

Grade 5

Matter and Materials

Slippery Shapes

The Task

Using the inquiry process, students were to choose an appropriate lining material for gelatin moulds. Specifically, they were to:

- identify the properties of the materials selected;
- conduct a fair test to determine the best lining possible;
- communicate their findings;
- explain the states of matter and changes in states of matter observed.

Students submitted completed worksheets for assessment. Once they had completed their worksheets, they were asked to respond orally to questions posed by the teacher. These interviews were videotaped, and the videos were also used for assessment purposes. (A copy of the videotape is included with this document.)

Expectations

This task gave students the opportunity to demonstrate their achievement of all or part of each of the following selected overall and specific expectations from the strand Matter and Materials: Grade 5 – Properties of and Changes in Matter. (The codes that follow the expectations are from the Ministry of Education's *Curriculum Unit Planner*.)

Students will:

1. demonstrate an understanding of the three states of matter and of changes in state (5s27);
2. investigate common changes of state and make informed choices about materials when finding solutions to problems in designing and constructing objects (5s28);
3. identify the three different states of matter – solid, liquid, and gas – and give examples of each state (5s33);
4. identify the characteristic properties of each of the three states of matter and group materials on the basis of these properties (5s34);
5. conduct a fair test to determine the effectiveness of a variety of commercial products designed for the same purpose (5s41);
6. formulate questions about and identify needs and problems related to the properties and changes in state of familiar materials, and explore possible answers and solutions (5s42);
7. plan investigations for some of these answers and solutions, identifying variables that need to be held constant to ensure a fair test and identifying criteria for assessing solutions (5s43);
8. use appropriate vocabulary, including correct science and technology terminology, in describing their investigations and observations (5s44);

9. compile data gathered through investigation in order to record and present results, using tally charts, tables, and labelled graphs produced by hand or with a computer (5s45);
10. communicate the procedures and results of investigations for specific purposes and to specific audiences, using media works, oral presentations, written notes and descriptions, drawings, and charts (5s46).

Prior Knowledge and Skills

To complete this task, students were expected to have some knowledge or skills related to the following:

- activities and content related to the strand Matter and Materials:
Grade 5 – Properties of and Changes in Matter
- conducting an inquiry, including a fair test

In the teacher's notes and comments accompanying the student samples that follow, the examples cited are either from the student worksheets (indicated by a "P", for "print") or from the videotape (indicated by a "V").

For information on the process used to prepare students for the exemplar task and on the materials and equipment required, see the Teacher Package reproduced on pages 49–57 of this document.

Task Rubric – Grade 5: Slippery Shapes

Expectations*	Level 1	Level 2	Level 3	Level 4
Understanding of Basic Concepts				
The student:				
1, 3, 4	– demonstrates limited understanding of the three states of matter and the changes that matter can go through	– demonstrates some understanding of the three states of matter and the changes that matter can go through	– demonstrates considerable understanding of the three states of matter and the changes that matter can go through	– demonstrates thorough understanding of the three states of matter and the changes that matter can go through
Inquiry Skills				
The student:				
– initiating and planning 2, 6, 7	– applies a few of the skills and strategies required to plan an investigation to select an appropriate lining material for the moulds	– applies some of the skills and strategies required to plan an investigation to select an appropriate lining material for the moulds	– applies most of the skills and strategies required to plan an investigation to select an appropriate lining material for the moulds	– applies all or almost all of the skills and strategies required to plan an investigation to select an appropriate lining material for the moulds
– performing and recording 2, 4, 5, 7, 9	– meets a few requirements of a fair test – makes and records limited observations about the properties of the lining materials	– meets some requirements of a fair test – makes and records some observations about the properties of the lining materials	– meets most requirements of a fair test – makes and records specific observations about the properties of the lining materials	– meets all or almost all requirements of a fair test – makes and records specific and detailed observations about the properties of the lining materials
– analysing and interpreting 2	– draws limited conclusions based on observations and knowledge of properties of the materials	– draws some appropriate conclusions based on observations and knowledge of properties of the materials	– draws valid conclusions based on observations and knowledge of properties of the materials	– draws insightful conclusions with substantial depth based on observations and knowledge of properties of the materials
Communication of Required Knowledge				
The student:				
8, 10	– provides limited explanations for the choice of lining – makes limited use of appropriate science and technology vocabulary	– provides some explanations for the choice of lining – makes some use of appropriate science and technology vocabulary	– provides detailed explanations for the choice of lining – makes general use of appropriate science and technology vocabulary	– provides thorough explanations for the choice of lining – makes extensive use of appropriate science and technology vocabulary

Expectations*	Level 1	Level 2	Level 3	Level 4
Relating of Science and Technology to Each Other and to the World Outside the School				
The student:				
1, 2	– offers limited explanations when identifying examples of changes in states of matter found in the outside world	– offers some explanations when identifying examples of changes in states of matter found in the outside world	– offers complete explanations when identifying examples of changes in states of matter found in the outside world	– offers thorough and complex explanations when identifying examples of changes in states of matter found in the outside world

*The expectations that correspond to the numbers given in this chart are listed on pages 12–13.

Note: This rubric does not include criteria for assessing student performance that falls below level 1.

Student Task Description

Students were presented with the following scenario and instructions:

A Grade 2 teacher is planning to make “Slippery Shapes” cookies for his class. He is using a mould that must be lined to contain the “slippery solution”. He is not sure which lining material will be best to:

- contain the shape until it sets;
- allow him to remove the shape easily and with a minimum of damage from both the mould and the lining material;
- ensure that the finished product has the shape of the mould.

He has asked your class to recommend a lining material for his moulds. To do so you will have to develop and record the results of a fair test that will allow you to determine a material that will meet his criteria. You will be asked to explain your findings to the teacher.

The Grade 2 teacher is also wondering if he will be able to teach his class about matter as he makes the shapes. You will need to convince him that he can do so. To be prepared, you will identify the states of matter and the changes in the states of matter that you observed as the shapes were made.