	TEAM: 4	
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Smartphone-accelerations into physics situations	Italy	Serena Budelacci Tommaso Senni
EXPERIMENT:		

1. ORIENTATION

We want to do an experiment in which one person holds his/her phone in her hands. Then, the person will have to spin around his axis with a straightened arm. We'll do 3 different angles and compare them to each other to find a relation between the size of the angle and the orbital speed. You can see a demonstration in the following link: https://www.youtube.com/watch?v=fs-7i_fgtgI

Research question:

How does the orbital speed of a smartphone change when the size of the angle between the side of the body and the arms changes?

1.1. **Hypothesis**

How larger the angle size is, how larger the orbital speed will be. The formula of the orbital speed is $v = 2\pi r/T$. So, consequently how bigger the angle size is, the bigger the radius is and the bigger the orbital speed will be.

2. PREPARATION

2.1. **Material**:

- A smartphone with the app Phyphox
- Human being
- A set square or a ruler

2.2. Method:

1. Open the app Phyphox on your mobile phone and choose the correct measuring instrument (= centrifugal acceleration). Press then on the three points in the right upper corner and press on timed measurement. Delayed start 5s and duration experiment 10s.
2. If you are ready to do the experiment, press on the start button and start spinning around in circles for 15s.
3. You have to do 3 different experiments, each with another angle. One experiment with an angle of 0° degrees, another one with an angle of 45° and a last one with an angle of 90°.
4. You have to hold your phone with a stretched arm. For the first measurement (angle of 0°), you hold your arm next to your body and you turn around until you have a good result in the app. Try to turn around at an equal speed the whole time. The experiment has to be done 3 times for each angle, because the experiment is more reliable when you have 3 similar measurements.
5. After this, you repeat the same with the angles of 45° and 90°. You have to make sure the angle stays the same, so your arm can't move upside or down during the experiment. Do the experiment until you have 3 good measurements.
6. Export the data (angular velocity and acceleration). With this data calculate the orbital speed and find the relation between the size of the angle and magnitude of the orbital speed.

3. DATA ANALYSIS and DISCUSSION

3.1. Observations and Measurements:

3.2. Discussion:

4. REFLECTION

4.1. Conclusion:

4.2. Comparison of the results of the different countries

4.3. Reflection:

5. REFERENCES

[Experiment with your phone! OM! What happens to the Centripetal Acceleration?]