

Natural vs. Synthetic

Teacher Page:

Description: This performance task allows students to research a chemical process that is very close to them-their clothing. They will research the types of fabrics currently available, what they are made from and how common each is. They will perform scientific experiments on them to determine their properties. Working with a group, they will determine which fabric is best "suited" for different types of clothing and research an article of clothing. They will give an oral report on the garment they chose.

Materials:

Day 1: library and computer resources

Day 2: 1 cm² squares of 8 fabrics (wool, silk, linen, cotton, nylon, dacron, orlon, rayon for example -- these may be obtained from a local fabric store) alcohol burners, dissecting probe, beaker, bleach, test tubes and rack, goggles

Day 3: library and computer resources

Strategies for Administration:

Student may write reports as a group report or individually. The scoring rubric should be explained to students in advance (see last page). The Bleach test on the lab has been limited to one fabric per group to conserve on equipment. Groups will have to share data.

Scoring Guide:

Title of Task: **Natural vs. Synthetic**

Student Name(s): _____

Teacher: _____ Class: _____

<i>The student should be able to:</i>	<i>Where to find evidence:</i>	E	G	NI	Points
<i>Accurately complete data table with at least 6 fabrics</i>	Data Table				
<i>Group fabrics correctly according to type (natural or synthetic)</i>	Data Table				
<i>Complete homework</i>	Homework Report				
<i>Work safely with group to complete lab</i>	Teacher Observations				
<i>Correctly interpret lab data</i>	Lab Report				
<i>Participate in group report</i>	Oral Report				

E=Excellent

G=Good

NI=Needs Improvement

*Check if student work is a strong and clear example of rating given.

Student Pages:

Natural vs. Synthetic

Day 1:

1. Working in your group and using library resources, computers or other materials, research the following questions:

- a. What fabrics are clothes made from?
- b. What are the fabrics made from?
- c. Which fabrics are natural (made from plants or animals) and which are synthetic (made from chemicals)?
- d. Are certain types of fabrics more likely to be used in specific types of clothing? (ex: Are pajamas more likely to be made from a certain type of fabric?)

2. Make a data table for your group to summarize the information.

HOMEWORK: Check the labels on 15 different articles of clothing that you have at home. Use a variety of clothing types. Write the information down and bring it back to school to complete your data table.

Natural vs. Synthetic

Day 2:

Use your homework to finish your data table from day 1.
Then complete the following laboratory assignment in class:

Purpose: To test for similarities and differences between natural and synthetic fabrics.

Materials:

1 cm² squares of 8 fabrics
alcohol burners
dissecting probe
beaker and goggles
bleach
test tubes and rack

Prediction: Which fabrics will burn quickest?

Procedure:

1. Describe the fabrics' color, feel, stretch ability and/or thickness. Record your data in the description section of the table.
2. Test the water absorption rate by placing a drop of water on each fabric sample. Time how long it takes for the water to sink in.
3. In a test tube, add some bleach to the fabric your teacher assigns your group. Label it and let it sit overnight. Our fabric is _____.

4. Time how long it takes a piece of fabric to burn. Put on your goggles. Place a piece of fabric on the tip of the probe. Start timing and hold it over the burner flame until it starts to burn. Take it out of the flame and let it finish burning. Hold it over a beaker of water in case it falls off the probe. Stop timing when the flame goes out. Record your observations in the table below.

Name of Fabric	Description	Reaction to Bleach	Water Absorption Time	Burn Time

Analysis

1. Which fabrics would be safe to bleach? unsafe?
2. Which fabrics were stretchiest, natural or synthetic?
3. Why would stretchy fabric make good clothing?
4. Which absorbed water faster, natural or synthetic?
5. When would you want clothing to absorb water?
6. What type fabric burned fastest?
7. What was the main difference between how natural and synthetic fabrics burn?
8. What are advantages of synthetic fibers?
9. What are disadvantages of synthetic fibers?
10. Which type of fabric would you use for children's clothing? Why?

Conclusion:

Natural vs. Synthetic

Day 3:

Working with your group, compare how one specific type of clothing has changed with the invention of synthetic fabrics. (ex.: coats, pajamas, swim suits) Prepare a group report that includes the types of fabrics the item was made from in the past and how new materials are used in it today. Compare and contrast the effectiveness of the garment with the new materials compared to its previous effectiveness. Use resources provided by your teacher as well as interviews with people who remember the older types of clothing. You may make drawings or use pictures for your report. Make a prediction about the future of this clothing item. What might it be made of in the future? What could a fabric with different properties do for it?

Day 4:

Report to the class on your findings. Each member of your group must have a part. Be prepared to answer questions. You will be evaluated using the scoring guide below.

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