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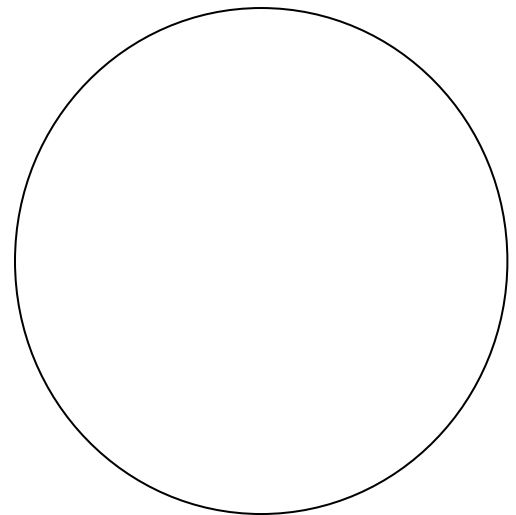
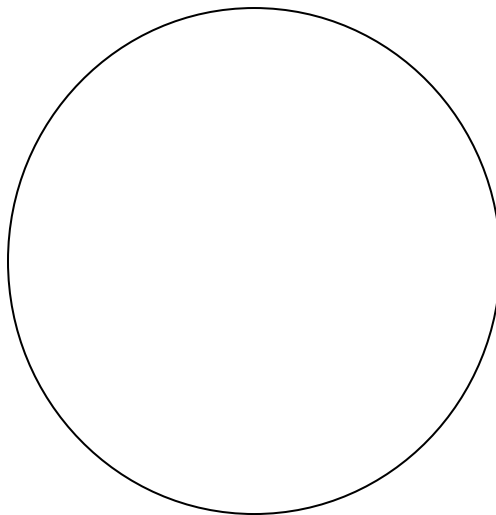
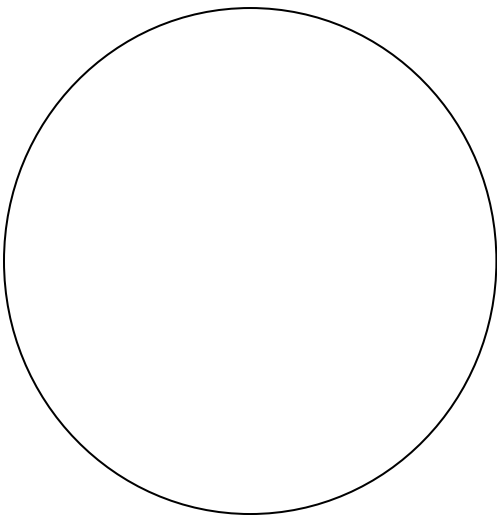
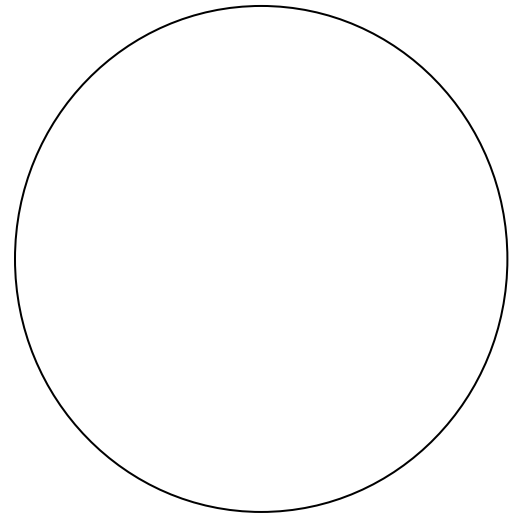
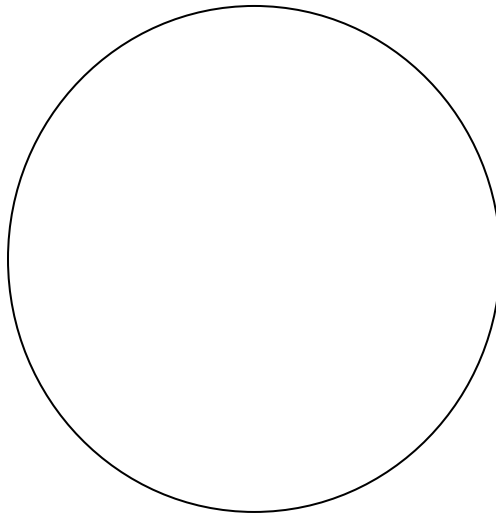
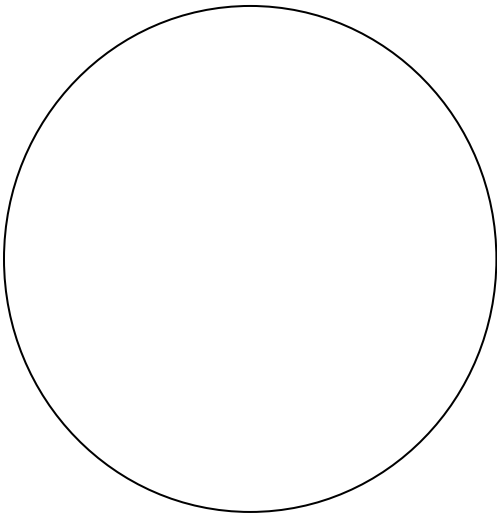
Fiber Analysis

Forensic Science

Like hair samples, there are many different fiber samples that can be observed at a crime scene. In the following lab, you are going to perform a series of tests on different fiber types and record your results.

Part A: Weave Patterns

For the following fiber types, you are going to use a dissecting microscope to look at and sketch the weave patterns. Make sure to label the different parts of the weave.

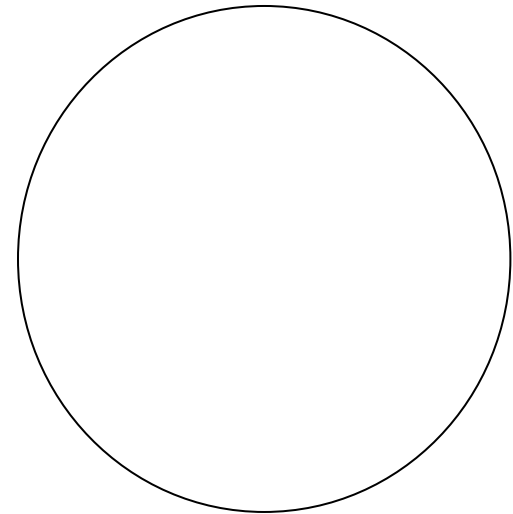
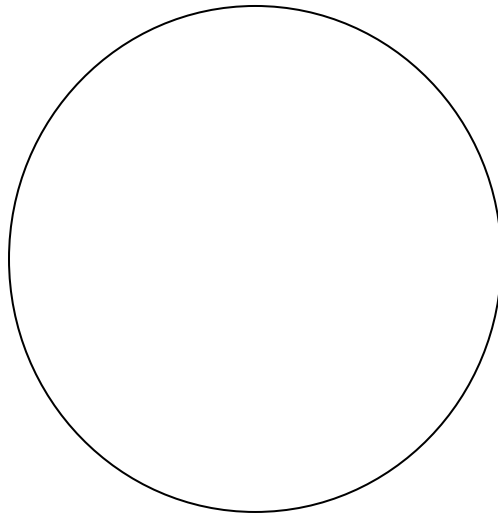
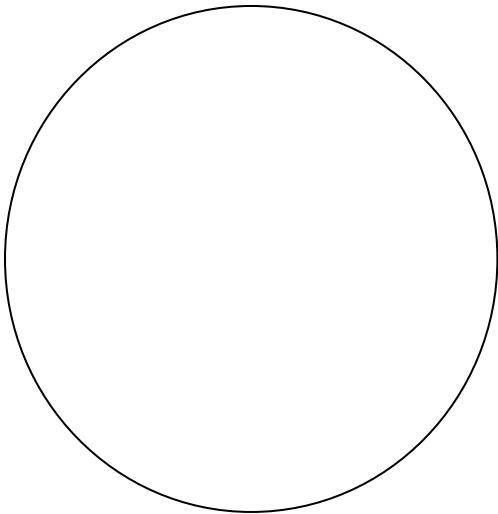
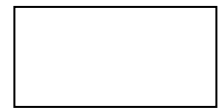
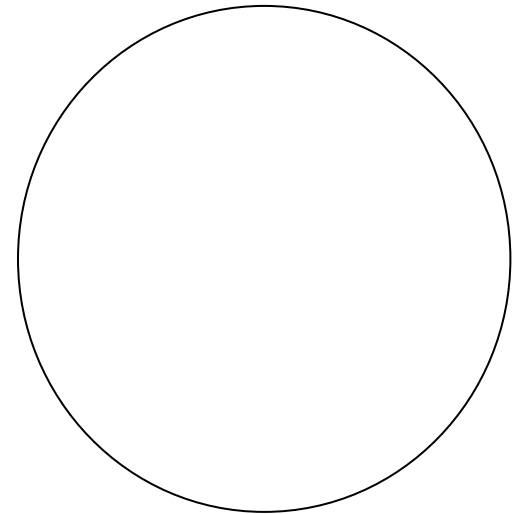
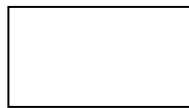
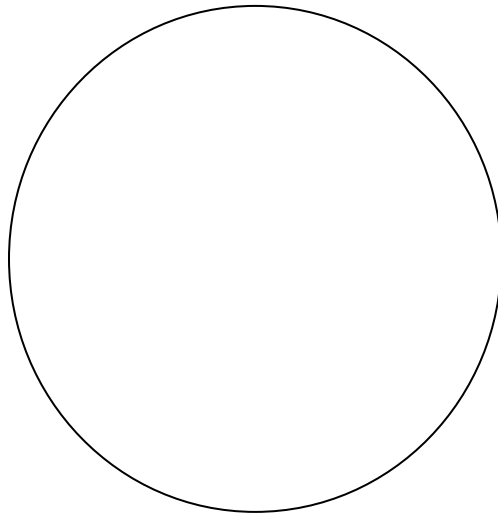
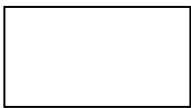
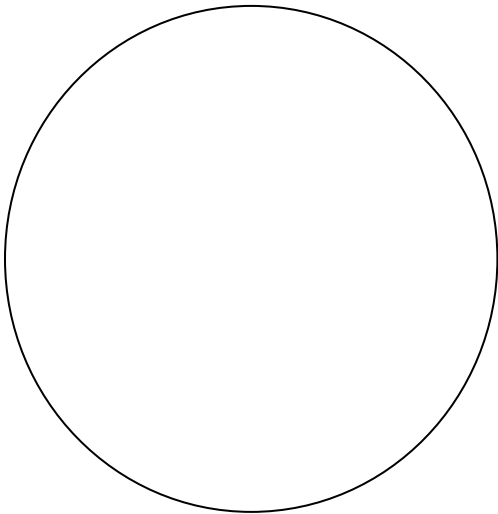


Part B: Fibers

You are going to make wet mounts of the different unknown fibers. Because these fibers are undyed, you are going to have to pay close attention to the small details that are observed on medium and high power. Make sure that your drawings are detailed!

Procedure:

1. For these wet mounts, please use tweezers to remove a bundle of fibers from the labeled fabrics you used in Part A. From this, you need to remove 1 or 2 individual fibers for analysis. Keep what is left of the bundle for use in a later part. Make sure that these bundles are in a labeled place so that you do not mix them up.



Part C: Burn Tests

Different fibers will burn differently, will have different odors, and will have different appearances of the ash or the residue that follow. These characteristics can help in the identification of fibers in a crime scene lab.

Procedure:

1. For this section, you will use the fibers that you removed from the fabric samples to make your wet mounts. Be sure that you have each of the samples in a labeled spot so that you don't mix the samples up.
2. Construct a data table on a separate paper to record your observations throughout this section - this should include name of the fiber, observations, odor, appearance etc.
3. Light your Bunsen burner or have your teacher help you.
4. Hold the fiber bundle with tweezers or forceps and bring them SLOWLY into the flames.
5. Note any odor, whether the fabric continues to burn when you SLOWLY remove it from the flames, color of the flame, type of ash or residue and the color of the smoke.
6. If you are observing a blended fabric, look at the warp and the weft separately.

Attach your data table.

Part D: UV Analysis

In this section, you will be using an ultraviolet light (UV light) to observe the fluorescent properties of the different types of fabric.

Procedure:

1. Construct a data table on a separate paper for you to organize your observations.
2. Look at the different fabric samples using a UV hand held lamp and describe their characteristics in the data table you constructed.
3. Observe the fluorescence of the clothes you and your partner are wearing. Make any observations about them in the data table. Make sure that you look at the fluorescence of different colored materials - do they all fluoresce? Do they all fluoresce in the same way?
4. Remove several fibers from the most fluorescent fabric and place them on your clothes. Have your partner find them.
5. Now do the same with the least fluorescent fabric and record your observations.

Attach your data table.

Part E: Chemical Tests

The chemical composition of a polymer largely determines its chemical reactivity. With this test, you will look at the solubility and chemical decomposition of different fabrics. ***The chemicals that you will be using include strong acids, strong bases and solvents, all of which can irritate the skin, cause irreparable damage to your eyes, and dissolve your clothing. You must wear safety goggles and a safety apron during this lab all the way through clean-up. Clean up spills, even a single drop, at once and report any accidents to your teacher. Before you remove your safety equipment (goggles and apron) you must wash your hands with soap and water.***

Materials:

Well plate	6M HCl	Toothpicks
Fabric samples	6 M H ₂ SO ₄	
6M NaOH	NaOCl (Bleach)	

Procedure:

1. Pull a few fibers from each of the samples of fabric (if you are looking at a blend make sure to get samples from both the warp and the weft).
2. Arrange your samples in the well plate so that you can test each of the four reagents (NaOH, HCl, H₂SO₄, NaOCl). Draw and label the picture of your well plate before you continue with your experiment.
3. Add enough reagents to cover each sample. You may use a toothpick to mush the fabric into the liquid. Watch those samples that are blends because part of the fabric may react but part may not.
4. After 15 minutes, record your observations in a data table of your construction.
5. Use a stereomicroscope (dissecting scope) to observe each reaction and record these in your data table.

Conclusion

In paragraph form, address the following:

- Summarize your results for each fabric.
- If an unknown fiber was found at a crime scene, what steps could you take to identify it?
- What would you do differently if multiple fibers were found versus just one or two?

Style considerations:

- Avoid using first person (I, we, etc) where possible (like summarizing your results. Since I am asking for your opinions and beliefs in two of the bullets above, those should be in first person.)
- Be clear and precise. Avoid flowery language. This is science class!
- Use science vocabulary correctly.
- Use past tense—you have already performed the lab.
- Avoid passive voice (is, was, has, have, had) as much as possible. Try to use active verbs as much as possible.

Part F: Effects of Dyes

Different fabric dyes will react differently with different fabrics. This is just another way that we can help to identify different types of fabrics. For this activity, you will use the remaining fabric pieces from the lab to test how well each fabric takes the dye.

Procedure:

1. Cut your remaining pieces of each fabric into 2 equal parts. Keep each fabric type separate from one another and labeled so that you do not mix them up.
2. Choose 2 different dyes to test - one will be a food coloring and one will be a fabric dye.
3. You will test each fabric in each of the 2 dyes - you will have 12 dyed pieces of fabric when you are finished (one of each fabric in each of the 2 dyes).
4. Submerge the fabric in the dye and allow it to sit there for 10 minutes.
5. Remove it from the dye using forceps so that you do not get dye on your hands.
6. Rinse the sample thoroughly with warm water and blot it dry with paper towels and allow it to dry.
7. Repeat the dying steps with each fabric piece in the 2 different dyes.
8. Construct a data table and record any observations you made throughout the procedure including your results.