Forces at work: Friction and grip

do more feel better live longer

Friction and grip: Student sheet

Prediction

Which shoe will grip the best? Rank all three shoes and explain your answers.

1. _____

Why? _____

2. _____

Why? _____

3. _____

Why? _____

Method

Method 1: Flat surface

1. Read the instructions in full before you begin
2. Begin with the shoe on a level surface (floor or bench)
3. Place a 1kg mass, or heavy object, in the shoe
4. Use the force meter to slowly increase the horizontal force on the shoe until it just starts to slide
5. Write down how many newtons were required to start the movement
6. Repeat three times and work out the average
7. Try each shoe, switching with other groups, and work out the average force for each
8. Explain your results in terms of the predictions you made in the space provided

Method 2: Slope

1. Read the instructions in full before you begin
2. Create a ramp using a wooden board or similar. Set this up in a way that you can change the height of the ramp or, if it's lightweight, team members can hold it at different heights
3. Place a 1kg mass, or heavy object, in the shoe
4. Use the force meter to apply force until the shoe starts moving down the ramp
5. Write down how many newtons were required to start the movement
6. Repeat three times and calculate the average
7. Try each shoe, switching with other groups, and work out the average force for each
8. Explain your results in terms of the predictions you made in the space provided

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Results table 1

Type of shoe	Force needed to start slide	Average force (N)
	1.	
	2.	
	3.	
	1.	
	2.	
	3.	
	1.	
	2.	
	3.	

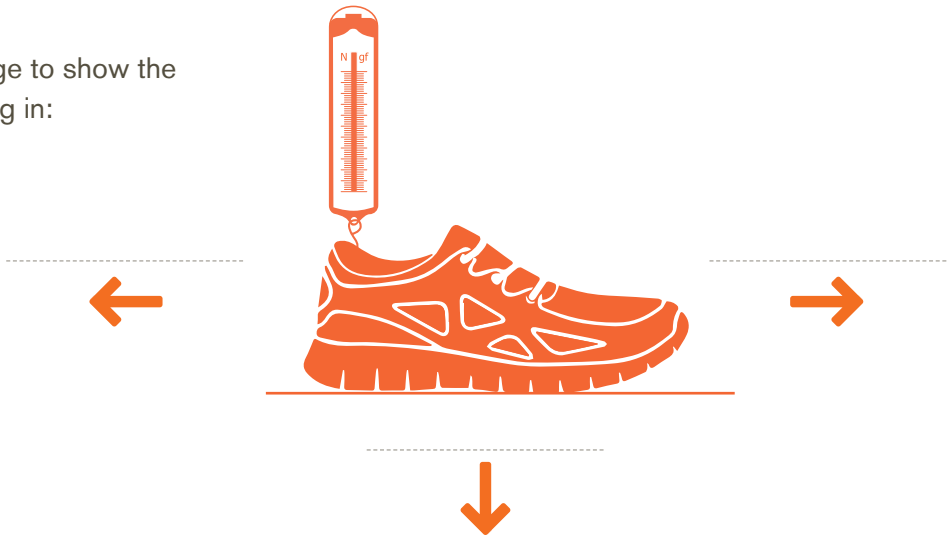
Explain your results:

Label the arrows on the below image to show the direction each of the forces is acting in:

Gravity

Applied force

Frictional force



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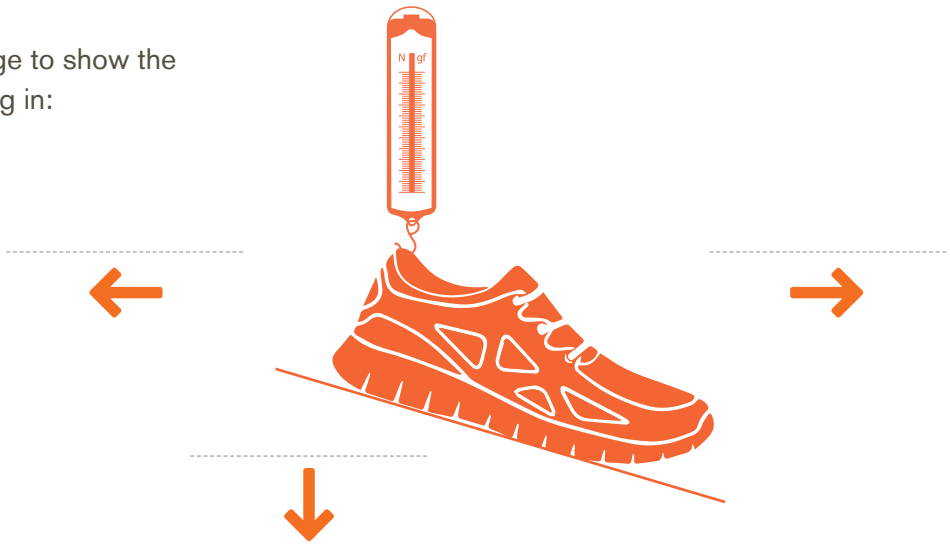
Results table 2

Type of shoe	Force needed to start slide	Average force (N)
	1.	
	2.	
	3.	
	1.	
	2.	
	3.	
	1.	
	2.	
	3.	

Explain your results:

Label the arrows on the below image to show the direction each of the forces is acting in:

Gravity

Applied force

Frictional force