

## ***Bone Density***

### **OVERVIEW:**

In this activity, students will explore bones, focusing on bone density and osteoporosis. Students will identify and recognize risk factors and provide recommendations for the prevention of this bone disease. Additionally, students will create visual displays about osteoporosis and share them with the community.

### **CONCEPTS:**

#### **National Science foundation Standards:**

#### **Standard C: Life Science (Structure and Function in Living Systems)**

- Cells as the fundamental unit of life.
- Levels of organization in living systems for structure and function, e.g., cells, organs, tissues, organ systems, whole organisms, and ecosystems.
- Life functions in cells.
- Specialized cells, tissues, and organs and their functions.

#### **Benchmark 6: The Human Organism**

##### **A: Human Identity**

- Like other animals, human beings have body systems for obtaining and providing energy, defense, reproduction, and the coordination of body functions.

##### **C: Basic Function**

- Organs and organ systems are composed of cells and help to provide all cells with basic needs.

### **OBJECTIVES:**

#### **Students will:**

- Define osteoporosis and bone density
- Compare and contrast the relationship between osteoporosis and bone density
- Visually represent the recommendations for the prevention of osteoporosis
- Identify the risk factors and tips for prevention of osteoporosis

### **PROCEDURES:**

- Allow 1.5 to 2 hours to present the background information and to complete the activity.
- Present the background information to the students.
- Complete the activities (Part A): “Bone Study” and “Prevention tips for Osteoporosis”
- Follow up the activity with the discussion questions. (see Part B) These questions may be used as an assessment.

### **MATERIALS:**

- Background information: Bone Density and Osteoporosis
- Brochure: *Osteoporosis Screening. Are you at risk? Be screened today!* (or a comparable brochure from the local Health Department.)
- X-rays showing bones affected with osteoporosis
- X-rays of healthy bones

## **BACKGROUND: Osteoporosis**

Osteoporosis is a bone disease that reduces the strength of your bones, causing them to become brittle and prone to fractures. It is a disorder that decreases bone mass. Bones affected by the disease lose calcium and become porous, brittle, and are more likely to break.

Osteoporosis can lead to pain, height loss due to backbones that curve forward, or fractures.

The best way to protect you from the effects of this disease is early detection using a bone density screening test. The test is simple and painless; it is a noninvasive procedure that x-rays the heel or on the elbow. It is a very short procedure that takes approximately 30 seconds. The test will expose you to very little radiation, which is considered insignificant, because it is less than a tenth of a chest x-ray. You do not need any special clothing while taking the screen test. The test measures your bone mineral density, (BMD), bone mass, and compare that number with a reference population whose age, sex, and racial background are similar to yours.

Most women get scanned for this disease by the age of 45. Approximately 50% of women after the age of 50 have osteoporosis and are at risk of an osteoporosis-related fracture. Women who are postmenopausal are at risk of osteoporosis. The presence of any of these factors can add to your risk:

- Increasing age
- Caucasian or Asian descent
- Thin or small build
- Previous fracture
- Family history of Osteoporosis
- Early Menopause (before age 45)
- Smoking
- Inactive lifestyle
- Certain medications (including steroids and thyroid hormones)
- Alcohol abuse

## **Work Cited**

University of Kentucky, Chandler Medical Center, *Osteoporosis Screening.....Are you at risk? Be screened today!*

## **ACTIVITY:**

### **Part A:**

**Activity 1:** A Bone Study: Comparing x-rays of a person with healthy bones to a person with bones

- Allow time for students to read the brochure.
- Allow time for students to see the x-rays of healthy bones and the bones affected with osteoporosis.
- Have students compare and contrast the x-rays.
- Discuss thoughts and ideas with the class.

## Activity 2: Prevention Tips for Osteoporosis

### Material:

- Poster board
- Art materials (markers, rulers, crayons, colored pencils, etc.)
- Recommendations from the National Osteoporosis Foundation

The National Osteoporosis Foundation recommends the following steps to prevent osteoporosis.

- Get your daily recommended amounts of calcium and vitamin D.
  - Engage in regular weight-bearing exercise.
  - Avoid smoking and excessive alcohol.
  - Talk to your doctor about bone health.
  - Have a bone density test and take medication when appropriate.
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- Design a poster (or skit, rap, power point presentation, poem, public service announcement) to support the recommendations of the National Osteoporosis Foundation.
  - The poster should highlight the dos and don'ts as well as risk factors.
  - Display posters and/or present the other options at a public event (community church, Wal-Mart, cooperative extension office, etc).

### Part B:

**Ask the following questions and allow time for class/ group discussion.**

#### Share:

What is osteoporosis?

#### Process:

How is bone density measured? What is the relationship between bone density and osteoporosis?

#### Generalize:

What are the concerns for someone who has osteoporosis?

#### Apply:

What can an individual do to lessen the chances of developing osteoporosis?