Plankton to Plastic Pollution Class Discussion Questions

Note: The questions provided below are guide questions that students can discuss as a class in order to determine what they learned/took away from the kit.

Part 1: Plankton to Petroleum

1. What did you observe when looking at the diatoms and foraminifera?
2. How do plankton play a role in the formation of petroleum?
   Petroleum is formed when plankton die and fall to the seafloor. Once on the seafloor, the dead plankton get trapped under very thick layers of sand and mud.
3. How does the settling model relate to the formation of petroleum?
   The settling model helps show the formation of petroleum and how long it takes for plankton to make it to the seafloor and get trapped under sand and mud

Part 2: Petroleum to Plastic

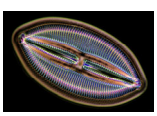
1. What are monomers and polymers?
   A monomer is a single molecule and a polymer is a chain of monomers. Polymers are used to make plastic.
2. Name some examples of monomers and polymers other than plastic.
   Examples of monomers include monosaccharaides (carbohydrates), glycerol and fatty acids (lipids), nucleic acids (nucleotides), and amino acids (protein). Examples of polymers include silk, rubber, cellulose, wool, amber, keratin, collagen, DNA, and starch.
3. What trends do you see when observing the data table regarding the amount of plastic produced every year?
   The amount of plastic being produced every year is increasing at an accelerating rate.
4. What do you predict will happen to the amount of plastic produced as the years go on? Explain your reasoning.
   The amount of plastic being produced will continue to increase as years increase due to an increased population and increase in demand. In addition, plastic is a cheap, versatile, and lightweight material that is easy to mass-produce, but difficult to recycle.
5. Why are non-biodegradable plastics unable to decompose?
   Non-biodegradable plastics do not decompose due to the polymer molecules being unable to decay at an atomic level. Instead, the polymer breaks down into smaller and smaller pieces of plastic that get littered into our rivers and oceans.

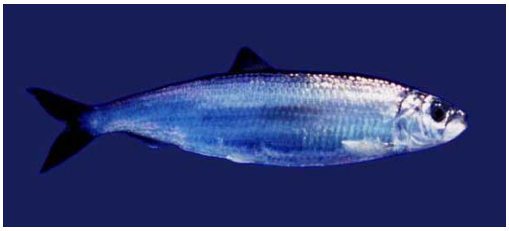
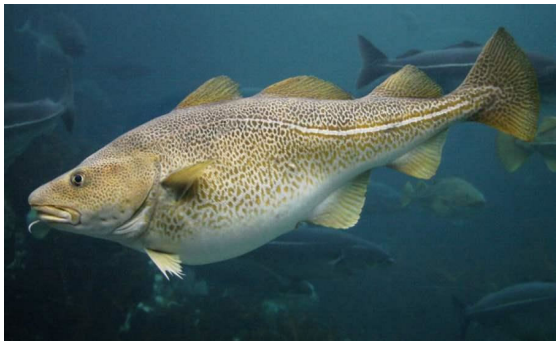
Part 3: Plastic Pollution

1. How does plastic travel to different oceans around the world?
   Waves, currents, and gyres
2. Explain how waves, currents and gyres effect the movement of plastic.
   Waves are generated through the movement of wind dragging on the surface of the water. Waves help carry objects on top of the water to different locations. Currents are larger than waves and are similar to large rivers of water that help carry things very quickly. Currents help form gyres, which are located in the North and South Atlantic Ocean, North and South Pacific Ocean, and Indian Ocean. Each gyre moves in a circular motion. When debris and plastic get caught in one, it becomes trapped and beaks down into small pieces of plastic.

Part 4: Problems with Pollution

1. Because phytoplankton make their own food through photosynthesis, how do zooplankton obtain plastic when consuming the phytoplankton?
   Due to plastic being present throughout the ocean, when zooplankton are feeding on phytoplankton they also pick up pieces of the polymer.
2. What trends do you see as you move up the food chain from phytoplankton to the cod?
   As you move up the food chain, more and more plastic is consumed.
3. What trends can you observe from the bar graph? Explain your findings.
   More and more plastic is consumed. This is because the zooplankton consumes the polymer that is present in the water. Once the herring eats the zooplankton, the herring inherently eats plastic from the water and from the zooplankton. This trend increases as you move up the food chain.
4. How can you as an individual help with plastic pollution?
   Refuse to use plastic bags, straws, lids, etc. and instead as for non-plastic alternatives. In addition, choose to buy more durable items that will last and if you are unable to avoid using plastic, reuse it whenever able to. Lastly, recycle!



Teacher Feedback Survey:

http://dat.cns-eoc.colostate.edu/STEMkits/stem_kit_survey.php

Thank You!