MA: Emergence Project

Thursday, October 4, 2018 8:12 AM

The pieces that are required to be turned in are as follows:

1. **A 3-5 minute video uploaded to flipgrid and you need to enter a title for your video**

   Here is a link to our grid https://flipgrid.com/3db34bb3

   Here are the instructions to upload your video How to Upload a Custom video

2. **Submit a script for your video to the Canvas assignment**
3. **Submit citations to the Canvas assignment (can be same document as script)**

   Citations need to include a link and a brief description of the source (why it was useful, what info you got from it)

From <https://eastsideprep.instructure.com/courses/2608033/assignments/23722129>

Life is an *emergent property*. That is, organisms are complex systems with countless interdependent parts that all contribute to the condition we recognize as *life*. An organism's ability to stay alive arises from many sub-systems working together to conduct metabolism; sense and respond to stimuli; grow, develop and reproduce; and maintain homeostasis. Each of life's characteristics can also been seen as an *emergent property*. In humans, these emergent properties depend upon an amazingly synchronized:

- digestive system
- circulatory system
- nervous system
- endocrine system
- muscular system
- skeletal system
- immune system
- reproductive system
- integumentary system

Each of these systems can also be said to have *emergent properties* that arise from specialized organs like the heart, the kidney or the skin, working together. If we zoom down further, each organ demonstrates *emergent properties* stemming from the different tissues that make it up. Broadly speaking, there are four types of tissue:

- nerve tissue
- muscle tissue
- connective tissue (bone, tendon, ligament, blood, fat, etc.)
- epithelial tissue (linings like the insides of blood vessels, outer skin layers, glands, etc.)

Tissues are organizations of specific cells that work together to give them emergent properties and cells are organizations of molecules that give *them* emergent properties. Your next major assignment is a deep dive into, you guessed it, *emergent properties*.

Your task is to create a video or narrated PowerPoint that presents the molecules, cells, tissues, organs and organ systems that work together to make possible one of life's emergent properties. You may choose a topic or have one assigned to you. If you wish, you may look more deeply into one of the topics written about in a "Making a Living" page or pursue another interest. You may look at an "every day" characteristic of life or something that allows for extreme survival under atypical conditions. Your topic may focus on an organism other than humans but it must have identifiable organ systems. Once you have a topic, you should frame it as a research question like:

- How do we heal from injury?
- How are some people able to free dive hundreds of feet underwater on one breath?
- How do our bodies develop as we age?
- How have some people adapted to life at high altitude?
- How do we recover from an infection?
- How can super athletes meet the demands of extreme physical exertion?
- How do we maintain a proper blood sugar level?
- How can we survive without food or water for extended periods of time?
- How do we respond to physical threats or emotional stress?

What emergent property would *you* like to learn about? The most important part of doing a research project like this is to choose a topic that is interesting to you. Your teacher can help you formulate a research question from your topic of interest.

A detailed rubric will be posted but your presentation should:

- demonstrate an understanding of the concept of emergent properties
- describe one or more organ systems that coordinate to allow the organism to stay alive.
- describe in detail the structure and function of at least one organ.
- describe different tissue types found in the organ mentioned
- describe, in detail, at least one type of cell.
- describe at least one associated protein
- describe other molecules involved in the system