**Big Idea:** At the molecular level, biology is based on three-dimensional interactions of complementary molecular surfaces.

**Other important concepts:**

1. All molecules are 3D objects (2D is just a representation).

2. Structure of a molecule enables its function.
   
   a) Structure is a combination of the 3D shape of the molecule and the chemical identities of the different parts of the domains of the molecule.

3. Interaction between molecules happens by shape matching/fitting with the use of chemical entities in the faces of the interacting molecules.
   
   a) Molecules that seem to differ in very minor ways (e.g. different carbohydrate linkage) can have drastically different properties.

4. All interactions in a cell happen because of a combination of molecular forces.

5. Many of the physical properties of water are due to hydrogen bonds.
   
   a) Hydrophilic molecules can form hydrogen bonds with water, thus becoming part of the network.

   b) Hydrophobic molecules need to "hide" from water, which is looking to displace them in order to resume the hydrogen bond network and increase entropy.

   c) Amphipathic molecules have both hydrophilic and hydrophobic characteristics. This duality allows them to form vesicles and membranes.

6. Membranes separate inside from outside, making existence of cells possible.