

FORCES AND SMALL MACHINES (GRADE 5) ROCKS MINERALS AND EROSION (GRADE 4) - MINING IN SASKATCHEWAN

GRADE 4-5

THE IDEA



Students had been investigation in the classroom about small machines. They looked at all aspects of the curriculum including things like types of small machines, force, and friction. Before their work on force and small machines the students had done some learning on rocks, minerals and erosion. The students learned and investigated elements of these three things as well as how they connect to Saskatchewan's land, economics, industry, and environmental sustainability. We used mining as a focus for many of our discussions and connections to Saskatchewan. We also connected the work we had done on learning about habitat (gr 4) and how the mines would have to make plans and processes to use the land with respect and thoughtfulness.

For a final project for this learning was to combine our thinking of these ideas. They were tasked with building a machine that could be used in the mining industry.

THE PROCESS



The students were given an outline of what they had to do.

1. Build a machine used in the mining industry
2. It has to have 2 or 3 small machines used
3. It has to have movement in it
4. It has to have a verbal and/or written explanation of what it is used for and how it works

The classroom then invited an expert to come into the classroom to show us a bit about mining and the machines that were used to do the work. An industry geologist showed the students elements of mining in Saskatchewan. She showed the students the different machines that are used to dig, haul, move, transport and clean ore from different forms of mining. She had both pictures and some video to engage the students into the activity.

After this interaction, the students were then put into groups of 2 or 3. These groups were given time to research what mining machines looked like and what they were used for on their own so they could choose what they were going to make. They had to make a drawing of their machine and make a list of materials they would need to build it. I put no limits of what they could use and only supplied things like paper, white glue, elastics, a few boxes/cardboard. They supplied the rest of the materials they needed.

They were given 2 work periods to build the machine and have their presentation of the machines ready to present to the classroom. They were very creative, and the intensity of the building was awesome.

THE CURRICULUM CONNECTIONS

This lesson was part of a multi-grade project and it was done with grade 4-5 students. These are some of the connections we used.

Grade 4

A. Science

1. **RM4.1** Investigate physical properties of rocks and minerals, including those found in the local environment.
2. **RM4.2** Assess how human uses of rocks and minerals impact self, society, and the environment.
3. **RM4.3** Analyze how weathering, erosion, and fossils provide evidence to support human understanding of the formation of landforms on Earth.

B. Social Studies

1. **RW4.1** Analyze the strategies Saskatchewan people have developed to meet the challenges presented by the natural environment.
2. **RW4.2** Investigate the importance of agriculture to the economy and culture of Saskatchewan.
3. **RW4.3** Assess the impact of Saskatchewan resources and technological innovations on the provincial, national, and global communities.

C. Art

1. **CP4.7** Create visual art works that express own ideas and draw on sources of inspiration from Saskatchewan
2. **CP4.8** Create art works using a variety of visual art concepts (e.g., organic shapes), forms (e.g., kinetic sculpture, mural), and media (e.g., wood, wire, and found objects).

D. Language Arts

1. **CR4.2** View and respond to visual and multimedia texts (including graphs, charts, diagrams, maps, multimedia DVD, websites, television programs, advertisements, posters), explaining the creator's technique and the impact on viewers.
2. **CR4.3** Listen, summarize, paraphrase, and evaluate what was listened to and draw conclusions.
3. **CC4.3** Speak to present and express a range of ideas and information in formal and informal speaking situations (including giving oral explanations, delivering brief reports or speeches, demonstrating and describing procedures) for differing audiences and purposes.
4. **CC4.4** Use a writing process to produce descriptive, narrative, and expository compositions that focus on a central idea, have a logical order, explain point of view, and give reasons or evidence.
5. **AR4.1** Reflect on and assess own viewing, listening, reading, speaking, writing, and other representing experiences, the selected strategies employed (e.g., using class-generated criteria), and explore possible ways to improve.
6. **AR4.2** Set and pursue personal goals to improve viewing, listening, reading, speaking, writing, and other representing tasks more effectively.

Grade 5

A. Science

1. **FM5.1** Analyze the effects of gravitational, magnetic, and mechanical forces, including friction, on the movement of objects. (CP, SI)
2. **FM5.2** Investigate characteristics of simple machines, including levers, wheels and axles, pulleys, inclined planes, screws, and wedges, for moving and lifting loads. (SI, TPS)
3. **FM5.3** Assess how natural and man-made forces and simple machines affect individuals, society, and the environment. (CP, DM, SI)

B. Social Studies

1. **DR5.1** Analyze the historic and contemporary relationship of people to land in Canada.
2. **DR5.2** Assess the impact of the environment on the lives of people living in Canada.

3. **RW5.1** Explain the importance of sustainable management of the environment to Canada's future.
 4. **RW5.2** Hypothesize about economic changes that Canada may experience in the future.
- C. Art
1. **CP5.8** Create art works using a variety of visual art concepts (e.g., positive space), forms (e.g., graphic design, photography), and media (e.g., mixed media, paint).
- D. Language Arts
1. **CC5.3** Speak to express and support a range of ideas and information in formal and informal speaking situations (e.g., giving oral presentations and reports, retelling a narrative, explaining a display to others, working in groups) for particular audiences and purposes.
 2. **AR5.2** Set goals to enhance the development and improvement of the skills and strategies in viewing, listening, reading, speaking, writing, and other forms of representing and take steps to achieve goals.

THE ASSESSMENT



1. Use the criteria to form a check list on the machine
2. If the students write-up the ideas formed from the project, use your writing criteria to gauge an idea on written assessment.
3. Present their creations to their care-partner grade 1 classroom and their parents at our 3-way conferences. The students can again present their creations and review the learning it took to make and talk about the machine.