YORK/SENECA INSTITUTE FOR SCIENCE, TECHNOLOGY AND EDUCATION

YSISTE

ASSESSMENT OF SCIENCE AND TECHNOLOGY ACHIEVEMENT PROJECT (ASAP)

Science and Technology Exemplars

Grade 1: Structures and Mechanisms – Everyday Structures

Exemplar Task (1SMPT01/Feb, 2002)

For the Birds

Preface

This task is one of a series developed by the Assessment of Science and Technology Achievement Project (ASAP) which is being used for the ASAP Science and Technology Exemplars Project.

This task is organised in three parts:

A. Task Overview
B. Student task sheet – designed to be photocopied for the students
C. Teacher Information – providing essential information relating specifically to this task

For further information, contact the ASAP office at 416-736-5006 or email: asap@edu.yorku.ca

Task Overview

Description of the Task

In this task, students are asked to design, construct and test a bird feeder. They will need to choose from a variety of tools and materials and should select those most appropriate to the function of the feeder e.g., the materials should be waterproof.

Materials & Equipment Needed

2 litre pop bottles	Margarine containers	Yoghurt containers
Small pop bottles	Fruit nets	Plastic containers
Small cardboard boxes	Pipe-cleaners	String
Scissors	Paper punch	Masking tape
Clear tape	Glue	Found materials

Suggested Timeline

- designing, building and testing the feeder (3 x 30 minutes sessions)
- completing the written sheets (60 minutes)

Suggested Grouping

individual

Safety First

Students should be familiar with using the equipment required for the task.
Students should be warned to take care with sharp scissors or objects with points.
Students should not eat any birdseed they use to test their feeders.

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Student Task Sheets

For the Birds!

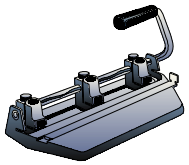
You are going to design and build a bird feeder. Your bird feeder should attract birds, should keep the bird feed dry and should hold the bird feed safely.

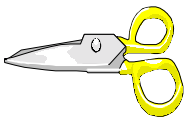
1. Circle the things your bird feeder should do.

- attract birds
- hold the bird feed safely
- feed baby birds
- feed the cats
- feed the squirrels
- keep the bird feed dry
- scare the cats
- hold the birds eggs

2. Circle only the tools and materials you will use to build your bird feeder:

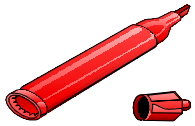

String

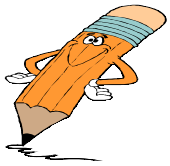

Hole Punch

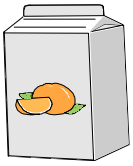

Scissors

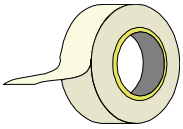

Plastic bottle

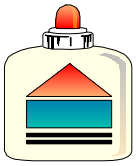
Plastic Pot

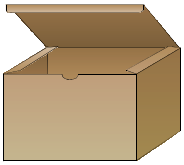

Marker Pen


Pencil


Carton


Tape


Glue


Cardboard box


Pop bottle

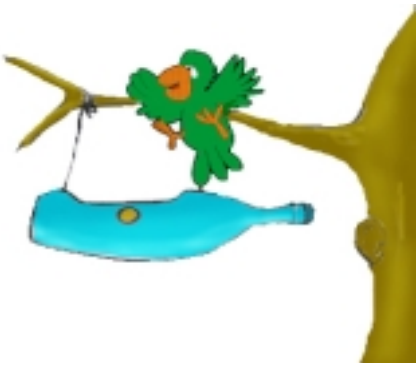
Write and/or draw other things you will use:

I will also use_____

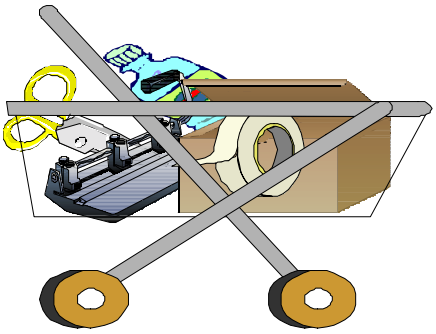
I will also use_____

I will also use_____

Number these boxes from **1** to **6** to show the plan you will follow to build your bird feeder.

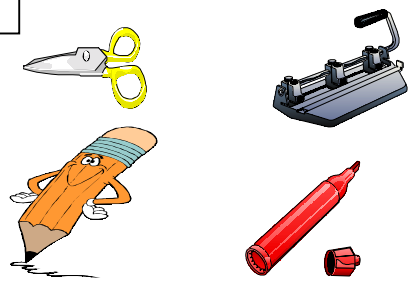


I will test my bird feeder

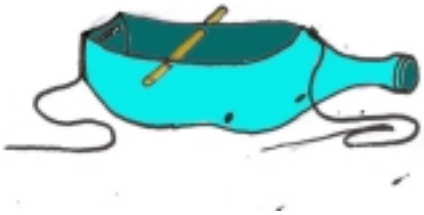


I will collect my materials and tools

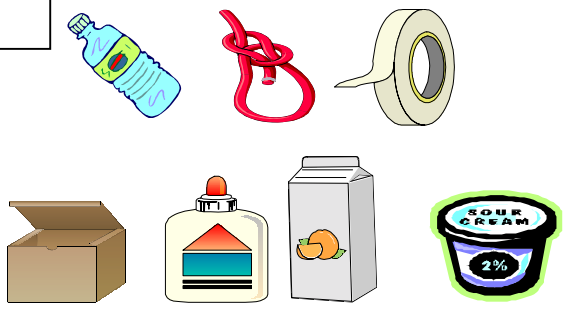
I will design my bird feeder



I will choose my tools



I will build my bird feeder



I will choose my materials

4. Build your bird feeder and test it.

Use words and/or pictures to tell how you tested your bird feeder:

I tested my bird feeder by:

- _____
- _____
- _____

5. Paste or draw a picture of your bird feeder here.

Label a) where the bird seed is put
b) where the bird sits to get the seed

5. Use words and/or pictures to explain how you made your birdfeeder.

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Teacher Information Sheets

SPICE Model

The second goal of Science and Technology Education encourages students to develop the skills, strategies, and habits of mind for scientific inquiry and technological design. As students' design, construct and test devices to solve problems through the technological design approach, it is important that they accommodate the attributes of the design process similar to the SPICE Model as follows:

S – Situation – The situation or context provides an opportunity for something to be designed. It is the setting of the problem. Observe the scene and question.

P – Problem – The problem defines what is going to be solved using the phrase "Design and Make a …"
This statement tells us clearly what is going to be built

I – Investigation – This step requires the problem to be brainstormed. Several different ideas should be explored. Identify the requirements, the available resources and the restrictions. Sketches are an effective way of brainstorming.

C- Construction – The construction step requires the problem's solution in the form of a model to be built from real materials. List of materials can be generated and procedures established. Plan adequately and make the model safely

E – Evaluation – The evaluation is the testing and inspection of the model to see if it works to solve the problem. Look back at the problem and reflect on the achievements. Consider any improvement

By permission of Geoff Day

This task assesses the following **specific expectations**:

Developing Skills of Inquiry, Design and Communication

- **design and make different structures using concrete materials, and explain the function of the structure**
- **use appropriate vocabulary in describing their investigations, explorations or observations**
- **record relevant observations, findings and measurements using written language, drawings, charts and concrete materials**
- **communicate the procedures and results of investigations and explorations for specific purposes using demonstrations, drawings, and oral and written descriptions**
- **use appropriate natural and manufactured materials to make structures**
- **select appropriate tools and utensils**
- **use tools appropriately when joining and shaping various materials**

Relating Science and Technology to the World Outside the School

- **explain the function of a structure that they have made and describe how they have made it**
- **recognize that a product is manufactured to meet a need**

Teachers may wish to provide birdseed for the students to test their feeders.

Prior knowledge and skills

Background Knowledge – For the Birds

Students should be able to explain the function of their bird feeder. They should be able to discuss that it should hold seed effectively, keep the seed dry and provide a safe resting-place for the birds.

They should have been introduced to the function of a number of everyday objects. Examples of these are:

- an umbrella is used to keep us dry when it rains
- a car is used to take us from place to place
- a house is used to keep us warm and dry
- a bridge is used to cross rivers

Students should also be familiar with:

- planning, designing, constructing and testing a product
- the possible need to modify and re-test their design
- the difference between tools and materials
- appropriate and safe use of materials and tools

Introductory activities

1. Display the materials and equipment for the students. Allow the students to manipulate the materials
2. Discuss the uses and benefits of bird feeders with the students and identify criteria
3. Brainstorm with the whole class possible designs and materials for the bird feeder.
4. Allow the students to respond with ideas.
5. Discuss the pictures for the plan. Explain that they should be numbered from 1-6 in the order each thing should be done for a well organised plan.
6. Read the scenario to the whole class. This may have to be repeated with individual students.
7. Brainstorm how they could test and improve their feeders. A list could be put up in the class.
8. Discuss the assessment criteria with the students.
9. Assign the student work sheets.
10. Clarify how each student will be presenting his/her work

Glossary

Structure – A supporting framework (e.g., a bridge or building that is built to sustain a load)

Materials – Objects such as tape, string, glue used in the construction of a structure

Tools – Objects such as scissors, hammers, pencils, rulers used to help construct a structure

Concrete materials – Objects and materials that can be handled

RUBRIC FOR GRADE 1: FOR THE BIRDS

Knowledge/Skills The student	**Level 1** The student	**Level 2** The student	**Level 3** The student	**Level 4** The student
Design Skills • designs, constructs and tests a bird feeder (e.g. chooses materials, follows a plan, builds and tests a structure, communicates what happened)	• applies few of the required skills and strategies • uses materials and equipment safely and correctly only with assistance	• applies some of the required skills and strategies • uses materials and equipment safely and correctly with some assistance	• applies many of the required skills and strategies • uses materials and equipment safely and correctly with occasional assistance	• applies all, or almost all, of the required skills and strategies • uses materials and equipment safely and correctly with no assistance
Communication of required knowledge • communicates procedures and records observations	• communicates with limited clarity and precision • rarely uses science and technology terminology in context	• communicates with some clarity and precision • sometimes uses science and technology terminology in context	• communicates clearly and precisely in most of the task • often uses science and technology terminology in context	• communicates clearly and precisely through all of the task • always uses science and technology terminology in context
Relating Science and Technology • explains the function of the bird feeder • describes how they made it • recognizes a product is made to satisfy a need	• explains the function of their bird feeder with little detail • describes how they made the bird feeder unclearly and with few details • recognizes that their bird feeder has been made to meet a need with much assistance	• explains the function of their bird feeder with some detail • describes how they made their bird feeder with some clarity and detail • recognizes that their bird feeder has been made to meet a need with little assistance	• explains the function of their bird feeder with detail • describes how they made their bird feeder with clarity and detail • recognizes that their bird feeder has been made to meet a need	• explains the function of their bird feeder with much detail • describes how they made their bird feeder with clarity, precision and much detail • recognizes that their bird feeder has been made to meet a need and identifies the need clearly