**TEXTILES CAN BE FUN AND EDUCATIONAL**

**Discussion and Examples of Fibers vs. Yarns vs. Fabric**

**Fibers:** Cotton balls, spinning kits, making nylon (ask your local chemist or YouTube)

**Yarns:** Different types of yarn

**Fabric:** Knits, wovens, nonwovens, can also do weaving (construction paper, pipe cleaners, tabletop looms)

**Consumer Problems**

**Purpose:** To apply understanding of fibers and fabrics to common consumer problems

**Detergency Lab**

**Purpose:** To see how different stains (oil-based, protein-based, Earth-based) react to different treatments

**Discussion Question:** How does detergency work?

**Properties Lab**

**Purpose:** To understand the properties of different fibers and terminology involved (ex: heat setting, tenacity, resiliency, etc.)

**Discussion Questions:** Which fibers can be heat set? Which are the strongest fibers? Which fibers are the most resilient with relation to surface abrasion? Which fibers are the most wrinkle resistant? Which fibers are the most absorbent?

**Burning Lab**

**Purpose:** To observe how different fibers react to flame

**Discussion Questions:** How do natural cellulosic fibers behave in flame? How do natural protein fibers behave in flame? How do synthetic fibers behave in flame?

**Microscopic Examination**

**Purpose:** To observe the outward appearance and surface qualities of various fibers on a microscopic level.

**Discussion Questions:** What is the difference between cotton and flax fibers and how does this affect their appearance and behavior? What is the difference between nylon and polyester and how does their surface quality affect the appearance of the fabric? Why is wool scratchy?

**Solubility Lab**

**Purpose:** To observe how different fibers react to different chemicals

**Discussion Question:** What happens to wool in bleach? What happens to cotton in bleach? What happens to silk in bleach? What happens to acetate in acetone? How do polyester and acrylic react similarly in bleach and acetone? Why do you think this is?

**Detergency Lab**

Objective: To determine effectiveness of water temperature, pretreatments, detergents, and brighteners on every day stains.

Each lab group will be given 8 swatches containing the following 4 everyday stains:

1. Fruit

2. Make up

3. Chocolate

4. Oil

Each lab group will pick up pre-stained swatches and test both treatments specified. After treatment, rinse in warm water to see if stain has been effectively removed.

Lab group 1: Water temperature (Hot and Cold)

Lab group 2: Pretreatments (Commercial and home-made)

Lab group 3: Brightener/Enhancers (Chlorine Bleach and oxygen bleach)

Lab group 4: Detergents (National Brand and Organic)

Group 1:

1. Take a swatch from each stain and rinse in hot water and list observations and effectiveness on chart.
2. Repeat step 1 for remaining temperature.
3. Report findings to the class

Group 2 and 3:

1. Take one of each stain and apply first pretreatment option.
2. Let sit for five minutes.
3. Rinse in luke warm water and list observations and effectiveness on chart.
4. Repeat for second pretreatment
5. Report findings to the class

Group 4:

1. Fill sink half full of luke warm water. Add 2 gracious TBSP of one of the detergents.
2. Agitate one swatch of each stain for 2 minutes. Then rinse.
3. List observations and effectiveness on chart.
4. Repeat steps for the second detergent
5. Report findings to the class

Stain Demos: Ink, Arm pit stains, Neck lines, Blood

Treatment: Water temperature

|  |  |
| --- | --- |
| Stain:  | Recommendations: |
| Make up |  |
| Chocolate |  |
| Fruit |  |
| Oil |  |

Treatment: Pretreatments

|  |  |
| --- | --- |
| Stain:  | Recommendations: |
| Make up |  |
| Chocolate |  |
| Fruit |  |
| Oil |  |

Treatment: Brighteners/Enhancers

|  |  |
| --- | --- |
| Stain:  | Recommendations: |
| Make up |  |
| Chocolate |  |
| Fruit |  |
| Oil |  |

Treatment: Detergents

|  |  |
| --- | --- |
| Stain:  | Recommendations: |
| Make up |  |
| Chocolate |  |
| Fruit |  |
| Oil |  |

Treatment:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Stain:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Swatch:

Observations:

Swatch:

Observations:

Textiles Properties Lab

## Heat setting

Items needed: heating unit, wooden dowel/pencil, nylon and cotton thread

Procedure: Wrap two lengths of thread (one each nylon and cotton) around the dowel or pencil. Secure the ends with tape. Expose the dowel to the heating unit for 1 minute, keeping the dowel about 3" from the heat source. Let the dowel cool for 10 seconds and carefully remove the threads. Record your observations.

Procedure 2: Wet the samples with water and record any changes that may occur.

|  |  |  |
| --- | --- | --- |
| **Fiber** | **Heated, dry** | **Heated, wetted after** |
| Cotton |  |  |
| Nylon |  |  |

## Tenacity

Items needed: cotton, nylon, and rayon threads; water

Procedure: Break a dry yarn of each fiber type. Record your observations (was it easy, moderate, or difficult to break, etc.). Then wet a second yarn of each fiber type and break the wet sample. Record your observations.

|  |  |  |
| --- | --- | --- |
| **Fiber** | **Dry** | **Wet** |
| Cotton |  |  |
| Rayon |  |  |
| Nylon |  |  |

## Resiliency

Items needed: Fabric swatches of flax, wool, acetate, and polyester

Procedure: If needed press swatches flat. Allow swatches to cool. Then compress each swatch in the palm of your hand for 15 seconds. Record the appearance of each swatch in the table below.

|  |  |  |  |
| --- | --- | --- | --- |
| **Flax** | **Wool** | **Acetate** | **Polyester** |
|  |  |  |  |

## Abrasion Resistance

Items needed: Sandpaper, fabric samples of cotton, silk, wool, polyester

Procedure: Hold each swatch securely around your index finger with your thumb. Lightly rub with sandpaper 15 times in a circular motion. Keep the pressure consistent between swatches. Report your results in the table below using the following rating system: **High** - little or no evidence of wear **Medium**- some evidence of wear, color loss, fuzzies or pilling, etc., **Low**- shows wear, holes, yarn slippage, etc. Explain why you chose the specific rating for each swatch.

|  |  |  |  |
| --- | --- | --- | --- |
| **Silk** | **Cotton** | **Wool** | **Polyester** |
|  |  |  |  |

## Absorbency

Items needed: water, oil, fabric swatches of cotton, polyester, wool, and silk

Procedure: Lay all 4 swatches on two layers of paper towels. Drop one drop of water on one end of each fabric swatch. Record what happened, noting how quickly the water is absorbed and how wet each fabric feels.

Repeat with one drop of oil on the opposite end of each fabric swatch. Record your results, noting how quickly the oil is absorbed and how wet/oily each fabric feels.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Reaction** | **Cotton** | **Polyester** | **Wool** | **Silk** |
| to Water |  |  |  |  |
| to Oil |  |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Fiber or Fabric** | **Approaching the flame** (does it fuse and/or curl away?) | **In the flame** (describe ease of ignition, how rapidly it burns, amount of smoke and color of smoke) | **Following removal from flame** (describe whether there is afterglow, self-extinguishing behavior, or if it continues to burn) | **Type of residue** (amount and character – hard, brittle, stringy, bead, soft, feathery) |
| **Wool** |  |  |  |  |
| **Silk** |  |  |  |  |
| **Cotton** |  |  |  |  |
| **Flax (Linen)** |  |  |  |  |
| **Rayon** |  |  |  |  |
| **Lyocell** |  |  |  |  |
| **Acetate** |  |  |  |  |
| **Nylon** |  |  |  |  |
| **Polyester** |  |  |  |  |
| **Acrylic** |  |  |  |  |
| **Rubber** |  |  |  |  |
| **Spandex** |  |  |  |  |

**Microscopic Examination**

|  |  |  |
| --- | --- | --- |
| Wool\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Silk\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Cotton\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Flax\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Rayon\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Acetate\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Polyester\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Acrylic\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Spandex\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

**Solubility Lab**

|  |  |  |
| --- | --- | --- |
| **Fiber or Fabric** | **Reaction in Acetone** | **Reaction in Bleach** |
| **Wool** |  |  |
| **Silk** |  |  |
| **Cotton** |  |  |
| **Flax** |  |  |
| **Rayon** |  |  |
| **Acetate** |  |  |
| **Polyester** |  |  |
| **Acrylic** |  |  |