Work Done by Force of Gravity

When solving problems, try to make quick diagrams that show the direction of force and displacement. This will help you figure out the angle between displacement and force and therefore the sign of work done

1. As a ball is thrown upward, its kinetic energy:

   A) Increases

   B) Decreases

   C) Remains constant

   D) Instantly becomes zero

2. During the upward flight of a bird, the work done by gravity is:

   A) Positive

   B) Negative

   C) Zero

   D) Constant

3. At the peak of a climber's ascent, the total work done by gravity is:

   A) Positive

   B) Negative

   C) Zero

   D) Indeterminable

4. When a drone is lifted straight up, gravity does work that is:

A) Positive

B) Negative

C) Zero

D) Equal to the lifting force's work

5. If a helicopter hovers at a steady height, gravity's work is:

A) Positive

B) Negative

C) Zero

D) Equal to the engine’s work

6. As a child slides down a slide, gravity's work is:

A) Positive

B) Negative

C) Zero

D) Slide angledependent

7. A window washer pulling himself up does muscular work that is:

A) Positive

B) Negative

C) Zero

D) Equal to gravity's work

8. Before an apple hits the ground, gravity's work is:

A) Positive

B) Negative

C) Zero

D) Equal to initial potential energy

9. When a barbell is held stationary overhead, total work on it is:

A) Positive

B) Negative

C) Zero

D) Equal to gravity’s work

10. A book pushed at constant speed across a table has push force work that is:

A) Positive

B) Negative

C) Zero

D) Opposite to friction's work

Answers UnCubed

1. Answer: B) Decreases

The kinetic energy of the ball decreases as it ascends due to the work done against gravity. As gravity acts downward, it opposes the ball's motion, converting kinetic energy into potential energy.

2. Answer: B) Negative

Gravity does negative work on the bird as it flies upward. This is because the gravitational force acts downward, opposite to the bird's upward displacement, reducing its kinetic energy.

3. Answer: B) Negative

The work done by gravity on the climber is negative at the peak. Gravity's force, acting downward, is opposite to the upward displacement, leading to a reduction in the climber's kinetic energy.

4. Answer: B) Negative

As the drone is lifted, gravity does negative work. The gravitational force is downward, opposite the drone's upward displacement, opposing the lifting force.

5. Answer: C) Zero

When a helicopter hovers at a constant height, there is no displacement, so gravity does no work. Work requires displacement, and in this case, the helicopter does not move vertically.

6. Answer: A) Positive

Gravity does positive work as the child slides down. The gravitational force and the child's displacement are in the same direction, aiding the motion and increasing kinetic energy.

7. Answer: A) Positive

The muscular work done by the window washer is positive. The force exerted by his muscles and his upward displacement are in the same direction, working against gravity.

8. Answer: A) Positive

Before hitting the ground, gravity's work on the apple is positive. The gravitational force and the apple's displacement are in the same direction, increasing its kinetic energy.

9. Answer: C) Zero

With the barbell stationary above, the total work done is zero. Although the lifter exerts an upward force, there's no displacement, and hence no work is done by either the lifter or gravity.

10. Answer: A) Positive

The work done by the push force on the book is positive. The force and the displacement are in the same direction, moving the book across the table, despite friction opposing the motion.