make secondary colors.*)
- Can you name some secondary colors? (*orange, green, purple*)
- Today we will try some science experiments to see how the primary colors combine to make secondary colors.

Experiment 1:

Show the kids the framed plastic sheets – use the white cardstock behind the frame to help see the color. Hand out a sheet of white paper and a scrap of each color (red, blue, yellow) to each child.

- Ask the kids what they think will happen if they combine the **red** and **blue** sheets.
- Once they have predicted, use the framed sheets to see if they are correct.
- Have the kids do this with their own sheets (the white paper helps to see the colors better).
- Emphasize each time that the plastic sheet colors are primary colors and the colors that result from the combinations are secondary colors.

Repeat the process for **red and yellow**, and then for **blue and yellow**.

Collect the sheets and paper.

Experiment 2:

Give each child:

- 4 small cups
- 1 pipette (*keep for later*)
- 1 plate (*keep for later*)
- 1 napkin on top of the plate

Set out the waste bucket in the middle. **Next to you**, set up the diluted color solutions. Remind the kids that the colors will stain, and we need to be careful.

Show the kids how to use a pipette. (squeeze, put it in the color, let go to fill up, move to empty cup, squeeze out the color)

In each step, emphasize which are the primary and secondary colors.

Place a small amount of **red** colored water in one of each of the kids' small cups and some **blue** in a different cup. Ask them to predict what will happen when we mix the two. After predictions, ask them to use their pipette to suck up some red and place it in an empty cup, and then ask them to add some blue to it. Have them use the pipette to squeeze a small amount of purple onto the napkin (which should still be on top of the plate) so they can see the color. When you are finished, empty the purple solution into the waste container and quickly wipe out the purple cup with a paper towel. Keep the red and blue cups.

Place a small amount of **yellow** colored water in one of each of the kids' cups. Repeat the process for **yellow + red**. When finished, empty the orange solution into the waste container & quickly wipe out the orange cup with a paper towel.

Repeat the process for **yellow + blue**. When finished, empty the green solution into the waste container.

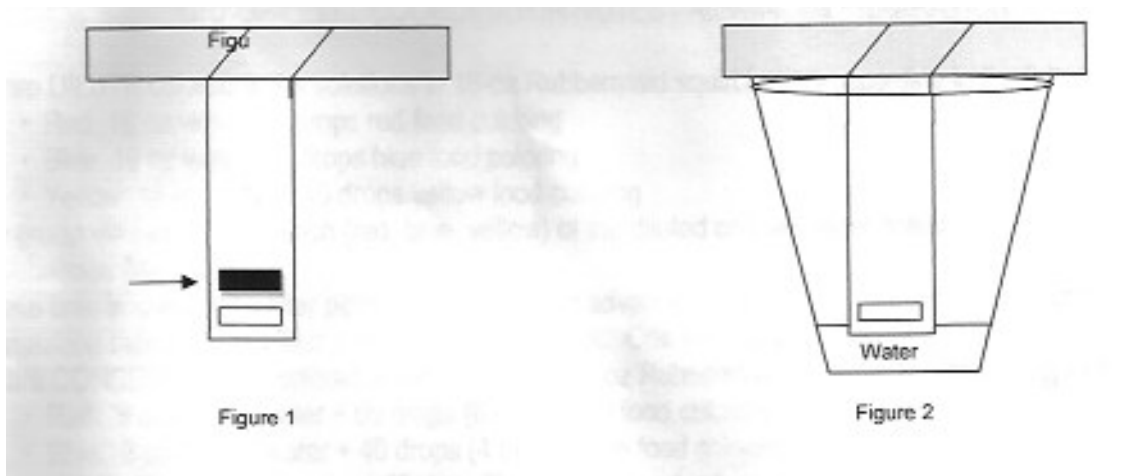
Empty all color solutions into the waste container, collect the cups, and throw away the napkins.

Point out that the color of the water in the waste container is black. The color black is a combination of many different colors mixed together.

**ACTIVITY #2:
SEPARATING COLORS (Chromatography)**

In the first two experiments, we mixed primary colors to get secondary colors. When we mixed them all, we got black (in the waste water container). Now we will try to take the color black and break it apart into some of the primary and secondary colors. We will do this using an experiment called chromatography.

- Write each child's name on the craft stick part of the chromatography set.
- Give each child:
 - 1 Large plastic cup (*keep for Activity 3*)
 - 1 Chromatography set
- You will also need:
 - 2 black Vis-à-vis markers
 - the container of plain water
- Have each child draw a line using the Vis-à-vis markers, about 1" from the edge of the paper that is not attached to the craft stick (see diagram, below).
- Then have each child balance the stick on the rim of the cup and dangle the paper down into the cup.
- Carefully pour a small amount of water into the cup so that the water touches the bottom of the paper but does NOT reach the black line.
- Point out the line of water creeping up the paper through the black line.
- Tell the kids that we will now see how black separates into several different colors. The scientific name for this is called chromatography. In the last two experiments we combined primary colors to make secondary colors, but now we are separating black into the primary colors.
- When the water is near the top of the paper, have the kids remove the paper and allow it to dry.
- *Empty the water into the waste container and quickly wipe out the cups. Collect the markers.*



**ACTIVITY #3:
MAKING A TIE-DYE BEAR**

If necessary, do this activity while the filter paper chromatography is developing. Show the tie-dye bear as an example of what we are doing. Each group should also have a sample bear that has already been dyed.

Give each child:

- 1 Felt bear
- 1 Pipette (*from Activity 1*)
- 1 Plate (*from Activity 1*)

You will also need:

- black Sharpie markers
- Concentrated color solutions (*shared with the class*)
- 3 Cups in the center of the table (*from Activity 2*)
- napkins – *place these under each bear after the child has finished*

Write each child's name on their paper plate.

Taking turns with the Sharpie markers, have each child draw eyes, nose, and mouth on the bear.

While kids are drawing, fill the central cups with a small amount of each concentrated color (red, blue, yellow – 1 color per cup)

Instruct the kids to use their pipettes to place drops of color on their bear. Drops should be close but not directly on top of another drop.

The drops will spread out and make secondary colors when they overlap.

Ask the kids not to put too many drops on the bear – if the bears get soaked with color, they might look brown or gray like our waste water in the beginning.

Leave the bears on the plates to dry in the classroom. Add each child's chromatography set to their plate.

Empty all colors into the waste container. Use paper towels to quickly dry the cups. Throw away pipettes, napkins.

AT THE END OF THE LAB:

- Collect all materials and place back in the bag you were given at the beginning
- Waste water will be dumped in the bathroom
- THANK YOU!!!