

GRADE 5 SCIENCE

Specific Curriculum Outcomes

Physical Science: Forces and Simple Machines

Forces and Their Effects

- investigate and compare the effect of friction on the movement of objects over a variety of surfaces (204-1, 204-5, 303-15)
- demonstrate the use of rollers, wheels, and axles in moving objects (303-

Simple Machines: Levers

- design a lever for a particular task and differentiate between the positions of the fulcrum, the load, and the effort (303-18, 303-19)
- use simple machines to identify the effort and load required to move objects (205-2, 206-9, 303-17)

Simple Machines: Pulleys, Systems of Machines

- compare and record the force needed to lift and load an object by using a single pulley system with that needed to lift it by using a multiple pulley system and predict the effect of adding another pulley or load-lifting capacity (303-20, 204-3)

Why Use Cooperative Learning?

Extensive research has compared cooperative learning with traditional classroom instruction using the same teachers, curriculum, and assessments. On the average:

Students who engage in cooperative learning learn significantly more, remember it longer, and develop better critical-thinking skills than their counterparts in traditional lecture classes.

Students enjoy cooperative learning more than traditional lecture classes, so they are more likely to attend classes and finish the course.

Students are going to go on to jobs that require teamwork.

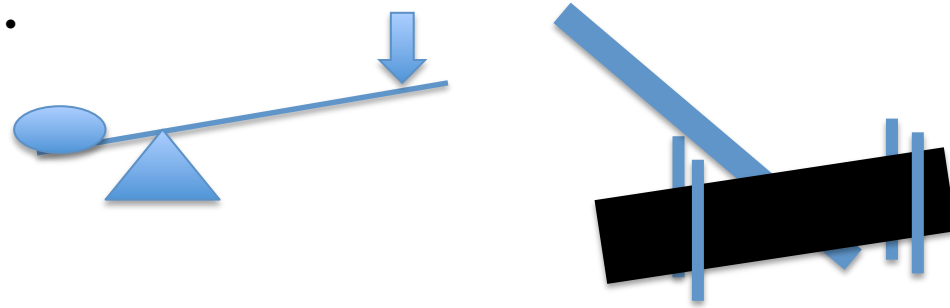
Cooperative learning helps students develop the skills necessary to work on projects too difficult and complex for any one person to do in a reasonable amount of time.

Cooperative learning processes prepare students to assess outcomes linked to accreditation.

Group Roles:

- **Group facilitator:** keeps the group on task, assures work is done by all, and makes sure all have opportunity to participate and learn.
- **Timekeeper:** monitors time and moves group along so that they complete the task in the available time, keeps area clean
- **Recorder:** Adds
- **Photographer/Illustrator:**

Class One Lever



Problem: Student asked what type of lever and how effort required will change as the position of the fulcrum or where effort is exerted on the is changed.

Method: Each student will push down on the lever twice attempting to lift the log. The first attempt will be from the end of the pole and the second from the 2/3rd position. After each attempt they will record but not share their perception of the effort required on a scale of 1 to 10 with 1 being the easiest and 10 the hardest. After all students have participated, the recorder will transcribe the individual results to the master sheet as seen below.

<u>Student</u>	<u>Attempt 1</u>	<u>Attempt 2</u>
<u>One</u>		
<u>Two</u>		
<u>Three</u>		
<u>Four</u>		
<u>Five</u>		

Class 2

Wheelbarrow

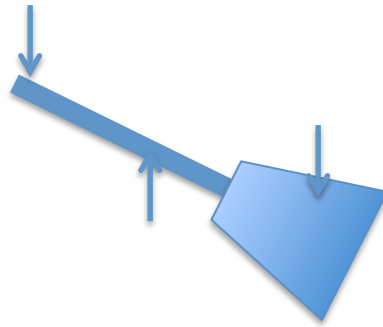


Each student will move the wheelbarrow from point A to point B twice. In the first attempt the load will be placed at the front of the wheelbarrow and in the second attempt at the back.. After each attempt they will record but not share their perception of the effort required on a scale of 1 to 10 with 1 being the easiest and 10 the hardest.

Student	Attempt 1	Attempt 2
One		
Two		
Three		
Four		
Five		

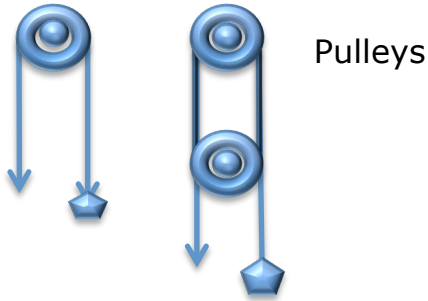
Class 3 Lever

Shovel



Each student will use the shovel to place a load in the wheelbarrow twice. In the first attempt the lower hand will be placed at the $\frac{1}{3}$ way point and in the second attempt the lower hand will be placed at the $\frac{1}{2}$ way point. After each attempt they will record but not share their perception of the effort required on a scale of 1 to 10 with 1 being the easiest and 10 the hardest.

Student	Attempt 1	Attempt 2
One		
Two		
Three		
Four		
Five		



Smooth Surface		
Student	One Pulley	Two Pulleys
One		
Two		
Three		
Four		
Five		
Rough Surface		
Student	One Pulley	Two Pulleys
One		
Two		
Three		
Four		
Five		

Smooth Surface

1. One pulley: Each student will pull on the rope twice attempting to move the log two feet.
2. Two pulleys: Each student will pull on the rope twice attempting to move the log two feet.

Rough Surface:

1. Each student will pull on the rope twice attempting to move the log two feet.
2. Each student will pull on the rope twice attempting to move the log two feet

After each attempt they will record but not share their perception of the effort required on a scale of 1 to 10 with 1 being the easiest and 10 the hardest. At the completion of the activity, students will hand in their sheets to the *recorder* to be included in the master sheet and averaged.

ACTIVITY STATIONS 1 & 2

302-10:

identify patterns in indoor and outdoor air movement

205-7; 300-13

record observations using measuring instruments in order to describe weather in terms of temperature, wind speed, wind direction

204-8; 205-4; 206-5:

identify and use appropriate tools, measuring instruments and materials to measure the temperature of soil and water after exposing them to light and **draw conclusions**

1. In a forested area, measure airflow (speed and direction), and temperature (ground temp and air temp) using appropriate instruments.

2. In an open field area, measure airflow (speed and direction), and temperature (ground temp and air temp) using appropriate instruments.

ACTIVITY STATIONS 3 & 4

205-7; 300-13

record observations using measuring instruments in order to describe weather in terms of precipitation and cloud cover

104-4; 206-1

classify clouds as stratus, cumulus, cirrus or "other, compare results with others and recognize that results may vary

3. In a forested area find evidence of and/or make predictions about precipitation (#1) and, observe and sketch cloud/canopy cover (#2). Describe observations.

4. In an open field area find evidence of and/or make predictions about precipitation (#1) and observe and sketch cloud/canopy cover (#2). Describe observations.

#1 examine soil type and moisture content

#2 (amount of cloud and open sky, identify types of cloud using a visual chart)

ACTIVITY STATIONS 4 & 5

5. Designate a 1metre square plot of forest ground and observe/count certain features (such as vegetation, garbage, insects) then *estimate ??* what exists in the whole Baille Ard trail forest area.

6. Designate a 1metre square plot of open field ground and observe/count certain features (such as vegetation, garbage, insects) then *estimate ??* what exists in the area of the whole school yard.

Natural indicators:

- **Vegetation**
- **Precipitaion**
 - **Tree Rings (long term)**
 - **Soil type**
- **Sunshine**
 - **Canopy vs open**
 - **Disturbances**
 - **Surface temperature, quality of light**
 - **See "THE PHYSIOLOGICAL ECOLOGY OF PLANT SUCCESSION"**
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- 2 hours total
- About 60 students
- two separate circuits of 5 stations
- approx 15-20 min activity stations
- stations led by 2 gr 9 students each
- a few minutes transition time between stations
- need to confirm grade 5 group leaders (teachers? volunteers? BEd students?)