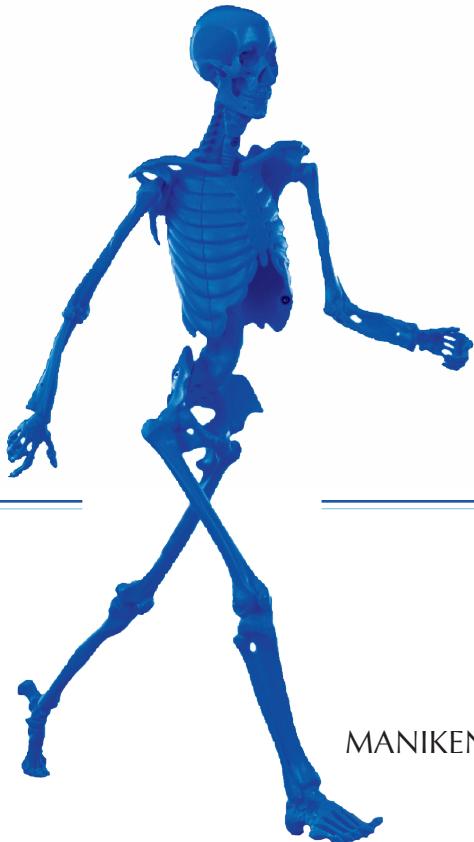


# ANATOMY IN CLAY® LEARNING SYSTEM

*The mind cannot forget what the hands have learned.™*



MANIKEN® Striding Skeleton Model © Jon Zahourek

## May: Arthritis Awareness Month

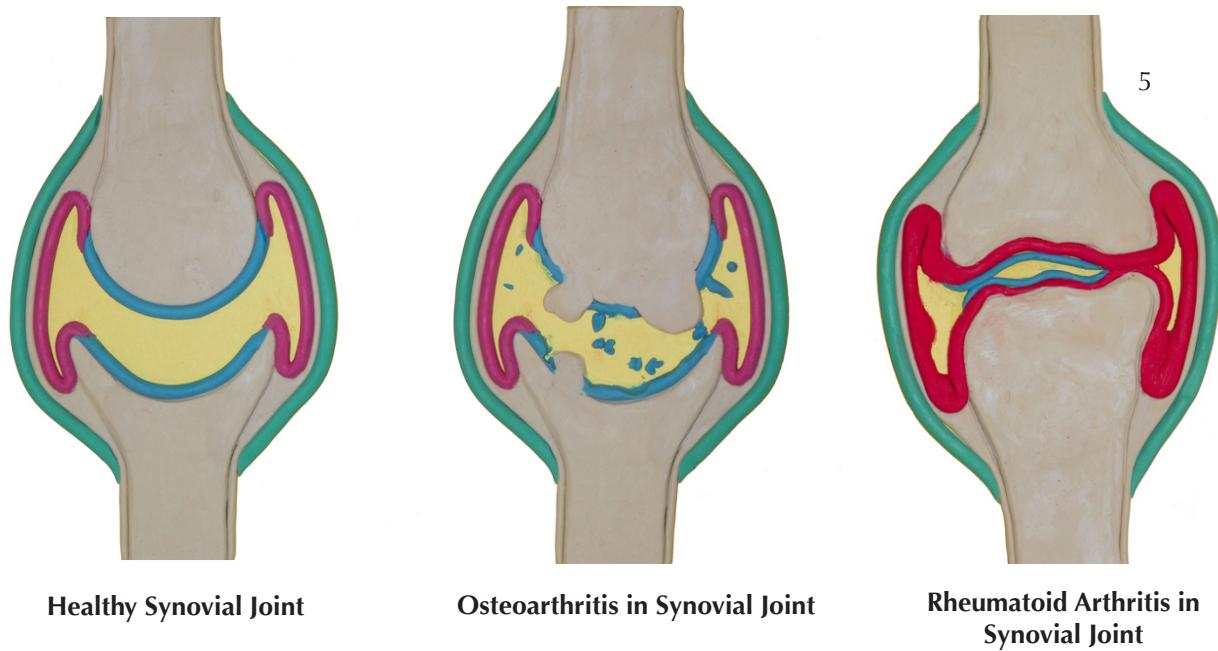
Arthritis is the leading cause of disability in the United States. By 2030, an estimated 67 million Americans will have arthritis - unless the trend is reversed.<sup>1</sup>

In support of America's **Arthritis Awareness Month** in May, we asked Steve Kish, Associate Professor of Anatomy and Physiology at Zane State College, to prepare a lesson using the ANATOMY IN CLAY® Learning System. We hope that teaching students about Arthritis will lead to its prevention.

## Introduction

Arthritis is a form of rheumatism in which the joints of the body may become swollen, stiff, and painful<sup>2</sup>. The two most common forms of arthritis are osteoarthritis (“wear-and-tear” arthritis) and rheumatoid arthritis. Osteoarthritis affects approximately 27 million Americans, most over the age of 65<sup>3</sup>. It is caused by a deterioration of the cartilage found covering the ends of articulating bones. Rheumatoid arthritis is a chronic disease that affects approximately 1.3 million Americans<sup>4</sup>. It is the result of an autoimmune process that attacks the synovial membrane of synovial joints.

## Lesson



**Lesson Length** 45 minutes

**Unit Title** Arthritis

**Skill/Strategy Focus** Identification of synovial joints on MANIKEN® models, Kinesthetic building of synovial joints using clay, peer conversations.

**Overarching Understanding** Genetics, along with personal health choices, affect the structure and function of the synovial joints, impacting quality of life.

**Essential Questions**

- 1) How is knowledge of human anatomy and physiology important in understanding how genetics and personal health choices affect the progression of arthritis?
- 2) How does knowledge of human anatomy and physiology help prevent the progression of arthritis?
- 3) How does knowledge of anatomy and physiology help in understanding the treatment methods available for treating arthritis?

## National Standards Addressed

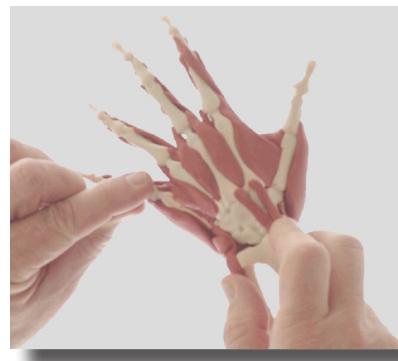
- 1) Demonstrate a working understanding of the anatomy of the synovial joints and how changes in the anatomy based on genetics, behavioral choices, and aging, correlate to health risks.
- 2) Understand the concepts related to the progression of arthritis and the options available to slow the progression of arthritis to enhance overall health.

## Integrate – Building a Synovial Joint

Ask students to follow along with you and build a synovial joint out of clay. Use buff clay for the bones and periosteum, blue clay for the articular cartilage, red clay for the synovial membrane, and green clay for the fibrous joint capsule.

The synovial joints should include:

- 1) Proximal bone of the synovial joint
- 2) Distal bone of the synovial joint
- 3) Articular cartilage
- 4) Synovial membrane
- 5) Periosteum
- 6) Fibrous joint capsule



MidiMANIKEN™ Hand Model  
© Jon Zahourek

## Synthesis/Application- Osteoarthritis – Rheumatoid Arthritis

- 1) Synovial joints are designed with spaces and cushioning between two articulating bones in the form of articular cartilage and synovial fluid. This allows synovial joints to produce a far greater range of motion than fibrous or cartilaginous joints. Ask students to identify all of the synovial joints visible on a MANIKEN® model.\*
- 2) Arthritis is a condition that directly affects the structure of the synovial joints, damaging the articular cartilage, the synovial membrane, and, possibly, the underlying bone tissue. Ask students how changing the structure of a synovial joint could change the function of the joint.
- 3) Explain the differences in the causes of and the progression of osteoarthritis and rheumatoid arthritis. Ask students to describe the signs and symptoms that would become noticeable to the patient as an arthritic condition progressed.
- 4) Ask students to demonstrate the differences between osteoarthritis and rheumatoid arthritis by altering the structure of the synovial joints constructed earlier.
- 5) Reducing pain and restoring mobility are important to the treatment of arthritis. Explain how exercise, weight loss and proper nutrition can help reduce pain and restore mobility. Ask students what other areas of daily life can contribute to the signs of arthritis and what changes can be made to help alleviate them.

\*Enrichment Idea: students can study joint movements with ANATOMY IN CLAY® Learning System's MANIKEN® Range of Motion sets.

- 1) Retrieved on May 4, 2012, from [http://www.arthritis.org/media/newsroom/Arthritis\\_Prevalence\\_Fact\\_Sheet\\_5-31-11.pdf](http://www.arthritis.org/media/newsroom/Arthritis_Prevalence_Fact_Sheet_5-31-11.pdf)
- 2) Tortora, G., and Derrickson, B., (2012). Principles of Anatomy and Physiology, Hoboken, NJ: John Wiley & Sons.
- 3) Retrieved on April 15, 2012, from <http://www.arthritistoday.org/conditions/osteoarthritis/all-about-oa/index.php>
- 4) Retrieved on April 15, 2012, from <http://www.arthritistoday.org/conditions/rheumatoid-arthritis/all-about-ra/what-is-ra.php>
- 5) ANATOMY IN CLAY® work of Steve Kish. © 2012 Zahourek Systems Inc. All Rights Reserved. Photograph use rights authorized through [www.anatomyinclay.com](http://www.anatomyinclay.com)

## Joint Build



### Step One

Start by rolling two pieces of clay out into 5" by 5" circles, each about 1/4" thick.

The entire build was done on yellow construction paper, which will eventually become the synovial fluid.



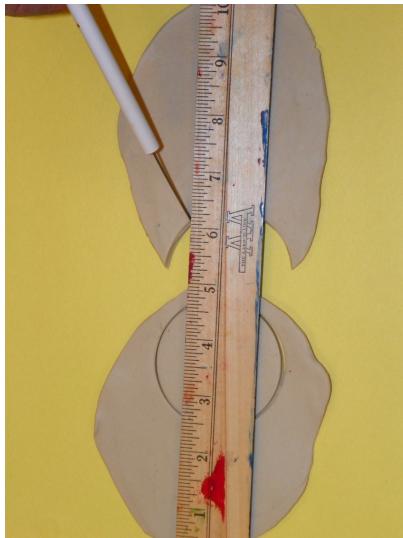
### Step Two

Use a small cup to outline a circle in one piece.

-This will become the proximal bone of the joint.

Use the same cup to cut out a half circle in the other piece.

-This will become the distal end of the bone.



### Step Three

Use a wide ruler to outline the shaft of the proximal and distal bones



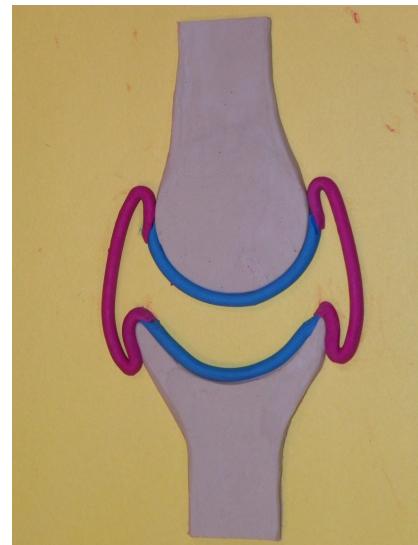
### Step Four

Cut away excess clay to make the general outline of the proximal and distal bones.



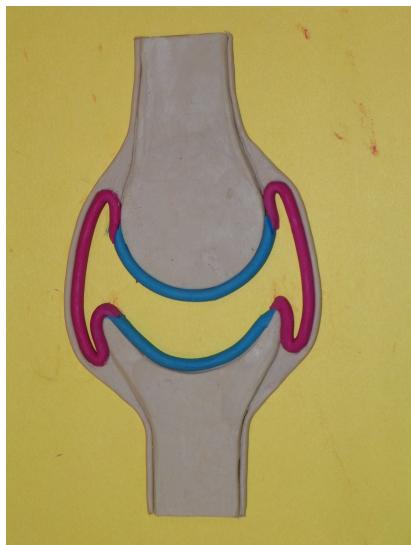
### Step Five

Use blue clay to make the articular cartilage.



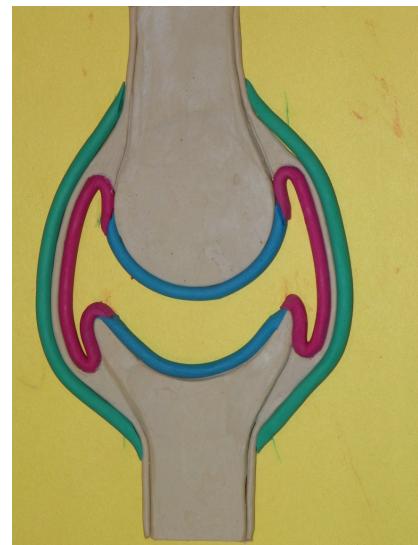
### Step Six

Use red clay to make the synovial membrane.



### Step Seven

Use buff clay to make the periosteum of the bone.



### Step Eight

Use green clay to make the fibrous joint capsule.