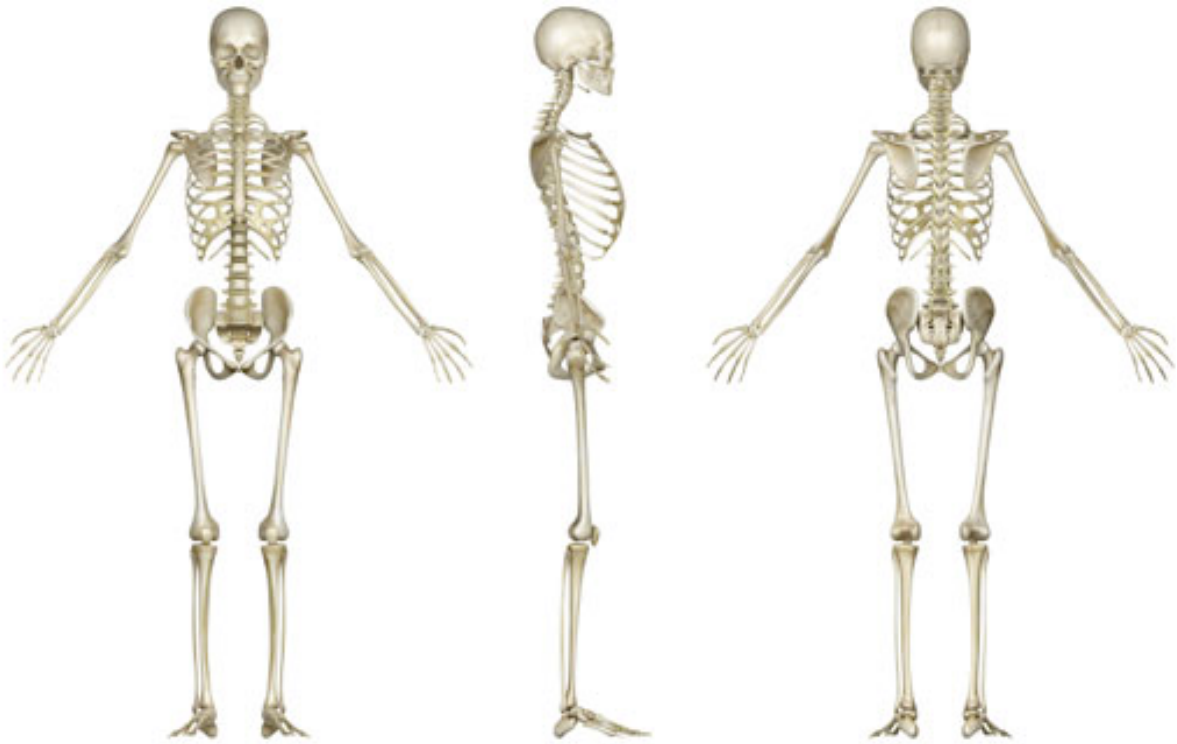
Inquiry Question

Our bones allow us to do many different things such as standing, jumping, and playing . What are they made of that makes them so strong?

Name: _____ Date: _____



We each have 206 bones in our bodies that help support us and allow us to do basic tasks such as standing, jumping, and playing.

It not only does that it also helps protect some of our most vital organs, like our brains.

They are so essential to our everyday lifestyles, but what are they made of?

In this experiment we will be using chicken bones to discover the key components of what our bones are made from.

General Instructions

The end goal of this project is to be able to observe the change within the bone and why these changes occur. Thus, it is important to follow the directions in this experiment carefully.

Materials you'll need:

- Chicken leg bones
- Vinegar
- Oven
- Bleach (optional)

Hints and Ideas:

- Attached is the lab instructions

Project submission:

Create a series of diagrams, photos, or videos outlining your experiment and observations. If you can drop-in to the school, you can present it to your teacher in-person. Otherwise, upload it to the project submission folder at the end of the unit.

FIRM, BUT FLEXIBLE: CHICKEN BONE LAB

Materials needed:

Chicken leg bones
Vinegar
Oven
Bleach (optional)

Pre-Demonstration:

1. Select two chicken leg bones, dry off any excess moisture, remove any "meat" and "gristle," weigh and measure the length of each specimen.
2. Record data on a chart on the board and have students prepare their own data charts.
3. Place one chicken leg bone in a container of household vinegar. Provide enough vinegar to cover the bone. Each day, at the same time, remove the bone, dry off any excess moisture, and weigh and measure. Record the findings onto the chart. Notice any changes in color, texture, or appearance of the bone. Write down your observations. Continue this for 7 to 10 days.
[Note: All of the "hard" chemicals in the bone (calcium phosphate) should be dissolved away, leaving behind only the elastin and collagen protein fibers. It should be easy to twist or even tie the bone into a knot. Tap the bone on a table; it will be quite "rubbery." Hint: Prepare a "wish bone" as the leg bones were prepared and tie a knot in both ends!]
4. Place the other chicken leg bone on a cookie sheet and bake it in the oven at 250 degrees for about 2 hours. If an oven is not available, or you wish to try another technique, place the other bone in a container of household bleach instead. Provide enough bleach to cover the bone and proceed as with the vinegar container. [Note: This will "dry out" the organic matter in the bone, leaving behind the "hard chemicals." The bleach, as with the heat, also breaks down the organic matter in the bone. These bones will have some of the proteins broken down, leaving the calcium behind, and will become quite brittle. After they have cooled down, weigh and measure them. Tap them on a table and they will crack.]

Demonstration and Discussion:

1. Let the students handle the bones and discuss the differences between them.
2. Tap the bones on the table. Be careful with the brittle bone that has been in the oven: it is likely to shatter when hit on the table.
3. Discuss with students that bone is built of two very important chemical groups:
    (a) mineral, calcium phosphate (calcium and phosphorus), and
    (b) the proteins (elastin and collagen). These chemicals are obtained from the foods we eat and are responsible for the firmness and durability of bone. Normally, the minerals in our bones do not dissolve completely away, but they do become less able to maintain their density in bone structure as we age. If we have provided our bodies with enough calcium in our diets as we are growing up (in childhood and early adulthood), we hope to have enough stored in our bones to keep them in good shape as we age.