

## **Activity: Them Bones**

**Grade Levels: 3-5**

### **Next Gen Science Standards:**

3-LS1-1 Developing and Using Models Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions. Develop models to describe phenomena.

### **Common Core State Standards:**

MP.4 Model with mathematics. (4-ESS3-1), (4-ESS3-2)

4.G.A.3 Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded across the line into matching parts. Identify line symmetric figures and draw lines of symmetry. (4-LS1-1)

W.3.7 Conduct short research projects that build knowledge about a topic. (3-ESS3-1)

W.3.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly. (3-LS4-1), (3-LS4-2), (3-LS4-3), (3-LS4-4)

W.4.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly. (4-PS3-1)

RI.5.9 Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. (5-ESS1-1)

### **Overview of Activity:**

Students will engage in activities that allow them to explore and share information on the human skeletal system, including the names of the major bones, the importance of bones, the design and patterns associated with the skeletal system, and how the human skeleton compares to other vertebrates and invertebrates. At the end of this activity, students will work in competitive teams to name as many bones of the skeletal system as they can.

### **Background Knowledge:**

#### **Factoids:**

- The human skeleton supports the entire body and gives it its shape.
- Your skeleton is made of many bones. Around 206 bones make up the adult skeleton.

- The skeleton itself is less than 20% of the weight of your body.
- An important part of the skeleton is the backbone. A joint is any connection between different skeletal parts.
- Bones in the skeleton come together at these joints and are connected by ligaments.
- There is usually a cushioning material called cartilage in the joint.
- Bones are attached to muscles by tendons.
- The human skeletal system is bilaterally symmetrical.

**Background Information website-** [http://www.kidsbiology.com/human\\_biology/skeletal-system.php](http://www.kidsbiology.com/human_biology/skeletal-system.php) A very comprehensive explanation of everything you need to know about bones before teaching. Easy to read and understand. Includes a video about x-rays.

**Key Vocabulary: (in addition to the names of the major bones)**

**bilateral symmetry-** the property of being divisible into symmetrical halves on either side of a unique plane.

**cartilage-** is a flexible connective tissue in animals, including the joints between bones, the rib cage, the ear, the nose, the bronchial tubes and the intervertebral discs. It is not as hard and rigid as bone, but it is stiffer and less flexible than muscle.

**invertebrate-** an animal lacking a backbone; familiar examples of invertebrates include insects, crabs, lobsters and their kin, snails, clams, octopuses and their kin, starfish, sea-urchins and their kin, and worms. The majority of animal species are invertebrates. The invertebrates comprise about 95 percent of animal species.

**joint-** a structure in the human or animal body at which two parts of the skeleton are fitted together.

**ligament-** is the fibrous connective tissue that connects bones to other bones

**skeletal system-** is all of the bones in the body and the tissues such as tendons, ligaments and cartilage that connect them. Your teeth are also considered part of your **skeletal system** but they are not counted as bones. Your teeth are made of enamel and dentin.

**symmetrical-** having sides or halves that are the same : having or showing **symmetry**.

**vertebrate-** an animal of a large group distinguished by the possession of a backbone or spinal column, including mammals, birds, reptiles, amphibians, and fishes.

**Informative Texts:**

Before and during this activity, students should be exposed to a wide variety of engaging and informative texts. Below are a just a few examples of the many available text resources for

young children.

[Skeleton Inside You](#) by Philip Balestrino, True Kelley (Illustrator)

<http://www.amazon.com/Skeleton-Inside-Lets-Read-Find-Out-Science/dp/0064450872>

[Bones](#) by Steve Jenkins

<http://www.scholastic.com/teachers/book/bones#cart/cleanup>

[You Can't See Your Bones with Binoculars: A Guide to Your 206 Bones](#)

by Harriet Ziefert

<http://www.amazon.com/Cant-Your-Bones-With-Binoculars/dp/1609054172>

[My Bones](#) by Carol K. Lindeen

<http://www.amazon.com/My-Bones-Body-Carol-Lindeen/dp/0736878408>

### **Related Scientific Concepts:**

(See class discussion section for activity related to these concepts.)

5-PS2-1. Support an argument that the gravitational force exerted by Earth on objects is directed down.

4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

### **Related Mathematics Concepts:**

4.G.A.3 The Case of the Missing Bones (Attachment A) – A symmetry activity using the skeletal system.

### **Informational Links Pertaining to Standard(s):**

[www.sciencephoto.com](http://www.sciencephoto.com) This website has AWESOME images! Just search “skeletal x-rays” and browse through to make your selection.

Is the human body symmetrical?(5-PS2-1)

<http://www.livestrong.com/article/445348-what-type-of-symmetry-do-humans-have>

Why are we symmetrical?

<https://blogs.stsci.edu/livio/2012/08/28/why-are-we-symmetrical>

Motivating Children to Read and Enjoy Informational Text

<http://www.readingrockets.org/article/building-world-knowledge-motivating-children-read-and-enjoy-informational-text>

**Writing Informative Text** – a graphic organizer that helps young children learn the process of writing about non-fiction topics from informative texts. (Attachment B)

**Video Engagement for Students:**

Fantastic images in this slideshow with follow up questions. (Printable)

<http://studyjams.scholastic.com/studyjams/jams/science/human-body/skeletal-system.htm>

Cartoon video explaining function of bones. (5 min)

<http://kidshealth.org/kid/htbw/SSmovie.html>

Short video and quiz

<https://www.brainpop.com/health/skeletalsystem/skeleton/preview.weml>

The Skeletal System, video with quiz (7 min.)

<https://www.youtube.com/watch?v=IUP-D4dKp14>

**Interactive Links:**

Skeleton Tutorial, interactive drag and drop games and quiz.

[http://www.sheppardsoftware.com/health/anatomy/skeleton/Skeleton\\_tutorial.htm](http://www.sheppardsoftware.com/health/anatomy/skeleton/Skeleton_tutorial.htm)

Play and learn using the Anatomy Arcade. Several choices of activities.

<http://www.anatomyarcade.com/games/gamesSkeletal.html>

Drag and drop the bones to assemble the skeleton. Drag and drop names of bones to label the skeleton.

[http://www.abcya.com/skeletal\\_system.htm](http://www.abcya.com/skeletal_system.htm)

**Class Discussion:**

**Whole Group Discussion (5-PS2-1)**

How does the bilateral symmetry of the skeletal system relate to the gravitational force of Earth? Explore to discover that the symmetrical design of living things connects to the need for balance and stability in response to the Earth's gravitational force. By nature, we are designed to move in straight motion. Demonstrate by having students stand on one leg. What happens? Why? Have students hold something very heavy in one hand. What effect does this have on your ability to walk in a straight line?

**Writing Activity (4-LS1-1)**

How does the skeletal system support the survival of living things? Choose a vertebrate and re-design its skeletal system by changing the bone structure. Write about a day in the life of your living thing and how it would be affected by those changes. How would it have to adapt in order to survive?

**Extension Activity**

Use the x-rays of animal skeletons in the [www.sciencephoto.com](http://www.sciencephoto.com) library to compare/contrast human and animal bone structure. Discussion question: There is a category for “flowers” but no x-ray images are available. Why?

**Extra Practice and Printable Activities**

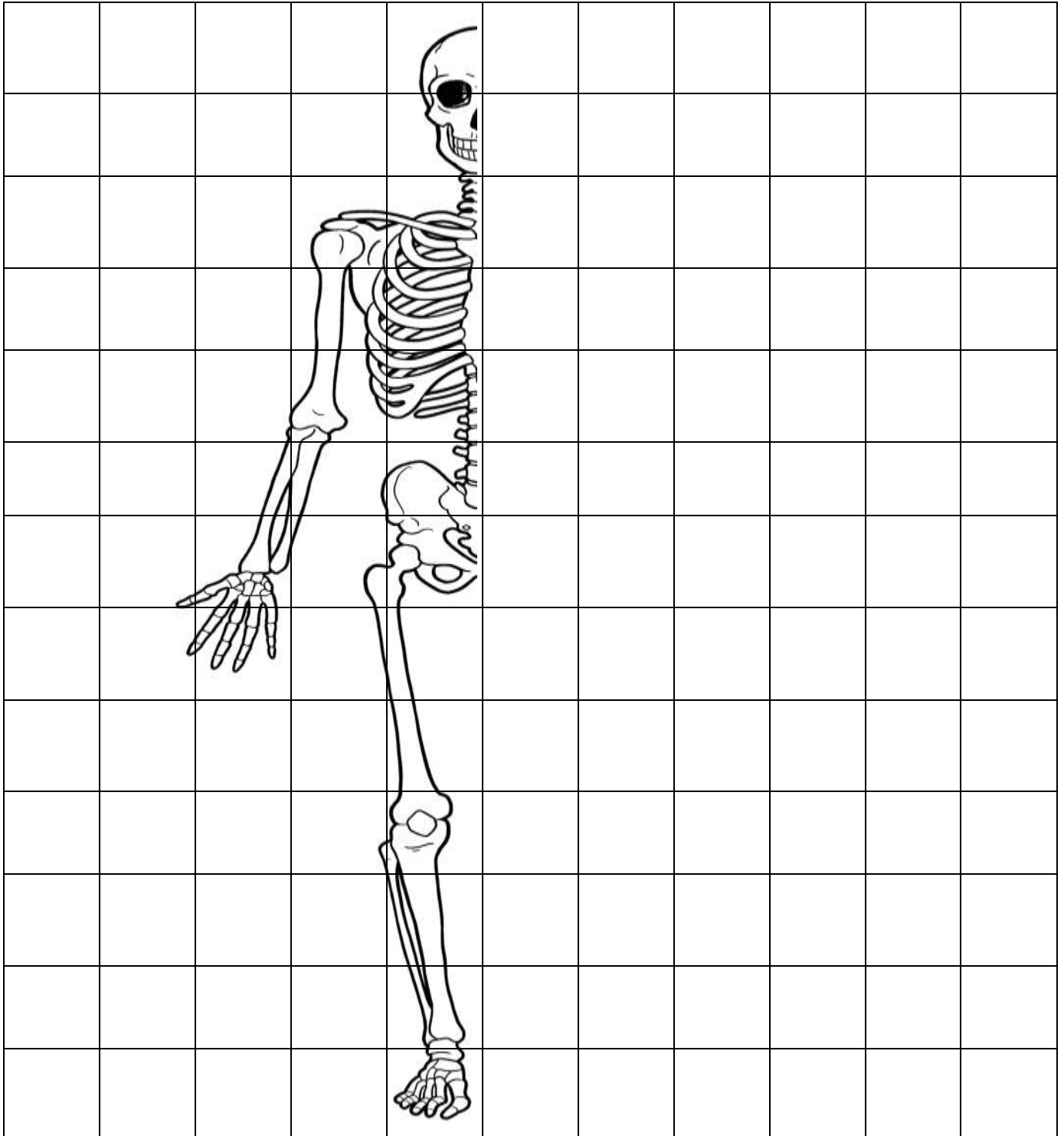
Label the bones, word bank included.(Attachment C)

A more simple diagram of the skeletal system for younger students. (Attachment D)

Name \_\_\_\_\_

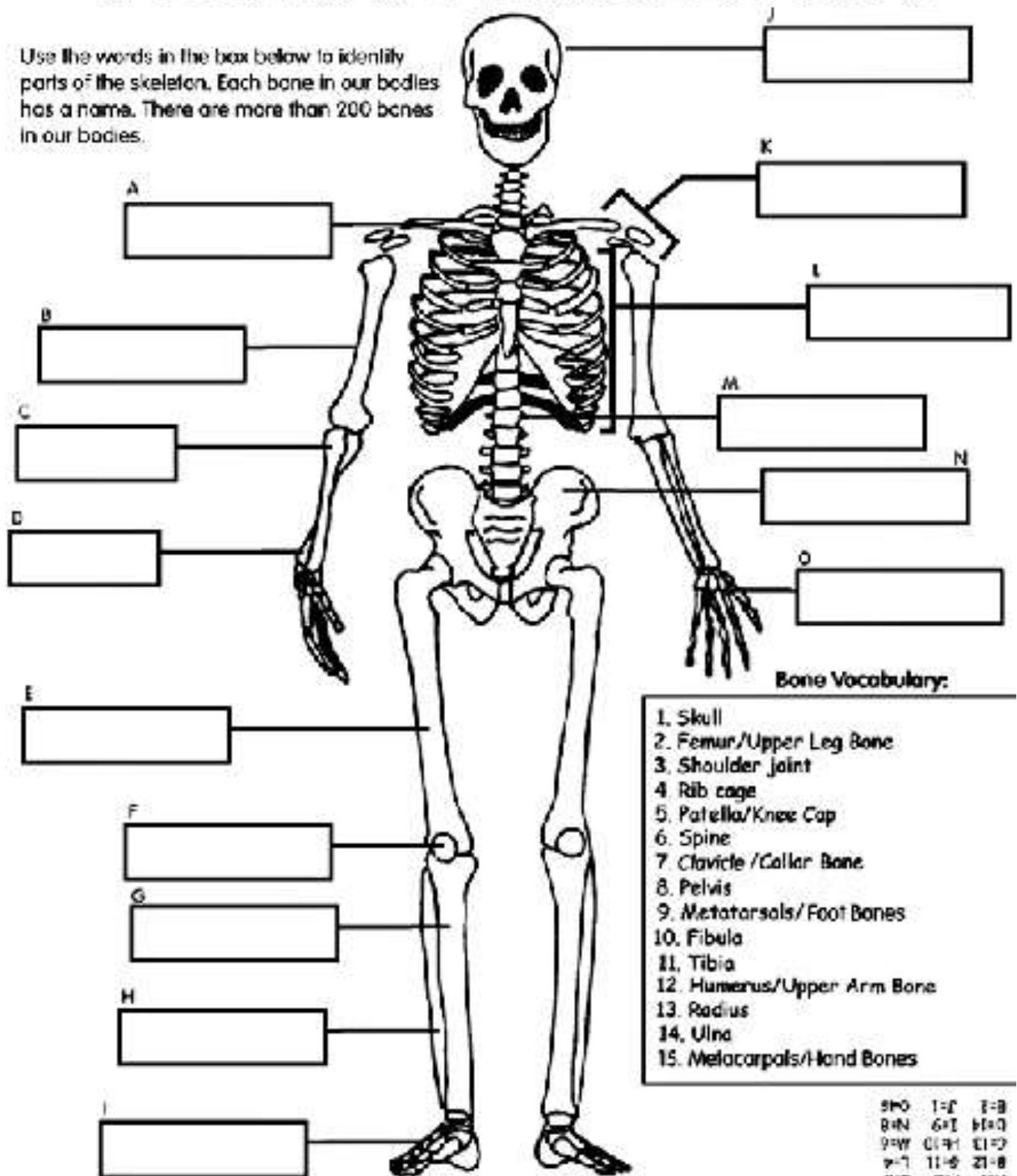
## The Case of the Missing Bones

The skeleton below is missing his other half. Using what you know about the symmetry of the human skeletal system, complete the picture using the gridlines as a guide.



# HUMAN SKELETON

Use the words in the box below to identify parts of the skeleton. Each bone in our bodies has a name. There are more than 200 bones in our bodies.



### Bone Vocabulary:

1. Skull
2. Femur/Upper Leg Bone
3. Shoulder joint
4. Rib cage
5. Patella/Knee Cap
6. Spine
7. Clavicle /Collar Bone
8. Pelvis
9. Metatarsals/Foot Bones
10. Fibula
11. Tibia
12. Humerus/Upper Arm Bone
13. Radius
14. Ulna
15. Metacarpals/Hand Bones

8MO 1-2 3-8  
 84N 64I 440  
 94W 04H 110  
 4-7 11-8 21-8  
 84Z 84Z 24Y

