ACTIVITY 1

ARE THE SEEDS OF ALL FRUITS THE SAME?

EXPERIMENT OBJECTIVES AND CONTENT

In this activity, students gain a better understanding of the seeds of edible fruits.

ESSENTIAL KNOWLEDGE

Matter:
- Characteristics of living things: reproduction of plants
- Organization of living things: anatomy of plants, senses

Systems and interactions:
- Interaction between living organisms and their environment: adaptation

Techniques and instrumentation:
- Use of simple observational instruments

Appropriate language:
- Terminology related to an understanding of living things
- Tables
- Drawings, sketches

SUGGESTED MATERIALS

Scientific equipment:
- Magnifying glasses and any other available observation instruments

Perishable non-scientific materials:
- Selection of fresh fruits

Household materials:
- Plastic knives
- Kitchen knives
- Small cups or jars
- Nutcracker

School supplies:
- Colored pencils
- Adhesive tape
- Labels
- Large sheets of paper

Note: Some students could bring fruits typical of the country their family originally came from.

CONTEXT: SITUATIONAL PROBLEM OR RESEARCH QUESTION

Many types of fruits can be found at the market or grocery store. Have you ever touched, tasted or smelled these fruits? Have you ever wondered what their seeds look like?

SUGGESTED PREPARATORY ACTIVITIES (INTRODUCTION)

In late spring or summer, or in early fall, the teacher organizes a visit to the place closest to the school with trees, flowers or garden vegetable plants so the students can observe them. The students can describe or compare the color, form, texture, size or smell of the fruits.

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 cut open fruits and examine the insides, I will see that some do not have seeds. I predict this because when I cut a pineapple, I never see any seeds.

Example 2
I predict that if I cut a fruit in half, I will always find seeds in the middle of the fruit. I predict this because apple seeds are always in the middle. And so are plum and cherry pits.

Example 3
I predict that if I look at fruit seeds with the naked eye or under a magnifying glass, they will not all be the same size, texture or color, or be made out of the same thing. I predict this because grape seeds are small, but peach or avocado pits are big.

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 cut open fruits they have selected to examine their seeds. They draw the cut (crosswise or lengthwise) and remove and count the pits or seeds.

Example B
After removing the pits and seeds from the fruits, the students describe them according to various criteria (e.g., size, shape, texture, color and odor). They have fun dissecting the seeds and looking at their interiors under a magnifying glass.

EXPERIMENTAL FACTORS

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

- None

DISCUSSION: SUGGESTED INTEGRATION ACTIVITIES (CONSOLIDATION)

The teacher reviews the activity with the whole class. The students could draw what they observed (the cuts they made in the fruits, the seeds and pits), then each team could present an oral summary of their discoveries. A summary table of all the discoveries could be created, noting, for example, the similarities or differences among the seeds according to one or more classification criteria (shape, size, color, position, etc.).

SUGGESTED ACTIVITIES FOR APPLYING KNOWLEDGE (APPLICATION)

The students identify the country of origin of various fruits. With the pieces of remaining fruit they could prepare a delicious fruit salad, and the teacher could take the opportunity to discuss the importance of eating fruit every day.

SCIENTIFIC CONCEPTUAL CONTENT

The formation and function of fruit

Fruit develops from the sole pistil of a flower that has been pollinated. Fruit is thus the ripened ovary that surrounds the ovule (the seed). Some fruits that form from other parts of the flower (e.g., figs, apples, pears, pineapples, and strawberries) are "false fruits" from a scientific perspective. For example, the small black seeds visible on the red fleshy part of a strawberry (called achenes) are in fact the strawberry's real fruits. The fruit protects the seeds and fosters their dissemination by way of wind, water or the animals that eat them, digest the pulp and excrete the seeds in their feces. Not all fruits are edible by humans. Some are even toxic or deadly (e.g., the fruit of jimsonweed, Canada yew and hemlock).

The function of seeds

The seed is the organ that protects the embryo of the future plant and that allows its dissemination. Some plants have "naked seeds" while others are enclosed in fruits. Seeds have many different physical characteristics, which give them the specific properties they need to survive, propagate and germinate in the various environments specific to their species. For example, some seeds are able to float on the wind, while others can roll on the ground. Some are rough so they can hook onto other surfaces, while still others are hard so they can resist shocks.

CULTURAL REFERENCES

Worldwide market

Do you know which fruits are the most commonly grown in the world? At the top of the list are citrus fruits (oranges, grapefruits, etc.), which are primarily grown in the United States and Brazil for juice production. Then come grapes (in Europe), bananas, and apples.

Health

Fruits are full of vitamins, fiber, minerals and antioxidants that are vital to good nutrition. Health Canada recommends that children and adolescents eat five to eight portions of fruit or vegetables per day, and that adults eat seven to ten portions. A 2003 Health Canada study showed that more than half of Quebecers do not eat enough fruit.

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

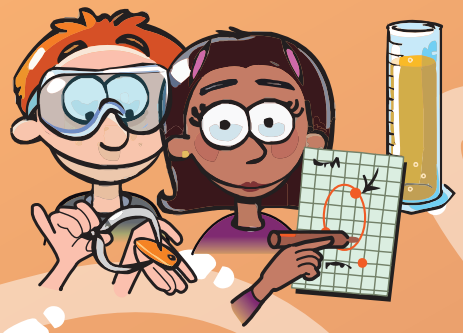
- **Situation problem** or
- **Discovery question** or
- **Need to be fulfilled**
- **Question related to the operation of an object** (how does it work?)

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



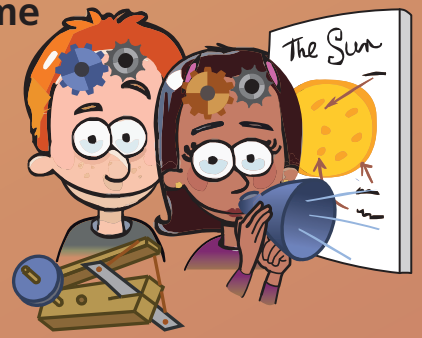
My equipment:
- I observe and handle the equipment.
- How could this equipment be useful to me?
- I choose my equipment and my materials.

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?

New question?

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

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