DIY Air Force Activities:

Slime Time

Materials:

- Elmer's Glue
- Borax
- water
- 2 bowls
- measuring cup
- measuring spoons
- food coloring
- spoon to stir with

Polymers are long chains of molecules called monomers that are linked together. One polymer might consist of hundreds of thousands of monomers! Polymers are everywhere. Plastic is a polymer. Some of your toys are made of polymers, even some of your clothes are constructed from polymer materials! Polymers can be liquid or solid. Some polymers have the properties of both liquids and solids; we call these non-Newtonian. When a force is applied, like squeezing, they act more like a solid. When left on a table they flow like a liquid. This unique behavior stems from the fact the polymers are cross-linked or tied together. Following the instructions below you can make your own cross-linked polymer slime and experiment with its properties.

Directions:

1. Mix 1 cup Elmer's glue and ¼ cup water in a bowl. Add two drops of food coloring if desired.
2. In another bowl add ¼ teaspoon Borax to ½ cup hot water. Stir until dissolved.
3. Slowly add half of the Borax solution to the Elmer's and water mixture. Mix thoroughly, then slowly add the rest. Experiment with the properties of your slime. What happens when you drop it? What happens when you squeeze it slowly? Does it behave differently when you stretch it versus tear it apart?
4. Make another batch of borax solution to add to your slime. Run the same tests listed above. How did the properties of your material change?

Repeat this experiment and until you decide upon a perfect glue to borax ratio and make your own ideal slime mixture!

Air Force Associations:

Polymer matrix composites are extremely attractive to Air Force researchers working on next-generation applications due to their light-weight properties and ability to withstand extreme conditions in high temperature environments. A team at the Air Force Research Labs at WPAFB, in conjunction with researchers at NASA's Glenn Research Center and the University of Louisville, successfully printed the highest-temperature capable, reinforced polymer composite parts using additive manufacturing. This means embedded carbon fibers are added to reinforce the material, making it stronger. Parts 3-D printed from this material are capable of withstanding temperatures greater than 300 degrees Celsius!