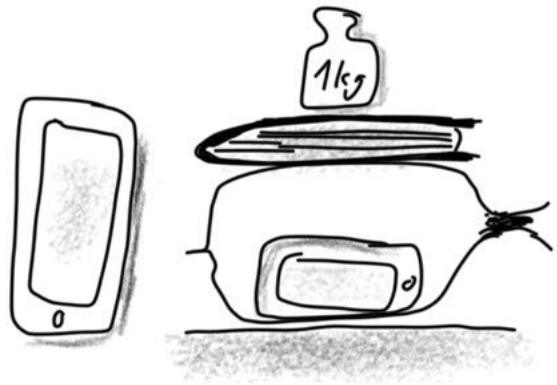
Experiment Instructions: Pressure on a Surface
Investigate how the pressure depends on the force and the area.
Materials:

- freezer bag 3l
- elastic band
- 2 digital devices to be used for Phyphox
- one of them with pressure gauge and phyphox
- thin book
- weights: 2x1kg and 1x0.5kg
- tile 10cmx10cm

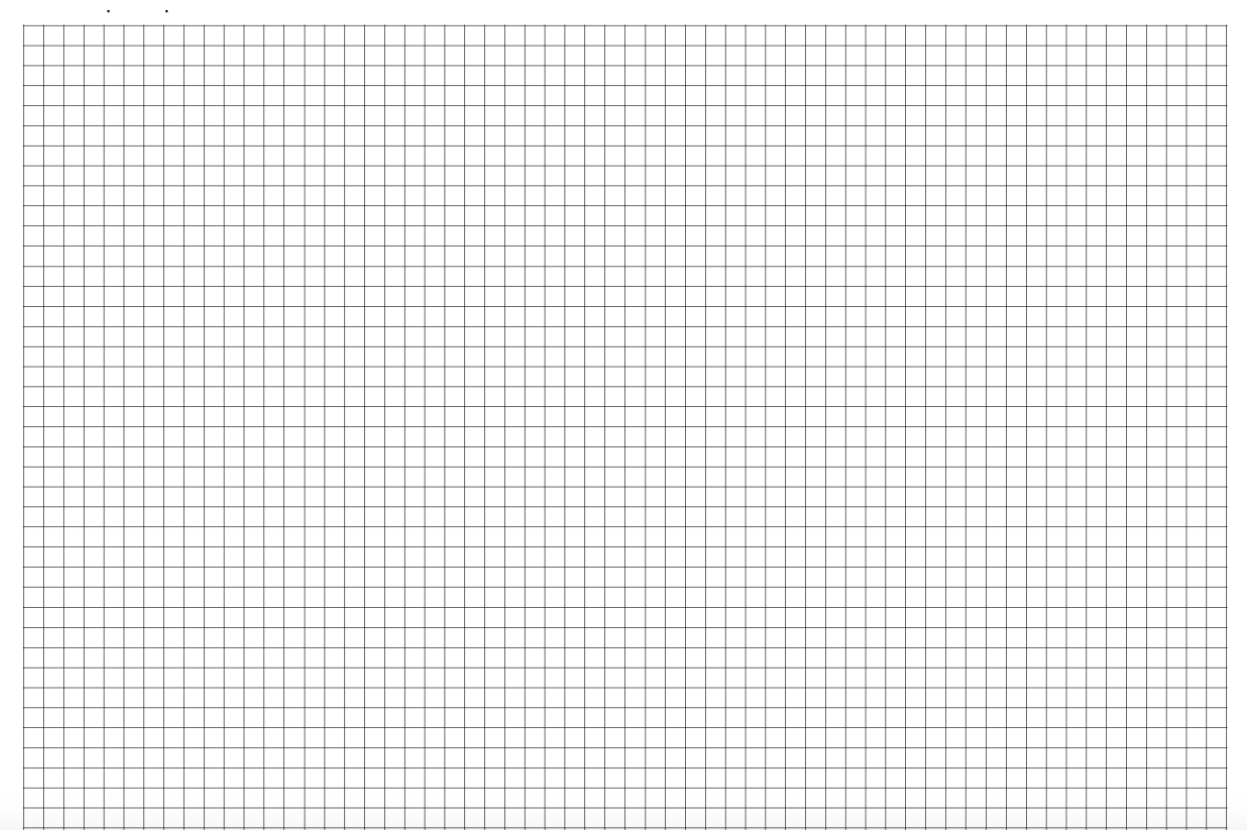
Experiment 1
<u>Examine the change in pressure depending on the effective force.</u>

Active the air pressure experiment in the phyphox app on the mobile phone and remote access via the three dots in the top right corner. You will now see an internet address below. Open this on the second device so that you can control the experiment remotely.
Put the pressure gauge (the phone) in the freezer bag, blow some air into it and close it very well with the elastic band. Place a book securely on the bag and write down the values. Now place the masses one after the other and note the change in pressure.



Mass (Kg)	Additional Force (N)	Pressure (hPa) (Rounded to 1 digit)	Change in pressure from the initial value (hPa)
Only Book	0		0
0.5	5		
1			

Draw the diagram that shows the change in pressure as a function of the force and write a mnemonic.



Experiment 2
<u>Examine the pressure depending on the area</u>

Repeat the experiment with the 1kg mass piece and the book only that this time the mass piece is on the bottom and the book is balanced on it. You can still hold the book lightly. Write another mnemonic!

Mass (Kg)	Pressure (hPa) (Rounded to 1 digit)
Book + 1Kg	
1Kg + Book	

PRESSURE DEFINITION:
The pressure p is expressed as the amount of that acting force on a body/object
Force F and the flat surface A are defined. $P = \frac{F}{A}$

Experiment 3
<u>The Unit Pascal</u>
Measure the pressure exerted by a force of 100N on an area of 100 cm^2. In addition, use the 1kg mass piece and a tile that happens to be exactly 100 cm^2 in size.

Mass (Kg)	Pressure (hPa) (Rounded to 1 digit)	Pressure Change
Only Tile		
Tile + 1 Kg		

Now you know what pressure a force of 10N triggers on an area of 1 dm^2. Since 1 m^2 is exactly 100 times larger, the force from 1 m^2 would also have to be 100 times larger, i.e. 1000N, in order to generate the same pressure. According to your measurement is:

$$P = \frac{F}{A} = \frac{10\ N}{dm^2} = \frac{1000}{m^2} = \cdots hPa = \cdots Pa$$

Therefore, would be 1 Pa = $\frac{\ldots N}{\ldots m^2}$

Compare your measurement to the definition of a Pascal from the physics book or the internet. There you can find the value 1 Pa = $\frac{\ldots N}{\ldots m^2}$

Translated by: Solmaz Khodaeifaal