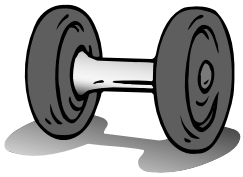
Chapter Science Investigation Name _____

Working on a Slant

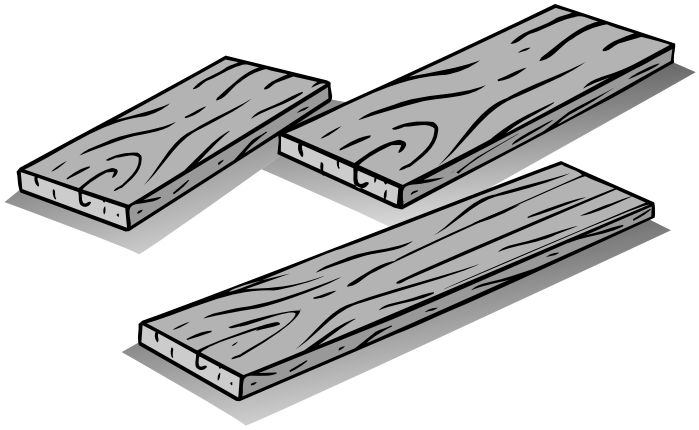
What You Need

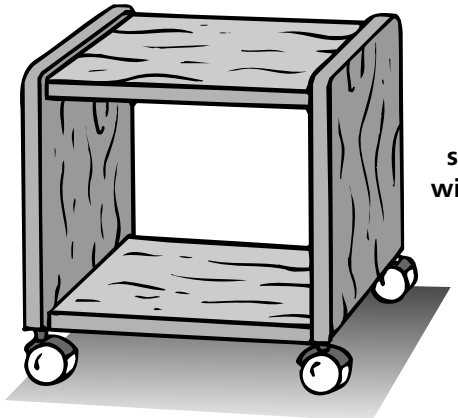

stack of books


spring scale


small heavy object


metric ruler


boards, each of a different length


small cart with wheels

Find Out

What effect does the slope of a ramp have on the force needed to use it?

Process Skills

Predicting
Measuring
Communicating
Observing

Time

- 20 minutes a day for four days

What to Do

1. **Predict** which board will require the most work to pull the cart up the ramp.
2. **Measure** the length of the boards. **Record** these lengths in your chart.
3. Stack the books. **Measure** and **record** the height of each stack.
4. Use the first board to make a ramp up to the top of the stack of books.
5. Place the small, heavy object to be moved in a cart, and use the spring scale to pull the cart up the ramp at a steady speed. **Observe** and **record** the reading on the spring scale.
6. Repeat Steps 4 and 5 each day using a new board with a different length.

Prediction: _____

_____

_____

Slope and Force			
Time	Length of Ramp (length of board)	Height of books (the same each time)	Force (reading on spring scale)
Day 1			
Day 2			
Day 3			
Day 4			

Conclusions

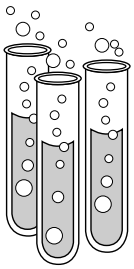
1. Which board needed the greatest force to move the cart up the ramp?

2. Which board needed the least force?

New Questions

1. When does a car exert the greatest force?

2. Write a new question you have about ramps and the use of force.



Name _____

ACTIVITY

Measuring Force

What happened when you and your partner pulled on the spring scale?

What happened when you and your partner pushed on the scale?

How much force does it take to move each object you have collected? **Record** your measurements in the chart.

Object	Force When You Pull	Force When You Push

Name _____

Conclusions

1. What did you feel when your partner pushed or pulled on the spring scale?

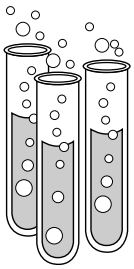
2. Which objects made the scale read the highest when you pulled and pushed them?

3. Why did it take a bigger pull to move some objects?

Asking New Questions

1. Both pushing and pulling made the spring scale read 10 N. How are pushing and pulling the same?

2. Why is it useful to be able to measure force?



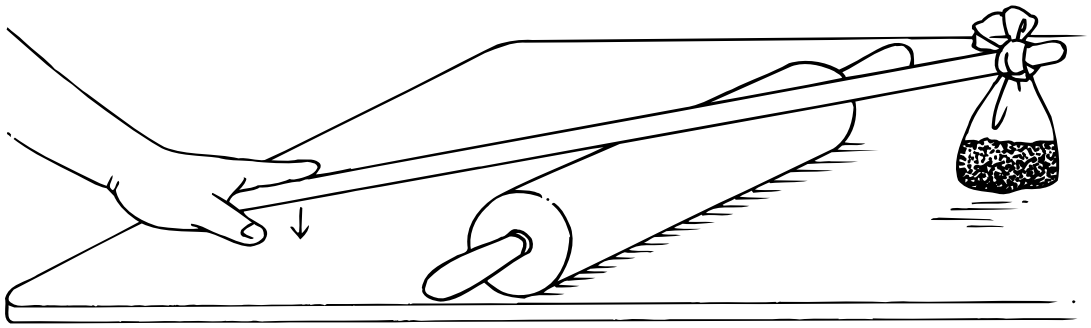
Name _____

ACTIVITY

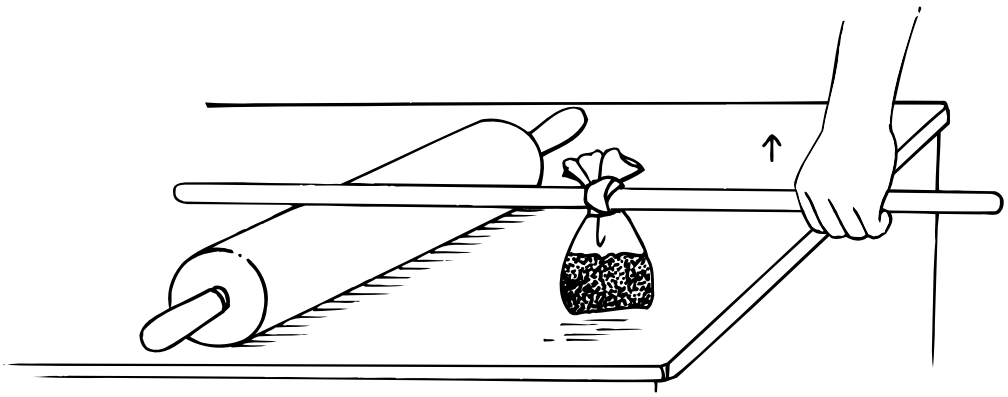
Making a Lever

Look at the pictures. Under each picture, **record** what happens when you use the lever this way.

Lever with Fulcrum at the Center and Load at One End



Lever with Fulcrum at One End and Load at the Center



Name _____

Conclusions

1. Which kind of lever would you use to move a very heavy object? Why?

2. Which kind of lever would you use to lift an object high in the air? Why?

Asking New Questions

1. Look around at school and at home to see levers in use. Can you find at least five?

2. What are some everyday uses for the kinds of levers you made in this activity?

