RAFT IDEAS

Topics: Biology, Anatomy, Skeleton

Materials List
- ✓ Masking tape
- ✓ Pipettes
- ✓ Water in containers
- ✓ Paper
- ✓ Pens or pencils
- ✓ Zip lock style bags
- ✓ Jars with twist lids
- ✓ Film canister with flip lids
- ✓ Tongs
- ✓ Small objects to transfer (e.g. – pony beads)

This activity can be used to teach:
- Fine Motor Skills & Learning: Curiosity and initiative (Early Education: Desired Results Dev. Profile (DRDP-R, 2010))

Next Generation Science Standards:
- Organisms & survival (Grade K, Life Science 1-1; Grade 1, Life Science 1-2)
- Traits of organisms (Life Science, Grade 3, 3-2; Middle School, 4-4)
- Characteristics & survival (Grade 3, Life Science 4-2, 4-3)
- Body structures (Grade 4, Life Science 1-1)

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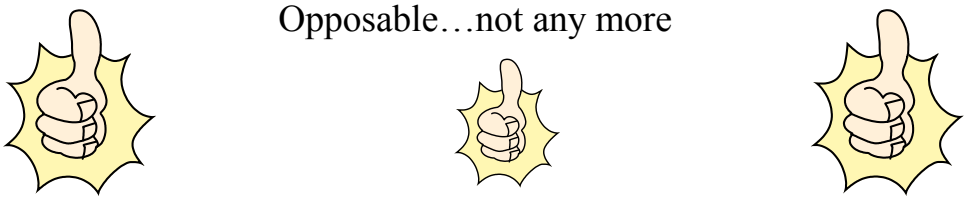
Thumbs Tied

Opposable…not any more



Students tape down their thumbs and attempt normal activities without use of their opposable thumb.

To Do and Notice

1. Use 20 cm – 60 cm (1-2 ft) of masking tape to secure the thumb to the hand. Working in pairs can make this step easier.
2. Ask students to perform simple tasks (Teacher note: Consider setting up the classroom in stations for this activity):
   - Write their name on paper
   - Rip or cut paper
   - Open a small zip lock package
   - Open a twist top jar or film canister
   - Use a pipette to transfer water
   - Transfer small objects with tongs
3. After experiencing life without thumbs, discuss and/or record experiences. Which task was the most difficult? Which was the easiest?

The Science Behind the Activity

The human body is an amazing design in reference to structure and function. Along with the skeleton, muscles and the nervous system, joints are necessary for movement. The well- muscled thumb allows for an extremely wide range of motion, a very strong grip and precision manipulation of objects large and small. Uniquely, humans are able to touch the pads of all fingers with their thumbs. Other primates are not able to do this. The cerebral cortex processes incoming information from the hands and generates appropriate responses for fine motor control of thumb and fingers. The Evolution of the opposable thumb was important to the emergence of modern humans, *Homo sapiens*, and was made possible by the development of an upright, bipedal stance from the previous reliance on all four limbs for walking. Other animals that have opposable thumbs and/or toes are pandas, koalas, and opossums.

Taking it further

- Investigating chicken wings is an inexpensive and readily available way to explore and identify the parts of a joint: bone, tendon, ligament.
- Have older students use more masking tape and a 30 cm (12") ruler or strip of stiff cardboard to stabilize their elbow joint. Ask them to put on their coat/jacket, and then perform 3-4 pre-planned activities (i.e. open a door, write etc).

Web Resources (Visit www.raft.net/raft-idea?isid=435 for more resources!)
For more information on the anatomy and origin of the thumb, visit:
- http://en.wikipedia.org/wiki/Thumb & http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1571064/

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