

Orbit and escape
Worksheet A.

1st Activity

A) In the preceding presentation you saw some indicative trajectories of the red object. Bring on screen the application O&E, use the Green planet. Adjust $M=3 \cdot 10^{24}$ kg, Height: 1500 km and Radius of the planet: 4000 km, create similar motions with the application and fill in the table below. Consider the mass of Earth: $M_E=6 \cdot 10^{24}$ kg.

Description of the motion	Initial V (m/s)	Time of motion (s)
1. Vertical fall		
2. Launch horizontally and fall on the planet		
3. Launch horizontally and fall on another point of the planet		
4. Orbiting the planet		
5. Escaping		

Note: In the case 4, the time of a round is named: "Period" and is symbolized by "T".

B) Choose other values for Mass and Radius of the planet and Height record these values and fill in the table below. Consider again the mass of Earth.

M= _____ (kg)

R= _____ (m)

H= _____ (m)

Description of the motion	Initial V (m/s)	Time of motion (s)
1. Vertical fall		
2. Launch horizontally and fall on the planet		
3. Orbiting the planet		
4. Escaping		

2nd Activity:

A) In the second part of the 1st activity, find the velocity of circular orbit and run the application with the specific adjustment of initial velocity. At the end of the motion take a screen shot print and attach it to your worksheet.

B) With the same adjustments find the escape velocity.
Complete the sentences below.

1. The velocity and the period of circular orbit are: _____ m/s and _____ s.

2. The escape velocity is: _____ m/s

Attach the screenshot here

3rd Activity:

A) A satellite moves in circular orbit around the Earth at a height of 2000 km. Use the application to define the Velocity and the period of the motion. Describe in a few words your thought and the way you worked.

$V_{\text{circular}} =$

$T =$

4th Activity:

A) Imagine two satellites in different heights H_1 and H_2 ($H_1 < H_2$) with circular orbits, with velocities V_1 and V_2 . Define which of the following is correct:

$V_1 > V_2$
 $V_1 < V_2$
 $V_1 = V_2$.

$T_1 > T_2$
 $T_1 < T_2$
 $T_1 = T_2$.

Explain the way you worked with the simulation.

