Name _____ Period _____ Date _____

Example Problems

8.2 Work-Energy Theorem

E1. A 1,500 kg monkey-mobile is traveling at 25 m/s. The driver suddenly applies the brakes causing the car to skids to a stop. If the average braking force between the tires and the road is 7,100 N, how far does the car slide before it comes to rest?

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

$\vec{F} =$

$d =$

$\vec{m} =$

$\Delta v =$

a) _____ ◄—— units

E2. A monkey is driving a 2,000 kg monkey-mobile at a speed of 12.0 m/s. The monkey suddenly viers off the road and hits a tree. If the collision with the tree causes a 0.5 meter dent in the front of the car, calculate the work done by the tree on the car and the average force the tree applies to the car.

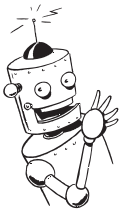
Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

$\vec{F} =$

$d =$

$\vec{m} =$

$\Delta v =$



a) _____ ◄—— units b) _____ ◄—— units

Chapter 8 Energy, Work, and Power

E3. A net force of 205 N is applied vertically to a 3.27 kg stone lifting the stone 1.75 meters. Calculate the height from the point of release that the will the stone rise.

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

F =

d =

m =

g =

Δh =

a) _____ ← units

E4. An archer puts a 0.30 kg arrow to the bowstring. An average force of 201 N is needed to draw the bowstring back 1.3 meters. If the arrow is shot straight up into the air, calculate how high the arrow will rise and the arrow's change in potential energy.

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

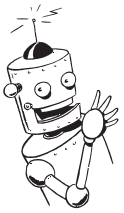
F =

d =

m =

g =

Δh =



a) _____ ← units b) _____ ← units

E5. An arrow is fired from a bow. The bowstring exerts an average force of 95 N on the arrow over a distance of 0.80 meters. If the arrow has a mass of 0.08 kg, calculate the speed of the arrow and the arrows change in kinetic energy as it leaves the bow.

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

$F =$

$d =$

$m =$

$\Delta v =$

a) _____ ⟵ units b) _____ ⟵ units

E6. A 50 kg runner changes velocity from 8 m/s to 10 m/s over a 50 meter distance. Calculate the average force the runner exerts on the ground.

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

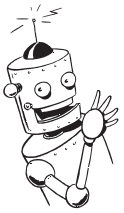
$F =$

$d =$

$m =$

$v_o =$

$v_f =$



a) _____ ⟵ units

Chapter 8 Energy, Work, and Power

E7. A 0.01 kg bullet is shot though a wooden board. The bullet enters the board traveling 600 m/s. The board is 0.05 m thick and exerts an average force of 10,000 N to slow the bullet. Calculate how fast the bullet is traveling as it leaves the wooden board.

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

F =

d =

m =

v_o =

v_f =

a) _____ ← units

E8. A 10,000 kg Navy jet lands on an aircraft carrier and snags a cable to slow it down. The cable applies an average force of 12,500,000 N as it stretches 25 meters to stop the plane, calculate the planes landing speed.

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

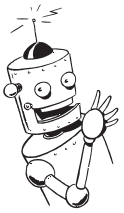
F =

d =

m =

v_o =

v_f =



a) _____ ← units

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Student Problems

8.2 Work-Energy Theorem

1. A 75 kg bobsled starts from rest and is pushed along a horizontal surface by two athletes. After the bobsled is pushed a distance of 4.5 meters its speed of the bobsled is 6.0 m/s. Calculate the work done on and the net force applied to the bobsled.

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

F =

d =

m =

Δv =

a) _____ ← units b) _____ ← units

2. A 1,500 kg monkey-mobile accelerates from rest to a speed of 25 m/s over a distance of 35 meters. Calculate the work done on and the average force applied to the car.

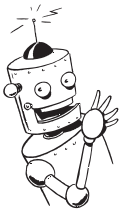
Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

F =

d =

m =

Δv =



a) _____ ← units b) _____ ← units

3. A 1,500 kg car traveling at 20 m/s when the driver slams on the brake causing the car to skids to a stop. The average force of friction between the tires and the road is 12,000 N. Calculate how far the car skid and the change in the car's kinetic energy.

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

$\vec{F} =$

$d =$

$\vec{m} =$

$\Delta v =$

a) _____ ← units b) _____ ← units

4. A monkey applies a 200 N force to a 20 kg wagon in order to change its velocity. If the wagon starts from rest, calculate how far the monkey will have to pull the wagon before its speed is 10 m/s and how much work the monkey will have done.

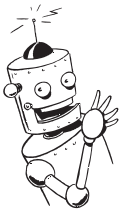
Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

$\vec{F} =$

$d =$

$\vec{m} =$

$\Delta v =$



a) _____ ← units b) _____ ← units

5. A 0.075 kg arrow is fired horizontally from a bow. The bowstring exerts an average force of 65 N on the arrow over a distance of 0.90 meters. Calculate the speed the arrow leave the bow and the change in the arrows kinetic energy.

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

$F =$

$d =$

$m =$

$\Delta v =$

a) _____ ← units b) _____ ← units

6. A bowstring is drawn 0.71 meters and shoots a 0.120 kg arrow straight upwards into the air. If the bowstring applied an average force of 152.65 N to the arrow, calculate the maximum height the arrow reaches and the arrows change in potential energy.

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

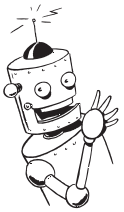
$F =$

$d =$

$m =$

$g =$

$\Delta h =$



a) _____ ← units

7. A 0.145 kg baseball is thrown straight upwards into the air. The thrower applies a constant net force over a 0.75 meter and then releases the ball. If the ball travels 7 meters above its release point, what was the size of the force exerted on the ball?

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

F =

d =

m =

g =

Δh =

a) _____ ← units b) _____ ← units

8. A constant net force of 410 N is applied upwards to a stone through a distance of 2.0 meters, and the stone is then released. If the stone travels 26 meters straight up from the point of release, calculate is the mass of the stone.

Record all givens, draw a picture, arrow all vectors, write the formula, substitute and solve

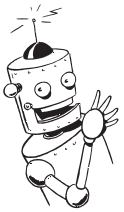
F =

d =

m =

g =

Δh =



a) _____ ← units