

ELEMENTARY SCIENCE PROGRAM
MATH, SCIENCE & TECHNOLOGY EDUCATION

A Collection of Learning Experiences

**SHAPES, FORMS, AND
COLORS**



TABLE OF CONTENTS

Unit Overview	2
Format & Background Information	2-6
Learning Experience 1 - Getting Started	7
Learning Experience 2 - Circles and Squares	8-9
Learning Experience 3 - Squares and Cubes.....	10-11
Learning Experience 4 - Rectangles	12-13
Learning Experience 5 - Triangles and Pyramids.....	14-16
Learning Experience 6 - Review of Shapes	17-19
Learning Experience 7 - Other Shapes	20-21
Learning Experience 8 - Colors of the Classroom.....	22-25
Learning Experience 9 - Seasons of Color.....	26-27
Learning Experience 10 - Color Mixing	28-30
Learning Experience 11 - Color Tints.....	31-32
Learning Experience 12 - Shades of Color.....	33-34
Learning Experience 13 - Helpful Colors.....	35
Learning Experience 14 - Different Temperatures - Different Colors	36-37
Learning Experience 15 - Color Booklet.....	38
More Ideas	39
Inquiry & Process Skills.....	40
Glossary	41-42
Teacher References.....	43

SHAPES, FORMS AND COLORS

GRADE K

Unit Overview:

Shapes and colors introduces students to both two dimensional shapes and three dimensional forms. Students are also given the opportunity to work with primary colors to form secondary colors. Color tints and shades are also explored. The skills of observing, discussing, describing, predicting, and classifying are used throughout the unit.

Scheduling

This unit may take from five to nine weeks to complete depending upon the goals of the teacher and interests of the students. Use of the section included in this manual called More Ideas may extend the time span of this kit.

Materials to be obtained locally:

Please make **one** student activity book for **each** student

chart paper	felt tip markers
construction paper of various colors	
scissors	mini-marshmallows
pencils	colored pencils/crayons
glue	old magazines & newspapers
objects around classroom	water
water soluble markers	paint smocks
tape	hole punch
paste	white paper (optional)
white construction paper	Tempera paint in green, red, blue, purple and /or yellow

Caution

Remind students to wash their hands after handling any of the materials in the kit. Small objects should be handled with care.

About the Format

Each learning experience is numbered and titled. Under each title is the objective for the learning experience.

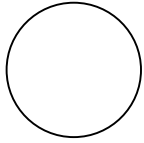

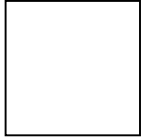
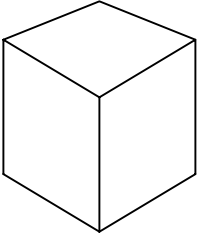

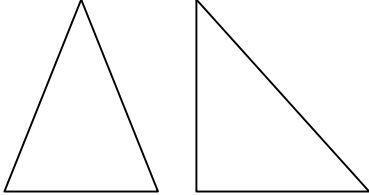
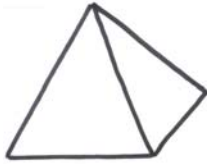

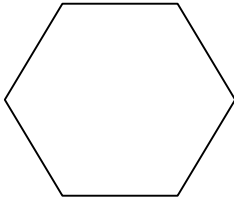
Each learning experience page has two columns. The column on the left side of the page lists materials, preparations, basic skill processes, evaluation strategy, and vocabulary. The evaluation strategy is for the teacher to use when judging the student's understanding of the learning experience.

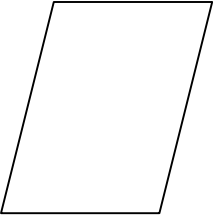

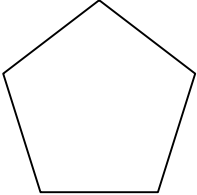
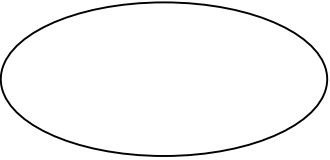
The right column begins with a "Focus Question" which is typed in italicized print. The purpose of the "Focus Question" is to guide the teacher's instruction toward the main idea of the learning experience. The "Focus Question" is not to be answered by the students. The learning experience includes direction for students, illustrations, and discussion questions. These discussion questions can be used as a basis for class interaction.

Background Information

Shapes

In this unit, students work with various two-dimensional shapes and three-dimensional forms. The shapes, forms, and their attributes are described below.

<p>Circle</p>  <p>No corners or no sides.</p>	<p>Sphere</p>  <p>No corners and no sides. Three dimensional form of a circle.</p>	<p>Square</p>  <p>4 sides 4 corners All four sides are of equal length. A square is a special type of rectangle.</p>
<p>Cube</p>  <p>4 square faces 3 dimensional form of a square</p>	<p>Rectangle</p>  <p>4 sides 4 corners two sides are longer than the other two sides</p>	<p>Triangles</p>  <p>3 sides 3 corners</p>
<p>Pyramid</p>  <p>3 dimensional form of a triangle with 4 triangle faces</p>	<p>Cylinder</p>  <p>2 equal parallel circles and a curved surface formed by straight lines with ends that lie on the circles.</p>	<p>Hexagon</p>  <p>6 sides 6 corners All sides are of equal length.</p>

<p>Rhombus</p>  <p>4 sides 4 corners All four sides are of equal length. Parallelogram</p>	<p>Trapezoid</p>  <p>4 sides 4 corners 2 parallel sides of unequal length.</p>	<p>Pentagon</p>  <p>5 sides 5 corners</p>
<p>Ellipse</p>  <p>No corners and no sides. Commonly called an oval.</p>		

Color in Light

When there is no light there is no color. We see color with our eyes. Light enters our eye through the pupil. Color is read by color-receivers in the retina called **cones**. Light has three main colors red, green, and blue. When light hits a red object, green and blue soaks into the object. However, the red bounces off the object to your eyes. You then see the object as red. It is different if you are looking at a blue object. The red and green soak into the object. The blue bounces off the object to your eyes. You then see the object as blue. If you mix all the colors of light (red, green, and blue), white light is formed. When there is no light, the color seen is black.

Colors on the Color Wheel

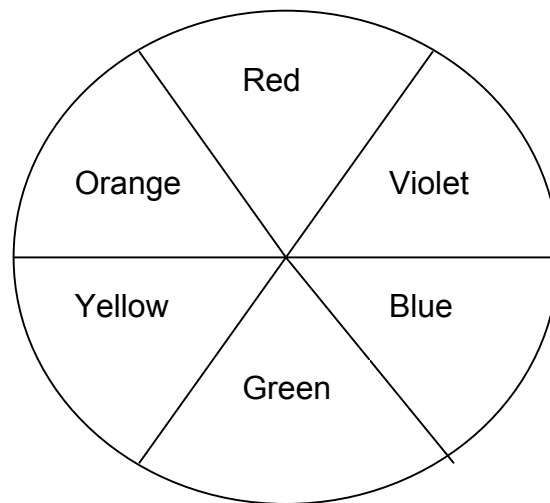
Red, yellow, and blue are the **primary colors**. When these colors are mixed together, the **secondary colors** are formed.

Red + Yellow = Orange

Red + Blue = Violet

Yellow + Blue = Green

The color wheel helps in using color. **Complementary colors** are found opposite each other on the color wheel (ex. red and green). Mixing complementary colors results in the color gray. **Analogous colors** are found next to each other on the color wheel (ex. red and orange).



When talking about the color on the color wheel, the absence of color results in white. When you mix all the colors together, the color result is black.

Monochromatics are tints and shades of one color. To make a color lighter, add white to that color. As a color becomes lighter, those colors are the **tints** of the original color. Black added to color makes the color darker. When black is added to a color, the color it creates is called a **shade** of the original color. Tints and shades of color also have names. For example, pink is a tint of red. Burgundy is a dark shade of red. Teal is a dark shade of blue-green. The **value** of a color is the lightness or darkness of the color.

A darker blue shade has a darker value of primary blue. The **intensity** of a color gives an indication of how bright a color is. The primary colors have the greatest intensity.

Colors can also be classified as **warm colors** or **cool colors**. Warm colors are reds, oranges, and yellows. Cool colors are blues, greens, and violets.

Learning Experience 1: Getting Started

Objective: Students will use their background knowledge to contribute to a class discussion on shapes.

Materials:

For the class:

Foam rubber shape set
Chart paper*
Felt-tip markers*

*provided by teacher

Preparation:

Read background information on pages 3 and 4. Remove the shapes from the foam rubber shape set.

Basic Skills Development:

Describing
Observing
Discussing

Evaluation Strategy:

Students will use their background knowledge to name various shapes displayed in the classroom and attributes about that shape.

Vocabulary:

shape
attributes

What shapes do you know?

Place all the shapes from the foam rubber shape set on a table. Ask students to pick out one shape that they are familiar with or a shape that they like the best. Ask students to name the shape and give an example of when they have seen or learned about that shape before. As students name the shapes, write down their names on the chalkboard or on chart paper. Read through the list of shapes with students after they have been named, and name any shapes that students were unfamiliar with. Explain to students that in this unit they will be learning about each shape's attributes, and they will become familiar shapes around their classroom and in the schoolyard.

Learning Experience 2: Circles and Spheres

Objective: Students will identify circle and sphere shapes around the classroom and provide a description of a circle's and sphere's appearance.

Materials:

For each student:

9" paper plate
Construction paper*
Scissors*
Pencil*

For the class:

Foam rubber shape set
3 " styrofoam ball
Chart paper*
Felt-tip markers*

*provided by teacher

Preparation:

Read background information on page 3. Draw a picture of a circle on chart paper and write the names of the objects that are circles around the picture. Circles created in this learning experience will be needed in Learning Experience #6.

Basic Skills Development:

Observing
Describing
Discussing

Evaluation Strategy:

Students will point out the objects in the room that are circular and spherical in shape and describe why that object is a circle or sphere.

Vocabulary:

circle
curved
straight
corner
sphere

What is a curved shape?

Have students sit in a circle on the floor. Introduce the concept of a curved shape by calling attention to the rounded formation in which they are seated. Introduce the words curved and straight, by showing them examples of a circle and a square from the foam rubber shape set. Also, introduce the word **corner** by showing students that squares have four corners. Ask students if the circle has those same types of corners. Have students locate a circle in the classroom and point to it. Ask each student to name where they found the circle and describe why they think the object is a circle in shape. Ask students to name the objects shaped like a circle. Write the names of the objects on chart paper.

Discussion Questions:

What shape are we sitting in right now?
How is a circle different from a square?
How many corners does a circle have?
How many sides does a circle have?
What objects in our room are in the shape of a circle?

Ask each student to trace a paper plate on a piece of construction paper and cut out the circle. Students can then hold and roll their circle while singing the rolling circle song. After students use the circle to sing the song, ask them to put their names on their circle. Keep the circles for use in Learning Experience #6.

Learning Experience 2 continued

Page 2

Sing The Rolling Circle song to the tune "Have You Ever Seen A Lassie?":

*Have you ever seen a circle, a circle, a circle?
Have you ever seen a circle, which goes 'round and 'round?
It rolls this way and that way,
And this way and that way.
Have you ever seen a circle, which goes 'round and 'round?*

The circle shapes that students have looked at in this Learning Experience have been two-dimensional. Use the styrofoam ball to show students the three-dimensional form of a circle called a **sphere**. Ask students to identify any sphere shapes in the classroom and add the names of those objects on the chart paper. Some students may have chosen a spherical object for a circle object. If so, circle those objects on the chart paper to indicate the object as a sphere.

Learning Experience 3: Squares and Cubes

Objective: Students will identify square and cube shapes around the classroom and create a model of a square and a cube.

Materials:

For the class:

Foam rubber shape set
Pattern blocks set
Paper tape
Toothpicks
Woodblock
Chart paper*
Felt-tip markers*
Construction paper*
Scissors*
Mini-marshmallows*

*provided by teacher

Preparation:

Read background information on page 3. Draw a picture of a square on chart paper and write the names of objects that are square around the picture.

Basic Skills Development:

Measuring
Observing
Discussing
Comparing

Evaluation Strategy:

Students will point out objects that are square and cubical in shape and describe why that object is square or a cube.

Vocabulary:

square
corner
side
cube
measure

What is unique about a square?

Hold up the square from the foam rubber shape set used in Learning Experience #2. Pass out squares from the pattern blocks set. Ask students to review what they learned about the corners of a square and ask students to count how many sides a square has.

Sing the song One Green Square to the tune of Three Blind Mice:

*One green square, one green square,
See how its shaped, see how its
shaped.
Four big corners it does have,
Four sides it does have,
One green square, one green square.*

Ask student to notice the length of the sides of the square. Cut a piece of paper tape that equals the length of the foam square or cut a larger square out of a piece of construction paper and measure the side of that square. Compare the length of that side with the other sides of the square. Students should see that each side of the square is the same length.

Students can use the squares provided in the pattern blocks as a nonstandard unit of measurement. Since students have seen that each side of the square is equal in length, ask students to use one side of the square to measure the length of their desk, the length of a book, or the length of the chalkboard.

Learning Experience 3 continued

Page 2

Chart the length of each object and compare lengths.

Sing the Square Song to the tune of the Mickey Mouse Club Theme Song:

S-Q-U-A-R-E

All squares have four sides.

Shaped like blocks,

Or a slice of bread,

All four sides are the same.

One, two, three, four (spoken)

S-Q-U-A-R-E

Squares are e-a-s-y.

Discussion Questions:

How many corners does a square have?

How many sides does a square have?

Are any of the sides the same size?

What makes a square different than a circle?

Ask students to look for square shapes around the room. Write the names of the objects that are square in shape on chart paper.

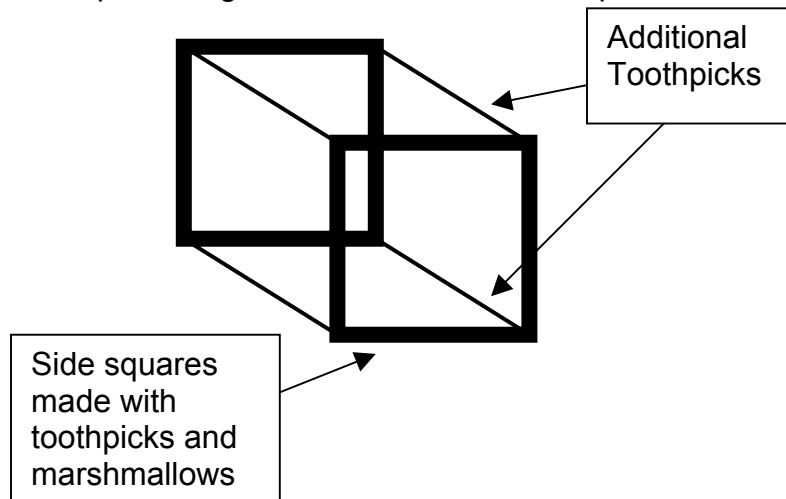
Discussion Questions:

Can you see any squares throughout the room?

Name the objects that are the shape of a square.

Ask each student to create a square with four mini-marshmallows and four toothpicks. The marshmallows become the corners of the squares and the toothpicks act as the sides.

Show students the wooden block in the shape of a cube. Count with students the number of square sides of the cube. Ask student pairs to create a model of a cube by putting together their square models with toothpicks. Students will need four more toothpicks to bind the squares together to make a cube shape.



Learning Experience 4: Rectangles

Objective: Students will describe the attributes of a rectangle in comparison to a square and find samples of rectangles around their classroom.

Materials:

For each student:

Shapes, Forms, And Colors Student Activity Book

For the class:

Foam rubber shape set

Pencils*

Colored pencils/crayons*

*provided by teacher

Preparation:

Read background information on page 3.

Basic Skills Development:

Observing

Describing

Discussion

Evaluation Strategy:

Students will point out rectangular shapes around the classroom and provide a description of the attributes of the rectangle.

Vocabulary:

rectangle

corner

side

How is a rectangle and square different/alike?

Hold up the rectangular shape from the foam rubber shape. Inquire how it is different and similar to a square. Students should notice that the square and rectangle have four sides and four corners, however, the sides of the square are equal and the rectangle has two sides that are shorter than the other two sides. Ask students to draw a rectangle free hand on the activity sheet for Learning Experience #4 in the Shapes, Forms, And Colors Student Activity Book. Then go around the room and pick out several objects in the classroom that are rectangular in shape. Students can hold the rectangle that they made as they move around the room to help them.

Discussion Questions:

How many sides does a rectangle have?

Are the sides all the same?

How are the sides different?

As students are looking for their rectangle, they can sing the song It's A Rectangle to the tune of B-I-N-G-O:

*There is a shape that has four sides,
But it is not a square...NO!*

It's a rectangle,

It's a rectangle,

It's a rectangle

It is not a square...No!

*Two sides are long; two sides are short
They are not the same...No!*

It's a rectangle,

It's a rectangle,

It's a rectangle

The sides are not the same...No!

Learning Experience 4 continued

Page 2

Ask students to create a picture with the rectangle they drew on their activity sheet with squares, circles, and smaller rectangles. Students can share their pictures with the class.

Learning Experience 5: Triangles and Pyramids

Objective: Students will describe the attributes of a triangle and pyramid and will create a model of a triangle and pyramid.

Materials:

For each pair of students:

2 Shapes, Forms, And Colors Student Activity Books

6 straws

4 pipe cleaners

Pencils*

Scissors*

*provided by teacher

Preparation:

Read background information on page 3. Cut pipe cleaners in half prior to this learning experience. Create a pyramid with the straws and pipe cleaners as a model for students.

Basic Skills Development:

Describing

Observing

Discussing

Evaluation Strategy:

Students will point out the triangle shapes around the classroom and provide a description of the attributes of a triangle.

Vocabulary:

triangle

corner

side

What are the attributes of a triangle?

Ask each student to cut out the square on their activity sheet for Learning Experience #5 in the Shapes, Forms, And Colors Student Activity Book.

Demonstrate for students how to cut across the paper square diagonally. Then, ask the class to hold up the two pieces of paper and see if the resulting figures look like circles, rectangles, or squares. Ask students to explain why the new shapes are not a rectangle, square, or circle. It does not have a rounded shape like a circle, and it does not have four sides like a rectangle or square. A triangle always has three sides. Ask students to look around the classroom to find objects that have a triangular shape. Students can use the triangle shapes as a model.

Discussion Questions:

How many sides does a triangle have?
How many points does a triangle have?
Do you see any triangles in our classroom?

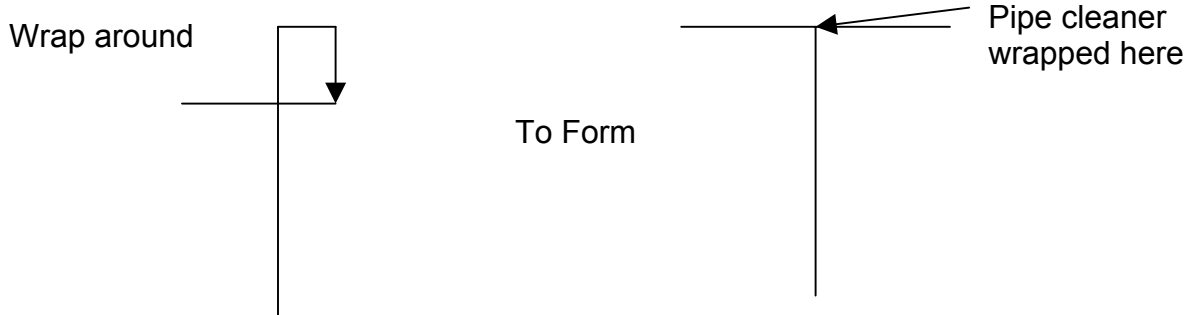
Sing the Triangle Song to the tune of Jingle Bells:

*Triangles, Triangles
Have three sides
Triangles, Triangles
Have three sides
You can draw big triangles
In the air,
It is fun to use your hands,
And make them anywhere.*

Learning Experience 5 continued

Page 2

Once students are familiar with the shape of a triangle, ask student pairs to create a model of a pyramid, the three-dimensional form of a triangle. Provide students with four pipe cleaners cut in half. Ask students to lay one piece of pipe cleaner on top of another to form a lower case "t" shape. The top part of the "t" is to be wrapped around the horizontal pipe cleaner. The result is a three "prong" form that looks like a capital "T".



Bend the pipe cleaners downward.



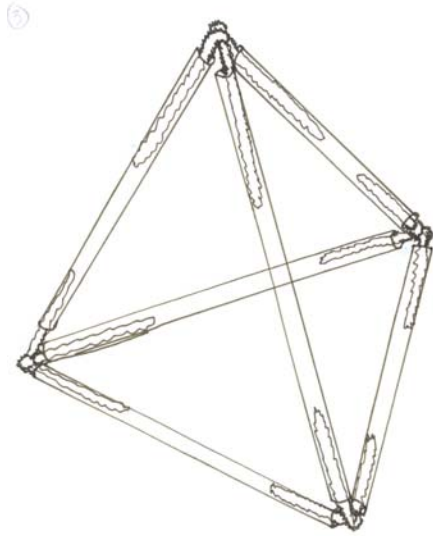
Each pipe cleaner is to fit into a straw. Three straws will be held together by the pipe cleaner. This forms the top part of the pyramid.



Learning Experience 5 continued

Page 3

Wrap all four pipe cleaners in the same manner. Each will act as a corner of the pyramid. The other three straws act as the base of the pyramid.



Discussion Questions:

How many triangles do you count in the pyramid?

How do you know it's a triangle?

Do you see any other pyramids in our classroom?

Learning Experience 6: Review of Shapes

Objective: Students will identify and describe a circle, square, triangle, and rectangle using their sense of touch and create patterns with shape beads.

Materials:

For each student:

Shapes, Forms, And Colors Student

Activity Book

Shoelace

Pencils*

Glue*

Crayons/Colored pencils*

For the class:

Foam rubber shape set

Container of wooden beads

Blindfold

*provided by teacher

Preparation:

Students will need the circles they cut out from Learning Experience #2 for this learning experience.

Basic Skills Development:

Describing

Observing

Manipulating materials

Evaluation Strategy:

Students will accurately identify and describe each of the four shapes they have learned and will reproduce and create shape patterns.

Vocabulary:

shape

pattern

Where can we find shapes around us?

Review with students the shapes they have learned.

To help with the review recite the poem Shapes What About You...

*I am a circle;
Here's what I can do.
I can roll around
How about you?*

*I am a square
So perfectly true
I am the same length on four sides
How about you?*

*I am a rectangle
With four sides too!
But I can be short or tall.
How about you?*

*I am a triangle
With only three sides.
But I can stand on any one.
How about you?*

Use the foam rubber shape set and ask students to use the blindfold and examine the shapes with just their sense of touch. Students can run their fingers around the shape then run their fingers around the puzzle board to find the correct placement of the puzzle piece. Students should name each shape they feel. Encourage students to describe what they are feeling using

Learning Experience 6 continued

Page 2

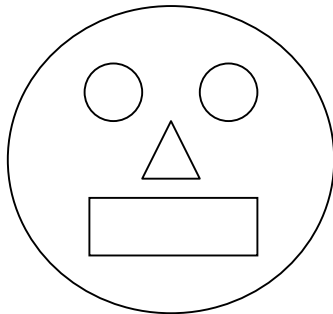
correct terminology such as number of sides and corners.

Discussion Questions:

How many corners does the shape have?
How many sides does it have?
Are all the sides the same?

On the activity sheet for Learning Experience #6 in the Shapes, Forms, And Colors Student Activity Book, students can complete a shape draw by following the directions given by the teacher. See directions below.

1. Paste your large circle (from Learning Experience #2) in the middle of your paper.
2. Draw a small triangle in the middle of the large circle.
3. Draw a medium size rectangle underneath the triangle.
4. Draw two small circles, one next to the other, above the triangle.



After students have drawn their picture of a face, ask students to draw other shapes to complete the picture to their liking.

Session 2:

Name the color and shapes of the wooden beads provided in the kit. Students should be familiar with the sphere and cube. Students are not familiar with the cylinder, as of yet. With the students, describe the attributes of the cylinder (two circles on top and bottom, no corners, rectangle wrapped in a circular fashion). Demonstrate the formation of a cylinder with paper, if necessary, with two circles and a rectangle. As students are working with the wooden beads in a three-dimensional form, they should name its two-dimensional shape (ex. sphere – circle).

Give each student a shoelace. Use the wood beads to create a simple pattern of the shapes. Students can then create the same pattern using their shoelace. Have students name the shapes as they are putting them on their shoestring. Students can make their own patterns and challenge other students to reproduce their pattern.

Learning Experience 6 continued

Page 3

Discussion Questions:

What shapes create this pattern?

Describe each shape.

What pattern would you create?

What shape did we learn that is not seen in the beads (pyramid, rectangle shaped bead)

Now that students have reviewed their shapes, go on a walk around the school and school yard for the shapes they have learned. As students spot a shape, ask them to raise their hand and point it out. You may want to group students by shape and have the group point out only those shapes assigned to them. Another option is to give students pieces of construction paper to cut out in the shapes they have learned. The teacher then points out a shape, and students hold up the shape that matches the one the teacher pointed out and names that shape.

Learning Experience 7: Other Shapes

Objective: Students will describe the attributes of five new shapes and create a shape book using pictures from magazines and newspapers.

Materials:

For each student:

Shapes, Forms, And Colors Student Activity Book

Glue*

For the class:

Foam rubber shape set

Wooden pattern blocks

Old magazines and/or newspapers*

*provided by teacher

Preparation:

Read background information on pages 3 and 4. Gather magazines and newspapers for use in this Learning Experience.

Basic Skills Development:

Observing

Describing

Comparing

Discussing

Manipulating materials

Evaluation Strategy:

Students will identify various new shapes and describe the attribute of each shape.

Students will create a shape book with accurate pictures of shapes cut from magazines and newspapers.

Vocabulary:

hexagon

trapezoid

rhombus

ellipse

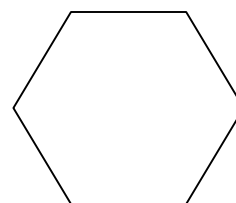
pentagon

booklet

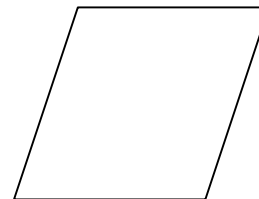
What other shapes do we know?

Give each student or pair of students a sample of each new shape found in the wooden pattern blocks and foam rubber shape set. Students should see a:

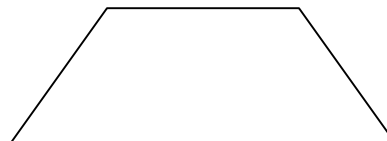
Hexagon



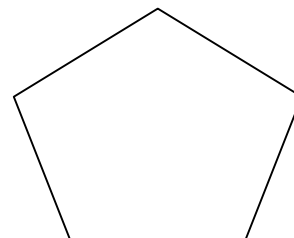
Rhombus



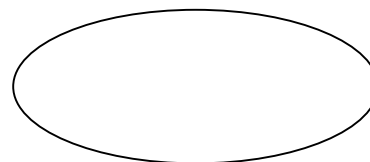
Trapezoid



Pentagon



Ellipse

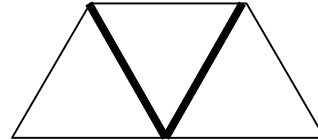


Learning Experience 7 continued

Page 2

Count the sides and corners of each shape and describe how they are similar or different than the circle, square, rectangle, and triangle. Encourage students to free play with the pattern blocks because they will see how the triangles and squares fit into the shapes shown above.

Example: (three triangles fit to create the trapezoid)



Discussion Questions:

What new shapes have we learned in this Learning Experience?

How many sides do these shapes have?

How many corners?

Do you see any of these new shapes around our classroom? In the school? In the schoolyard?

Ask students to work individually or in pairs and look through newspapers and magazines to find pictures of any of the geometric shapes they have learned so far. Cut the pictures out and sort them by shape. Students can then glue the pictures on the appropriate page of their shape book. The pages for the shape book are found on the activity sheet for Learning Experience #7 in the Shapes, Forms, And Colors Student Activity Book. Students can then share their books with the class once they have completed them.

Learning Experience 8: Colors of the Classroom

Objective: Students will identify various colors around the classroom and create patterns/classify objects of various colors.

Materials:

For each student:

Shoelace

For the class:

8 cool whip (labeled with color words)

Foam rubber shape set

4 prisms

Container of wooden beads

Objects around the classroom*

White paper* (optional)

Preparation:

Read background information on pages 5 and 6.

Basic Skills Development:

Observing

Describing

Discussing

Manipulating materials

Classifying

Evaluation Strategy:

Students will accurately identify various colors around the classroom and will accurately create patterns and classifications with color.

Vocabulary:

color

rainbow

What colors do we see around the classroom?

Begin by showing students the prisms provided in the kit. Take notice of the shape of the prism. Prisms are provided for students to see the colors of the spectrum. If there is direct sunlight shining into the classroom, place the prism in front of the window and a rainbow will reflect from the prism to the wall or the floor. Placing a glass of water in direct sunlight can produce the same rainbow effect. Place white paper underneath the rainbow to see if the colors become brighter and more distinct. However, if a sunny day is not possible, students can hold the prism near a window and look for the rainbow effect inside the prism itself. To begin this learning experience, students can name the colors that they see. Encourage students to remember the order of the colors of the rainbow by using a neumonic device such as ROY G. BIV = red, orange, yellow, green, blue, indigo, violet.

Sing the song, Oh, Rainbow to the tune of Oh, Christmas Tree:

*Oh, rainbow, oh, rainbow,
How lovely are your colors.*

*Oh, rainbow, oh, rainbow
How lovely are your colors.*

Violet, red and orange, too,

Yellow, green and blue so true.

Oh, rainbow, oh, rainbow,

How lovely are your colors.

Gather students in a circle and identify the colors in the clothing that they are wearing. Students can stand up, raise

Learning Experience 8 continued

Page 2

their hand, etc. if they have the color red on and point to it on their body. Having students recognize this will help them begin to notice the color all around them. There are eight plastic containers provided in the kit that are labeled with color words. Give pairs of students one of the containers and ask them to walk around the room and find objects to place in the container that are of the color that they were assigned. Once students have filled their containers bring them back to the circle to present their findings. Students may find that some objects could be put in several containers because of their multiple colors. Students could put back the objects they have found and pairs could switch colors. Student pairs could then find objects of a new color and share their findings. These containers could also be used as a center activity where various objects of different color are placed in the center and students have to sort objects by color.

Discussion Questions:

What colors are found around our classroom?

What color do we see the most around the classroom? Least?

Other Color Songs and Fingerplays:

Four Red Cherries to the tune of This Old Man:

*Four red cherries on the tree,
Two for you and two for me.
So-o shake that tree and watch
them fall.
One, two, three, four-that is all.*

Blue to the tune of Are You Sleeping?:

*B-L-U-E
B-L-U-E
That spells blue!
That spells blue!
Buttons are blue
Eyes are, too
Blue, blue, blue
Blue, blue, blue*

Twinkle, Twinkle, Yellow Star:

*Twinkle, Twinkle, yellow star,
How I wonder what you are.
Let's go looking here and there,
Let's go looking everywhere.
Twinkle, twinkle, yellow star,
How I wonder where you are.*

Red to the tune of Three Blind Mice:

*R-E-D
R-E-D
Red is the word.
Red is the word.
Apples and strawberries both are
red.
Tomatoes and cherries are also
red.
R-E-D
R-F-D*

Learning Experience 8 continued

Page 3

Green to the tune of BINGO:

*There is a color we all know
Can you guess what it is?
G-R-E-E-N
G-R-E-E-N
G-R-E-E-N
Green is what that spells.
The grass and leaves outside
Are green as green as they can be.
G-R-E-E-N
G-R-E-E-N
G-R-E-E-N
Green is what that spells.*

Brown to the tune of The Farmer in the Dell:

*B-R-O-W-N
B-R-O-W-N
B-R-O-W-N
That's how you spell brown
Big tree trunks are brown
Big tree trunks are brown
B-R-O-W-N
Big tree trunks are brown
And acorns are brown
Yes, acorns are brown
B-R-O-W-N
That's how you spell brown!*

Orange to the tune of Ten Little Indians:

*O-R-A-N-G-E ORANGE
O-R-A-N-G-E ORANGE
O-R-A-N-G-E ORANGE
Orange like the fruit you like to eat.
O-R-A-N-G-E ORANGE
O-R-A-N-G-E ORANGE
O-R-A-N-G-E ORANGE
Orange like Jack-O-Lanterns bright
O-R-A-N-G-E ORANGE
O-R-A-N-G-E ORANGE
O-R-A-N-G-E ORANGE
O-R-A-N-G-E ORANGE*

Give each student a shoelace. Use the wood beads to create a simple color pattern. Students can then create the same pattern using their shoelace. Have students name the colors as they are putting them on their shoestring. Once the children are comfortable with the simple pattern, create more complex patterns by using two beads of one color and one of the other or by using three colors. Ask children to repeat the same pattern. For a more difficult task, have the student follow a pattern that you describe verbally. For example – make a bead string of two blues, then a yellow, and two more

Learning Experience 8 continued

Page 4

blues. Students can make their own patterns and challenge other students to reproduce their pattern. Ask students to describe their pattern to you. Encourage students to describe their patterns to each other or the group.

Students can also remove the shapes from the foam rubber shape set and mix up the shapes on the table. Students can then group the objects by color then by shape.

Learning Experience 9: Seasons of Color

Objective: Students will observe pictures of the various seasons to pick out colors found in nature during that season and will describe how animals camouflage in nature due to their color.

Materials:

For the class:

Pictures of four seasons
Chart paper*
Felt-tip markers*
Construction paper of various colors*
Crayons*

*provided by teacher

Basic Skills Development:

Describing
Observing
Discussing

Evaluation Strategy:

Students will accurately identify the colors of each season and will create a color camouflage with construction paper.

Vocabulary:

season
color
camouflage

What colors are seen in the different seasons?

Review with students the colors they identified around the classroom.

Display for students the pictures of each season provided. Discuss with students the colors that are found in nature during each season. Ask students to point to or locate the color in the picture. Create a list of color words found in nature for each season. Compare the colors for each season and circle the colors that we see the most of in nature during each season.

Compare the colors seen in the picture with the colors outside the window (the season outside the window determines which picture to compare it to). Take a nature walk with students to look for the colors named.

Ask students to draw a picture of their favorite season only using the colors listed for that season. Discuss with students any additional colors they want to add to the list for a particular season due to something in nature that they wanted to add to their picture that was not in the picture displayed in class. Students can share their pictures with the class.

After sharing the pictures, discuss what **camouflage** means and how the coloration of animals helps protect them in their habitat. (lion's color protects them on the plains, polar bears white coat protects them in the snow,

Learning Experience 9 continued

Page 2

bright colors on insects protects them on flowers, etc.) Ask students to create two texture/patterns on colored paper with colored crayons. One would be a camouflage texture on the colored paper with colored crayons and another that is not as camouflaged but uses contrasts that are easier to see. For example, students can draw red circles on red paper and red spots on white or yellow paper. Have students display their camouflage paper and not camouflaged paper on their desks and ask students to walk around to their classmates desks and pick out the colors that are camouflaged on the papers they created. Discuss with students what would happen if animals did not have the camouflage to hide from their enemies.

Discussion Questions:

What colors do we see in each season?

What colors do we see the most in the fall? Winter? Spring? Summer?

Are there colors common to different seasons?

Look out the window. What colors do you see the most?

What season must it be?

What season do you like the best?

Learning Experience 10: Color Mixing

Objective: Students will identify the primary colors and mix colors together to create secondary colors on the color wheel.

Materials:

For each student:

2 Q tips
Waxed paper
Paint smock*

For each pair of students:

Watercolor tray
Styrofoam tray

For the class:

15 9 oz. plastic tumblers
10 coffee filters
Red food coloring
Yellow food coloring
Blue food coloring
Book – Mouse Paint by Ellen Stoll Walsh
Red, yellow, and blue cellophane
White construction paper*
Chart paper*
Felt-tip marker*
Water-soluble markers*
Scissors*
Water*
*provided by teacher

Preparation:

Read background information on page 5. Wearing paint smocks will protect clothing from the food coloring.

Basic Skills Development:

Observing
Predicting
Describing
Discussing

Evaluation Strategy:

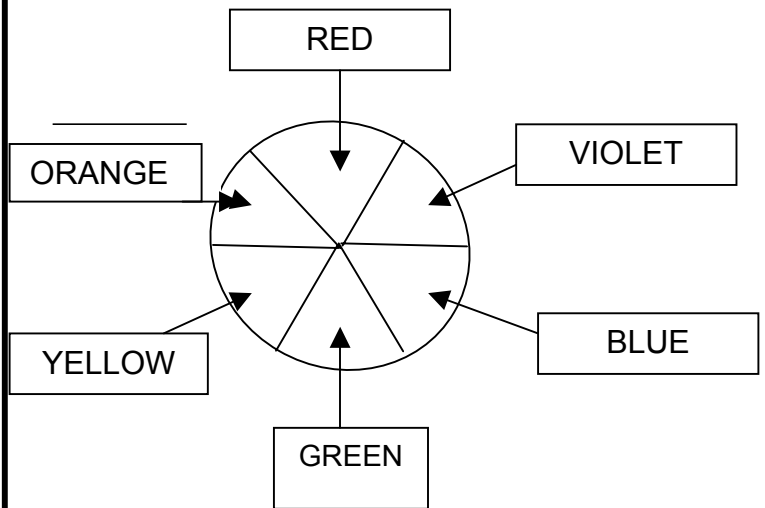
Student will name the primary colors and mix colors together to create the secondary colors.

Vocabulary:

primary colors
secondary colors
chromatography

How do colors change when they are mixed together?

On a table, have four 9 oz tumblers filled 2/3 with water. Place 3 - 5 drops of red food coloring in one tumbler and blue food coloring in the second tumbler. Two of four tumblers should have yellow drops mixed in with the water. Introduce these colors to the students as the primary colors and name them together. Create a color wheel on chart paper to showing just these three primary colors.



Ask students to predict what will happen if some of the red water was poured into the yellow water. Then pour some of the red in the yellow to create an orange color. Add orange to the color wheel between the red and yellow. Do the same for the blue and yellow blue and red. Add green and violet to the color wheel. Students will notice that the primary colors are no longer seen in the tumblers. The secondary colors have been created by mixing the primary colors together.

Learning Experience 10 continued

Page 2

Students can use the red, yellow, and blue cellophane to also see this color change. They can place the pieces of cellophane (in primary colors) in front of each other to create the secondary colors.

Give each student an opportunity to mix colors together by placing three drops of food coloring of one primary color next to three drops of food coloring of another primary color on a piece of waxed paper. Students can then use a Q tip to mix the colors together.

Student pairs can use the watercolors provided in the kit to create a picture on construction paper. Instruct student pairs to only use the red, yellow, and blue colors on their paint tray and to mix colors on the styrofoam tray when they want to add orange, green, or violet to their picture.

Discussion Questions:

Name the primary colors.

What happens when colors are mixed together?

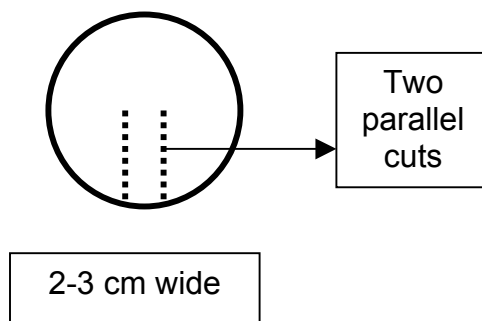
What colors make orange? Green? Violet?

What could we do if we were painting a picture and there wasn't enough orange paint to complete the picture?

Read the book, Mouse Paint by Ellen Stoll Walsh, to reemphasize that primary colors mix together to form new secondary colors. After the book is read to students, ask students to think back to why the cat could not find the mice on the white paper. Review what was discussed about camouflage in Learning Experience #9 with students.

Session 2:

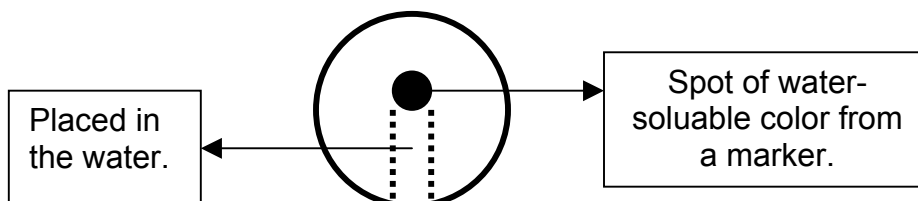
Colors can be separated by using the chemical separation technique called **chromatography**. Fill a 9 oz tumbler with approximately 2.5 cm of water. Cut out the inside circle of a coffee filter so the diameter is approximately 10 –12 cm. Make two cuts in the filter, parallel to each other, to form a strip that hangs down from the center of each circle. The strip that hangs down into the water should be approximately 2-3 cm wide.



Learning Experience 10 continued

Page 3

Make a spot of color in the center of the circle of each filter strip with a green water-soluble marker (ex. overhead marker).



Place the strip of the coffee filter that was cut into the water and the rest of the paper circle should sit on the rim of the tumbler. The water will rise up the strip onto the colored pen mark. The colors in the pen mark will separate into all the component colors that were needed to create the color made by the marking pen. In the case of the green marker, the green color separates into blue and yellow. The water rises up the strip due to capillary action. There should be one filter and one tumbler with water for each marking pen color used. It will be hard to remember what the original color was before the chromatography process, so it may be necessary to mark what the original color was on the outside of the tumbler. The complete chromatography process takes about 10 minutes per color. This same process can be tried with different types of paper and different types of markers. Once the separation is complete, the results can be used as a review with students of the primary and secondary colors.

Learning Experience 11: Color Tints

Objective: Students will describe and explore the creation of colors of different tint.

Materials:

For the class:

- 20 styrofoam trays
- 5 sponges
- Cotton swabs
- Tempera paint in green, red, blue, purple and /or yellow*
- Paint smocks*
- White construction paper*
- Scissors*

*provided by teacher

Preparation:

Read background information on pages 5 and 6. Cut the sponges provided into four squares.

Basic Skills Development:

- Observing
- Discussing
- Describing
- Manipulating materials

Evaluation Strategy:

Students will observe and describe how to create colors in different tints.

Vocabulary:

tint

How do colors change when white is added?

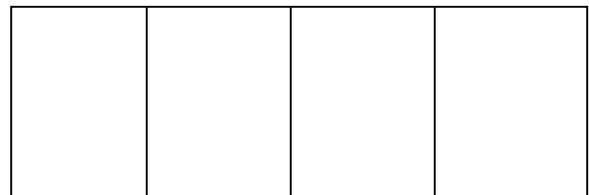
Students have explored with primary colors to see that when they are mixed together, new colors, called secondary colors, are created. However, colors can also change by changing their tint. Colors change in tint by adding white to the color.

One set of styrofoam trays with a single color may be prepared for this learning experience or several set of styrofoam trays with different color may be prepared. Use a cotton swab to mix white paint of varying amounts to the paint on each tray.

For example:

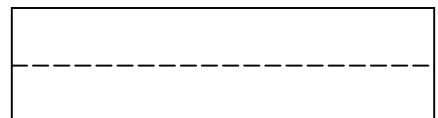
Different amounts of white paint added to the color in the tray:

0 drops 4 drops 8 drops 10 drops



Darkest  Lightest

Give each student a piece of white construction paper. Fold the construction paper in half horizontally. Place a sponge in front of each tray.



Fold

Learning Experience 11 continued

Page 2

Students can then dip the sponge into the paint and press the sponge onto the top half of the construction paper. Next to the first sponge print, students can make the next sponge print. When all four sponge prints are made, students should notice a difference between the colors. Students should see how the tint of the color has changed. The tint gets lighter and lighter a more white paint is added.

Discussion Questions:

What do you think will happen when we add white to the color(s)?

How can colors be made lighter in tint?

What happens when we add more white to a color?

How could we describe the new color tints we have made? Are there names for these colors?

How can we make pink or light blue?

What does each new color tint remind you of? Why?

Color Songs:

Pink to the tune of Are You Sleeping?:

P-I-N-K

P-I-N-K

That spells pink.

That spells pink.

Bubble gum is pink

Pigs and piggies are

pink

Pink, Pink, Pink

Pink, Pink, Pink

White to the tune of Happy Birthday:

W-H-I-T-E, W-H-I-T-E

Snowballs and popcorn

Are as white as can be

W-H-I-T-E

Learning Experience 12: Shades of Color

Objective: Students will describe and explore the creation of color of different shades.

Materials:

For the class:

- 20 styrofoam trays
- 5 sponges
- Cotton swabs
- Construction paper with color tints for Learning Experience #11
- Tempera paint in green, red, blue, purple and /or yellow*
- Paint smocks*
- Old magazines*

*provided by teacher

Preparation:

Read background information on pages 5 and 6. Cut the sponges provided into four squares. Students will place shades of color on the bottom half of the construction paper used in Learning Experience #11.

Basic Skills Development:

- Observing
- Discussing
- Manipulating Materials
- Describing

Evaluation Strategy:

Students will observe and describe how to create colors in different shades.

Vocabulary:

shade

How are shades of color created?

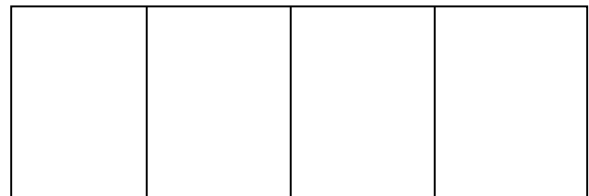
Students have explored with color tints and in this learning experience students explore the shades of colors. Colors change in shade by adding black to the color.

One set of styrofoam trays with a single color may be prepared for this learning experience or several set of styrofoam trays with different color may be prepared. Use a cotton swab to mix black paint of varying amounts to the paint on each tray.

For example:

Different amounts of black paint added to the color in the tray:

0 drops 4 drops 8 drops 10 drops



Students will again dip the sponge into the paint and press the sponge onto the construction paper. The bottom half of the white construction paper used in Learning Experience #11 should be used. Next to the first sponge print, students can make the next sponge print. When all four sponge prints are made, students should notice a difference between the colors. Students

Learning Experience 12 continued

Page 2

should see how the color has changed in its shade. The shade gets darker and darker as more black paint is added.

Discussion Questions:

How can colors be made darker?

What happens when we add more black to a color?

How could we describe the new color shades we have made? Are there names for these colors?

What does each new color shade remind you of? Why?

Students can then search through old magazines for pictures of a color of their choice. Students can cut out the pictures and lay them out on their desk. Students can then order the color pictures from lightest to darkest or group them based on whether the color has white or black added to it. Students can then use their pictures for the color booklet they create in Learning Experience #15.

Learning Experience 13: Helpful Colors

Objective: Students will describe the shapes and colors of traffic signs and identify the similarities and differences between the traffic signs.

Materials:

For the class:

Pictures of traffic signs

Preparation:

Find a location in the classroom where the signs can be grouped and displayed.

Basic Skills Development:

Observing
Describing
Comparing
Discussing

Evaluation Strategy:

Students will accurately describe the shapes and colors of traffic signs and identify the similarities and differences between signs.

Vocabulary:

sign
yield
caution

How do we use color in our everyday life?

Provided in the kit are road and safety signs. Display the signs for students and ask them to identify when they have seen the sign before. Discuss why stop signs, caution signs, and information signs use different shapes, colors, and words.

Use the shape and color words to group and classify the signs. Notice any similarities among the signs. What shape and color are most of the informational signs compared to the caution signs?

Discussion Questions:

How can color help us to avoid danger?
In a traffic light, what is the top color?
bottom color, middle color?
What does green mean?
What does red mean?
What color is a stop sign?
Road signs such as deer crossings and curves in the road are what color?
Where else on the road will you see color? (yellow lines or yellow warning caution lights)?

Learning Experience 14: Different Temperatures – Different Colors

Objective: Students will measure the temperature of thermometers encased in envelopes of different colors and use the data to explain that darker colors absorb light and lighter colors reflect light.

Materials:

For the class:

9 thermometers
Construction paper (23 x 28 cm) in red, orange, yellow, green, blue, violet, white, brown, and black*
Tape*
Chart paper*
Felt-tip markers*

*provided by teacher

Preparation:

A mini-lesson on how to read a thermometer may need to be taught before this learning experience.

Basic Skills Development:

Predicting
Measuring
Observing
Recording data
Gathering and interpreting data

Evaluation Strategy:

Students will accurately compare temperature data to explain that darker colors absorb light and heat and lighter colors reflect light and heat.

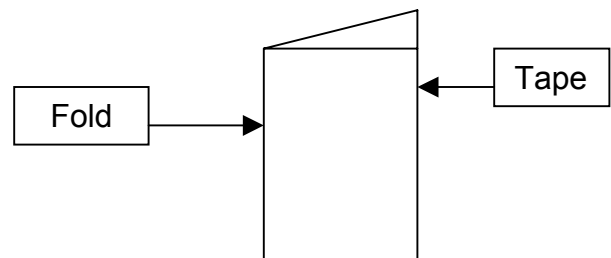
Vocabulary:

temperature
thermometer

How do colors absorb light differently?

Ask students if they have ever noticed how the color of clothing changes in the summer and the winter. Ask students how they feel when they wear dark colors on a sunny day vs. when they wear light colors on a sunny day.

Explain that in this learning experience students are going to observe temperature differences when thermometers are placed in envelopes made of different colors. Divide the class into groups so each group gets a color to observe. The colors should include red, orange, yellow, green, blue, violet, white, brown, and black. Using construction paper (23 x 28 cm), fold the paper in half and tape the open side closed.



Place a thermometer inside each color envelope. Students can predict what color will cause the thermometer to rise to the highest temperature. Place the envelopes in the same sunny location. Keep the envelopes in the same location for several minutes. Record temperature data for each color. Create a graph of the data and discuss results with students. Students should

Learning Experience 14 continued

Page 2

notice that the darker the color the higher the temperature . The lighter temperature is due to the darker colors absorbing the light/heat and the lighter colors reflect the light/heat. Refer back to why color choices are different with the season.

Learning Experience 15: Color Booklet

Objective: Students will review what they learned about the various tints and shades of color and create a booklet displaying their knowledge.

Materials:

For the class:

Paper fasteners
Construction paper in red, orange, yellow, green, blue, and violet*
Old magazines/newspapers*
Hole punch*
Scissors*
Glue*

*provided by teacher

Basic Skills Development:

Observing
Manipulating Materials
Classifying

Evaluation Strategy:

Students will create a color book with accurate pictures cut from magazines/newspapers showing a particular color.

Vocabulary:

booklet
tint
shade
primary colors
secondary colors

What colors do we find in pictures?

Now that students are able to recognize color in various tints and shades, students are to locate pictures of objects of different colors in magazines. Begin by handing out to students red construction paper and magazines. The red construction paper is to act as the “red page” in their booklet. Have students cut out pictures that are red or a tint/shade of red and paste them on the red page. Some students may be able to print the word red at the top of the page. Students cut out various pictures of a specific color in Learning Experience #13. Students are to use these pictures for a page in their color booklet. Follow these steps for each color. Bind the book together with paper fasteners.

Discussion Questions:

What might you find in a magazine that would be red?
Do we ever eat anything red?
Can you think of something outside that may be red?
Do we wear the color red?

MORE IDEAS

Language Arts

Book Suggestions: Shapes, Shapes, Shapes by Tara Hoban
Colors, Shapes, and Sizes by Michelle Worrance
Shapes by Earl Snellenberger
The Shape of Me and Others Stuff by Dr. Seuss
The Greedy Triangle by Marilyn Burns
Three Pigs, One Wolf, and Seven Magic Shapes
Color Zoo by Lois Ellert
Brown Rabbit's Shape Book by Alan Baker
Little Blue, Little Yellow by Leo Lionni
Purple, Green, and Yellow by Robert Munsch
The Magic School Bus Makes a Rainbow by Joanna Cole
Colors by Chuck Murphy
A Color of His Own by Leo Lionni

- ◆ Create riddles to identify different shapes. For example, I can roll I am a ... or I have four equal sides I am a
- ◆ Ask students to find shapes in the letters of their names.

Art

- ◆ Demonstrate to the class how to make pictures out of shapes. Cut out a large supply of different shapes from colored drawing paper and explain by using a brown rectangle and green circle, for example, the students can make a tree. Then distribute shapes of different colors to the class and have them make a mural by pasting the shapes onto a large piece of poster board.

Physical Education

- ◆ See if students can make shapes using their bodies on the floor – example: square. Ask “How many children would we need?” Approximately what size should the children be?

Science

- ◆ Freeze tempera paint in ice cube trays. Place clothespins in paint before freezing to be used as a handle. Paint a picture with the paint ice cubes and mix colors with your frozen paint cubes.
- ◆ As students arrive in the classroom, fasten a red, yellow or blue paper rectangle onto students' clothing. Comment on the color of the rectangle and ask students to name the color. Students can look for other objects that are the same color of what color rectangle they are wearing.
- ◆ Ask students to bring in food of different shapes to share with the class. Students are to name the food and name the shape that food is in.
- ◆ Make a collection of different shapes and sizes (ex. cubes - construction blocks, boxes; cones – ice cream cones, party hats; cylinders – wrapping paper tubes, jars; spheres – balls, marbles, oranges)

INQUIRY AND PROCESS SKILLS

Classifying	Arranging or distributing objects or events in classes according to some method of system.
Collecting Data	Obtaining visible or measurable information which illustrates a specific situation.
Communicating	Displaying or transmitting information to others.
Generalizing	Drawing general conclusions from information.
Formulating Hypotheses	Constructing a proposition or assumption of what is thought likely to be true based on reasoning, which serves as a tentative testable theory.
Identifying Variables	Recognizing characteristics of objects or events, which are constant or change under different conditions.
Inferring	Making a statement based on reasoning to explain an observation.
Interpreting Data	Analyzing information that has been collected and organized and describing apparent patterns or relationships for information.
Making Decisions	Choosing an alternative from among several and basing the judgment on defensible reasons.
Manipulating	Handling or treating materials from among several and basing the judgment on defensible reasons.
Measuring	Making quantitative observations by comparing to a standard.
Observing	Becoming aware of an object or event by using any of the senses to identify properties.
Predicting	Making a forecast or estimate of what future events may occur.
Replicating	Performing acts that duplicate demonstrated symbols or patterns.
Using Numbers	Stating and applying mathematical rules or formulas to calculate or compute quantities for basic measurements.

GLOSSARY

Attributes:	to regard something to have a particular quality.
Booklet:	a small book with a few pages and paper cover usually containing information on a particular subject.
Camouflage:	ways that animals blend into their environment in order to avoid being seen by predators or prey.
Caution:	a warning to someone to be careful in doing something.
Chromatography:	a method of finding out the chemical parts.
Circle:	a curved line surrounding a center point. Every point of the line is an equal distance from the center point. Geometric shape with no sides or corners.
Color:	a pigment used in painting/property of objects that depends on the light the object reflects.
Corner:	the location where two more lines or surfaces meet.
Cube:	a form of six equal square sides.
Curved:	with a rounded shape.
Ellipse:	a shape resembling an oval, stretched circles with longer, flatter sides.
Hexagon:	two dimensional figure with six sides.
Measure:	to find the size, length, quantity or rate of something using a suitable instrument or device.
Pattern:	a repeated design.
Pentagon:	a geometric figure with five sides.
Primary colors:	red, yellow, and blue.
Rainbow:	an arc of light separated into bands of color that appear when the sun's rays are refracted and reflected by drops of rain.
Rectangle:	a four sided shape have two sets of equal length parallel sides and four right angles.
Rhombus:	a parallelogram with four equal sides.

Season: one of the four periods of the year: spring, summer, autumn, and winter that brings certain weather conditions. Seasons are the result of the earth's tilt toward or away from the sun.

Secondary colors: orange, green, and violet.

Shade: a color that is a variation of a basic color by adding black.

Shape: a geometric form.

Side: a line segment that forms the perimeter of a geometric figure.

Sign: a publicly displayed notice/board showing directions, instructions, or warnings.

Sphere: a three dimensional form of a circle.

Square: a geometric figure with four equal sides.

Straight: without bends or curves.

Temperature: the measure of warmth or coldness of an object.

Thermometer: an instrument used to measure temperature.

Tint: a color mixed with white to create a variation of the basic color.

Trapezoid: a quadrilateral with two parallel sides.

Triangle: a shape with three sides and three angles.

Yield: to slow down or stop to let another vehicle pass.

TEACHER REFERENCES

Levenson, Elaine. Teaching Children About Physical Science. TAB Books

Media Library

Call the media library to order media materials and to check on new materials that are available. The number to be reached is (716) 376-8212.

Websites

http://www.thetech.org/exhibits_events/online/color/intro/

<http://www.pbs.org/kids/sesame/html/shapepbs.htm>

<http://www.nuttinbutkids.com/>

<http://www.kconnect.com>