Katie Porter: Sequencing for Cmap project

The sequencing of the Integrated II course is put in the most logical order based on previous knowledge and content standards. The first unit teaches students how to think like scientists. They spend quite a few blocks working in teams to develop cooperative learning skills as well as critical thinking skills. They share data and ideas with classmates, just as scientists would in a lab setting. They also review graphing skills, dissect words to see how word parts denote scientific meaning, and distinguish between independent and dependent variables. Through this, they will have reviewed previously learned skills and built upon them with better accuracy and understanding.

The second unit focuses on the characteristics of life. Students must be able to distinguish between nonliving and living things before they can study and classify them. The rest of the course is based mostly on living things, so it is important that they understand the difference between abiotic and biotic components.

The third unit focuses on cells. Students have learned that living things are made of one or more cells and then get in more depth with types of cells. They start with prokaryotic cells because they are the oldest and simplest. Then, that knowledge is built upon by discussing eukaryotic cells as well as their organelles. After types are distinguished, students study the cell cycle and mitosis and meiosis. They know about types of cells and that each cell eventually dies and needs replaced. Introducing the cell cycle at this point makes sense because we discuss how cells are replaced.

After meiosis, the third unit focuses on DNA and heredity. Meiosis is how sperm and egg cells are made, which combine genes(one from each parent) and pass down traits to offspring. It makes sense that students are taught how offspring acquire their traits and which traits are dominant and recessive. Pedigrees are introduced as a pictorial representation of the passing of traits. Once heredity is mastered, and in depth discussion of DNA happens. Students review where DNA is found in the cell and that it makes up chromosomes, which contain genes for traits. They see how DNA is copied and turned into proteins which make up our bodies.

When the discussion of traits and heredity has ended, students need to know how all of these processes are powered. The fourth unit focuses on photosynthesis and cellular respiration. This introduces how plants survive and bridges the gap between plants and animals. The introduction of plants allows for a discussion of energy flow and trophic levels.

Having discussed both plants, animals, and energy flow, students need to see how each of these are linked together. The fifth unit then focuses on how all of the organisms previously studied are classified in Linnaeus’ system. One classified, we can focus on different kingdoms and biomes. Each biome has its own unique characteristics and students discuss what pieces of each kingdom fit in each biome. Both of these topics are combined into one unit.

When students have learned which organisms fit where, we start to discuss adaptations. They have to use critical thinking and reasoning skills to describe why a polar bear might live in a tundra or why a cactus might be found in a desert. All of these adaptations make way for the sixth unit: evolution and natural selection.

Evolution and natural selection has been somewhat influenced by humans. We discuss the Industrial revolution and the natural selection of the peppered moths. This leads us to our final unit: human interaction with the environment and pollution. Students use reasoning skills built upon throughout the year to assess their impact on the environment and come up with ways they can lead a more sustainable life.