

Lesson #2 Macro Brain

(Adapted from "Potato Head" Lesson by the Pacific Science Center & Group Health Cooperative Brain Power Curriculum 2000)

Subject area / course / grade level: Science Grade 7-10

Summary: Students are introduced to the macro brain by building models.

Time Needed: 1 Period

Materials:

For "Potato Brain" (Mix dry ingredients first, then add hot water & food coloring. Knead in Ziplock bag)

- 300 ml instant potato flakes
- 360 ml clean sand (Play sand from hardware store)
- 450 ml hot water
- Approx. 4 drops red food coloring
- 1 Gallon Ziplock bag (1 per period)

For Group Brain Models

- Play-doh (many colors)
- Toothpicks for brain labels

For Individual Brain Box

- "Brain Box" worksheet (1 per student) [Download it here!](#)
- Colored pencils (Crayons make it hard to label later).

WASS: (Middle School):

6-8 LS1-C Multi-cellular organisms have specialized cells that perform different functions. These cells join together to form tissues that give organs their structure and enable organs to perform specialized functions within organ systems.

6-8 SYSA Any system may be thought of as containing subsystems and as being a subsystem of a larger system.

WASS: (High School):

9-12 INQA Scientists generate and evaluate questions to investigate the natural world.

9-12 SYSB Systems thinking can be especially useful in analyzing complex situations. To be useful, a system needs to be specified as clearly as possible.

NGSS(Middle School):

MS-LS1-d Design and conduct an investigation to gather evidence to support explanations that the body is a system of interacting subsystems composed of groups of cells working to form tissues and organs specialized for particular body functions, and that scientific advances in understanding of those systems have led to improvements in nutrition, health, and medicine.

NGSS (High School):

HS-LS1-2 Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

CCSS:

RST.6-8.7 Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (model)

What? Making models of the main parts of the brain.

How? In groups & with table partners.

Why? To understand how the brain is organized.

Differentiation:

Pair students in appropriate learning groups to support all learners' needs.

ENGAGEMENT (5 min) SHUT IT OFF

Instruct:



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"I want you to turn-off your brain for 2 minutes. Heads down on the desk." (Wait 2 minutes) "Could you do it? What happened? Why not?" The brain is a complex organ. It controls all of your functions. It helps you process thought, store memories, and regulate your homeostasis..." So what does it look like? How much does it weigh?"

EXPLORATION (15 min) BRAIN MODELS

"Let's make a model." (Make a potato brain in front of the class using volunteers). Pass the model around & discuss: Brain color, weight, texture, differences between preserved & non-preserved brains, and contents of brain (85% H₂O). Pass around the bag so students can feel heft & texture. Students now will make a group model with Play-doh and are required to show the teacher their group model for final assessment.

Instruct:

- In your lab groups:
- Use the link below to **identify** the main parts of the brain.
- <http://faculty.washington.edu/chudler/lobe.html>
- With different colors of Play-doh **model a brain**.
- Use toothpicks and strips of paper to **label your brain**.

SUGGESTION: Save a few models from each class to add to a "Brain Museum" Display case for the school. Other artifacts from the unit can be included as well.

EXPLANATION (15 min) MY BRAIN BOX

- Teachers will pre-color the key on the Overhead/Document camera copy of the "Brain Box." (Intentionally select colors to match your engineering model built in Lesson 6. We used purple, pink, green, yellow, orange)
- Each student receives the "Brain Box" worksheet along with the following resources for identifying the functions of each area:
["Lobes of the Brain" from Neuroscience for Kids](#)
["Functional Division of the Cerebral Cortex" from neuroscience for Kids](#)
["The Brain Right Down the Middle" from Neuroscience for Kids](#)

Instruct:

- Working with your table partner but using your own worksheet:
- LOOK-UP at the board...
- Use colored pencils to copy the "key" for the Brain Box.
- Write your name under "MyBrainBox"
- Color in your parts of the brain on your Brain Box. (Make sure they match mine).
- Use the link below to **identify** the main functions of the different parts of the brain.
- Label the parts of your Brain Box with the functions of each area.
- Cut out your Brain Box following the dotted lines.
- Fold on the straight lines to form a box.
- Tape the box together (MAKE SURE everything is done before you tape it).

SUGGESTION: Store Brain Box models for students to use in future lessons. When done using models let them keep them or hang them for decoration.

ELABORATION (10 min) LEARNING BRAIN

- Talk about the "Sensory Brain" by asking students to close the seven openings to their brain. (Eyes, ears, nostrils & mouth). Discuss how we learn primarily from our senses. Discuss infant/child development to gather evidence of sensory learning.



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- Ask students if they can think of a time when they do not make decisions during their day. Ultimately, they realize they are always making a decision.
- Conclude with discussion that the different parts of the brain must communicate with other parts/systems.

EVALUATION (On Going)

- Students will use their brain Box models in future lessons

