Ice & Slipperiness

Oct. 22

Question:

1. How to best prevent slipping on Ice?
2. What are some ways to prevent slipping? (comparing?)

What are we comparing?:

- gravel
- salt
- sand
-

shoveling?
temperature
Surface
footwear

Organizations:

- Our school, other schools
- City of Calgary
- Homes
- Apartments / Condos - older residents

Hypothesis:

We think...

Science Fair Meeting 1

December 4th

Mr. Rip's email
jmrip@cbe.ab.ca

- Need Hypothesis which is testable typically "if ___ then ___"
  - first, you need a question
- Once you have a prediction, you need a variable

Variables

- Independent Variable: what you will change. Usually just one!
- Dependent Variable: what you will measure.
- Controlled Variable: what you will keep the same. Related to source of error.
- All variables should be measurable

Assignment 1

1. Your Question
2. Hypothesis & prediction
3. Your Independent, dependent, & controlled variables
4. One resource you used for information

- When s
fricton
reduces
grips.

* Low fr

What

- Resist
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of fric

- 4 Mass
the
- Frict
surfa
move

* scien

-

- When something is icy, the friction between the 2 surfaces reduces which causes slips not grips.

* Low friction, slip

What affects friction?:

-

Resistance to Friction is measured with a value called coefficient of friction. low coefficient of friction high slips, high coefficient of friction high grip

-

↳ Mass of the moving object in the pull of gravity

- Friction is the resistance one surface or object has when it moves over another

* sciencefriday.com

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Science fair meeting 2

experimental procedure:

- a step by step "recipe" for your experiment
- Should be detailed so that anyone could repeat your experiment
- What materials will you use
- How will you change your independent variable and how will you measure that change (what units)
- How will you measure the change in your dependent variable (what units?)
- Do you need a control group

Flat ice, rather than a slope

Procedure

1. Prepare ice test surface a full day before testing
* What tray/container? - 12-18 inches, Boot tray
* On test day we will make sure the ice is set
* has to be level

2. Apply material to the test surface
* Consistant and recommended amount
* We will make sure we manage all our controlled variables
* Shoe weight - Bag of... Sand, flour,
* This experiment will be performed outdoors
* We will incline the surface so that material moves independantly
* We will measure with a protractor

3 Let the shoe slide across the ramp, use a stopwatch to time how long it takes to travel across.

* Repeat this for a min. of 25 trials for each materi

2.

1. Same
2. No material
2. Moving the shoes across the ice

No weight, with gripper's =
1.25 1.19 →
1.22 0.81 0.83

1.
2.
3. Sh
4. high
5. foshi
6 Dr. Mart
7 work bo

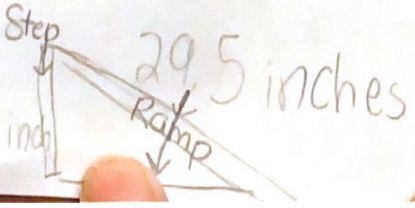
Current +2°C
High +3°C
Low -6°C

Model	Shoe	Surface Area (cm2)	Time (s)	Speed (m/s) Reference Y/N	Notes
1. Sand		Slides - Some grip			
2. Cat litter		Shoe slides		Y Y Y Y Y	
3. Senior building salt		No Movement	Best grip	N N N	
4. Church salt		Melted fast but granded slip			
5. Gravel					

Model experiment 2. (F)	Shoe	Surface Area (cm2)	Time (s)	Speed (m/s)	Notes
No weight with grippers: 1.25 1.19 1.22 0.81 0.83					*weigh footwear
1. Running shoe	0.86 0.83 1.05 0.9	0.9 0.98 0.81 0.95 1.26	1.03 0.91 0.95 0.91 1.07 0.91	0.95 1.05 1.16 0.91	2 lbs weight
2. Tall winter boot	0.81 1.18 0.9 1.17	1.01 1.24 1.03 1.04 1.23 1.15	1.25 1.11 1.15 1.11 1.27 1.22	1.02 1.10 1.12 0.90 1.14 1.10	2 lbs weight
3. Short winter boot	0.7 0.81 0.65 0.65	0.90 0.91 0.68 0.80	1.05 0.81 0.91 1.08 0.83 0.59	0.78 0.81 1.10 1.05 0.86 0.92	0.9
4. high heel	0.72 0.96 0.86 0.76	0.76 0.93 0.69 0.96 0.71	0.74 0.70 0.88 0.56 0.85 0.66 0.88 0.55 0.85 0.93		0.97
5. fashion boot	1.25 0.59 0.71 1.21 0.85 1.15 0.68 0.78 1.24 0.78		0.98 0.71 0.92 0.91 1.00 0.87 0.88 1.01 1.00 0.95		
6. Dr. Martens	0.75 0.76 1.05 1.05 1.00 0.93 0.90 1.17 1.08 0.80	0.71 0.74 1.03 0.81 0.94 0.66	0.61 1.02 1.00 0.88 1.04 1.06 1.01		
7. work boot	0.93 0.85 0.65 0.72 0.69 0.80	0.94 0.68 0.83 1.01	0.70 0.65 0.95 0.83 0.63 1.10	0.79 0.89 0.75 0.68 0.85 0.81 1.13 1.03 1.03 0.80 0.93 0.82	
8. work boot with gripper	1.10 1.00 0.96 1.13 0.83 0.89	1.01 0.86 1.16 0.97	1.31 1.10 0.79 1.24 1.15 0.98	0.88 0.73 0.80 0.94 0.93 0.83	Helps!

Hypothesis: Which shoe will slide the fastest? - 4. Fashion Boot
a. Which shoe will slide the slowest? - 7 & 8 - work boot with and without gripper

1.
2.



7.5 inches (19 cm)
33 inches (83 cm)

15 degrees

Final Slides

Feb 11

1. title
2. Q & H ✓
3. Bckrg Rsrch ✓ - 4
4. Variables (I), ~~Comparisons ns~~.
5. M & Pro. materials - Pic of Materials/features
6. results
7. Conclusion
8. Next Steps
9. Sources (ALL)!

Other info:

- 9 - 12 slides
- Avoid clutter
- Font 16+
- Point form

To-Do:

Make pictures (Canva)?

Binder:

- Project Purpose
- Why this matters to society
- Order rank

Worst shoe - #7 - High heel
Best one - #1 - Tall winter boot
Smooth, not much tread

	Size	Shoe	Surface	Tread
	6.5 W	high heel	seperate toe, very small heel	Smooth
S →	4 Y	tall winter boot	like a tire	deep
	5.5 Y	running shoe	continuous	shallow
B →	8 W	fashon boot	blocky → heel, low	smooth (extreme)
	6 W	Dr. Martins	seperate toe & heel	shallow
	7 W	short winter boot	continuous	smooth
	6 W	work boot	seperate heel	shallow

overall

Average: The total value of data

Outliers: outside the normal range

0.25