



# YSISTE

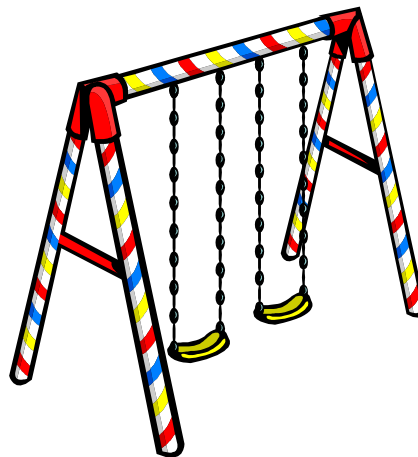
## ASSESSMENT OF SCIENCE AND TECHNOLOGY ACHIEVEMENT PROJECT (ASAP)

Science and Technology Exemplars

### Grade 2: Structures and Mechanisms - Movement

Exemplar Task (2SMPT03/Aug 2000)

## In the Playground



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***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 416-736-5269 or email: [asap@edu.yorku.ca](mailto:asap@edu.yorku.ca)

## Task Overview

### Description of the Task:



***This is a culminating activity designed to assess a cluster of expectations for this grade and strand. Students should have been taught the concepts and skills required to perform this task prior to attempting it.***

***In this task, students will be asked to design and build a model of playground equipment that incorporates a simple machine to create movement for the rider.***



### Materials and Equipment Required:

different sized boxes	bristol board
plastic containers	paper/card punch
construction paper	scissors
cardboard	glue
plastic lids	pipe cleaners
empty spools of thread	toothpicks
wooden dowels or wooden skewers	popsicle sticks
plastic straws	tape
string	pieces of wood
paper clips	



### Suggested Timeline:

Planning – 2 x 30 minutes  
Constructing – 2 x 60 minutes  
Reporting – 2 x 30 minutes



### Suggested Grouping:

Groups of four

### Safety Considerations:



Care should be taken with scissors and sharp objects

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## **Science and Technology Exemplars Project**

### **Grade 2: Structures and Mechanisms - Movement**

Exemplar Task (2SMPT03/Aug 2000)



## **Student Task Sheets**

# In the Playground

Your school has been given money to get a new piece of playground equipment.

Your group must design and build a model to show what piece of equipment you would like to put in the playground.

The equipment must move a person, up and down, or round and round, or back and forth.

1. Draw the model you plan to build. Label the moving parts.

2. List the materials you will need to build your model.

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

3. Circle the simple machines and mechanisms that you will be using in your playground equipment

*Lever*

*Wedge*

*Hinge*

*Wheels and Axle*

4. Circle the words that tell **how** your model moves.

*turns*

*spins*

*swings*

*bounce*

*back and forth*

*round and round*

*up and down*

*twists*

*slowly*

Are there any other words?

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## **Science and Technology Exemplars Project**

### **Grade 2: Structures and Mechanisms - Movement**

Exemplar Task (2SMPT03/Aug 2000)

**In the Playground**

## **Teacher Information Sheets**

This task addresses the following cluster of expectations. Expectations assessed by the rubric are highlighted in bold.



### ***Understanding Basic Concepts***

- **describe different mechanisms through observation and investigation (e.g., hinge, inclined plane), and identify the components that are simple machines (e.g., lever, wedge)**
- **describe, using their observations, the characteristics and movements of simple mechanisms (e.g., hinge, wheels and axle)**
- **describe, using their observations, the pattern of movement of objects (e.g., turning, spinning, swinging, bouncing, vibrating)**



### ***Developing Skills of Inquiry, Design and Communication***

- **communicate the procedures and results of investigations and explorations for specific purposes, using drawings, demonstrations, and oral and written descriptions (e.g., draw a sketch of an object they plan to make and another sketch of the object after it is made; tell the class the procedures they followed in making a vehicle or a container with a hinged lid)**
- **make simple mechanisms and use them in building a device they have designed (e.g., vehicle with wheels and axles)**
- **select and use appropriate tools, utensils, and equipment (e.g., use a paper punch to make holes for the axle in cardboard wheels)**
- **use appropriate techniques to make and fasten the components of a model that they have made (e.g., bend cardboard to make hinges; glue various materials together)**



**Prior Knowledge Required:**

Before attempting this task students should have been taught the following:

- to identify component that are simple machine e.g., lever, wedge
- the difference between stationary and moving objects
- how to record relevant observations, findings and measurements, using written language, drawing charts, and concrete materials
- how to bend cardboard to make hinges and to glue various materials together
- the type of surfaces that are best for certain motions



Students should be familiar with the following science and technology terminology:

Lever, wedge, wheel, axle, rotate, stable, mechanism, hinge, turn, spin, swing, bounce, back and forth, round and round, up and down, twist, slow, fast



**Prior Skills Required:**

Before attempting this task students should have experience of the following:

- planning, designing and constructing models
- working in groups co-operatively
- appropriate use of tools and equipment



**Suggested Introductory Activities:**

The following activities are suggested to introduce this task to the students:

- read the task aloud to the students
- discuss and brainstorm as a group possible designs for the equipment
- recap on chart paper simple machines and mechanisms and leave for class to refer to
- introduce the materials and tools to the class and recap safe use



### **Cross-strand Links:**

Every strand in the Science and Technology document has common set of expectations clustered under the title ***Developing Skills of Inquiry, Design and Communication***. This task is therefore appropriate to assess and evaluate these skills for every Grade 2 strand.



### **Cross-curricular Links:**

This activity provides an opportunity for students to be assessed and evaluated on their ability to work cooperatively as part of a group. Students should be made aware that this will be an integral part of the evaluation and should have prior experience of working with a group before being assessed. This provides a cross-curricular link with *The Ontario Curriculum Grades 1-8 Language, Grade 2: Oral and Visual Communication - Group Skills*.

*The Ontario Curriculum Grades 1-8 The Arts, Grade 2. 3D Construction. The Ontario Curriculum Grades 1-8 Health and Physical Education, Grade 2. Personal Safety and Injury Protection*



### **Reading and Writing Skills:**

This task has been constructed to take into account the possible limited reading and writing skills of some students at this grade level. At the end of Grade Two students are expected to be able to write a sentence (see MET Writing Exemplars 1999). Depending on the achievement level of the children in the class and the time in the school year that this task is administered, teachers will need to take into account the diverse abilities in their classes. The task could be presented orally and evaluated through teacher/student conferences. Teachers could use the questions on the student task sheet to guide their conferences. Students could make oral presentations about their observations to the class. Their presentation could be based upon the questions outlined in the student task sheet. Grade 5/6 students could act as reading/writing buddies to read out questions and transcribe answers.



### **Considerations for Combined Grade Classes:**

Appropriate strategies are as follows:

- Teach one grade while the other grade completes the task which does not require active teacher guidance
- Create separate learning centers for student investigation specific to each grade topic and strand. The methods of science and technology (inquiry and communication) would provide the whole class focus
- Introduce self-directed student activities connected to specific expectations

*Grade 2: In the Playground*

- Reorganize students into grade groupings for the purposes of teaching a given topic
- Teach specific grade expectations when part of the class is working with another teacher
- Make thematic connections by clustering the overall expectations around a unifying organizer such as “Form and Function”.



## DRAFT RUBRIC FOR GRADE 2: In the Playground

Knowledge/Skills	Level 1	Level 2	Level 3	Level 4
<b>Understanding of Basic Concepts</b> <ul style="list-style-type: none"> <li>• describe different mechanism</li> <li>• identify simple machines</li> <li>• describe characteristics of simple mechanisms</li> <li>• describe patterns of movement</li> </ul>	<b>The Student:</b> <ul style="list-style-type: none"> <li>• gives simple description or explanation that shows limited understanding</li> </ul>	<b>The Student:</b> <ul style="list-style-type: none"> <li>• gives partial description or explanation that shows some understanding</li> </ul>	<b>The Student:</b> <ul style="list-style-type: none"> <li>• gives nearly complete description or explanation that shows good understanding</li> </ul>	<b>The Student:</b> <ul style="list-style-type: none"> <li>• gives complete description or explanation that shows detailed understanding</li> </ul>
<b>a) Inquiry Skills</b> <div style="border: 1px solid black; width: 20px; height: 15px; margin: 0 auto; text-align: center; line-height: 15px;">or</div>				
<b>S K I L L S</b> <b>b) Design Skills</b> <ul style="list-style-type: none"> <li>• choice of materials and tools</li> <li>• produces a design drawing</li> <li>• developing and following a plan</li> <li>• safe use of materials and tools</li> <li>• testing and modification</li> </ul>	<b>The Student:</b> <ul style="list-style-type: none"> <li>• chooses appropriately only with assistance</li> <li>• design drawing lacks many details</li> <li>• develops and follows a limited plan</li> <li>• needs frequent reminders about safety</li> </ul>	<b>The Student:</b> <ul style="list-style-type: none"> <li>• chooses appropriate tools and materials with some assistance</li> <li>• design drawing has some details</li> <li>• develops and follows an adequate plan</li> <li>• needs some reminders about safety</li> </ul>	<b>The Student:</b> <ul style="list-style-type: none"> <li>• chooses appropriate tools and materials with little assistance</li> <li>• design drawing has adequate details</li> <li>• develops and follows an appropriate plan</li> <li>• needs few reminders about safety</li> </ul>	<b>The Student:</b> <ul style="list-style-type: none"> <li>• chooses appropriate tools and materials with no assistance</li> <li>• design drawing has many details</li> <li>• develops and follows an appropriate, detailed plan</li> <li>• needs no reminders about safety</li> </ul>
<b>Communication of Required Knowledge</b> <ul style="list-style-type: none"> <li>• clarity and precision of work</li> <li>• use of appropriate science and technology terminology</li> </ul>	<b>The Student:</b> <ul style="list-style-type: none"> <li>• presents a limited number of ideas and details with little clarity</li> <li>• includes few appropriate terminology</li> </ul>	<b>The Student:</b> <ul style="list-style-type: none"> <li>• presents some ideas and details with some clarity</li> <li>• includes some appropriate terminology</li> </ul>	<b>The Student:</b> <ul style="list-style-type: none"> <li>• presents most of the main ideas and details clearly</li> <li>• includes mostly appropriate terminology</li> </ul>	<b>The Student:</b> <ul style="list-style-type: none"> <li>• presents all of the main ideas clearly and precisely</li> <li>• includes all appropriate terminology</li> </ul>
<b>Relating Science and Technology to each other and the World Outside the School</b>				

