

# LETTER TO PARENTS

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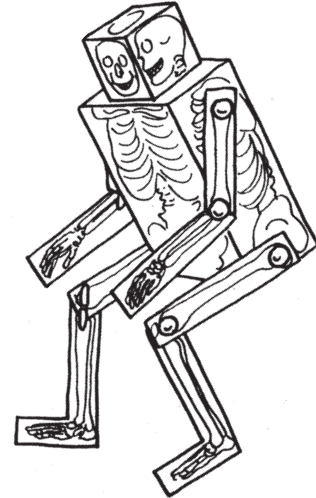
*Cut here and paste onto school letterhead before making copies.*

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## SCIENCE NEWS

Dear Parents,

Our class is beginning a new science unit using the **FOSS Human Body Module**. In this unit your child will investigate the basic structural systems of his or her body, which include the skeleton, joints, and muscles, and the ways these systems work together to provide movement and coordination. This is an exciting unit for students. Over the next 6–8 weeks they will engage in thoughtful investigations exploring bones, building skeletons, making models, and testing their responses to sensory stimuli.



Your child’s interest in the structure of the human body can be increased by asking about the investigations at school and by providing additional experiences at home. Investigate a turkey or chicken bone, or dissect a chicken wing to expose the muscles, bones, tendons, and ligaments. Has a family member had an X ray taken recently? Ask for the X ray; your child will enjoy examining it and sharing it with the class. Physical activity is a great way to increase awareness of the human body. Encourage a game of Bone Tag or Twister. Last, but not least, visit the library to check out some great books.

Watch for the Home/School Connection sheets I will be sending home with your child from time to time. These suggest ways for the whole family to look more closely at the structure of the human body and its wonders.

We are looking forward to many weeks of exciting investigations of the human body. If you have any questions or comments, or have expertise you would like to share with the class, please drop me a note.

Comments \_\_\_\_\_

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## PROJECT IDEAS

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- Research a joint disease such as arthritis or bursitis. Discuss what part of the skeleton is affected by these diseases.
- Think about life with certain joints immobilized. Research what kind of compensation is needed in order to perform everyday tasks.
- Increase disability awareness. Students and teachers with disabilities have difficulty getting around classrooms. Design an accessible classroom to help a teacher or student who uses a wheelchair take part in all classroom activities.
- Find out about artificial joints. Interview an orthopedic surgeon or someone who has had a joint replaced.
- Bring an X ray in from a doctor's office. Explain what bone is pictured, where it is located in the body, what other bones connect to it, and what the X ray shows.
- Career focus: Interview a doctor, nurse, X-ray technician, or physical therapist.
- Write a letter to the Arthritis Foundation or the Muscular Dystrophy Foundation.
- Investigate the skeletal system of an animal and make a poster.
- Research gymnastics and the flexibility of gymnasts' muscles and joints.
- Research the protective gear children wear to play sports or perform an activity like riding a bike or skateboard.
- Explore the specialized skeletons of animals with exoskeletons.
- Astronauts experience muscle and bone atrophy while in space. Research the measures taken to prevent the loss of bone and muscle tissue.
- Research strains, sprains, and cramps.
- Dissect a chicken or turkey wing.

Name \_\_\_\_\_

Date \_\_\_\_\_

# PROJECT PROPOSAL

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**1. What is the question or the project that you are proposing?**

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**2. What materials or references will you need to complete the project?**

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**3. What steps will you follow to complete the project?**

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Name \_\_\_\_\_

Date \_\_\_\_\_

## PRESENTATION GUIDELINES

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You will have exactly 3 minutes to present your project to the class. In those 3 minutes you should answer these questions.

- What were you trying to find out (your question)?
- What materials or references did you need to do your project?
- What procedure did you follow to complete your project?
- What did you learn from doing your project?

When you begin speaking, you will see the *green card* held up for 2 1/2 minutes. When you see the *yellow card*, you have 30 seconds left. When you see the *red card*, it means you can finish your sentence, but you must stop within the next few seconds.

Practice your presentation so you will be sure it is at least 2 1/2 minutes long, but not more than 3 minutes long. Be sure you have included all of the information asked for above.

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Name \_\_\_\_\_

Date \_\_\_\_\_

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Name \_\_\_\_\_

Date \_\_\_\_\_

## **MATH EXTENSION—PROBLEM OF THE WEEK**

### **INVESTIGATION 1: BONES**

An after-school science club was studying owls. They discovered that owls live longer in captivity than they do in the wild. The barn owl lives about 16 years in the wild, and it lives three times longer in captivity. How long does the barn owl live in captivity?

Show your work and explain your answer.

The great horned owl lives 12 years less than the barn owl in captivity. How many years does the great horned owl live in captivity?

Show your work and explain your answer.

The great horned owl lives one-fourth fewer years in the wild than it does in captivity. How many years does the great horned owl live in the wild?

Show your work and explain your answer.

Name \_\_\_\_\_

Date \_\_\_\_\_

# MATH EXTENSION—PROBLEM OF THE WEEK

## INVESTIGATION 2: JOINTS

Can you pass your body through a sheet of paper, or even a half sheet of paper?

Cut a standard sheet of paper in a way that lets you pass right through the paper. If you can pass through a full sheet of paper, can you pass through a half sheet of paper?

(The trick is to make a hole in the paper big enough to pass over your body.)

Explain how you found the answer.

What method did you try first? \_\_\_\_\_

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Was your first try successful? \_\_\_\_\_

What did you try second? \_\_\_\_\_

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Was your second try successful? \_\_\_\_\_

Name \_\_\_\_\_

Date \_\_\_\_\_

# MATH EXTENSION—PROBLEM OF THE WEEK

## INVESTIGATION 3: MUSCLES

Weigh yourself.

Use the conversion scale to change pounds into kilograms.

My mass is \_\_\_\_\_ kg.

Bone mass is  $\frac{1}{4}$  of the mass of a human body.

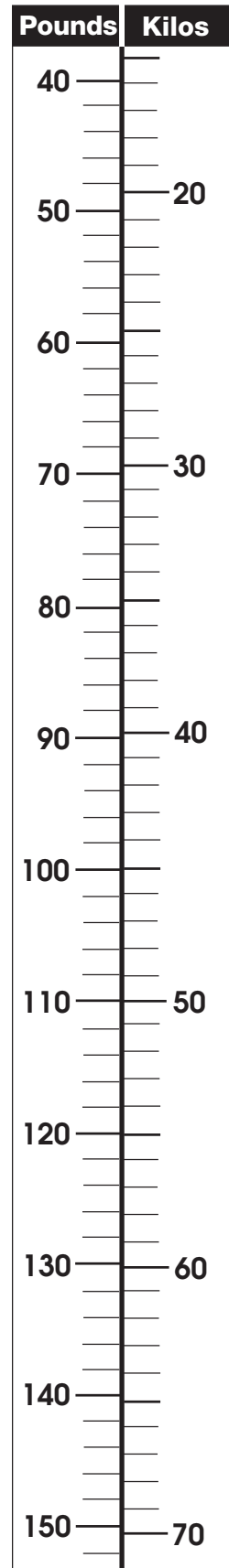
What is the mass of your bones? \_\_\_\_\_ kg

Show how you found out.

Muscle mass is  $\frac{2}{5}$  of the mass of a human body.

What is the mass of your muscles? \_\_\_\_\_ kg

Show how you found out.



Name \_\_\_\_\_

Date \_\_\_\_\_

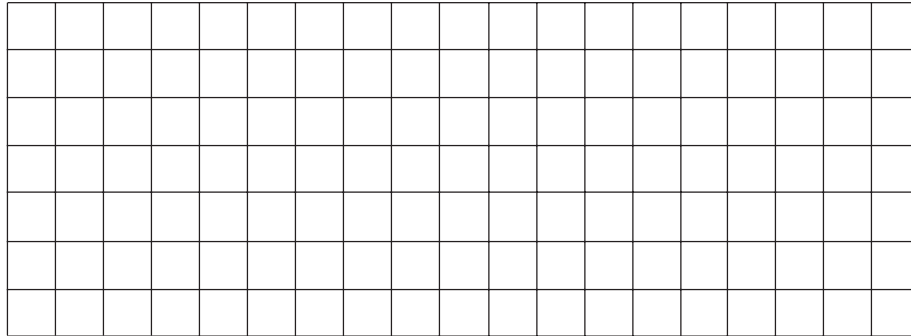
# MATH EXTENSION—PROBLEM OF THE WEEK

## INVESTIGATION 4: COORDINATION

Mr. Crane’s class was testing their arm/shoulder muscle strength by doing chair push-ups. Each student did as many push-ups as he or she could without resting. Here are the results.

Lucy	11	Roberto	15	George	17	Julia	14
Mark	16	Scott	15	Jose	14	Danny	16
Jasmine	15	Lorinda	12	Kalen	14	Maria	10
Sai	19	Miguel	20	Kim	16	Mack	17
Alma	14	Willie	18	Fran	15	Caleb	13

Graph the results.



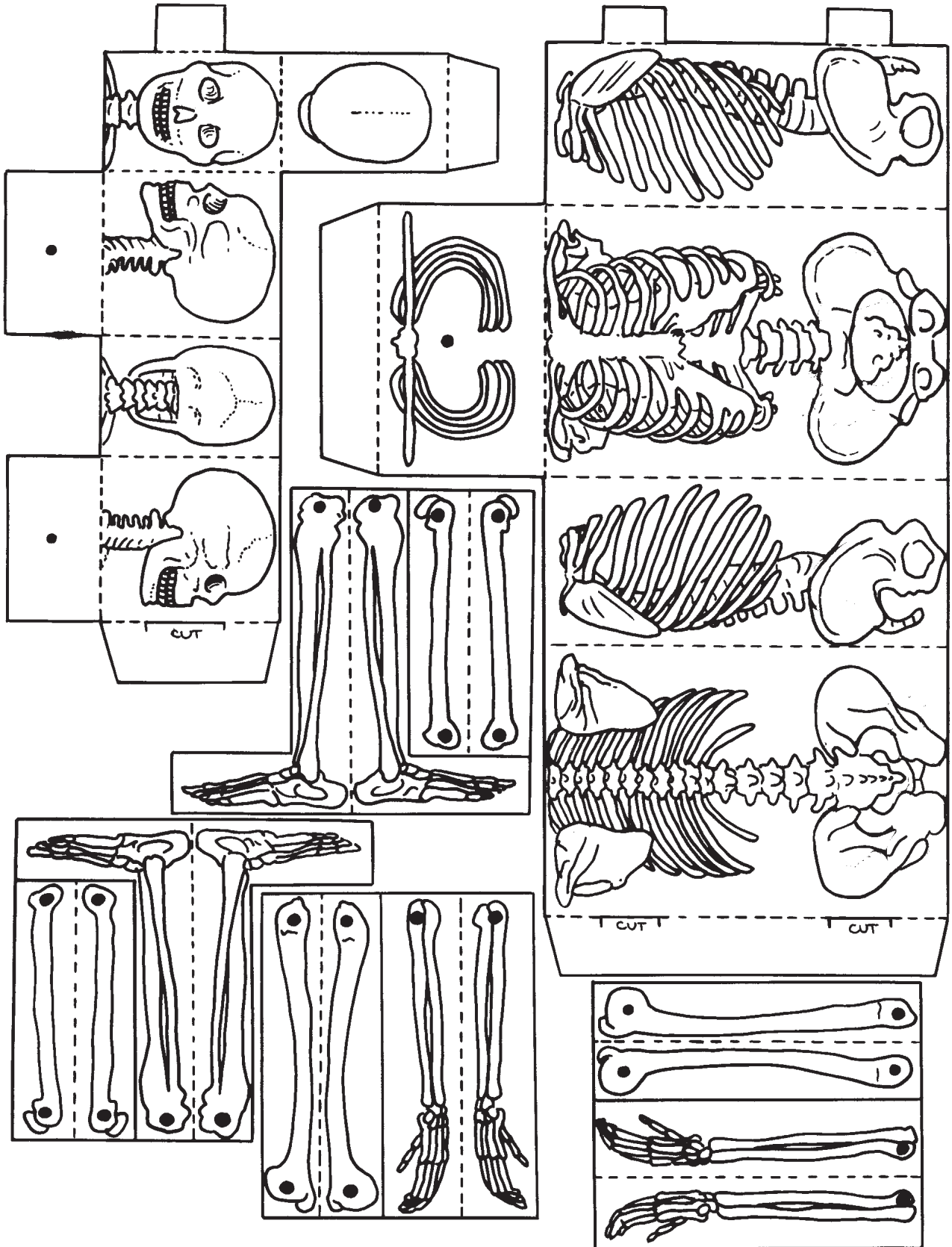
What was the total number of push-ups done by the class? \_\_\_\_\_

Name \_\_\_\_\_

Date \_\_\_\_\_

# HOME/SCHOOL CONNECTION

## INVESTIGATION 1: BONES (page 1)



# HOME/SCHOOL CONNECTION

## INVESTIGATION 1: BONES (page 2)

### Materials

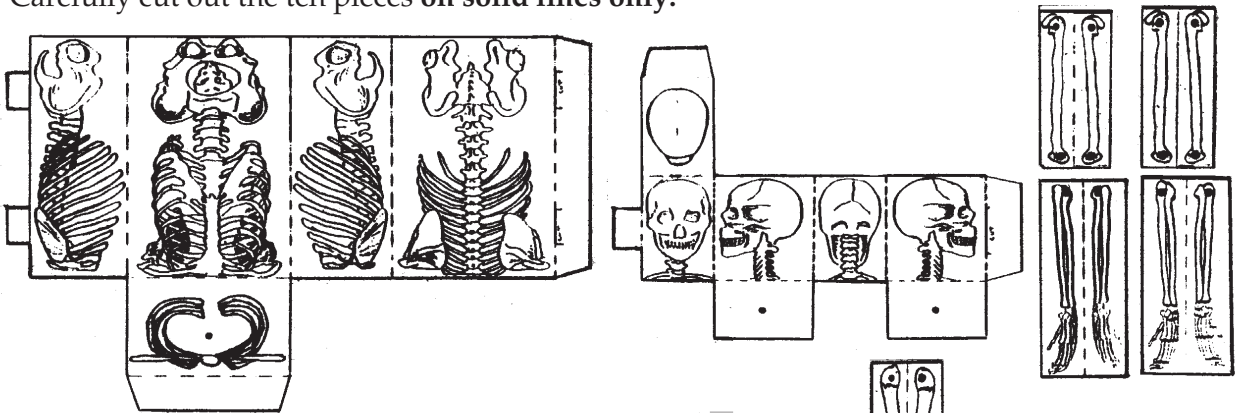
- 1 Bonita parts sheet on card stock
- 9 Paper fasteners, 1/2" long
- Transparent tape

### Tools

- 1 Scissors
- 1 Small nail to punch holes (4-penny)
- 1 Small piece of corrugated cardboard

**NOTE:** The slits for the three tabs must be cut with a mat knife before students start assembly.

1. Trace around each of the ten Bonita pieces with your finger. Carefully cut out the ten pieces **on solid lines only**.



2. Fold along **all dotted lines**. Put tabs into slits. Do not use any tape yet.

- The torso folds into a box.
- The head folds into a box.
- The legs and arms fold in half.

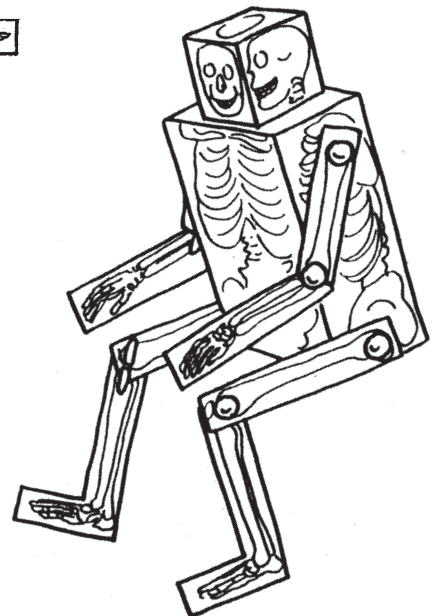
3. Make holes for the paper fasteners. Place each Bonita piece on the cardboard and use a nail to poke a hole through the dark circles. The dark circles mark joints on all but the torso.

4. Attach the head to the torso. Put a fastener through the hole in one tab on the head, then the second tab, and finally the hole in the torso. Fold the head into a box.

5. Attach the legs to the torso. Make sure the kneecap is in the correct place. Put the lower leg inside the fold of the upper leg. This way the knee joint will move like a human knee joint.

6. Attach the arms to the torso. Put the lower arm inside the fold of the upper arm.

7. Use small pieces of transparent tape to secure Bonita's torso and head as little boxes.



Name \_\_\_\_\_

Date \_\_\_\_\_

# HOME/SCHOOL CONNECTION

## INVESTIGATION 2: JOINTS

Living bone is composed of

- **Bone cells** and the blood vessels and nerves that maintain them.
- A **dense matrix** that fills the space between the cells.

It is the dense matrix that we associate with bone. The matrix is hard, strong, and resilient, making bone an ideal material for providing structure and protection.

The matrix is composed of two main materials:

- Mineral salts, mostly calcium phosphate, 65%.
- Long fibers of collagen, a flexible protein, 35%.

To find out more about bones, try this investigation at home.

- Remove all the meat from a cooked chicken wing or drumstick. Wash the bone well, perhaps using a metal scrub pad.
- Let the bone dry overnight.
- Place the bone in a jar. Cover the bone with regular household vinegar.
- In a day or two pour off the old vinegar and replace it with new vinegar.
- Repeat this process of refreshing the vinegar for a week or 10 days.
- Rinse the bone thoroughly with water and check it for rigidity.

What were your results? Describe the bone and what it can do.

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Vinegar is a mild acid. What do you think happened when the bone was put into acid?

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Name \_\_\_\_\_

Date \_\_\_\_\_

# HOME/SCHOOL CONNECTION

## INVESTIGATION 3: MUSCLES

Try these investigations with family and friends.

### **A SHORTER ARM?**

1. Stand next to a wall.
2. Stretch your arm straight out from the side of your body.
3. Adjust your position until the tip of your middle finger just touches the wall. Don't move.
4. Flex your arm rapidly 20 times—fist to chest, full extension, fist to chest, and so on.
5. Reach for the wall again without moving or leaning.

Were you able to touch the wall? \_\_\_\_\_

What muscles did you use in this exercise? \_\_\_\_\_

**Bones and muscles information:** Vigorously exercising your shoulder muscles tightens the muscles in your back. When this happens, the scapula (shoulder blade) is drawn more toward the center of your back. As a result your reach actually shrinks.

### **A STUCK FINGER?**

1. Place your hand palm down on a table.
2. Tuck your middle finger under your palm.
3. Try to lift each finger one by one.

What happened? \_\_\_\_\_

**Bones and muscles information:** Long tendons extend from the muscles in your lower arm out along the top and bottom of each finger. The middle finger and ring finger tendons are connected on the back of the hand. The result is that the ring finger cannot extend effectively unless the middle finger does the same.