

ENRICHMENT ACTIVITY

CHAPTER 10

Health Topic

Blood—The Liquid Lifeline

BLOOD TYPE

Your blood is the vital link between your cells and the outside environment. Blood carries oxygen and digested nutrients to your cells. It carries away the waste materials that are produced by the cells. It helps keep your body at the right temperature and contains cells that play an important role in your body's fight against infections.

The blood is commonly "typed" according to the kinds of antigens on the surface of the red blood cells. There are 10 kinds of antigens in all—A antigens, B antigens, and 8 kinds of Rh antigens. Using only the A and B antigens as a basis for classification, there are four types of blood:

- Type A (the surface of the red cells have the A antigens)
- Type B (the surface of the red cells have the B antigens)
- Type AB (the surface of the red cells have both A and B antigens)
- Type O (the surface of the red cells have neither A nor B antigens)

Using the Rh antigens as a basis for classification, there are two blood types:

- Type Rh+ (the surface of the red cells have the type of Rh antigens that cause severe agglutination reactions during blood transfusions)
- Type Rh- (the surface of the red cells have the type of Rh antigens that do NOT cause severe agglutination reactions during transfusions)

By combining the four blood types based on the A and B antigens with the two based on the Rh antigens, a total of eight blood types are produced:

- Type A, Rh+
- Type A, Rh-
- Type B, Rh+
- Type B, Rh-
- Type AB, Rh+
- Type AB, Rh-
- Type O, Rh+
- Type O, Rh-

Before a person can receive a blood transfusion, the medical specialist administering the transfusion must make certain that the blood of the one person (either blood donor or blood receiver) does not contain antibodies for antigens that are present in the other person's blood.

Forty-five percent (45%) of people have type O blood, 40% have type A, 12% have type B, and 3% have type AB. Eighty-five percent (85%) have type Rh+ and 15% have Rh-. This information is summarized below:

Blood Type:	O	A	B	AB	RH+	Rh-
% of People Having This Type:	45%	40%	12%	3%	85%	15%

To determine the percent of people having type O who also have type Rh+, combine the percents for each type by multiplying them together. For example, 45% of all people have type O blood. Of these, 85% have type Rh+. When we multiply 45% by 85%, we get 38.25%. Hence, 38.25% of the people have type O blood that is Rh+. The arithmetic may be easier for you to understand if you change the percents to decimals, multiply the decimals, and then change your answer to a percent:

$$0.45 \times 0.85 = 0.3825$$

$$0.3825 \times 100\% = 38.25\%$$

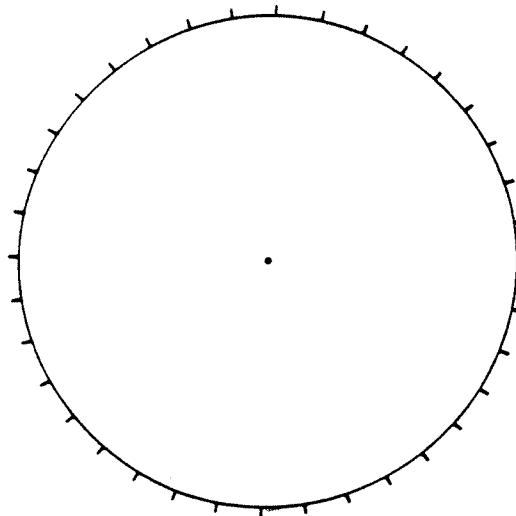
ENRICHMENT ACTIVITY (continued)

Health Topic Blood—The Liquid Lifeline

1. Determine how many people have each of the remaining seven types of blood by filling out the table below. Round the percents to the nearest half a percent. (The percents may add up to more or less than 100 due to rounding.)

Blood Types	O Rh+	O Rh-	A Rh+	A Rh-	B Rh+	B Rh-	AB Rh+	AB Rh-
% People Having These Types:	38.25							

2. Using the percentages you found for question 1, make a pie graph from the circle given below. Provide a title for your graph and label the various sections in the graph.



BLOOD VOLUME

The amount of blood in your body is related to your weight. The heavier you are, the greater the amount of blood in your body. A simple formula relates your weight and the volume of your blood:

$$V = 70W \quad \text{where } V = \text{the volume of your blood in milliliters}$$

$$W = \text{your weight in kilograms} \quad (\text{weight in pounds} \div 2.2 = \text{kg})$$

3. Using the formula above, calculate the volume of blood in your body.

Calculations: _____

Answers: _____

Blood is made up of several substances. Red blood cells make up 44% of the total volume. Platelets and white blood cells make up 1% of the volume. Plasma makes up 55%.

4. Calculate the volume of each of the following in your blood:

A. Volume occupied by red blood cells _____

B. Volume occupied by platelets and white blood cells _____

C. Volume of the plasma _____