Science Behind the Story
Are Bigger Brains Better? (A Brain Facts Story)
(1st – 6-7yrs)

We know that our brains are in our heads and we also know that some heads are bigger than others. In this story we will "look" to see if animals with bigger heads have bigger brains and if bigger brains are better.

- Animals brains are designed to help them do behaviors that they need to do to stay alive. The more behaviors an animal does, the bigger brain they need to do these behaviors.

  As the behaviors of animals change, in response to environmental challenges, the size of some areas reflects the increases in the complexity of the behaviors (Finlay and Darlington, 1995). The cerebral cortex, in particular, increases in size (Hofman, 1988).

- We will compare the behaviors that animals do to stay alive, along with their head and brain sizes.

  There are parts of the brains of animals that help us to stay alive. These areas are fairly consistent in size across various mammals (Krubitzer and Seelke, 2012).

- At some point, the brain does not get bigger, it gets bumpier.

  The weight of an animal's brain does not necessarily correspond to the number of behaviors that an animal is capable of doing (Breedlove, 2017).

  In order to accommodate the amount of brain cells and the thickness of the cortex necessary to produce all the behaviors of human do, there is an increase in the folding of cerebral cortex (Mota, 2015; Striedter, 2015).

- Bumpier is better than bigger in allowing animals to do more and more complex behaviors – but, keeping smaller heads.

  Given the constraints of child birth and the birth canal in humans (Fischer, 2015), a smaller head size is advantageous.

  Animals which are bipedal typically need to have smaller heads in order to maintain balance (Rosenberg, 1995). This also makes having a smaller head advantageous.

National Education Standards:
Next Generation Science Standards

- Crosscutting Concepts:
  - **Structure & Function:** The way an object is shaped or structured determines many of its properties and functions.

        - The shape and stability of structures of natural and designed objects are related to their function(s).
    - **Cause & Effect:** Events have causes, sometimes simple, sometimes multifaceted. Deciphering causal relationships, and the mechanisms by which they are mediated, is a major activity of science and engineering.
        - Events have causes that generate observable patterns.
    - **Patterns:** Observed patterns in nature guide organization and classification and prompt questions about relationships and causes underlying them.
        - Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.
- Related Grade Level Content
    - Molecules to Organisms: Structures and Processes

References:

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