	TEAM: 7	
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Smartphone-accelerations into physics situations	Italy	Diego Paglierani Stela Xhumri
EXPERIMENT: mathematical correlation between inclination and speed		

1. ORIENTATION

Put the smartphone on a sloping surface and let it slide off. Increase the angle of the slope to find the mathematical correlation between the speed of the smartphone and the gradient. Use Phyphox to measure all information.

a. **Research question:**

What is the mathematical correlation between the inclination angle and the acceleration of the smartphone that slides off the slope.

b. Hypothesis

The bigger the angle, the bigger the acceleration of the smartphone will be. (The bigger the angle, the lower the weight of the smartphone, the faster it will slide down)

2. PREPARATION

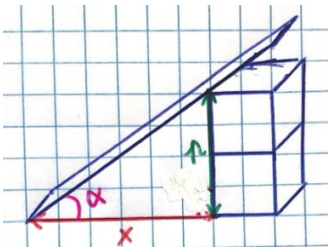
2.1. Material:

- Smartphone with the Phyphox application
- A plank (minimum 1 metre)
- Several (wooden) blocks
- A ruler

2.2. Method:

- First of all, prepare the construction for the experiment:
  Make a tower with the little blocks and let the plank lean on it. (see picture)

- Calcute the angle that you've just made:
  Measure the length between the end of the plank and the beginning of the tower. (red line (x) in the picture) and measure the height of (green line (p) in the picture). Then you can calculate the angle with the formula of the tangent. (tan α = p/x)



- Let your smartphone slide of the inclination (with Phyphox, use the experiment: 'acceleration without g'). Interpret the a(t) graph (only use the useful information of the graph) repeat 3 times.
- If you interpret the graph, use the column 'absolute'
- Put an extra block on the tower to increase the angle of inclination. Then let your phone slide off again 3 times and interpret the graphs.
- Repeat this experiment at least 3 times with a different inclination angle.

3. DATA ANALYSIS and DISCUSSION

3.1. Observations and Measurements:

Measurements with Phyphox:
First acceleration: 1,40 m/s2
Second acceleration 1,11 m/s2

The smallest angle:4,6°
The biggest angle:4,9

3.2 DISCUSION

-The angle of the first measurement is 4.6 °; calculating with Phyphox the acceleration modulus is 1.40 m / s2
- The angle of the second measurement is 4.9 ° with 1.11 m / s2 acceleration.
- From this it follows that if the angle decreases the acceleration increases. While if the angle is bigger the acceleration decreases.

4 REFLECTION

4.1 Conclusion

The three measurements with Phyphox "acceleration without g", are presented to us almost identical to each other, without evidence of major changes. The acceleration value (1.40 and 1.11) is the average of the three measurements made respectively taking into consideration the measurement of the minor and major angle (4.6 and 4.9)

4,3 Reflection

The measurements are not consistent with the initial hypothesis, since if the angle increases, the acceleration should also increase, and if it decreases, so should the acceleration. While our values and calculations show the opposite.