

Topics: Anatomy, Skeletal System, Joints

Materials List

- ✓ Articulated action figures toys (e.g. – “Captain Mercury”)
- ✓ Optional: protractor

This activity can be used to teach:

- Joints compared with machines and simple devices (CA Science Standards: Grade 7, 6.h)
- Bones & muscles providing a structural framework for movement (CA Science Standards: Grade 7, 5.c)

Articulated Man

Skeletal Structure, Joints, and Range of Motion



The human body is complicated, with amazing ranges of motion. Explore the difficulties in recreating a life-like body by examining action figure toys.

To Do and Notice (groups of 2-4)

1. Create a table to record observations that lists: doll joint, motion, and comparison to human joint.
2. Examine the motion capabilities of the action figure toy(s) joint by joint. (Suggestion: remove doll clothing in order to examine doll construction more closely.) (Optional: Use the protractor to measure range of motion.)
3. Compare and contrast doll motion to that of humans. Which doll joints move the same as human joints and which joints have different movement? (e.g. – Human heads can turn to look over each shoulder, while most doll heads can turn continuously around and around.)
4. Compare and contrast other features of doll and human. Record observations.
5. Which doll joints function the most like their human joint counterparts? Which are the most different?
6. Looking at structure and range of motion, try to classify joints by type (doll and human). If appropriate, provide the terms Ball & Socket Joint, Pivot Joint, and Hinge Joint to help guide classification efforts.
7. Discuss and record other objects that exhibit similar motion to joint types (e.g. – Door hinges move like elbows and knees).

The Science Behind the Activity

The skeleton contains 206 bones connected at joints (articulations). Scientists classify joints into types by structure and possible range of motion. There are 6 types of movable (synovial) joints: ball & socket (shoulder and hip joints), hinge (elbow and knee), pivot (skull on spine), saddle (wrist), ellipsoid (wrist), and gliding (wrist). Note the complicated wrist joint actually combines 3 joint types. As with any model used in science, discussions of similarities and differences can play a significant role in understanding the real world object. Most dolls are not well articulated and very few have (even limited) functioning fingers or hands (noted exceptions are collectables Fonzie with “thumbs-up” action and G.I. Joe with “Kung-Fu Grip”). In addition to more limited ranges of motion, dolls usually have rigid skin (instead of internal bones) that function as exoskeletons for structural support.

Resources (Visit www.raft.net/more for how-to videos and more ideas!)

For more on the skeleton, see *The Anatomy Coloring Book* (Kapit)

Enchanted Learning has a printable human skeleton page at:

www.enchantedlearning.com/subjects/anatomy/skeleton/Skelprintout.shtml