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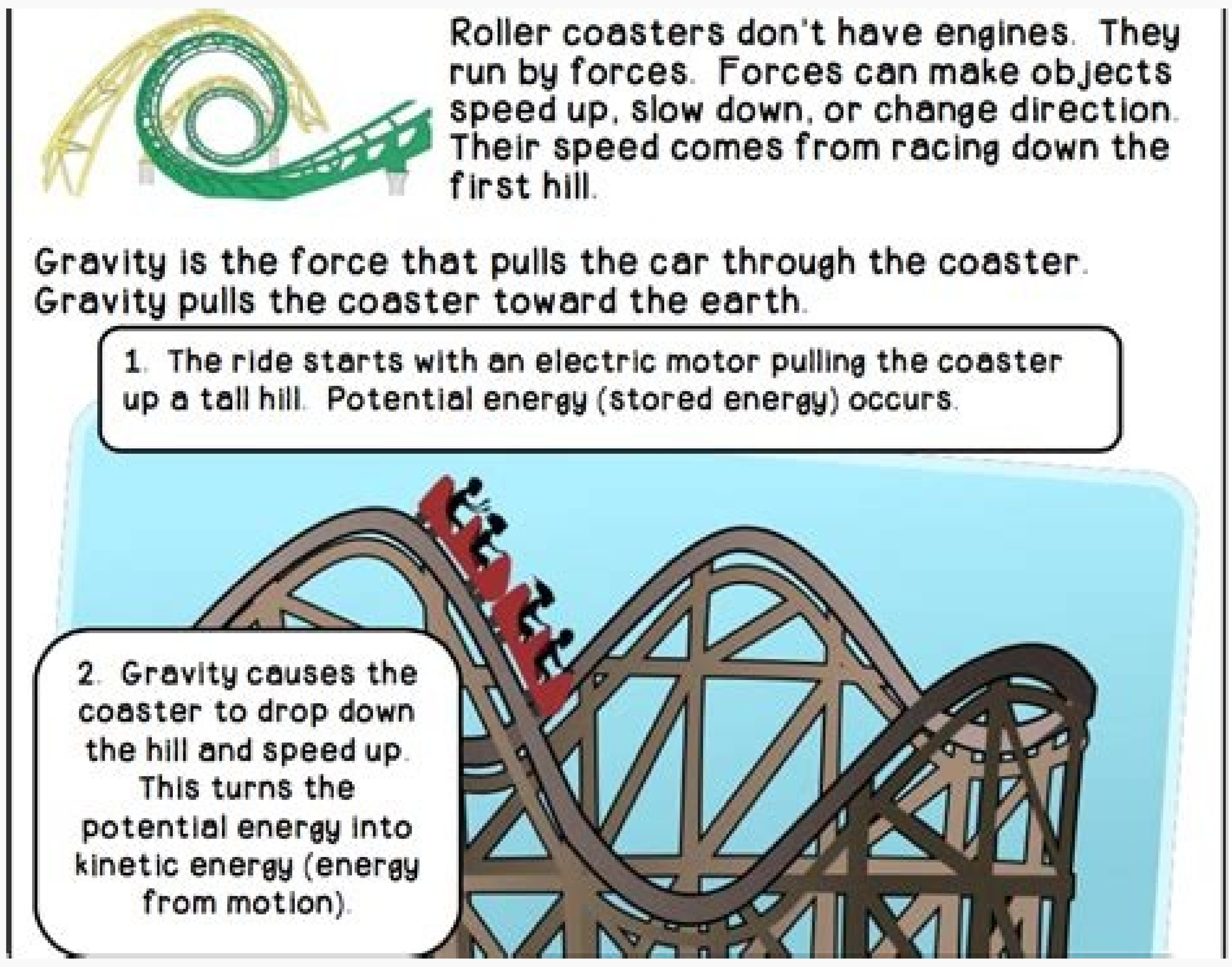
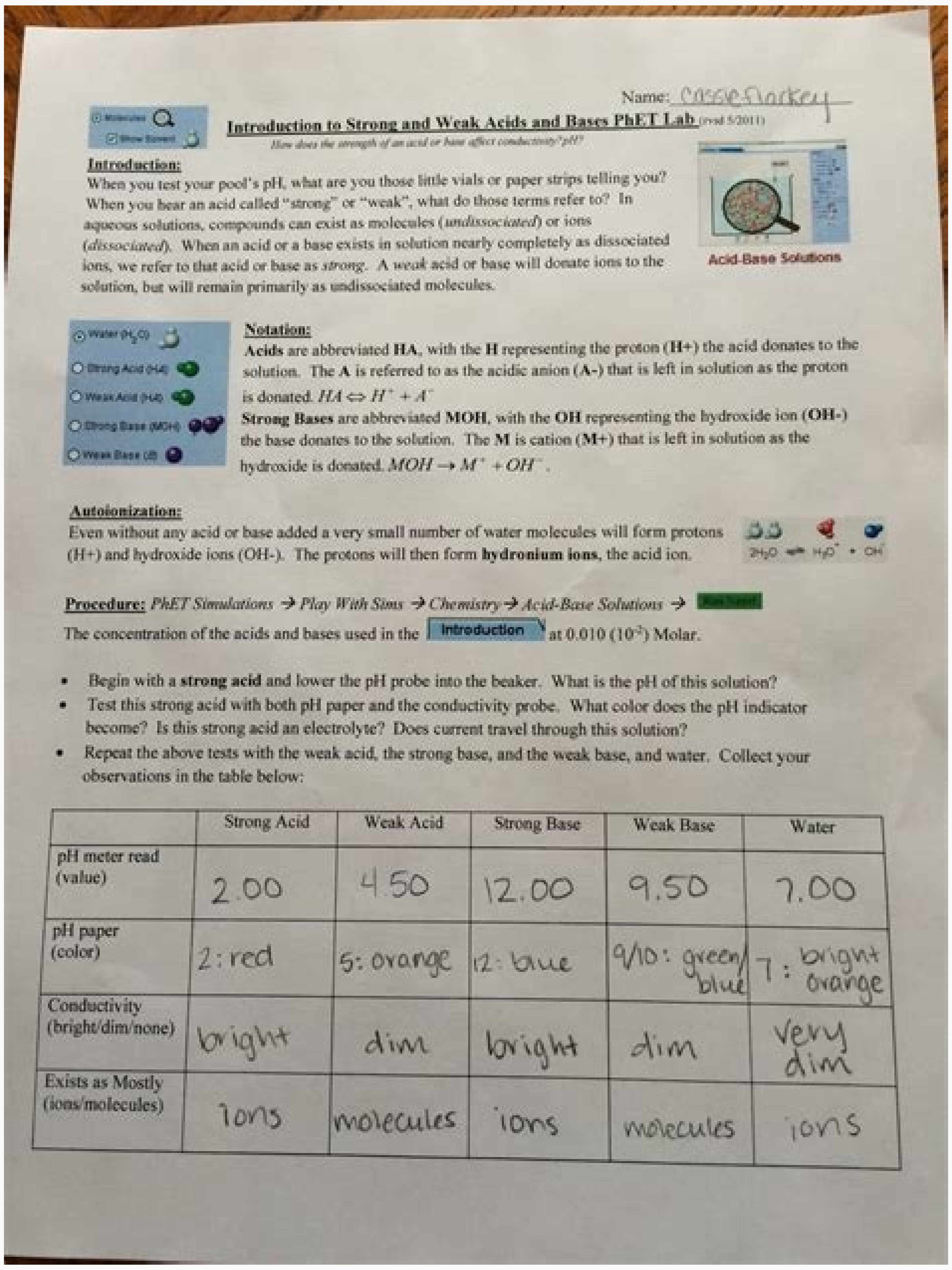
Kinetic and potential energy worksheet answers pdf free





Name: Cassie Starkey

Introduction to Strong and Weak Acids and Bases PhET Lab (rvsd 5/2011)

How does the strength of an acid or base affect conductivity? pH?

Introduction:
When you test your pool's pH, what are you those little vials or paper strips telling you? When you hear an acid called "strong" or "weak", what do those terms refer to? In aqueous solutions, compounds can exist as molecules (*undissociated*) or ions (*dissociated*). When an acid or a base exists in solution nearly completely as dissociated ions, we refer to that acid or base as *strong*. A *weak* acid or base will donate ions to the solution, but will remain primarily as undissociated molecules.

Acid-Base Solutions

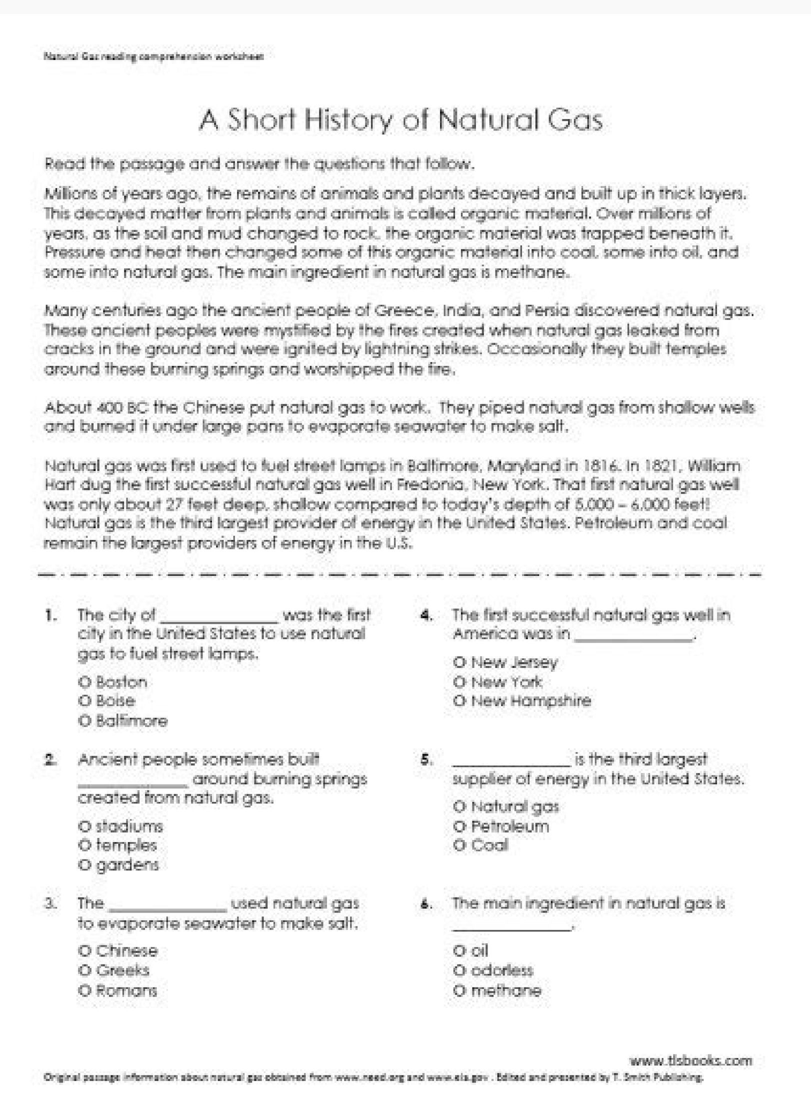
Notation:
Acids are abbreviated **HA**, with the **H** representing the proton **(H+)** the acid donates to the solution. The **A** is referred to as the acidic anion **(A-)** that is left in solution as the proton is donated. $HA \Leftrightarrow H^+ + A^-$
Strong Bases are abbreviated **MOH**, with the **OH** representing the hydroxide ion **(OH-)** the base donates to the solution. The **M** is cation **(M+)** that is left in solution as the hydroxide is donated. $MOH \rightarrow M^+ + OH^-$.

Autoionization:
Even without any acid or base added a very small number of water molecules will form protons (H+) and hydroxide ions (OH-). The protons will then form **hydronium ions**, the acid ion. $2H_2O \rightleftharpoons H_3O^+ + OH^-$

Procedure: *PhET Simulations → Play With Sims → Chemistry → Acid-Base Solutions →*
The concentration of the acids and bases used in the Introduction at 0.010 (10^{-2}) Molar.

- Begin with a **strong acid** and lower the pH probe into the beaker. What is the pH of this solution?
- Test this strong acid with both pH paper and the conductivity probe. What color does the pH indicator become? Is this strong acid an electrolyte? Does current travel through this solution?
- Repeat the above tests with the weak acid, the strong base, and the weak base, and water. Collect your observations in the table below:

	Strong Acid	Weak Acid	Strong Base	Weak Base	Water
pH meter read (value)	2.00	4.50	12.00	9.50	7.00
pH paper (color)	2: red	5: orange	12: blue	9/10: green/blue	7: bright orange
Conductivity (bright/dim/none)	bright	dim	bright	dim	very dim
Exists as Mostly (ions/molecules)	ions	molecules	ions	molecules	ions



Natural Gas reading comprehension worksheet

A Short History of Natural Gas

Read the passage and answer the questions that follow.

Millions of years ago, the remains of animals and plants decayed and built up in thick layers. This decayed matter from plants and animals is called organic material. Over millions of years, as the soil and mud changed to rock, the organic material was trapped beneath it. Pressure and heat then changed some of this organic material into coal, some into oil, and some into natural gas. The main ingredient in natural gas is methane.

Many centuries ago the ancient people of Greece, India, and Persia discovered natural gas. These ancient peoples were mystified by the fires created when natural gas leaked from cracks in the ground and were ignited by lightning strikes. Occasionally they built temples around these burning springs and worshipped the fire.

About 400 BC the Chinese put natural gas to work. They piped natural gas from shallow wells and burned it under large pans to evaporate seawater to make salt.

Natural gas was first used to fuel street lamps in Baltimore, Maryland in 1816. In 1821, William Hart dug the first successful natural gas well in Fredonia, New York. That first natural gas well was only about 27 feet deep, shallow compared to today's depth of 5,000 – 6,000 feet! Natural gas is the third largest provider of energy in the United States. Petroleum and coal remain the largest providers of energy in the U.S.

1. The city of ____________ was the first city in the United States to use natural gas to fuel street lamps.
   O Boston
   O Boise
   O Baltimore
2. Ancient people sometimes built ____________ around burning springs created from natural gas.
   O stadiums
   O temples
   O gardens
3. The ____________ used natural gas to evaporate seawater to make salt.
   O Chinese
   O Greeks
   O Romans
4. The first successful natural gas well in America was in ____________.
   O New Jersey
   O New York
   O New Hampshire
5. ____________ is the third largest supplier of energy in the United States.
   O Natural gas
   O Petroleum
   O Coal
6. The main ingredient in natural gas is ____________.
   O oil
   O odorless
   O methane

www.tlsbooks.com

Original passage information about natural gas obtained from www.need.org and www.eia.gov . Edited and presented by T. Smith Publishing.

Calculating Spring Constants and Elastic potential energy

1. A spring has been extended by 0.2m when a force of 5 Newtons is applied. Calculate the spring constant of this particular spring.

   k = F ÷ e = 5 ÷ 0.2 (✓) = 25 (✓) N/m (✓)

2. A spring has been extended by 0.25m when a force of 8 Newtons is applied. Calculate the spring constant of this particular spring.

   k = F ÷ e = 8 ÷ 0.25 (✓) = 32 (✓) N/m (✓)

3. When a force of 10 N is applied to a spring which has a spring constant of 19 N/m by how much would it extend from its original length?

   e = F ÷ k = 10 ÷ 19 (✓) = 0.53 (2 d.p) (✓) m (✓)

4. When a force of 12N is applied to a spring it extends by 24cm. Calculate the spring constant of this particular spring?

   e = 0.24m (✓)
   k = F ÷ e = 12 ÷ 0.24 (✓) = 50 (✓) N/m (✓)

5. A spring's original length is 2cm. When 300g of mass is a applied to the spring its new length is 12cm. Calculate the spring constant of this particular spring?

   e = 0.12 - 0.02 = 0.10m (✓)
   k = F ÷ e = 3 ÷ 0.10 (✓) = 30 (✓) N/m (✓)

6. A spring has a spring constant of 30N/m. If its original length is 2cm and its length when extended is 27cm, calculate the force which has been applied to the spring.

   e = 0.27 - 0.02 = 0.25m (✓)
   F = k x e = 30 x 0.25 (✓) = 7.5 (✓) N (✓)

7. A spring has a spring constant of 20N/m. Calculate the elastic potential energy stored in the spring if it has been extended by 0.25m.

   $E_e = \frac{1}{2} \times 20 \times 0.25^2$ (✓) = 0.6253 (✓) J (✓)

Name:..

Review Questions: E_p, E_k and E_e

1) a) A mass of 10 kg is raised through a height of 1.5 metres. Calculate the gain in gravitational potential energy of the mass.

   b) Calculate the amount of work done on the mass.

   c) Explain your answer to 1b) in relation to 1a).

2) A rifle fires a bullet of mass 5g at a velocity of 900 m/s. Calculate the kinetic energy of the bullet.

3) A vehicle at a constant speed has 900 000J of kinetic energy.
   a) What is the mass of the vehicles constant speed is 30 m/s?

   b) When the driver applies the brakes the car stops in a distance of 100m. Calculate the braking force required.

4) An acrobat of mass 50 kg jumps onto a spring board with a spring constant of 8000 N/m.
   a) Calculate the elastic potential energy of the spring board when it has be displaced by 0.5 m.

   b) Detail the changes in energy stores when the acrobat jumps onto the spring board.

teach

Kinetic and potential energy worksheet answers physics. Kinetic and potential energy worksheet answer key physical science. Kinetic and potential energy worksheet answers key.

The ball leaves your hand with a speed of 30 m/s. Walking down the street __K___ 3. This PowerPoint begins describing that Machines transfer force from one You're Reading a Free Preview Page 3 is not shown in this preview. PE = 1.5 x 9.81 x 21 PE = 309.015J 17. KE = 0.5 x 1120 x 402 KE = 896 000J 18. How high was the cannon ball to have this much potential energy? H = PE / G x M H = 15745J / (9.81 x 19) H = 84.47m 21. What is the height of the tower? A bowling ball sitting on the rack ___P__ What examples can you find in your home that are examples of kinetic and potential energy? Key terms are provided in the word bank for students to fill in the blanks - words inlcuded are renewable, oil, run, rate, fuels, geothermal, water, renewable, wind, hydroelectric, heat, light, mechanical, electricity, potential, bonds, form, atom, fall, chemical, roll, types, elastic, kinetic, size, around, transformed, distance, work, microscopic, used, forms. Kinetic and Potential Energy Worksheet Classify the following as a type of potential energy or kinetic energy (use the letters K or P) 1.A bicyclist pedaling up a hill __K___ 6. A volleyball player spiking a ball __K___ 8. KE = 0.5 x 1000 x 202 KE = 200 000J 22. If the roller coaster car in the above problem were moving with twice the speed, then what would be its new kinetic energy? Determine the kinetic energy of a 1000-kg roller coaster car that is moving with a speed of 20.0 m/s. PE = 7.9 x 9.81 x 20 PE = 1549.98J 19. Potential: _______Snow sitting on my roof____ 14. Kinetic: _______Washing Machine____ 12. A cinder block is sitting on a platform 20 m high. The potential energy of a 40-kg cannon ball is 14000 J. ThPage 3Help your students make sense of Energy! Includes: Forms of Energy and Examples Types of Energy:Potential and Kinetic Major U.S. Sources of Energy Renewable/Nonrenewable Fast Facts Vocabulary: 16 terms including energy, chemical, electrical, gravitational, heat, kinetic, light, mechanical, nuclear, potential, sound, thermal, transformation, motion, renewable, nonrenewable Can be used as part of a science interactive notebook, as a study guide, as a teacher reference sheet, introduction or genePage 4This is a 82 slide PowerPoint presentation with built-in class notes (red slides), challenge questions with answers, video links, build a spoon catapult project, and more. The car has _KINETIC___________ energy. Forces in Motion (1400 Slides, HW, Notes, Activities and More) Newton's Laws of Motion Lesson -Friction Lesson -Laws of MotiPage 2This is a Cloze (fill in the blank) worksheet to help middle school students review and assess their knowledge of forms of energy. H = PE / (G x M) H = 14000 / (9.81 x 40) H = 35.68M The Law of Conservation of Energy states that: Energy can be neither __CREATED_______________ nor ___DESTROYED_______________. A baby carriage is sitting at the top of a hill that is 21 m high. The more __mass______________ an object moves, the more ____potential energy_____________________it has. Solve the following word problems using the kinetic and potential energy formulas (Be sure to show your work!) Formulas: KE = 0.5 x m x v2 OR v = velocity or speed m = mass in kg PE = m x g x h g = 9.81m/s2 h = height in meters 15. If the mass of the loaded cart is 3.0 kg and the height of the seat top is 0.45 meters, then what is the potential energy of the loaded cart at the height of the seat-top? It weighs 7.9 kg. The coaster (at this moment) has __POTENTIAL__________ energy. A 75-kg refrigerator is located on the 70th floor of a skyscraper (300 meters above the ground) What is the potential energy of the refrigerator? Energy can be __TRANSFORMED______________ from one form to another. Kinetic energy depends on both ___mass_________________ and ___velocity_________________. The block has _____POTENTIAL_____ energy. Potential: _______All the junk on my top shelf in my office__________________________________ Kinetic Energy – what does it depend on? The total amount of _____ENERGY_______________ is the __SAME___________ before and after any energy transformation. The wind blowing through your hair __K___ 2. You serve a volleyball with a mass of 2.1 kg. M = PE / G x H M = 94646 / (9.81 x 72) M = 134kg 20. Also include are hundreds of unit PowerPoint slides, a bundled homework package that follows the slideshow, unit notes, and much more. (name two for each type of energy) 11. The carriage has _POTENTIAL________________ energy. A car is traveling with a velocity of 40 m/s and has a mass of 1120 kg. A cart is loaded with a brick and pulled at constant speed along an inclined plane to the height of a seat-top. The greater the ___velocity__________________ of a moving object, the more __kinetic energy__________it has. Kinetic: ________Ceiling Fan____ 13. This is a 200 slide PowerPoint Review Game about Newtons Laws of Motion, Friction, Speed, Acceleration, and more. PE = 3.0 x 9.81 x 0.45 PE = 13.24J 24. The bell has __POTENTIAL______________ energy. KE = 0.5 x 2.1 x 302 KE = 945J 16. The ball has ____KINETIC______________ energy. PE = 75 x 9.81 x 300 PE = 220 725J 25. Also included are hundreds of unit PowerPoint slides, the bundled homework package, unit notes, and much more. An archer with his bow drawn _P____ 7. The chemical bonds in sugar __P___ 10. A baseball thrown to second base __K___ 9. What is its mass? Calculate it and show your work. This PowerPoint is one small part of my Laws of Motion and Simple Machines Unit that I offer on TpT (1500+ slides, HW, Notes, and much more). There is a 19kg bell at the top of a tower that is storing 15745J of energy. A bowling ball rolling down the alley __K___ 5. KE = 0.5 x 1000 x 402 KE = 3 200 000J 23. A roller coaster is sitting at the top of a 72 m hill and has 94646J. Sitting in the top of a tree __P___ 4. This review game is one very small part of my 2000 slide Laws of Motion and Simple Machines Unit that I offer on TpT. The carriage with the baby has a mass of 1.5 kg.

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