



Episode title: Ada, the Surgeon & the Headless Skeleton

Episode launch date: July 28

Program name: Build an Articulated Model Hand

Program Magician: Brian Muldoon

Activity Overview

In this activity we will listen to a portion of the BPL podcast [Page Flippers Take on the World](#), and read a section of a book about the human body. Participants will also design and create a functioning model hand that demonstrates how the muscular and skeletal systems work together to help us move.

Learning Objectives

At the end of this session participants will. . .

- Understand that there are multiple systems in the human body that work together
- Understand the role muscles, bones, and tendons play in the human body
- Have a chance to exercise their creative thinking, design, and problem-solving skills

Materials Needed

- A book about the human body with a reading section prepared
- Speaker, and capacity to play a section of **Page Flippers**
- White card stock, drinking straws (paper or plastic), pencils, scissors, tape, yarn or string, and markers

Setup

- Find a well-illustrated book on the human body and identify a section to share about its different systems. Make sure the section makes mention of how the muscular and skeletal systems cooperate.

- Do some basic research on how the human hand works, including what joints and tendons are, and how muscles and bones work together.
- Gather enough card stock, straws, scissors, pencils, tape, markers, and string for the number of participants you anticipate.
- Create a list, display, or small book bundles on the human body for your patrons to peruse.

Podcast Clip

- Find and charge (if necessary) your speaker and the device from which you'll play the **Page Flippers** clip.
- The clip will appear as a "bonus" episode on the podcast feed (you can find it on [Spotify](#), [Apple Podcasts](#), [Stitcher](#), [RadioPublic](#), [Google Podcasts](#), etc.) or you can [preview the clip here](#)

Pre-Project Process

- Gather your physical materials together.
- Welcome the patrons to your program – play some music while they gather and settle in (if you like)
- Start your program with a brief discussion about the body. Ask participants what they know about the body and how it works. Share a few facts about the body (ex. the number of bones in the skeleton, or how fast our hair and fingernails grow).
- Read participants the pre-identified section of the selected book – asking questions of your audience as you go, tying it back to your previous discussion, and highlighting the illustration of the muscular and skeletal systems.

The Project



- Introduce the project by explaining that they will be creating a model hand that actually works similar to a real hand! Ask the participants to name some things they do with their hands, and if they have any ideas about how their hands work
- Have participants trace their hand (or an adult's if they need a larger one) on a sheet of card stock, spreading their fingers apart and making sure to include the wrist. Have them cut the outlined hand out with scissors.
- Ask participants if they know what joints are, then have them bend their fingers, paying attention to how they move and where the joints in their fingers are located. Have the kids place their hand back on top their cut-out hand and make a mark by each joint in their fingers and thumb. They should then fold the fingers in the places where they marked the joints.
- Participants will now have some time to decorate their hand however they like with markers. While they are decorating, start playing the clip from **Page Flippers** – ask some follow-up questions of your audience.
 - What did they notice? What did they find especially interesting?
- When everyone is done decorating, it's time to add the straws or the "bones." Briefly explain what bones do for the body, and have the kids feel for the bones in their hands. Participants should then cut three small straw segments for each finger and two for the thumb. The segments should be small enough to fit in between each joint and be spaced apart enough so the joints can still fold. If the segments are too big, they can trim them until they are the right size. Participants should also cut five larger straw segments to go along the palm and wrist.
- Have participants carefully line up and tape down the straw segments for each finger, making sure they are aligned properly, and that the tape is not covering the ends of the straws.
- Next, it's time to add the strings or "tendons." Briefly explain what tendons are and how they work with bones and muscles. Have the kids flex their hands to see if they can see the tendons in their hands and wrists. Participants will then cut five lengths of string or yarn about twice as long as their paper hand (the one for the thumb can be a little shorter). When all the strings are cut, have the kids carefully feed them through the straw segments of each finger. This can be a little tricky, it helps to wrap a small amount of tape over end of the string to keep it from getting stuck in the straws. Once the string is fed through, tape one end of each string to the tip of the finger, and leaving the other end hanging loose at the wrist. The hand is complete!
- Let the kids explore with their paper hands. Encourage them to try pulling the loose end of each individual string, as well as in different combinations. Challenge them to make different formation with their hands.
- Invite everyone to check out a book from our science section as they pack up and leave.
- Have Page Flipper postcards, flyers, bookmarks, or other handouts on hand to give out to participants.

Resources

- [Link to an overview of basic hand anatomy:](#)

- <https://handinstituteofcharleston.com/conditions-treatments/basic-hand-and-wrist-anatomy/>
- Links to videos demonstrating the model hand project:
 - <https://www.youtube.com/watch?v=Zhd0qMtCcE>
 - <https://www.youtube.com/watch?v=e1c095iTIqs>
- Booklist about the topic and/or associated career
 - <https://www.bklynlibrary.org/search?booklist=574620>
- For more information on the Human Body check out [ScienceFlix](#), available with your library card!

Scaling

- To Scale Younger: Consider instead of making a hand, making a simple small model arm using the same materials. It can have just one bendable joint at the elbow, but still demonstrate the same science.
- To Scale Younger: Consider reading a section of a nonfiction picture book during the program, presenting lots of clear images of the body's systems, and if very young consider adding in a song about the body.
- To Scale Older: Consider going more in depth into the parts of the hand. Including, the different types of bones and muscles, as well as the parts of the hand not represented in the model, such as blood vessels, nerves, and fingernails.
- To Scale for Time: Consider having participants put together just one of their model's fingers and letting them take some string and straws home to complete the rest later, or cutting short the discussion time for each portion of the program.