STUDENT SAMPLE LEVEL 3

Color Solutions Activity 2

Chemistry is the science that deals with how substances are **made**. Chemistry is also about the new products produced when different materials are mixed.

Mixing the water and lemonade powder to make a new product is chemistry. People who study chemistry are ***chemists.***

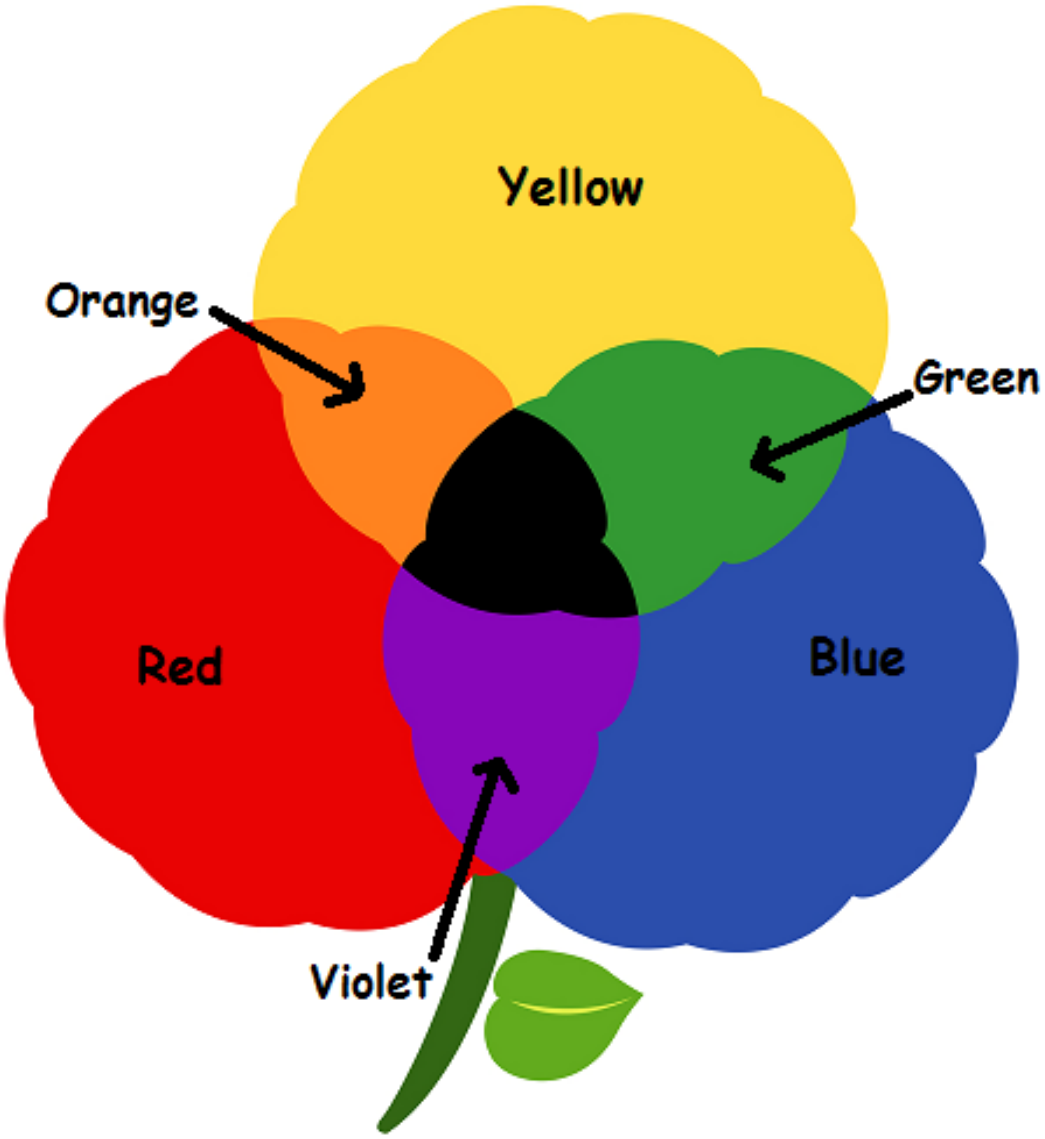
There are only **three** colors that make all other colors. Red, yellow, and blue are called **primary colors.** This means **all** other colors **begin** with one or more of these three colors. Primary colors are the **only** colors that cannot be made by mixing other colors.

Notice how the three primary colors **overlap** in the picture. This overlap of colors shows:

✓ **Red and yellow make orange.**

✓ **Yellow and blue make green.**

✓ **Blue and red make violet.**



When we experiment by mixing colors, we are using chemistry. After mixing different amounts of these colors, the new colors are a solution. Or are they? **Investigate!**

STUDENT NOTE:

Scientists wear protective clothing such as aprons and safety glasses for safety. Scientists always keep neat labs to avoid accidents. Trash is thrown away promptly and all spills immediately wiped up.

REMEMBER: THE BEST SCIENTISTS ARE SAFE SCIENTISTS!

Student Materials

- **Spot Plate**
- **Stir Rod**

Student Pipette Instruction

Pipettes are used by scientists to **carefully** measure liquids drop by drop.

1. Practice using the pipette with clear water. Pinch the bulb to remove all air from the pipette. While still pinching bulb, lower the tip into the water. Slowly release the bulb and water will be drawn **into** the pipette.
2. When the bulb is completely released, raise the tip. The water will stay inside the bulb. To release water, slowly squeeze bulb again. This will allow the water to squirt from the pipette. Practice until you can release the water drop by drop.

ALWAYS CLEAN PIPETTE AFTER EACH USE WITH WATER.

Color Mixing Instruction

1. In one of the beakers, measure 100ml of clear water. Drop in the red color tab and stir.
2. In another beaker, measure 100ml of clear water. Drop in the blue color tab and stir.
3. Repeat step one with the yellow color tab.

There are now three beakers with three different colored waters.

Why did the tablets fizz?

The color tablets are a **mixture** of soda and citric acids. When dropped in the test tube of water, the tabs **reacted** to the water. The reaction between the soda, acid, and water made a **gas.**

Gas is always **lighter** than liquid, so the gas bubbles floated to the top escaping in the air. Notice how the color tabs are **dissolving** in the water. Dissolve means the substances cannot be separated.

1. Was this a physical change or a chemical change? _____

_____

2. What was present that indicated which change it was?_____

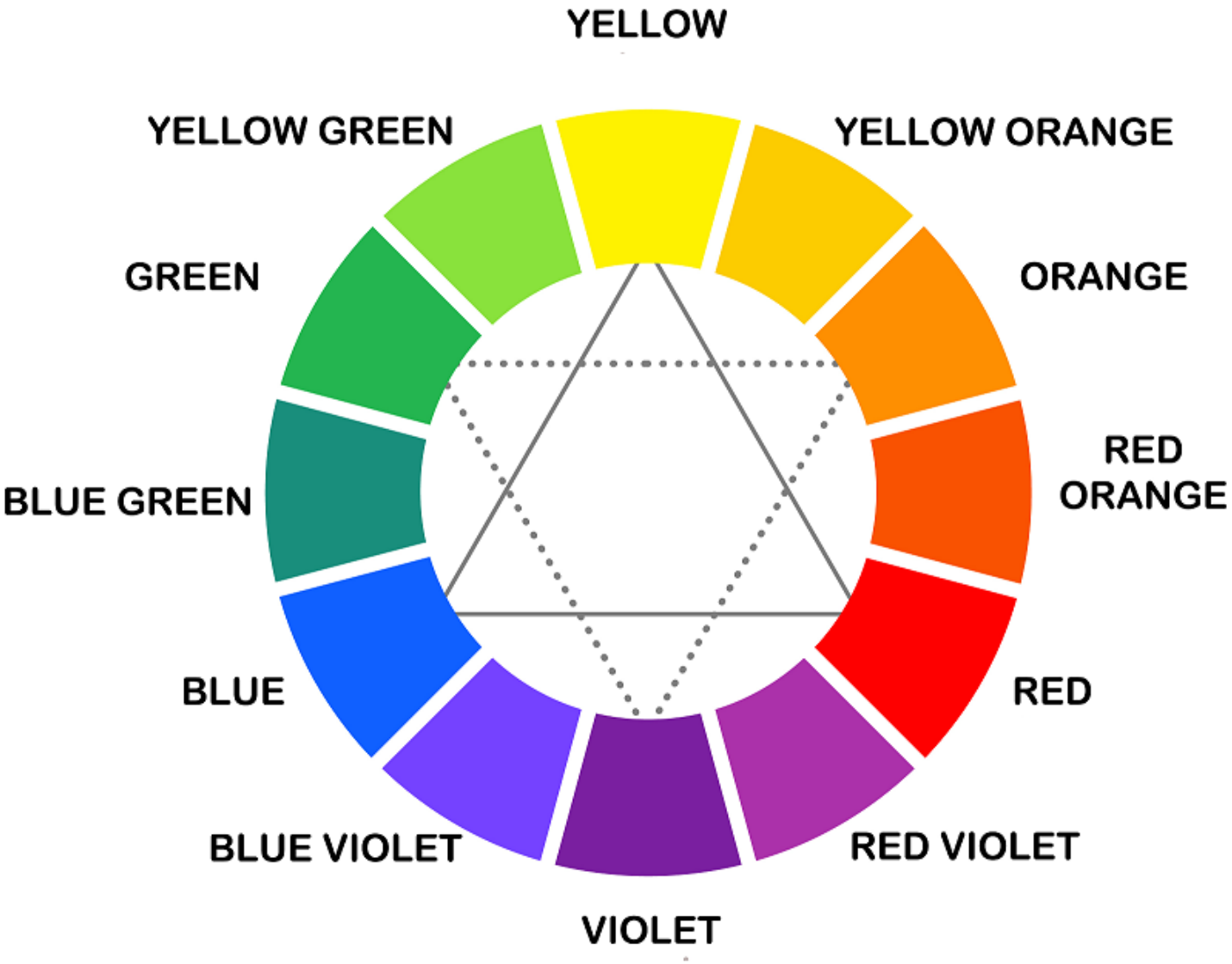
_____

_____

3. Using a pipette, draw up some of the red liquid from the beaker. Drop five drops of the red into one of the spot plates and stir. Squirt any red still remaining in the pipette back into the beaker. Clean pipette with fresh water until no red liquid remains. **After every color, clean the pipette for accurate results.**
4. Draw up some of the yellow liquid. Drop five drops of the yellow into the well plate with the red. Stir.
5. What is the new color?_____
6. Squirt any yellow still remaining in the pipette back into the beaker. Clean pipette with fresh water until no yellow liquid remains. After every color, clean the pipette for accurate results.
7. Using the color wheel, make the color green. What were the two colors used?_____
8. Using the color wheel, make the color violet. What were the two colors used?_____

_____

9. To make more colors, different amounts of the primary colors are used. Instead of five drops of red and five drops of yellow to make orange, three drops of red and five drops of yellow are used to make yellow-orange.
10. Study the color wheel. Make five different colors using the combinations on the color wheel. Complete chart of new colors.



New Color	Color Used and Amount	Color Used and Amount	Color Used and Amount	Color Used and Amount

❖ Sun Shadows

Every morning the sun rises on one side of our house and every evening it sets on the other. Why? Sunrise begins when the sun **first** appears on the eastern horizon.

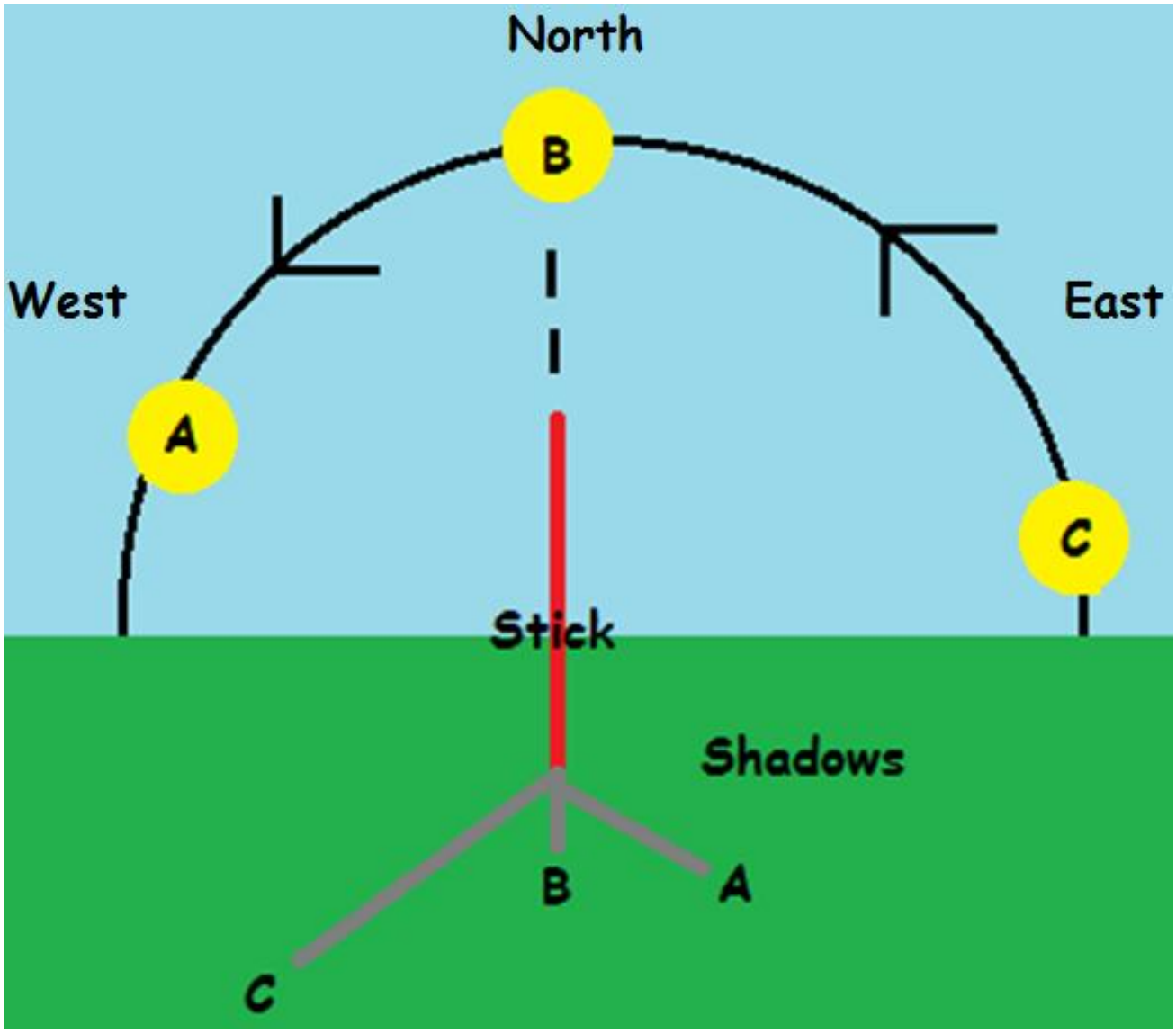
*In the morning, as the **sun rises in the east**, the rays bounce across objects in its path. This causes a long **shadow** on the ground because the light is hitting the object sideways as in the picture.*

As the sun rises to its highest point around noon, the shadows' lengths **shorten**. This is because the **angle** of the rays has changed. The higher the sun rises in the sky, the more direct the light rays and the shorter the shadows.

But as earth continues to rotate, the sun's rays become farther away. The shadows begin to stretch long again as the sun sinks in the western hemisphere.

Examine the three shadows of the stick. As the sun moves across the sky the **length** of the shadow varies.

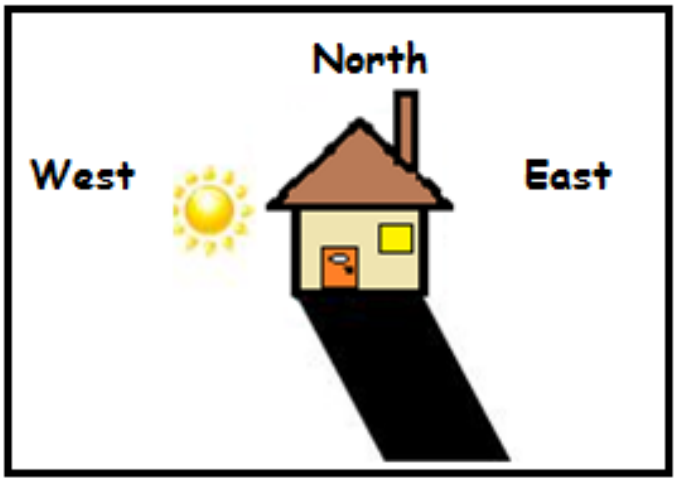
When the Eastern sun first strikes the stick, the shadow **C** is long as in the tree picture. When the sun is directly overhead, the **B** shadow is very short. As the sun continues its journey to set in the west, shadow **A** grows long.



Examine each of the shadows on the houses. By the shadows decide which time it is and circle the answer.

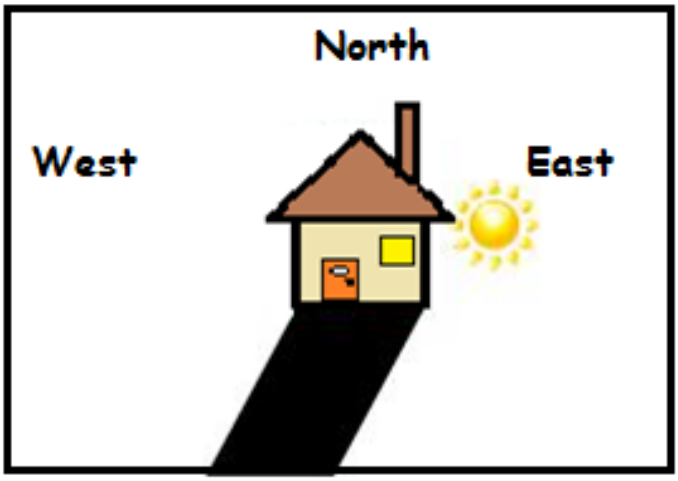
1.

a. Early in the morning
b. Noon
c. Late in the evening



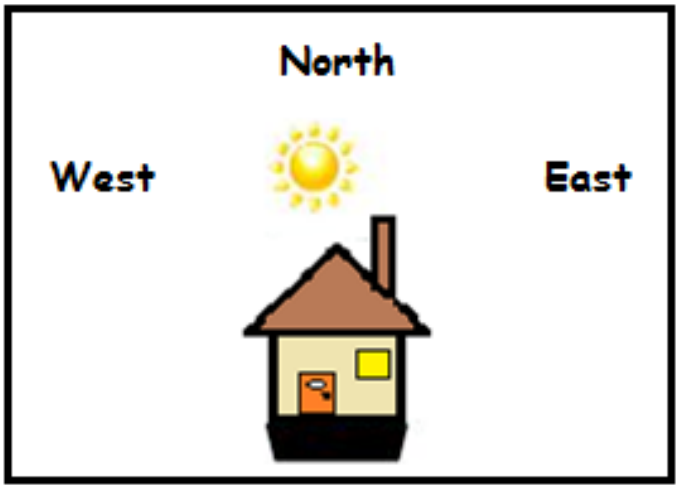
2.

a. Early in the morning
b. Noon
c. Late in the evening



3.

a. Early in the morning
b. Noon
c. Late in the evening



TEACHER SAMPLE LEVEL 3

Color Solutions Activity 2
Student Workbook Page 92

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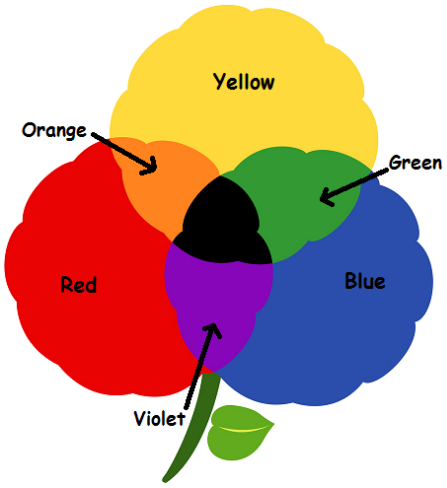

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Teacher Materials

- **BEAKERS GLASS 250ml (3)**
- **COLOR BURST TABLETS; RED, YELLOW, AND BLUE**
- **PIPETTES**

Student Materials

- **SPOT PLATE**
- **STIR ROD**

TEACHER NOTE: *Above materials will be needed for each experiment. Colors will be used for Activity 3.*

Student Pipette Instruction

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1. Was this a physical change or a chemical change? ***A CHEMICAL CHANGE.***
2. What was present that indicated which change it was? ***BUBBLES OR FIZZ ARE AN INDICATOR OF A CHEMICAL CHANGE.***

3. Using a pipette, draw up some of the red liquid from the beaker. Drop five drops of the red into one of the spot plates and stir. Squirt any red still remaining in the pipette back into the beaker. Clean pipette with fresh water until no red liquid remains. **After every color, clean the pipette for accurate results.**
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5. What is the new color? ***ORANGE.***
6. Squirt any yellow still remaining in the pipette back into the beaker. Clean pipette with fresh water until no yellow liquid remains**.** After every color, clean the pipette for accurate results.
7. Using the color wheel, make the color green. What were the two colors used? ***YELLOW AND BLUE.***
8. Using the color wheel, make the color violet. What were the two colors used? ***RED AND BLUE.***
9. To make more colors, different amounts of the primary colors are used. Instead of five drops of red and five drops of yellow to make orange, three drops of red and five drops of yellow are used to make yellow-orange.
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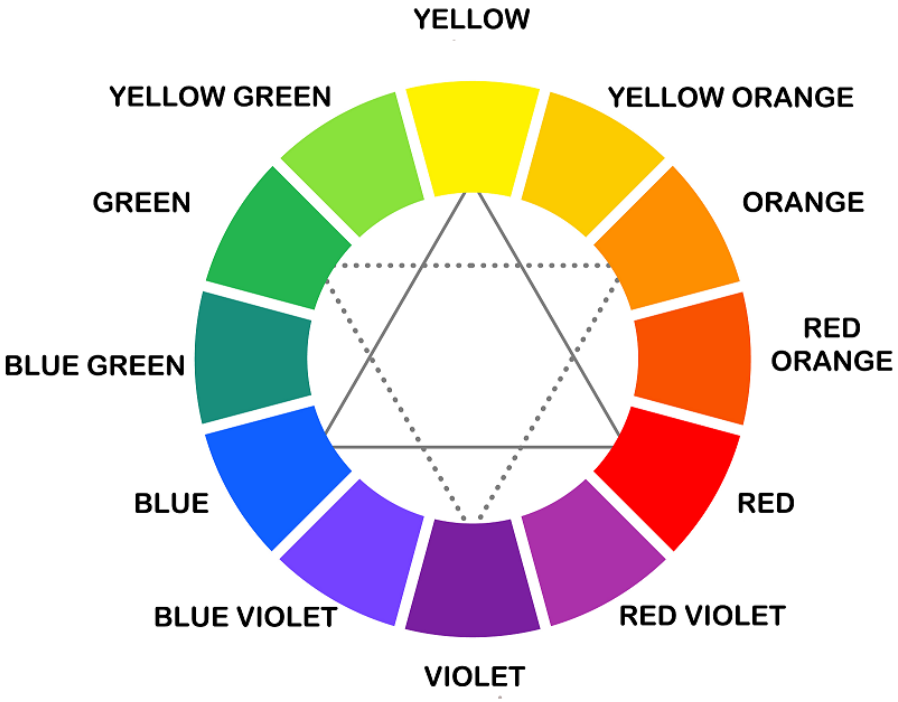

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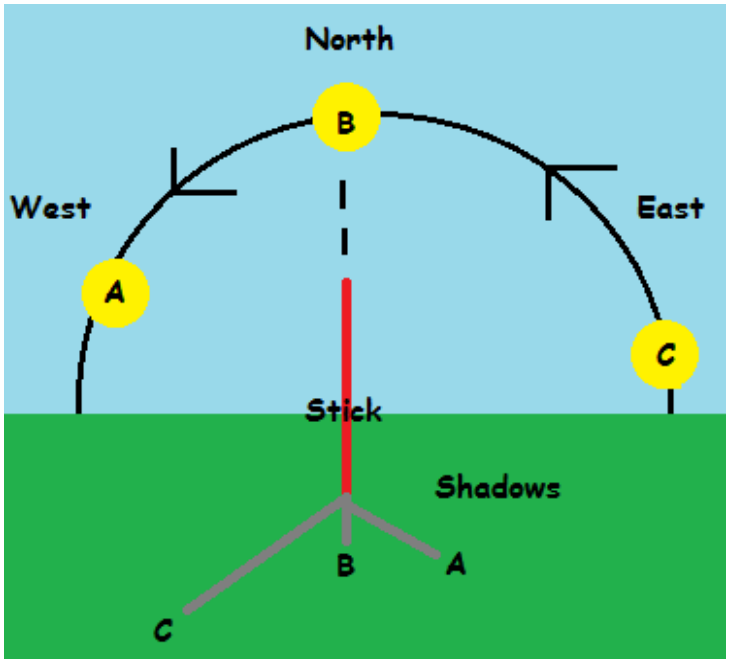
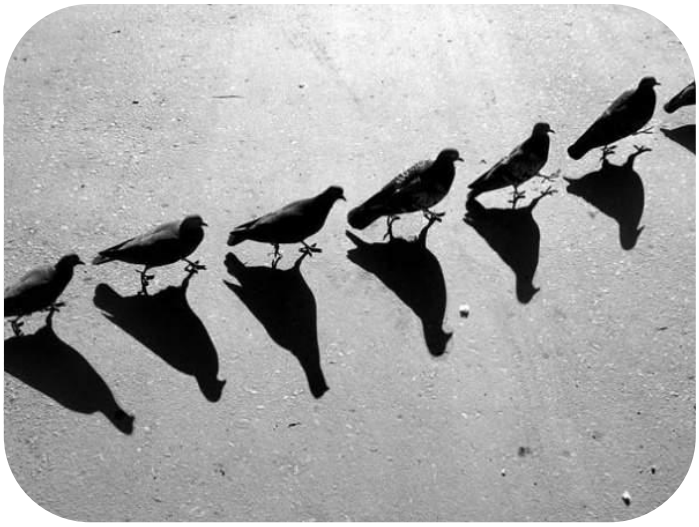


Which Way Am I Going? Activity
Student Workbook Page 300



Is there a way to know directions without a compass? Yes! In the morning, because the sun rises in the east, shadows from the sun will stretch to the **west**. As the sun sinks in the west, shadows will stretch toward the **east.** The length of shadows is also a clue. Long shadows mean early morning or late afternoon. Short shadows or none at all indicate it is around noon.

Examine each of the shadows on the houses. By the shadows decide which time it is and circle the answer.

1.

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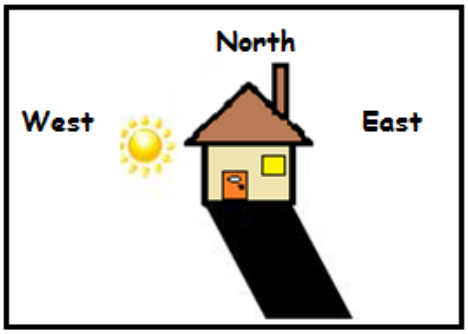
b. Noon
c. Late in the evening



2.

a. Early in the morning
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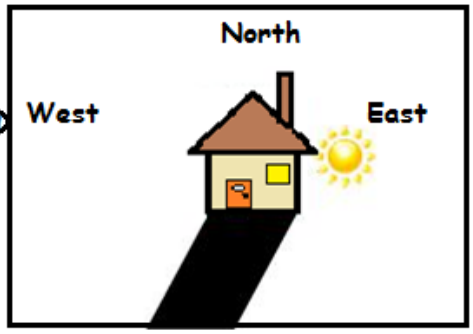
c. Late in the evening



3.

a. Early in the morning
b. Noon
c. Late in the evening