



ACTIVITY 7

WHAT KINDS OF FABRIC ARE MY CLOTHES MADE OF?



EXPERIMENT OBJECTIVES AND CONTENT

In this activity, students explore the world of fibers, identify the fibers of the fabrics their clothes are made of, and discover that certain fabrics are made of fibers while others are not.



ESSENTIAL KNOWLEDGE

- Consumption of living things



SUGGESTED MATERIALS

Scientific equipment

- Proscope digital USB microscope
- Stereo microscopes

Household materials:

- Various pieces of natural-fiber fabric (wool, cashmere, linen, fur, silk, jute, cotton)
- Various synthetic fabrics (polyester, aramid, acrylic, vinyl, nylon) and artificial fabrics (viscose)
- Raw, unprocessed fibers, or pictures of them (straw, hemp, cotton, flax, wool)
- String or cord
- Clothes or vegetable brush



CONTEXT: SITUATIONAL PROBLEM OR RESEARCH QUESTION

What materials were used to make the clothes you are wearing today? Is the fabric your pants or skirt are made of the same as your shirt? Do you know what these fabrics are made of?





SUGGESTED PREPARATORY ACTIVITIES (INTRODUCTION)

Before starting the activity, the students identify the animal that produces wool fiber. Starting from their response, they could try to find other animals that produce fibers used to make fabric. Samples of natural plant fibers (e.g., cotton, straw, raffia, flax) could also be shown to the students to get them to think about whether fabrics could be made from them.



INITIAL IDEAS AND HYPOTHESES

Here are a few examples of hypotheses the students might formulate based on their initial ideas:

Example 1

I predict that if I carefully examine each fabric, I can group similar fabrics together. I predict this because I always keep my wool sweaters together on one shelf, and my cotton underwear all in the same drawer.

Example 2

I predict that if I examine different fabrics under a magnifying glass, I will be able to tell whether or not they were made from the same fiber. I predict this because my wool sweater has bigger holes than my pants.

Example 3

I predict that if I lightly touch different fabrics with my fingers I will find some that are softer than others. I think this because my scarf is much softer than my raincoat.

Example 4

I predict that if I run a brush lightly over different fabrics, some will leave fluff on the brush and others will not. I predict this because there are little piles on my sweater where my school bag rubbed against it.

RECORD ALL YOUR IDEAS AND OBSERVATIONS IN YOUR EXPERIMENT WORKBOOK.





WORK PLAN AND EXPERIMENTATION

Here are a few examples of experiments the students can carry out to verify their hypotheses:

Example A

The students look at fabric samples with the naked eye or magnifying glass, touch them and even smell them in order to compare them and make groups of similar fabrics.

Example B

The students use a vegetable brush to lightly rub various fabric samples. They classify the fabrics according to how much fluff they produce.

EXPERIMENTAL FACTORS

To ensure scientific rigor, the students should evaluate the experimental factors that might influence the experimental results.

- Fabric samples
- Samples of raw materials (photos)



DISCUSSION: SUGGESTED INTEGRATION ACTIVITIES (CONSOLIDATION)

Were the students able to find answers to the initial question? In order to share their results with the rest of the class, each team could create a table showing the characteristics they observed (e.g., texture, size of weave, softness, fluff, etc.) and on which they place the samples that match each characteristic.

A review of the basic concepts could be done by way of a matching game, in which fibers or photos of raw materials (e.g., cotton boll) are shown and the students try to find which fabrics are made from them.

Younger students might find it fun to match certain animals to the fibers they produce. Older students could read the labels of their clothes to identify the primary materials then find out if they are of natural origin (animal or plant) or chemical origin (artificial or synthetic).





SUGGESTED ACTIVITIES FOR APPLYING KNOWLEDGE (APPLICATION)

To apply their knowledge, the students could make a list of occupations related to the textile manufacturing sector (e.g., from raising sheep to selling wool sweaters). They also might have fun making up a story in which fibers are found in certain places, after which they could connect all the fibers into one long thread. Showing a film clip illustrating, for example, how cotton was harvested before and after industrialization, would teach them something about slavery as well as cotton harvesting. There are also videos about silk harvesting.



SCIENTIFIC CONCEPTUAL CONTENT

The first clothes

Animal skins were probably the first clothes that prehistoric humans made. They would have used tools to clean and cut the hides and to sew strips of hide into clothing using tendons or nerve fiber for thread.

The first textiles

Much later, humans began to hand braid hairs from animal fleeces and plant fibers to make the first textiles. The natural dyes they used came from plant extracts.

Steps of clothing manufacture

From start to finish: transformation of the fiber or mixture of fiber into thread; weaving or knitting the thread into cloth; dyeing, printing or application of a coating; finishing, pattern and cutting; and finally, sewing.





Textile fibers

There are three main categories of textile fibers: natural fibers of plant (e.g., cotton), animal (e.g., wool) and mineral (e.g., silver) origin; inorganic fibers (e.g., asbestos); and chemical fibers, which may be artificial (made from cellulose extracted from plants, such as viscose) or synthetic (made from hydrocarbon or starch-based chemicals such as polyester or aramid fibers).

Modern textile industry

Clothing manufacture techniques vary depending on the nature of the textile used (e.g., silk, rayon) and the amount produced (e.g., mass production, couture production). However, most of the clothes we wear are made using ever more sophisticated industrial machines, from the harvest of the raw materials (e.g., cotton boll) to the final product (e.g., colored, printed shirt).



CULTURAL REFERENCES

Science and technology

The textile industry is constantly changing. Recently, scientists have perfected “smart fabrics” which incorporate nanotechnology into traditional fibers, to make clothes that do not need ironing, protect against UV rays or odors, or that change color in the sun!

Unusual fact

Did you know that bank notes—so-called “paper money”—are made from cotton fibers and so do not actually contain any paper? This is why real bank notes can be washed.

**FOR MORE CULTURAL REFERENCES,
VISIT THE ÉCLAIRS DE SCIENCES WEBSITE:
www.eclairsdesciences.qc.ca**





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Conception

L'île du savoir (CRÉ de Montréal)

A project of



Produced by



Major financial partners



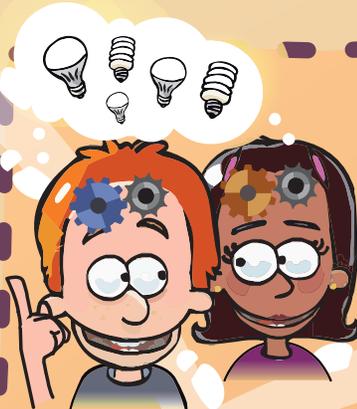
PROCESS OF ACTIVE DISCOVERY

GENERAL LEARNING PROCESS IN SCIENCE AND TECHNOLOGY (IN ELEMENTARY SCHOOL)

Context related to everyday life



- Situation problem or
- Discovery question or
- Need to be fulfilled
- Question related to the operation of an object (how does it work?)



Initial ideas and hypothesis

My initial ideas:

- I share my own ideas.

My hypothesis:

- I predict that... I think that because...
- I imagine my prototype.
- I think it works like this...

Planning and carrying out



My equipment:

- I observe and handle the equipment.
- How could this equipment be useful to me?
- I choose my equipment and my materials.

Carrying out my process:

- What will the steps be?
- What precautions should I take?

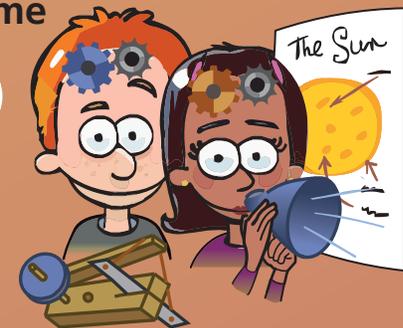
My actions:

- I carry out the steps of my protocol.
- I note or draw what I observe, what I do and what I discover.

My results:

- What is my answer to the problem, question or need?

Outcome



My outcome:

- Do my results confirm my hypothesis or not?
- Are my results similar to those of the other teams?
- Can the other teams' results help me to find answers to my problem, my question or my initial need?
- What could I communicate concerning my discoveries?

What I learned:

- What do I retain from this activity?
- What could I communicate concerning my results or my discoveries?

New question?