ACTIVITY #7

Estimating Fluid Needs

Everyone has different fluid needs

"You must drink 8 cups of water a day!" You might've heard this from your parents, grandparents, friends, or even on television. In reality, the amount of water you need is not that easy to determine. Some people need less than 8 cups while others need more. The amount of water you need per day depends on your age, weight, activity level, and gender.

A person's ***fluid need*** is the amount of fluid an individual needs per day for the body to function properly and stay hydrated. ***Fluid*** refers to the water found in food and beverages. You do not have to drink just water to meet your fluid need. You can also get fluids from both foods and beverages including milk and soup, and from fruits and vegetables containing lots of water like watermelon and cucumber. In science, and in this activity, we will use milliliters (mL) as the unit of measure to represent fluids.

Fluids are important for your body to stay healthy, and they must be replaced regularly because you lose water throughout the day. The human body loses water in four main ways: through the skin by ***perspiration*** (sweat), from the lungs by ***respiration*** (breath), from the intestines by ***defecation*** (bowel movements), and from the kidneys through ***urination***. Your activity level can affect the amount of water you lose because you will sweat more during times of increased

activity. ***Dehydration*** occurs when the body does not have enough water, and may cause dizziness, nausea, headache, dry lips and mouth, and difficulty urinating.

The following formula is used to find how much fluid a child needs a day in milliliters (mL). This equation considers fluid from both food and beverages.

(20 mL/kg) x (Weight in kilograms (kg) - 20kg) +1500 = Daily Fluid Needs

Remember: water sustains life! No living organism can live without it. Fluid is handy for much more than reliving the problems listed above. The human body uses water to regulate body temperature, maintain muscle tone, lubricate the joints and intestines, aid in digestion, and transport nutrients and oxygen.

FUN FACT:

The average person could live without food for nearly a month, but we could only survive about one week without water. That's how essential water is to our survival!

CHECK YOUR THINKING

Use the reading to find and support your answers

1. Circle another word for perspiration.

2. Underline the definition of fluid.

LET'S TRY IT TOGETHER

Estimating Fluid Needs

Here's the Story

Compared to her friends, who never seem thirsty, Savannah thinks she drinks a lot. She is often thirsty when she wakes up, so she will drink a cup of water after she brushes her teeth. Sometimes, she will drink a cup of orange juice at breakfast along with the milk she adds to her cereal. At lunch she drinks 2 cups of milk and 2 cups of water. At practice, she can easily drink at least 2 cups of water, and she drinks another cup when she gets home. Savannah is starting to wonder if this normal. She wants to know just how much fluid she should have every day. Let's calculate Savannah's fluid needs Savannah currently weighs 110 pounds. Here is the formula we need to determine Savannah's fluid needs:

(20 mL/kg) x (Weight in kilograms - 20 kg) +1500 = Daily Fluid Needs

Directions

First, we need to know Savannah's weight in kilograms. Convert Savannah's weight from pounds to kilograms, using the following conversion factor:

1 lb = 0.45 kg

What is Savannah's weight in kilograms?

1. Multiply Savannah's weight by 0.45

110 lbs x 0.45 = 50 kg

Next, we need to calculate how many kilograms Savannah weighs over 20 kilograms. Subtract 20 kilograms from Savannah's total weight in kilograms. Use the following formula to figure out how many kilograms Savannah weighs over 20 kilograms. This answer will be used in the daily fluid needs equation.

(Savannah's weight in kg) - 20kg = the number of kg Savannah weighs over 20kg

50 **kg – 20kg =** 30 **kg**

2. How many kilograms does Savannah weigh over 20 kilograms?

30 kg

Last, we need to use the fluid needs equation to calculate Savannah's daily fluid needs in milliliters.

(20 mL/kg) x (Weight in kg - 20kg) +1500 = Daily Fluid Needs

(20 mL/kg) x (____30____ kg) + 1500 mL = Daily Fluid Needs in mL

3. How many milliliters of fluid does Savannah need per day?

____2100____ mL

Thinking More Deeply

What is Savannah's daily fluid need in cups? Use the following conversion factor:

1 cup = 236.6 mL (Round to the nearest whole number)

$$2100\ mL \times \frac{1\ cup}{236.6\ mL} = 9\ cups$$

Did Savannah meet her daily fluid needs?

TRY IT ON YOUR OWN

Now that we have calculated Savannah's fluid needs, let's try to calculate James' fluid needs. James currently weighs 185 pounds.

Directions

First, you need to know James' weight in kilograms. Convert James' weight from pounds to kilograms, using the following conversion factor: **1 lb = 0.45 kg**

Next, you need to calculate how many kilograms James weighs over 20 kilograms. Subtract 20 kilograms from James' total weight in kilograms. Use the following formula to figure out how many kilograms James weighs over 20 kilograms. This answer will be used in the daily fluid needs equation.

(James' weight in kg) - 20kg = the number of kg James weighs over 20kg

Last, you need to use the fluid needs equation to calculate James' daily fluid needs in milliliters.

(20 mL/kg) x (Weight in kg - 20kg) +1500 = Daily Fluid Needs

Summarize it

1. How many kilograms does James weigh?

2. How many kilograms does James weigh over 20 kilograms?

3. What is James' daily fluid need in milliliters?

Thinking More Deeply

What is James' daily fluid need in cups? Use the following conversion factor: **1 cup = 236.6 mL**

FUN FACT:

The foods that contain the most water are fruits and vegetables. Watermelon are made up of about 92% water and cucumbers are made up of about 96% water!

TAKE IT HOME: HOW ABOUT YOU?

Directions

With a parent or another adult, use a bodyweight scale to determine your weight in pounds. Then, use the daily fluid needs equation to calculate *your* daily fluid needs.

Materials: bodyweight scale and calculator

First, you need to know your weight in kilograms. Convert your weight from pounds to kilograms, using the following conversion factor: **1 lb = 0.45 kg**

Next, you need to calculate how many kilograms you weigh over 20 kilograms. Subtract 20 kilograms from your total weight in kilograms. Use the following formula to figure out how many kilograms you weigh over 20 kilograms. This answer will be used in the daily fluid needs equation.

(Your weight in kg) - 20kg = the number of kg you weigh over 20kg

Last, you need to use the fluid needs equation to calculate your daily fluid needs in milliliters. Use the following equation to calculate your daily fluid needs.

(20 mL/kg) x (Weight in kg - 20kg) +1500 = Daily Fluid Needs

FUN FACT:

Solid foods contribute up to 20% of our total fluid intake! The other 80% is from beverages!

Summarize it

1. How many kilograms do you weigh?
2. How many kilograms do you weigh over 20 kilograms?
3. What are your daily fluid needs in milliliters?