

Spinal Cord and Nerves

Time: 45 min

In this activity we introduce the basic structure of the spinal cord, spinal nerves and the type of information carried.

Activities:

1) SPINAL CORD and NERVES CONSTRUCTION

SETUP: Have supplies already on tables.

- Each group of two students gets a pair of scissors, two different color pipe cleaners (2-4 pipe cleaners of each color), two cans of different color Play-Doh for every 4 students (two groups working together), and a small pad of post-it notes per 4 students.
- Print worksheets, one per student.

Instructions:

- Review before activity with a few slides going over the spinal cord and the pathways that sensory and motor impulses take. There are two ways to approach this. Either stress the importance of knowing what carries sensory, motor, and both types of info in a spinal cord cross section *before* the activities, or just give super general overview and see if they can make that connection during the activity.
- Make sure students know ahead of time that the color of pipe cleaners used to construct their spinal nerves or roots/rami is meaningful. Perhaps put some leading questions up on a Power Point slide to guide their thinking. Students need to use the different color pipe cleaners to indicate spinal nerves, or motor versus sensory information carried in rami and roots *and* how they differ. They must use the colors consistently.
- Hand out worksheets.
- Have students pair up to work together.
- Have paired students get with another pair to make a group of four so they can share materials.

Worksheets: [spinal cord construction](#)

of TAs: 3

Instructor comments: This is a popular activity with students. Using the colored pipe cleaners and Play-Doh to build the spinal cord really allows them to think through what structures carry sensory/motor info, etc. It is essential to give them some sort of primer regarding colors of pipe cleaners and sensory vs motor information.

SPINAL CORD CONSTRUCTION - WE'VE GOT YOUR BACK!

[Jump to activity description](#)

We're going to do some creatin' today! You will need your lecture notes out for these activities. Use your pipe cleaners, Play-Doh, etc. at your desk to create the following.

1. Craft a spinal cord and associated structures:

Things to think about! Colors you use are important. For example, if you use a pipe cleaner to represent a specific structure then you can't use that same color pipe cleaner to represent a *different* structure.

- For example, if you have a *green* pipe cleaner represent a spinal nerve root, then that *green* pipe cleaner has to be used for *all* spinal nerve roots you present.

Include the following:

- spinal cord "proper"
- conus medullaris
- spinal nerve roots (you don't have to do all - just a few, and you don't have to be as detailed as showing both dorsal and ventral roots)
- cauda equina (you don't have to do all – just a few)
- filum terminale

Questions:

- Ask a TA or a group around you – is your rendering of all of the above correct?
- What is the difference in length between 'regular' spinal nerve roots and those in the cauda equina? Did yours reflect this? Did you use the same or different colors for each?
- At what vertebrae does the spinal cord 'proper' end? What is the tapered end of the spinal cord 'proper' called? What does that have to do with the differing lengths of the spinal nerve roots?

SOMETHING TO PONDER: During fetal development, the spinal cord grows more slowly than the vertebral column. Consequently, the spinal cord shifts higher and higher (more superiorly) into the vertebral column. So, in the adult (e.g., you!) the spinal cord is usually between the first and second lumbar vertebrae (L1 and L2), but newborn babies have their spinal cords going all the way down to L3. Awww...adorable. Moving on!

2. Cross section of spinal cord and nerves:

- choose one color of pipe cleaner to represent *sensory* neurons
- choose one color of pipe cleaner to represent *motor* neurons
- use a small amount of Play-Doh to represent the dorsal root ganglion
- use Play-Doh to denote gray and white matter
- use post it notes to write arrows to show direction of sensory and motor info through:
 - dorsal/ventral roots
 - spinal nerve
 - dorsal/ventral rami

Questions:

- Check with a TA – is your rendering of all of the above correct?
- Which direction did you have *sensory* information going? Hmm...why would it be going *that* way?
- Which direction did you have *motor* information going? Hmm...why would it be going *that* way?
- What type of information (*motor, sensory or both*) is carried by each of the following:
 - ventral roots
 - dorsal roots
 - spinal nerves
 - ventral rami
 - dorsal rami

SOMETHING TO PONDER: If you've had chicken pox — caused by the varicella zoster virus — you have dormant (or latent) little versions of this nasty little virus in your dorsal root ganglion. That's right, these viruses are just snoozing away, waiting for the perfect moment to strike. If the varicella zoster virus does become active, sometimes due to stress, it can cause a rash on the skin in the dermatome of that nerve. This is called shingles (or herpes zoster). It is more common in older people. Chicken pox vaccines as a kid, or a shingles vaccine as an adult, minimizes the risk of getting shingles. But, hey, what's a dermatome?