1. [–/1 Points] DETAILS OSCOLPHYS2016 7.1.P.002.

MY NOTES | ASK YOUR TEACHER | PRACTICE ANOTHER

A 67.0 kg person climbs stairs, gaining 3.30 meters in height. Find the work done (in J) to accomplish this task.

_____ J

†

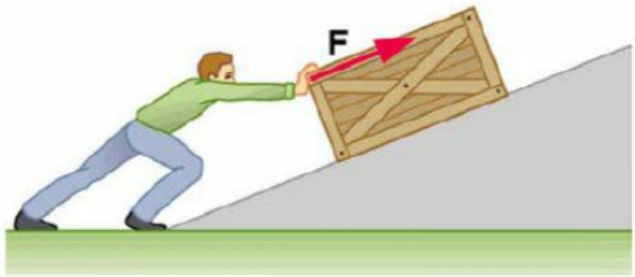
Additional Materials

Reading

2. [–/1 Points] DETAILS OSCOLPHYS2016 7.1.P.005.

MY NOTES | ASK YOUR TEACHER | PRACTICE ANOTHER

Calculate the work done (in J) by an 80.0 kg man who pushes a crate 3.90 m up along a ramp that makes an angle of 20.0° with the horizontal. (See the figure below.) He exerts a force of 490 N on the crate parallel to the ramp and moves at a constant speed. Be certain to include the work he does on the crate and on his body to get up the ramp.



_____ J

Additional Materials

Reading

3. [–/2 Points] DETAILS OSCOLPHYS2016 7.1.P.001.

MY NOTES | ASK YOUR TEACHER | PRACTICE ANOTHER

How much work does a supermarket checkout attendant do on a can of soup he pushes 0.460 m horizontally with a force of 4.70 N? Express your answer in joules and kilocalories.

J

kcal

†

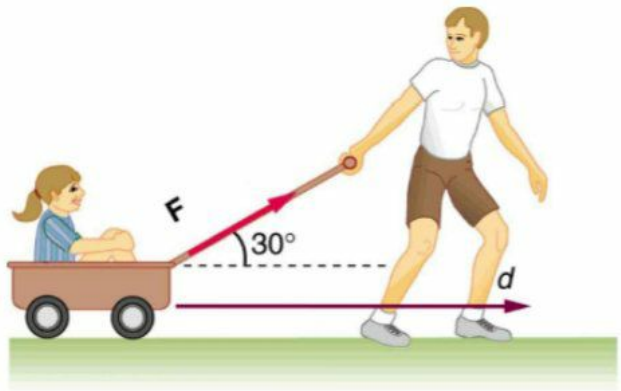
Additional Materials

Reading

4. [–/1 Points] DETAILS OSCOLPHYS2016 7.1.P.006.

MY NOTES | ASK YOUR TEACHER | PRACTICE ANOTHER

How much work is done by the boy pulling his sister 32 m in a wagon as shown in the figure below?



Assume no friction acts on the wagon. (Assume $d = 32$ m and $F = 53$ N.)

J

Additional Materials

Reading

5. [-/2 Points] DETAILS OSCOLPHYS2016 7.2.P.010.

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

(a) How fast (in m/s) must a 4950 kg elephant move to have the same kinetic energy as a 62.0 kg sprinter running at 10.3 m/s?

m/s

(b) Discuss how the larger energies needed for the movement of larger animals would relate to metabolic rates.

This answer has not been graded yet.

†

Additional Materials

Reading

6. [-/3 Points] DETAILS OSCOLPHYS2016 7.2.P.014.

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

Boxing gloves are padded to lessen the force of a blow.

(a) Calculate the force (in N) exerted by a boxing glove on an opponent's face, if the glove and face compress 6.00 cm during a blow in which the 7.00 kg arm and glove are brought to rest from an initial speed of 10.0 m/s.

N

(b) Calculate the force (in N) exerted by an identical blow in the gory old days when no gloves were used and the knuckles and face would compress only 2.00 cm. (Assume the total mass of the arm remains 7.00 kg.)

N

(c) Discuss the magnitude of the force with glove on. Does it seem high enough to cause damage even though it is lower than the force with no glove

This answer has not been graded yet.

†

Additional Materials

Reading

7. [-/2 Points] DETAILS OSCOLPHYS2016 7.2.WA.009.

MY NOTES | ASK YOUR TEACHER | PRACTICE ANOTHER

An athlete with a mass of 69.5 kg is in a cross country race, and at one instant he has a speed of 5.20 m/s.

(a) What is his kinetic energy at this instant?

KE_i = _____ J

(b) If he wishes to doubles his speed to reach the finish line, his kinetic energy will change by what factor?

$\frac{KE_f}{KE_i}$ = _____

Additional Materials

Reading

8. [-/1 Points] DETAILS OSCOLPHYS2016 7.4.P.022.

MY NOTES | ASK YOUR TEACHER | PRACTICE ANOTHER

A 4.50×10^5 kg subway train is brought to a stop from a speed of 0.500 m/s in 0.400 m by a large spring bumper at the end of its track. What is the force constant *k* of the spring (in N/m)?

_____ N/m

†

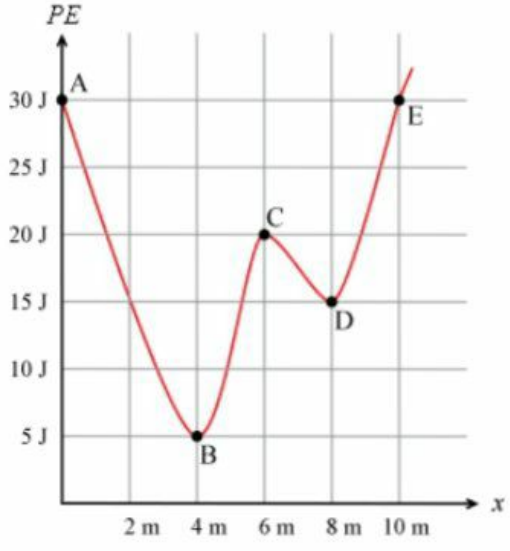
Additional Materials

Reading

9. [-/4 Points] DETAILS OSCOLPHYS2016 7.4.XP.001.

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

A 1.8 kg mass starts from rest at point A and moves along the *x*-axis subject to the potential energy shown in the figure below.



(a) Determine the speed (in m/s) of the mass at points B, C, D.

point B _____ m/s

point C _____ m/s

point D _____ m/s

(b) Determine the turning points for the mass. (Select all that apply.)

- ☐ point A
- ☐ point B
- ☐ point C
- ☐ point D
- ☐ point E

†

Additional Materials

Reading

10. [-/2 Points] DETAILS OSCOLPHYS2016 7.4.P.023.

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

A pogo stick has a spring with a force constant of 2.10×10^4 N/m, which can be compressed 12.5 cm. To what maximum height (in m) can a child jump on the stick using only the energy in the spring, if the child and stick have a total mass of 41.0 kg?

_____ m

Explicitly show how you follow the steps in the Problem-Solving Strategies for Energy. (Submit a file with a maximum size of 1 MB.)

Choose File No file chosen

This answer has not been graded yet.

†

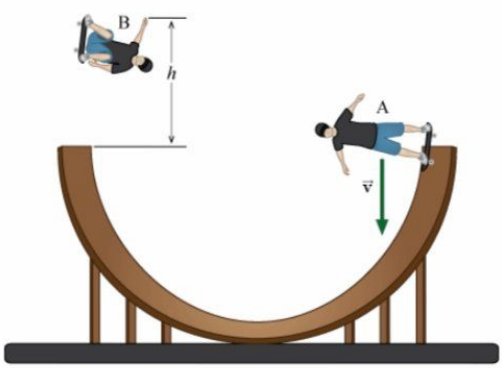
Additional Materials

Reading

11. [-/1 Points] DETAILS OSCOLPHYS2016 7.6.WA.048.

MY NOTES ASK YOUR TEACHER PRACTICE ANOTHER

As shown in the figure below, a skateboarder starts at point A on the ramp and rises to point B, a maximum height of h = 2.47 m above the top of the ramp.



If the amount of work done against friction is insignificant, determine his initial speed (in m/s) at point A.

_____ m/s

12. [–/1 Points] DETAILS OSCOLPHYS2016 7.6.WA.051.

MY NOTES | ASK YOUR TEACHER | PRACTICE ANOTHER

The specialty of an athlete on the women's track team is the pole vault. She has a mass of 58 kg and her approach speed is 9.5 m/s. When she is directly above the bar, her speed is 1.4 m/s. Neglecting air resistance and any energy absorbed by the pole, determine the amount(in m) she has raised herself as she crosses the bar.

_____ m

Additional Materials

Reading

13. [–/2 Points] DETAILS OSCOLPHYS2016 7.7.P.032.

MY NOTES | ASK YOUR TEACHER | PRACTICE ANOTHER

A person in good physical condition can put out 100 W of useful power for several hours at a stretch, perhaps by pedaling a mechanism that drives an electric generator. Neglecting any problems of generator efficiency and practical considerations such as resting time, answer the following.

(a) How many people would it take to run a 2.00 kW electric clothes dryer?

_____ people

(b) How many people would it take to replace a large electric power plant that generates 900 MW?

_____ people

†

Additional Materials

Reading

14. [–/3 Points] DETAILS OSCOLPHYS2016 7.8.P.045.

MY NOTES | ASK YOUR TEACHER | PRACTICE ANOTHER

(a) What is the power output in watts and horsepower of a 63.0 kg sprinter who accelerates from rest to 11.0 m/s in 2.90 s?

power in watts _____ W

power in horsepower _____ hp

(b) Considering the amount of power generated, do you think a well-trained athlete could do this repetitively for long periods of time?

This answer has not been graded yet.

Additional Materials

Reading

15. [–/2 Points] DETAILS OSCOLPHYS2016 7.8.P.047.

MY NOTES | ASK YOUR TEACHER | PRACTICE ANOTHER

(a) What is the efficiency of an out-of-condition professor who does 2.10×10^5 J of useful work while metabolizing 490 kcal of food energy?

_____ %

(b) How many food calories (in kcal) would a well-conditioned athlete metabolize in doing the same work with an efficiency of 20%?

_____ kcal

Additional Materials

Reading