**Lab 1 - Spooling purified DNA:**

**Description:**

**DNA is the material that contains all of the instructions that are required for building your cells and keeping them alive. Each of the 46 chromosomes that are contained in one of your cells contains one DNA molecule that is an inch or two long, though it is far too slender to be seen with any but the most powerful electron microscopes. If we could enlarge one of these DNA molecules enough so that we could see it…approximately the same diameter of one of the hairs on your head for example…we would find that it would be several miles long.**

**In this activity we will take advantage of this long, thin, “threadlike” shape of DNA molecules to “spool” them, which is to say, we will wind them around a wooden stick like a piece of thread. As you may know cotton fibers being only a couple of inches long individually and quite thin, can be combined into one long, continuous thread, because they tend to stick to one another and line up side by side. The same thing can happen when DNA molecules come out of solution if we pull on them from one end. We will do this by slowly twisting a stick in the region where DNA is beginning to precipitate. Each DNA molecule that is initially caught and wound around the stick then catches and pulls others. Thus, if we work carefully, we can wind all of the DNA molecules into one long continuous thread. Although DNA molecules are so thin that they cannot be seen with the naked eye, if you wind up many such molecules together, as described above, the DNA becomes visible and the properties can then be studied.**

**Materials: (For each group):**

1. **Test tube (1) of DNA *(DNA Source: Carolina Labs)***
2. **Test tube (1) of alcohol**
3. **Wooden stick (1)**

**Procedure:**

**Step 1: Your teacher will give you a test tube of DNA *(isolated from salmon sperm)*, another test tube of alcohol, and a wooden stick. Record your observations of the liquids on your observation sheet. *(Can you tell which id DNA? How, why? Color, etc…)***

 **Step 2: Uncap the tubes and hold the one that contains DNA at a 45degree angle.**

**Step 3: Carefully transfer the alcohol from its tube into the tube of DNA by pouring very slowly. We do not want the alcohol to mix the DNA by stirring it up during the pouring process. Record your observations *(What does the alcohol do?)***

**Step 4: Gently insert your stick through the alcohol layer to the interface where the two liquids meet. Twirl the stick gently trying to keep the tip at that interface zone the whole time.**

**Step 5: Now slowly lift the stick from the tube and observe the material clinging to it. How long a fiber can you lift from the tube? *(Approximate the length in inches, and centimeters)***

**Step 6: Put the stick back into the tube and gently twirl it in the vicinity of the interface again. Can you get more DNA to attach to the stick?**

**Step 7: When you have finished with the stick, cap the tube and shake it several times. Do you see more DNA in the tube now?**

**Observation Sheet:**

1. **Describe the appearance of the liquids in the two tubes**
2. **Can you tell which tube contains the DNA? How? *(be specific)***
3. **Describe what happened when you first twirled the stick in or near the DNA –alcohol interface**
4. **When you lifted the stick out of the tube, and a fiber of DNA followed, did you think that it was a single molecule of DNA? Why or why not?**
5. **How would you describe the appearance of DNA of someone who has never seen it?**
6. **What do you think it is about the biology of salmon and sperm cells that makes it easy to isolate a large quantity of DNA from salmon sperm?**