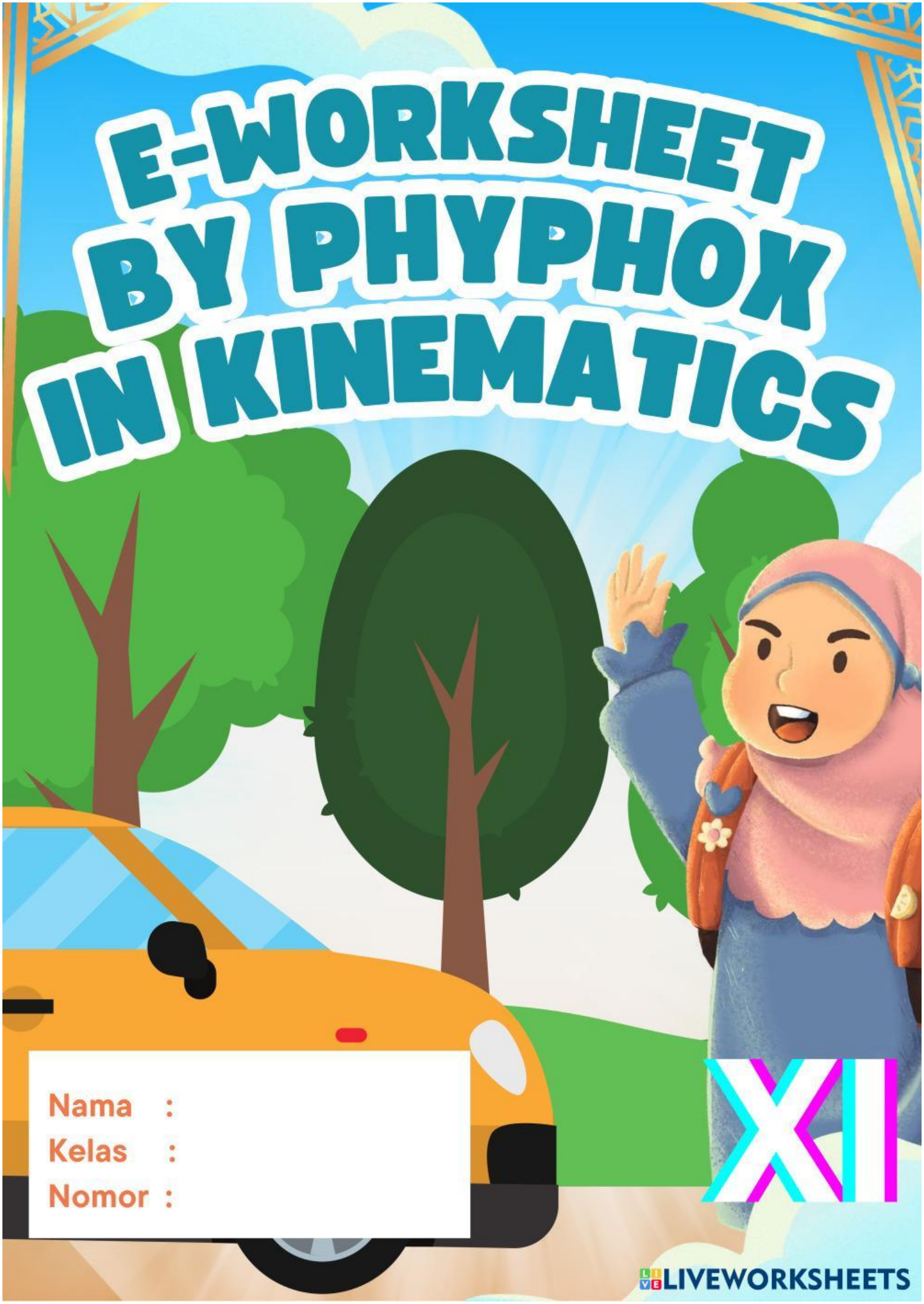
E-WORKSHEET BY PHYPHOX IN KINEMATICS



Nama :

Kelas :

Nomor :

XII

Instructions

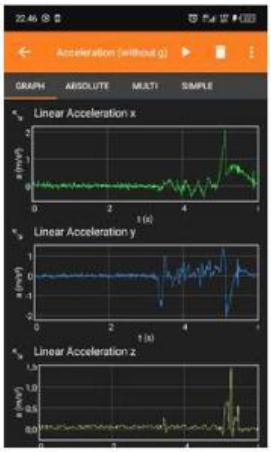
Instruction of Electronic Worksheet

- First read the instructions on the front of the e-worksheet
- Read and observe practicum 1
- Read and understand the objectives, tools and materials, as well as the steps in carrying out the practicum
- Write the data obtained in the observation table
- Compare practical results via Phyphox and manual calculations
- Write the conclusions you get in the conclusion column

Tutorial using Phyphox

- Download the Phyphox application on the Playstore or Appstore via the following link: https://play.google.com/store/apps/details?id=de.rwth_aachen.phyphox
- Once downloaded, open the Phyphox application on your gadget.

- Pilih pada bagian Raw Sensors > Acceleration (without g)

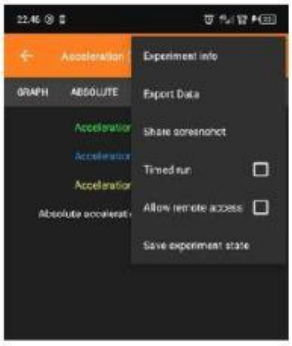


- Gadget movement as an Acceleration sensor, then look at the graph on the display

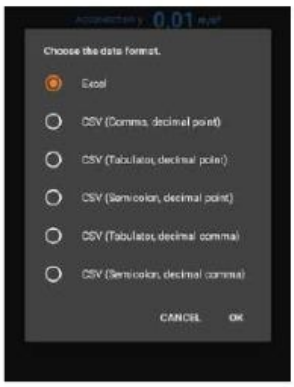
- View the entire graph and the total values in the absolute section.

Tutorial using Phyphox

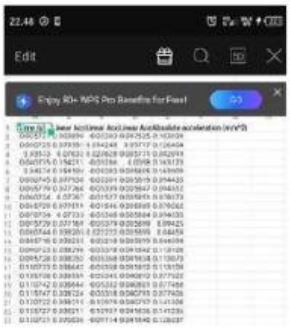
- View the overall graph in the multi section, to see the graph on the x-axis, y-axis, and z-axis.



- Select the simple section > click the three dots in the top right corner > select export data



- When exporting data, select the Excel menu then download.



- Display of collected data

Material

Kinematics

Kinematics is a branch of classical mechanics that studies the motion of objects and systems without considering the forces that cause the movement. This term comes from the Greek word "kinema" which means movement. Kinematics includes the analysis of the position, velocity, and acceleration of objects in various types of motion

Uniform rectilinear motion (GLB)

Uniform rectilinear motion (GLB) is defined as the motion of an object at a constant speed (both magnitude and direction). A moving car with a constant speed of 50 km/h shows that every hour the car moved 50 km. If the direction remains the same during movement, then you can It is said that every hour a car covers a distance of 50 km. In uniform straight motion there is no instantaneous speed because speed is always constant. Average speed is equal to instantaneous speed. Can be written.

$$v = \frac{\Delta x}{\Delta t}$$

For initial position x0 at time t = 0 then

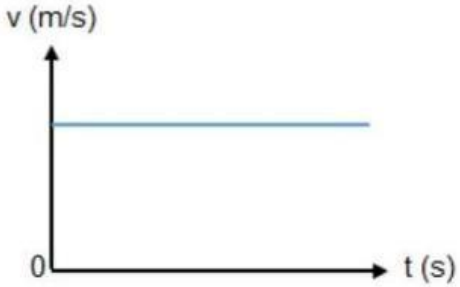
$$\Delta \vec{x} = x_t - x_0 \text{ dan } \Delta t = t - 0$$

$$x - x_0 = vt$$

$$x = x_0 + vt$$

Material

graph of the relationship between speed and time



Uniformly Changing Straight Motion (GLBB)

Uniformly Varying Straight Motion (GLBB) is a type of movement along a straight path where the speed changes regularly. In GLBB, acceleration is constant, whether it is positive (increasing speed) or negative (decreasing speed)

Formula:

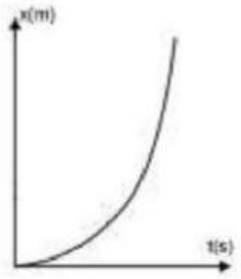
$$v_t = v_0 + at \rightarrow t = \frac{v_t - v_0}{a}$$

$$x_t = x_0 + v_0 t + \frac{1}{2}at^2 = x_0 + v_0\left(\frac{v_t - v_0}{a}\right) + \frac{1}{2}a\left(\frac{v_t - v_0}{a}\right)^2$$

oleh:

$$v_t^2 - v_0^2 = 2a\Delta x$$

graph of the relationship between speed and time



Purpose

- Students know what uniform rectilinear motion
- Students know what uniform change motion
- Determine the relationship between distance and time.
- Calculate acceleration and graph position versus time

Tools & Material

- Toy Car
- Timer
- Board
- Ruler
- Gadget

Procedure

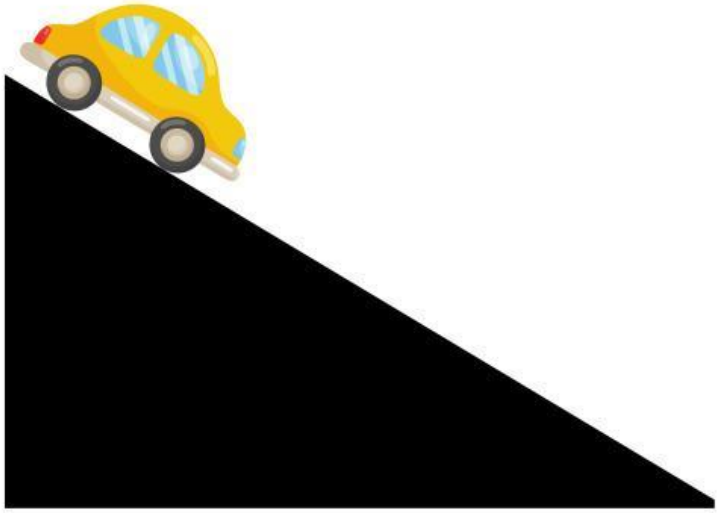
Uniform rectilinear motion (GLB)

- Place the toy car on the floor straight
- Mark the floor at a distance of 40 cm, 60 cm, 80 cm, 100 cm, and 120 cm.
- Drive the toy car and record the time over these distances.
- Tabulate the observation results in the table

Procedure

- Also do this by attaching the toy car using the cellphone that is already in the Phyphox menu
- Then vary the distance
- Look at the observation data in the results section.
- Tabulate the results in a table

The rectilinear motion changes uniformly



- Place the toy car on a sloping floor (you can use a sloping board)
- Mark the floor at a distance of 40 cm, 60 cm, 80 cm, 100 cm, and 120 cm.
- Drive the toy car and record the time over these distances.
- Tabulate the observation results in the table

Procedure

- Also do this by attaching the toy car using the cellphone that is already in the Phyphox menu
- Then vary the distance
- Look at the observation data in the results section.
- Tabulate the results in a table

Table Observation

Uniform rectilinear motion (GLB) without Phyphox

No.	Distance	Time	Acceleration
1.	40 cm		
2.	60 cm		
3.	80 cm		
4.	80 cm		
5.	100 cm		

Procedure

Uniform rectilinear motion (GLB) with Phyphox

No.	Distance	Time	Acceleration
1.	40 cm		
2.	60 cm		
3.	80 cm		
4.	100 cm		
5.	120 cm		

Procedure

The rectilinear motion changes uniformly (CLBB) without PhyPhox

No.	Distance	Time	Acceleration
1.	40 cm		
2.	60 cm		
3.	80 cm		
4.	100 cm		
5.	120 cm		

Procedure

The rectilinear motion changes uniformly (GLBB) with PhyPhox

No.	Distance	Time	Acceleration
1.	40 cm		
2.	60 cm		
3.	80 cm		
4.	100 cm		
5.	120 cm		

Conclusion

SELAMAT MENGERJAKAN