

Surface Area & Pressure

Pressure- _____

Surface Area- _____

Equation:

Equation Triangle:

Force- pounds (lbs), Newtowns (N)
 Area- ft², in², cm², m², etc.
 Pressure- lbs/in², N/m², etc. (*force/area*)

PRESSURE ACTIVITY PROCEDURE:

- Trace the bottom of your shoe on the provided graph paper.
- Calculate the surface area of the bottom of one of your shoes by counting the squares (whole and partial squares) that your shoe covered on the graph paper. *Note: 1 square = 1 cm².* Multiply the total surface area that you calculate by 2 so that you have the surface area for both of your shoes (when you stand, you stand on TWO feet).
- Determine the pressure that you exert on both of your feet by using your equation for pressure and enter that information in the data table below:



$$\text{Pressure} = \frac{\text{Force (your weight in pounds)}}{\text{Area (surface area of shoe in cm}^2\text{)}}$$

- Repeat procedure steps A-C for a high-heel shoe and enter that information in the data table below.
- Your teacher will provide the surface area information for snowshoes. Calculate your pressure when wearing snowshoes by using the equation in procedure step C and enter that information in the data table below.

Data Table:

	Your Shoes	High-heel Shoes	Snowshoes
Surface Area in cm ² For TWO Shoes			
Pressure in lbs/cm ² For TWO Shoes			

1. Which “shoe” has the largest surface area?
2. Which “shoe” exerts the most pressure on the ground/your feet?
3. Which “shoe” exerts the least amount of pressure on the ground/your feet?
4. You calculated your pressure for when you stand on the ground on TWO feet. What would happen to your pressure if you stood on the ground on ONE foot?
5. Describe how using snowshoes in deep snow can help you walk easily in deep snow.
6. The principles of surface area & pressure can be useful in emergency rescue situations. How do you think that surface area & pressure might apply during an emergency rescue of a person stranded on thin, brittle ice on the lake?



Beware - thin ice

7. What is the pressure on the ground of a 150 pound (lbs.) person who is wearing shoes with a surface area of 35 in^2 ?
8. The same 150 person from question #6 lies down on the ground. Describe what happens to the amount of pressure that this person is now exerts on the ground.