eTwinning	TEAM: 9	
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Smartphone-accelerations into physics situations	Italy	Angelica Severi Arianna Carino
EXPERIMENT:		

1. ORIENTATION

Experiment:

We want to do an experiment in which we put a phone in a bucket attached to a rope, so we can search for a relation between the length of the rope and the centripetal force in an uniform motion. One person holds this rope in his hands and starts to turn in circles. That way we can calculate the centripetal force with the app on the phone (in the bucket). We will try to keep the angular velocity consistent. We adjust the length of the rope during the experiment.

1.1. **Research question:**

What is the relation between the length of the rope (radius) and the centripetal force in a uniform circular motion?

Sub-question:

How does the centripetal acceleration changes if you change the length of the rope?

1.2. **Hypothesis:**

If you increase the length of the rope and keep the mass and angular velocity the same, the centripetal force will also increase. Because when you take a look at the formula, if you increase the radius, the force will also increase. We also think if we increase the length of the rope and keep the angular velocity the same, that the centripetal acceleration will decrease for the same reason above.

2. PREPARATION

2.1. **Material**:

- Bucket
- Rope
- Smartphone
- Phyphox
- Tape
- Ruler
- Scale

2.2. **Method:**

1. You put your smartphone in the bucket and make that it is attached to the bucket with tape.
2. Attach a rope to the bucket and make sure the bucket is well attached.
3. Start the Phyphox program on your phone and go to centripetal acceleration.
4. press on the three points in the right upper corner and press on timed measurement.
5. Delayed start 5s and duration experiment 10s.
6. Press on start button and start spinning around in circles for 15s.
7. When you are ready press again on the three points and export the data to excel.
8. Change the length of the rope and repeat the experiment 3 times with every length. Try to turn each time with the same velocity.

3. DATA ANALYSIS and DISCUSSION

3.1. **Observations and Measurements**:

$$F_{\text{mpz}} = m\omega^2 r$$

3.2. **Discussion:**

4. REFLECTION

4.1. **Conclusion**:

4.2. **Comparison** of the results of the different countries

4.3. **Reflection:**

5. REFERENCES