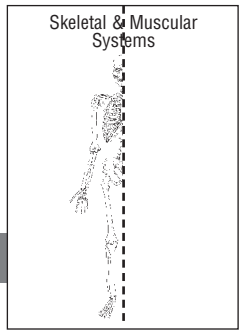
What is the skeletal system?

Human Body Concepts:

- Cells are the building blocks of all living organisms including the human body.
- Groups of similar cells form tissues and tissues form organs.
- Groups of organs working together are called systems.
- The skeletal system is made up of an organized system of bones and cartilage.
- The skeletal system provides support, protects organs, anchors muscles to provide movement, and produces blood cells.
- Two main types of joints are hinge and ball-and-socket.

Vocabulary Words:

body cells skeleton joints *systems *tissues *organs *hinge *ball-and-socket



Construct and Read:

Lots of Science Library Book #1. (See page 67)

Activities:

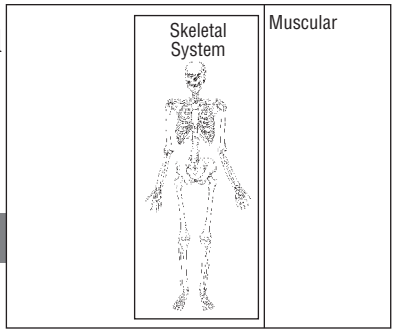
Skeletal System – Graphic Organizer

Focus Skill: explaining a function

Paper Handouts: 12" x 18" sheet of construction paper 8.5" x 11" sheet of paper
a copy of Graphics 1A - B

Graphic Organizer: Using the 12" x 18" construction paper, make a Shutter Fold. Glue/copy Graphic 1A on the left side of the cover as shown. Label the cover of the Shutter Fold *Skeletal and Muscular Systems*. Using the 8.5" x 11" paper, make a Hot Dog. Place the Hot Dog so that the fold is on the right side. Glue Graphic 1B on the front and label it *Skeletal System*. Open the Shutter Fold and glue the Hot Dog on the left part of the middle section, being sure to place the fold on the right side. Open the Hot Dog. On the top right side:

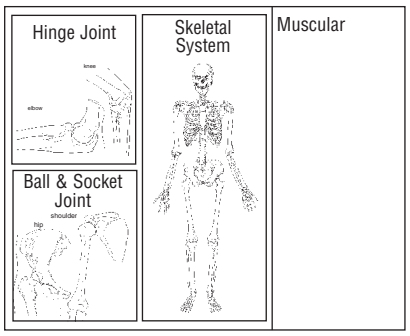
- ✎ Draw a skeleton.
- ✎✎ Write clue words about the four main functions of the skeletal system: *supports the body, protects organs, anchors muscles, produces blood cells.*
- ✎✎✎ Explain the four main functions of the skeletal system.



Moveable Joints – Graphic Organizer

Focus Skill: comparing and contrasting

Paper Handouts: 8.5" X 11" sheet of paper Graphics 1C - F



Graphic Organizer: Make a Hot Dog. Cut it to make a Large Question and Answer Book. Open it so that the Hot Dog's fold is on the left side. Open the *Skeletal and Muscular Systems Shutter Fold*. Glue the Hot Dog on the left section, being sure to place the fold on the left side. Glue/copy Graphics 1C on the top tab and 1D on the bottom tab. Label the tabs *Hinge Joints* and *Ball-and-Socket Joints*. Glue Graphics 1E & 1F under each tab. On the Hinge tab, using a red marker, circle the elbows and knees. On the *Ball-and-Socket* tab, using a blue marker, circle the shoulders and hip joints. Beside the Graphics:

✎ Draw a picture of a hinge joint and a ball-and-socket joint accordingly.

✎✎ Write clue words about each joint and include examples. hinge joint - *move in one direction, strong, elbow and knee.* ball and socket joint - *can be twisted like a joy stick, allows movement in many directions, rotation, shoulder and hip.*

✎✎✎ Describe each joint, explain how they move, and include examples.

This *Skeletal and Muscular Systems Shutter Fold* will be used in Lessons 2-3.

How Tall Are You?

Activity Materials: butcher paper tape measure

Activity: Lie down on a piece of butcher paper and ask a partner to outline your body. Cut out the outline and fill in the details. Measure the outline.

Experiences, Investigations, and Research

Select one or more of the following activities for individual or group enrichment projects. Allow your students to determine the format in which they would like to report, share, or graphically present what they have discovered. This should be a creative investigation that utilizes your students' strengths.

1. Research the life of Wilhelm Conrad Roentgen and the history of the X-ray, including its uses today.

2. Examine your ears and the tip of your nose. Feel the end of your nose; wiggle it. Bend your ear. Can you do this with parts of your body such as your finger tips or toes? Why or why not?

3. Use modeling clay to make a stand-up figure. Make another figure using toothpicks as a frame. Cover the frame with clay. Which figure holds its shape better?

4. Read *Clara Barton*, *Founder of the American Red Cross* (The Childhood of Famous Americans Series) by Augusta Stevenson. ✎✎ & ✎✎✎

5. http://www.bartleby.com/107/ - Use this site throughout the study to view colored illustrations on the human body. ✎✎✎

6. http://bart.northnet.com.au/~amcgann/body/

7. http://library.thinkquest.org/10348/- Contains various systems; ideal for ✎✎ & ✎✎✎

Lots of Science Library Books

Each *Lots of Science Library Book* is made up of 16 inside pages, plus a front and back cover. All the covers to the *Lots of Science Library Books* are located at the front of this section. The covers are followed by the inside pages of the books.

How to Photocopy the *Lots of Science Library Books*

As part of their *Great Science Adventure,* your students will create *Lots of Science Library Books.* The *Lots of Science Library Books* are provided as consumable pages which may be cut out of the *Great Science Adventures* book at the line on the top of each page. If, however, you wish to make photocopies for your students, you can do so by following the instructions below.

To photocopy the inside pages of the *Lots Of Science Library Books:*

1. Note that there is a "Star" above the line at the top of each *LSLB* sheet.

2. Locate the *LSLB* sheet that has a Star on it above page 16. Position this sheet on the glass of your photocopier so the side of the sheet which contains page 16 is facing down, and the Star above page 16 is in the left corner closest to you. Photocopy the page.

3. Turn the *LSLB* sheet over so that the side of the *LSLB* sheet containing page 6 is now face down. Position the sheet so the Star above page 6 is again in the left corner closest to you.

4. Insert the previously photocopied paper into the copier again, inserting it face down, with the Star at the end of the sheet that enters the copier last. Photocopy the page.

5. Repeat steps 1 through 4, above, for each *LSLB* sheet.

To photocopy the covers of the *Lots of Science Library Books:*

1. Insert "Cover Sheet A" in the photocopier with a Star positioned in the left corner closest to you, facing down. Photocopy the page.

2. Turn "Cover Sheet A" over so that the side you just photocopied is now facing you. Position the sheet so the Star is again in the left corner closest to you, facing down.

3. Insert the previously photocopied paper into the copier again, inserting it face down, with the Star entering the copier last. Photocopy the page.

4. Repeat steps 1 through 3, above, for "Cover Sheets" B, C, D, E, and F.

How to assemble the *Lots of Science Library Books*

Once you have made the photocopies or cut the consumable pages out of this book, you are ready to assemble your *Lots of Science Library Books*. To do so, follow these instructions:

1. Cut each sheet, both covers and inside pages, on the solid lines.

2. Lay the inside pages on top of one another in this order: pages 2 and 15, pages 4 and 13, pages 6 and 11, pages 8 and 9.

3. Fold the stacked pages on the dotted line, with pages 8 and 9 facing each other.

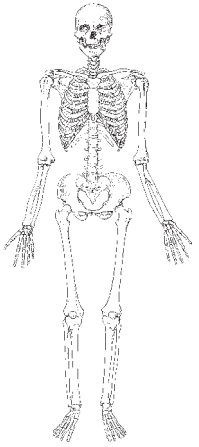
4. Turn the pages over so that pages 1 and 16 are on top.

5. Place the appropriate cover pages on top of the inside pages, with the front cover facing up.

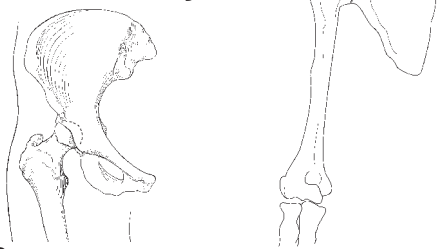
6. Staple on the dotted line in two places.

You now have completed *Lots of Science Library Books*.

What is the skeletal system?



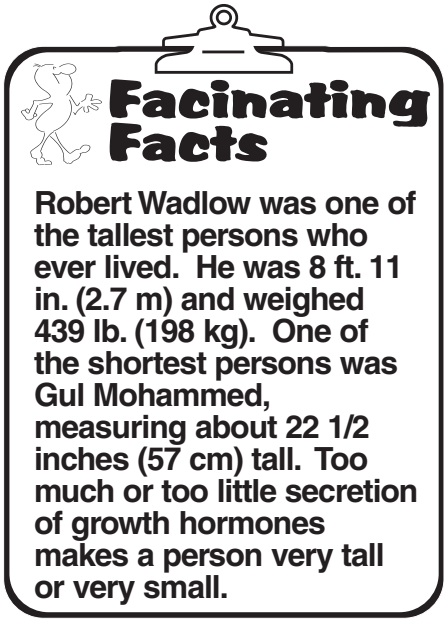
A ball-and-socket joint can be twisted like a computer joystick. It allows movement in many directions and allows rotating movements. The shoulder and hip are examples of ball-and-socket joints.



When you look at a person's body, what do you see? You see the exterior face, hair, arms, and legs. Hidden inside the human body there are incredible systems that work together like magic.

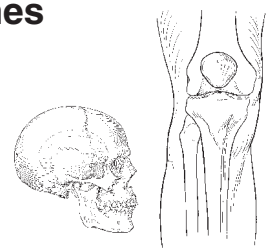
4) All the body's red blood cells and some white blood cells are produced within the marrow of bones. Marrow contains many nerves and blood vessels.

The process by which blood cells are produced is called hemopoiesis.

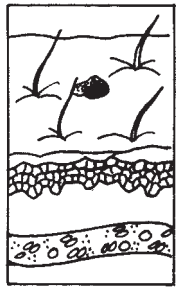


Robert Wadlow was one of the tallest persons who ever lived. He was 8 ft. 11 in. (2.7 m) and weighed 439 lb. (198 kg). One of the shortest persons was Gul Mohammed, measuring about 22 1/2 inches (57 cm) tall. Too much or too little secretion of growth hormones makes a person very tall or very small.

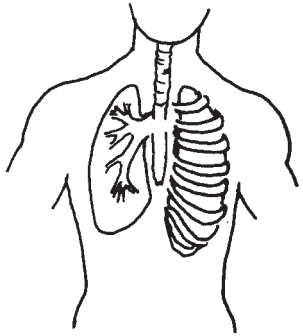
Bones are connected to other bones. The place where two bones meet is called a joint. Joints allow bones to move in certain directions. Some bones move freely, such as the hip and knees; other bones are fixed, such as the skull.



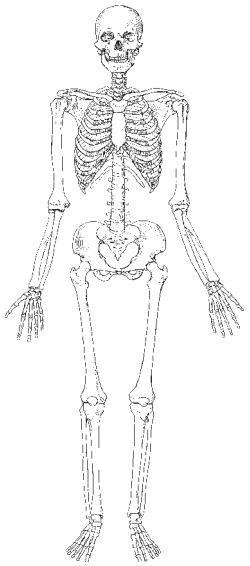
Cells are the building blocks of the human body. Groups of similar cells make up tissues. Groups of tissues that work together are called organs. Cells, tissues, and organs make up the systems in the human body.



2) The skeleton protects internal organs such as the heart, lungs, and brain.

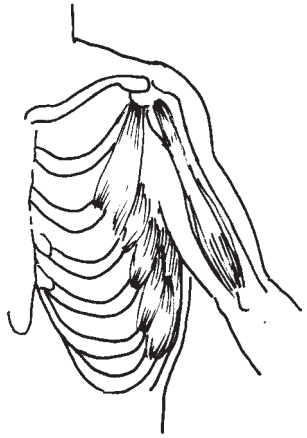


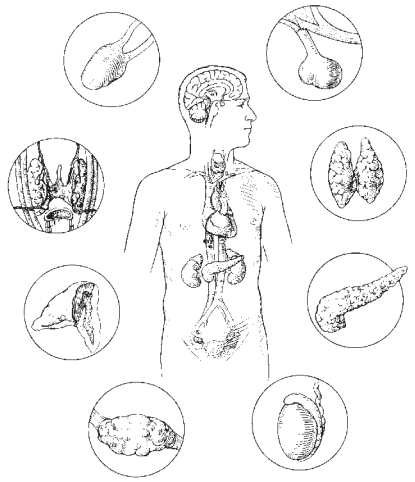
Ribs protect the heart and lumgs.



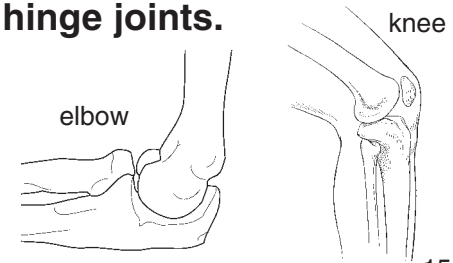
This framework of bones is called a skeleton. All the bones and cartilage of the human body make up the skeletal system. Cartilage is similar to bone, but cartilage does not contain the mineral compounds found in bone. Therefore, cartilage is not as hard and brittle as bone. Cartilage is firm yet flexible. Your ears and the tip of your nose are made out of cartilage.

3) Bones anchor muscles to provide movement.



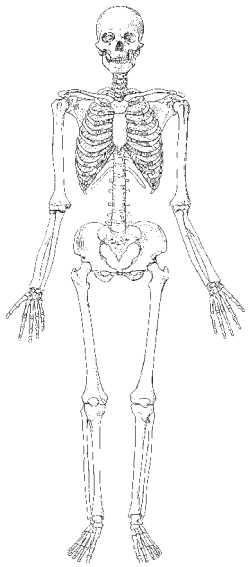


There are two main types of moveable joints: hinge joint and ball-and-socket joint. The hinge joint moves in one direction only. A hinge joint is strong. The elbow and knee are examples of hinge joints.

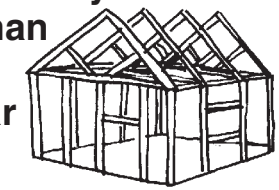


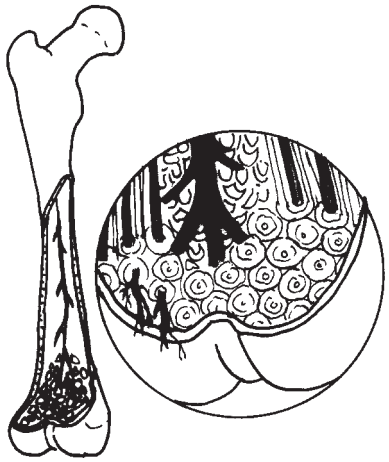
The skeletal system provides four main functions:

1) The bones of the skeleton are arranged in such a manner to give the body shape and support.

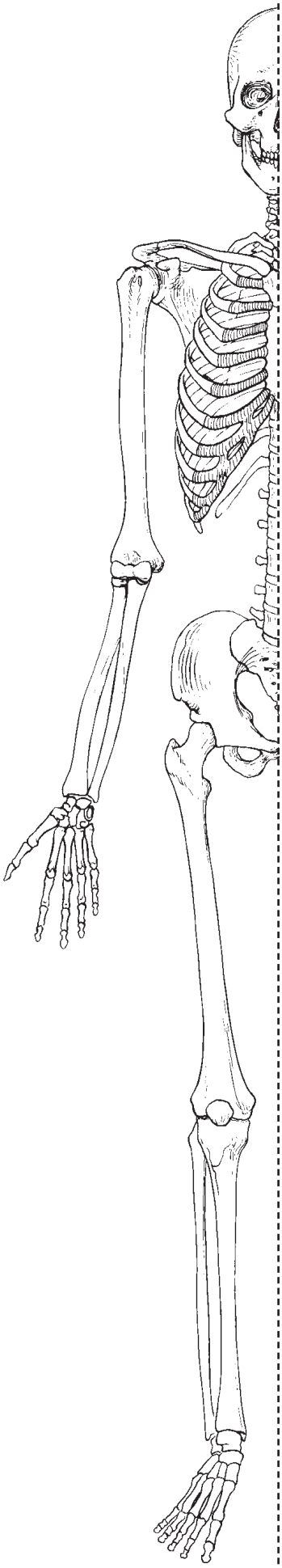


The human body is supported by a framework of bones similar to the framework of a building. Like the beams of a building the size and shape of bones differ depending on their function and location. The human body is more amazing than the most spectacular building.

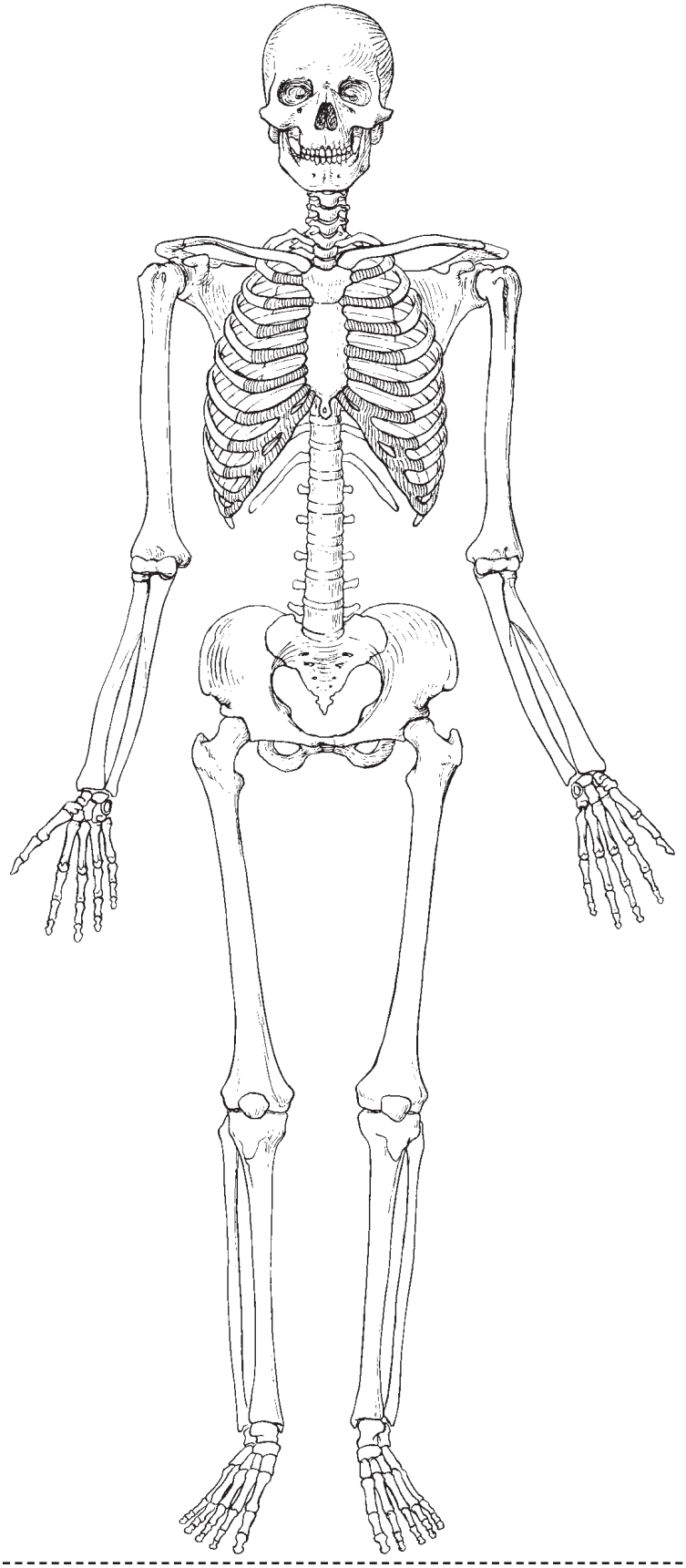




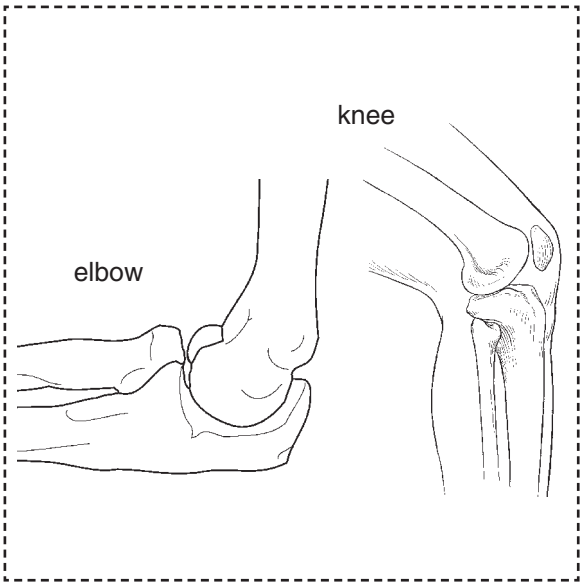
1A



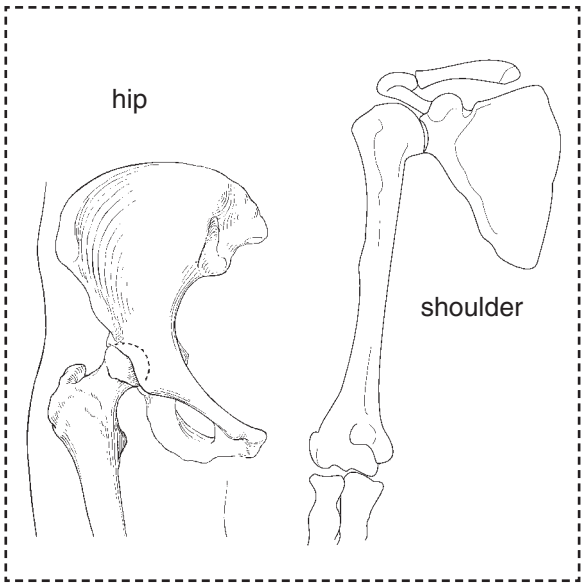
1B



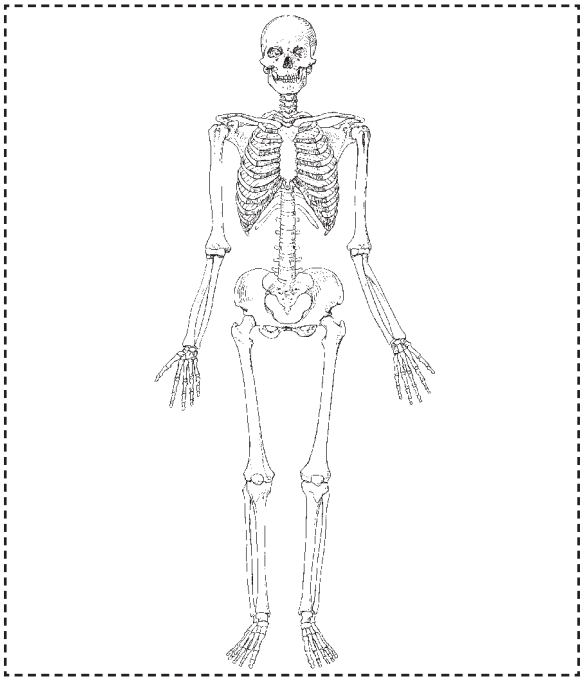
1C



1D



1E



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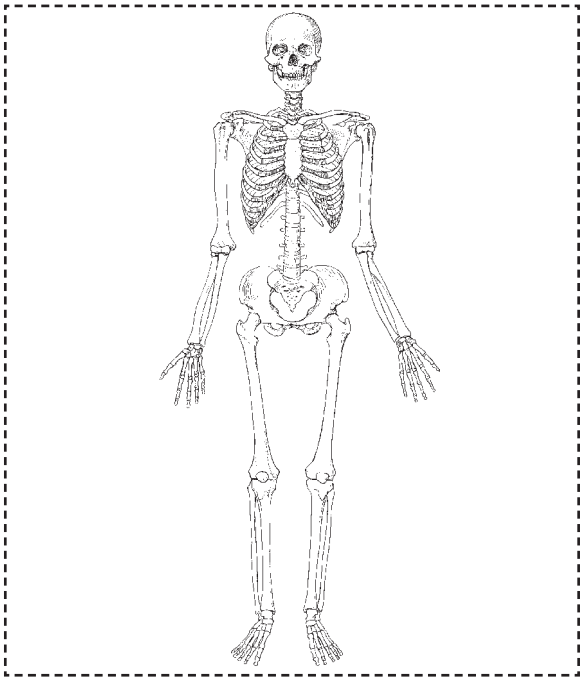
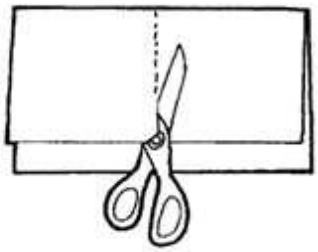


Large Question and Answer Book

1. Fold a sheet of paper in half like a Hamburger. Fold it in half again like a Hamburger. Make a cut up the Valley of the inside fold, forming two tabs.



2. A larger book can be made by gluing Large Question and Answer Books "side–by–side."