

RAFT IDEAS

Topics: Anatomy,
Skeletal System,
Vertebrae, Nerves

Materials List

- ✓ Clear portion cups
- ✓ Foam disks, 3 mm - 13 mm ($\frac{1}{8}$ " - $\frac{1}{2}$ ") thick, diameter about the size of the bottom of the portion cups
- ✓ String or wire
- ✓ Hot glue and glue gun or duct tape
- ✓ Drill or craft blade

This activity can be used to teach:

- Body structures and systems (Next Generation Science Standards: Grade 4, Life Science 1-1; Middle School, Life Science 1-3)



Bone Up on the Spine Modeling the Backbone



Modeling the spine can help students understand the function of the disks, the flexibility of the back, and the transfer of information along the spinal nerve.

Assembly (May be done by adult or by students depending on students' abilities)

1. Stack portion cups and drill or cut a ~6 mm ($\frac{1}{4}$ ") hole in the center bottom of each portion cup. Poke a hole in the center of each foam disk. The number of cups and disks depends on the size of the model being built.
2. For each vertebra, hot glue or tape 2 portion cups together, open-ends together.

To Do and Notice

1. Using string or wire, string vertebra together, with a foam disk in between each to create a model of the spine or a portion of the spine.
2. Manipulate the model to see the different ways that the spine can move.
3. Observe how the disk cushions the bones. This cushioning may become less efficient over time after years of repeated compressions.



The Science Behind the Activity

The spine or vertebral column has 24 individual vertebrae, plus fused vertebrae. The vertebral column has 5 regions: Cervical (neck) containing 7 vertebrae, Thoracic (upper back), containing 12 vertebrae, Lumbar (lower back) containing 5 vertebrae, and the Sacral and Coccygeal regions which contain fused vertebrae in the tail region. This structure is the same for all mammals; even the giraffe has only 7 cervical vertebrae. The spine serves 2 main functions: support, for muscles and ligaments connecting to the other main parts of the body, and information transmission through the spinal nerve.

All models are, by definition, only representations of reality or "fakes." Some models are better than others. When discussing the backbone model, discuss how the model is similar to the real spine and how it is different.

Taking it Further

Challenge students to improve the model and explain their improvements. The spine is extremely complex, thus students will have many choices in how to make this simplified model more accurate.

Resources - (Visit www.raft.net/raft-idea?isid=310 for more resources!)

- *The Anatomy Coloring Book* by Kapit and Elson, 1993. Contains high level anatomy information for all parts of the body, plus visuals for students to "color-code".
- Anatomy drawing to print out - www.enchantedlearning.com/subjects/anatomy/titlepage.shtml