eTwinning	TEAM:3	
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Smartphone-accelerations into physics situations	Italy	Bonuomo Giulia Miriam Sassaoui Eleonora Bussi
EXPERIMENT:		

We chose to do the roll experiment; this means we will use our phone with PhyPhox running in the background to measure the speed of a roll going down a slope with a variable angle by neatly putting the phone inside the roll.

1. ORIENTATION

1.1. **Research question:**

What is the correlation between the size of the orbital speed an object experiences and the angle from which the object is set into a rolling motion?

1.2. **Hypothesis**

De correlation is kwadratic, because $vorb = (2\pi * F)^2 * r$

2. PREPARATION

2.1. **Material**:

- Roll that is big enough to put your phone in
- Phone with PhyPhox
- An incline with adaptable angles. (examples a wooden plank)
- Ruler(to measure the diameter)

2.2. **Method:**

- Put your phone inside the roll and make sure it is fastened
- Take the plank and set up your incline
- Hold the roll in its place at the top of the incline

- Set up Phyphox (roll-experiment) to start the measurements
- Press on the three points in the right upper corner and press on timed measurement.
- Delayed start 3s and duration experiment 4s.
- When you are ready press again on the three points and export the data to excel.
- Do this experiment 3 times without changing the angle
- Change the angle to an arbitrary value and repeat the experiment three times over. Don't forget to export the data!
- Change the angle one last time and repeat the experiment 3 times.
- Export the data

3. DATA ANALYSIS and DISCUSSION

3.1. Observations and Measurements:

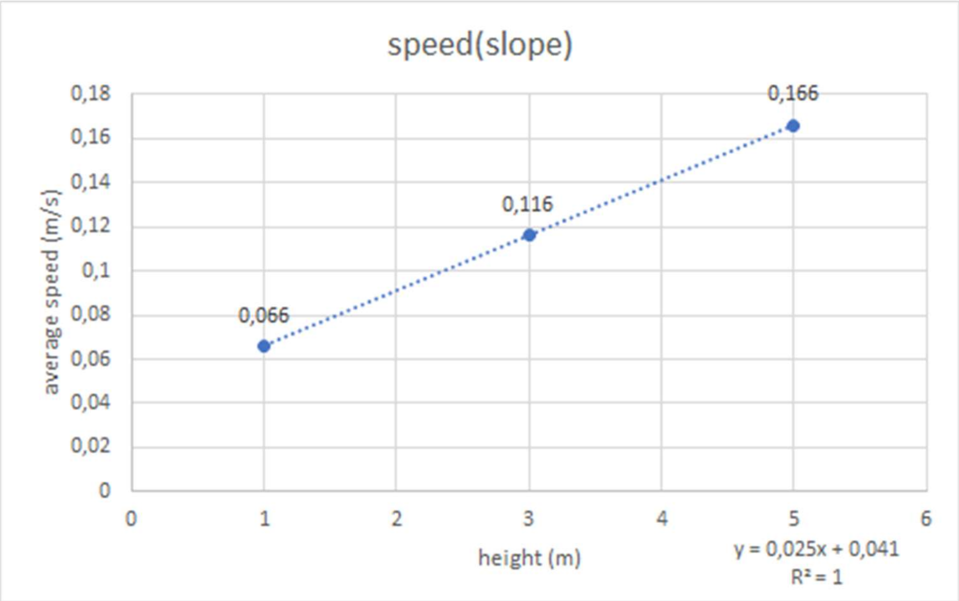
LINK TO PHYPHOX RESULTS

https://docs.google.com/spreadsheets/d/1sUVwE19ba2RAvFn_OWXfSJhG-WZ95cPC/edit?usp=sharing&ouid=110646732025876546876&rtpof=true&sd=true

AVERAGES

AVG SPEED ROL 1	0,434506 m/s	HEIGHT SLOPE 1	6,6 cm
AVG SPEED ROL 2	0,456256 m/s	HEIGHT SLOPE 2	11,6 cm
AVG SPEED ROL 3	0,552064 m/s	HEIGHT SLOPE 3	16,6 cm

GRAPH



=> the slope is equal to the sinus

3.2. Discussion:

In our graph you can see that we have a linear correlation. The R^2 (R-squared) is the so-called coefficient of determination. This indicates which part of the variation in one variable is explained by the other.
In other words: how 'reliable' is the trendline. If the R^2 is less than 0.5, the relationship is weak to moderate, if it is between 0.5 and 0.75, the relationship is strong, otherwise very strong. As our R^2 is 1, we can be pretty sure that it is a linear correlation. Our function is $y(x)= 0.025x + 0.041$. The average orbital speed is constant

1. REFLECTION

3.3. Conclusion:

Our hypothesis was wrong; it is not a quadratic but linear correlation. You can see this in our graphs. Our function was also different than we expected.

3.4.

3.5. Comparison of the results of the different countries

3.6. Reflection:

4. REFERENCES