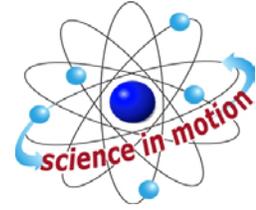


HUMAN BODY

SECTION 9: MUSCLES, BONES, AND JOINTS

From *Hands on Science* by Linda Poore, 2003.



Westminster College

STANDARDS:

Students will select appropriate tools (e.g., thermometers, meter sticks, balances, and graduated cylinders) and make quantitative observations.

Students will record data using appropriate graphic representation (including charts, graphs and labeled diagrams), and make inferences based on those data.

MATERIALS:

3 types of bones
magnifier
tray
rulers
measuring tape

EXPLORE:

Observe bones. Discuss differences in size and shape.
Measure each bone in millimeters. Draw and label.
Discuss what bones are used for. (protection, support) Identify bones.

DISCUSS:

BONES

1. Borrow a human skeleton model to use with a discussion on bones:
Adults have 206 bones and babies have 300.
Some bones join and fuse with age.
A baby's skull has several bones that fuse after birth.
The skull protects the brain and has 22 bones, but only 1 bone moves (the jaw).
2. **VERTEBRAE:**
There are 33 in a child, 26 in an adult (some fuse during growth).
Vertebrae protect the spinal cord.
Feel the vertebrae in your back.
3. **BREAST BONE AND RIBS:**
Count the ribs on a diagram or body model.
The ribs protect the heart and lungs.
The lower ribs are floating and are not attached to the sternum (breastbone).
4. **CARTILAGE** attaches the ribs to the breastbone. Cartilage expands, is flexible, and protects ribs from breaking or damage. Wiggle your nose. Feel

the cartilage. (Chicken and turkey breast bones have cartilage, which is a soft, white, rubbery substance.)

5. **CHEST CAVITY:** Measure the ribs expanded and contracted. Have a male student measure his chest full of air and then after exhaling. Notice the cartilage connects ribs on the skeleton model. Cartilage allows the chest cavity to expand for breathing.
6. **JOINTS:** Illustrate ball and socket and hinge joints on the skeleton. *Have students:* Try moving their joints. (ball and socket joint in the shoulder and hinge joint at the knee). Observe the door hinge and compare it to the hinge joint on the body (elbow). Some pen desk sets are attached with a ball and socket joint and can be used to show how this joint works.

EXPLORE:

MUSCLES

1. There are 600 muscles in the body.
If all of your muscles worked together they could pull 25 tons.
2. Muscles move food through the throat and make heat to keep the body warm.
The heart is a muscle that pumps blood.
3. Clap your hands in front of your partner's eyes. Why do eyes close? What is an involuntary muscle? (reacts automatically) Name other involuntary muscles: lungs, heart, stomach, intestine.

4. REACTION GAME

Muscles and nerves work together.

How long does it take to get the messages to the brain to work a muscle? Pass out the student work sheet, *Testing Your Reaction Time*. Read the worksheet and discuss the experiment. If you only have 1 meter stick, let students experiment (compete) one at a time and make a class chart or graph.

Graph males and females separately to see if there is a difference in reaction time.