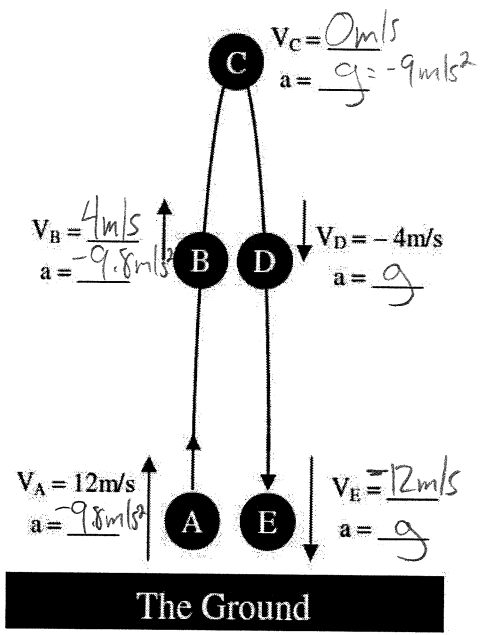


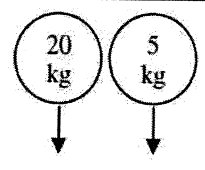
1. Fill in the missing information.



2. Freefall? Yes or No?
- Paper floating down.
 - An airplane.
 - A volleyball hit over a net.
 - A person jumping.

3. What do we call any space that has no air?

Vacuum



4. If the two objects at the right are dropped in a vacuum, which will hit the ground first?

Same time

5. What if there is air resistance? 20kg

6. "An object is thrown 3 m/s from the ground and it lands on the ground."

$v_i = 3 \text{ m/s}$; $v_f = -3 \text{ m/s}$; $a = -9.8 \text{ m/s}^2$; $\Delta y = 0 \text{ m}$.

7. "An object is thrown into the air going 80 m/s. How high does it go?"

$v_i = 80 \text{ m/s}$; $v_f = 0 \text{ m/s}$; $a = -9.8 \text{ m/s}^2$;

8. An object is dropped from a 15 m ledge. How fast is it moving just before it hits the ground?

Variables:
 $a = -9.8 \text{ m/s}^2$
 $\Delta y = -15 \text{ m}$
 $v_f = ?$
 $v_i = 0 \text{ m/s}$
 $t = \text{—}$

Equation and Solve:
 $v_f^2 = v_i^2 + 2a \Delta y$
 $v_f^2 = 0 \text{ m/s}^2 + 2(-9.8 \text{ m/s}^2)(-15 \text{ m})$
 $v_f^2 = 19.6 \cdot -15$
 $\sqrt{v_f^2} = \sqrt{294}$
 $v_f = 17.1 \text{ m/s}$

9. A person throws tennis ball 6 m/s straight up. How long does it take for it to come back to their hand?

Variables:
 $a = -9.8 \text{ m/s}^2$
 $\Delta y = \text{—}$
 $v_f = -6 \text{ m/s}$
 $v_i = 6 \text{ m/s}$
 $t = ?$

Equation and Solve:
 $v_f = v_i + at$
 $-6 \text{ m/s} = 6 \text{ m/s} + (-9.8 \text{ m/s}^2)t$
 $-12 = -9.8t$
 $t = 1.2 \text{ sec}$

10. A ball is thrown 24 m/s into the air. How high does it go?

Variables:
 $a = -9.8 \text{ m/s}^2$
 $\Delta y = ?$
 $v_f = 0 \text{ m/s}$
 $v_i = 24 \text{ m/s}$
 $t = \text{—}$

Equation and Solve:
 $v_f^2 = v_i^2 + 2a \Delta y$
 $(0 \text{ m/s})^2 = (24 \text{ m/s})^2 + 2(-9.8 \text{ m/s}^2) \Delta y$
 $-576 = -19.6 \Delta y$
 $\Delta y = 29.4 \text{ m}$

11. A rock falls off a cliff and falls for 3 secs. How high was the cliff?

Variables:
 $a = -9.8 \text{ m/s}^2$
 $\Delta y = ?$
 $v_f = \text{—}$
 $v_i = 0 \text{ m/s}$
 $t = 3 \text{ s}$

Equation and Solve:
 $\Delta y = v_i t + \frac{1}{2} a t^2$
 $\Delta y = 0 + \frac{1}{2} (-9.8 \text{ m/s}^2)(3 \text{ s})^2$
 $\Delta y = -44.1 \text{ m}$

12. An object is thrown up into the air going 9 m/s. How fast is it going 2 seconds later?

Variables:
 $a = -9.8 \text{ m/s}^2$
 $\Delta t = \text{—}$
 $v_f = ?$
 $v_i = 9 \text{ m/s}$
 $t = 2 \text{ sec}$

Equation and Solve:
 $v_f = v_i + at$
 $v_f = 9 \text{ m/s} + (-9.8 \text{ m/s}^2)(2 \text{ s})$
 $v_f = 9 + -19.6$
 $v_f = -10.6 \text{ m/s}$

13. An object is thrown 16 m/s straight up from a 7 m tall cliff. How much time does it take to hit the ground below?

Variables:
 $a = -9.8 \text{ m/s}^2$
 $\Delta y = -7 \text{ m}$
 $v_f = \text{need to wash}$
 $v_i = 16 \text{ m/s}$
 $t = ?$

Equation and Solve:
 $v_f^2 = v_i^2 + 2a \Delta y$
 $v_f^2 = (16)^2 + 2(-9.8)(-7 \text{ m})$
 $\sqrt{v_f^2} = \sqrt{393.2}$ $v_f = -19.8 \text{ m/s}$
 $v_f = v_i + at$
 $-19.8 = 16 \text{ m/s} + (-9.8)(t)$
 $-35.8 = -9.8t$
 $t = 3.65 \text{ sec}$