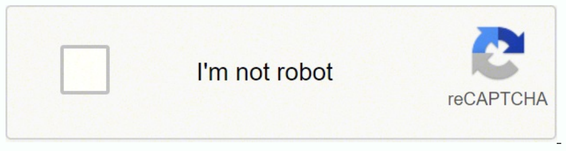

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Kinetic vs potential energy worksheet answers free printable worksheet

KINETIC AND POTENTIAL ENERGY WORKSHEET

Determine whether the objects in the following problems have **Kinetic** or **Potential Energy**. Use the correct formula to calculate the answer.

K.E. = P.E. =

1. You serve a volleyball with a mass of 2.1 kg. The ball leaves your hand with a speed of 30 m/s. The ball has _____ energy. Calculate it.

2. A baby carriage is sitting at the top of a hill that is 21 m high. The carriage with the baby weighs 12 N. The carriage has _____ energy. Calculate it.

3. A car is traveling with a velocity of 40 m/s and has a mass of 1120 kg. The car has _____ energy. Calculate it.

4. A cinder block is sitting on a platform 20 m high. It weighs 79 N. The block has _____ energy. Calculate it.

5. There is a bell at the top of a tower that is 45 m high. The bell weighs 190 N. The bell has _____ energy. Calculate it.

6. A roller coaster is at the top of a 72 m hill and weighs 966 N. The coaster (at this moment) has _____ energy. Calculate it.

NAME _____

Science

Kinetic VS Potential Energy Practice

Part 1: This graph shows a ball rolling from A to G.

1. Which letter shows the ball when it has the maximum kinetic energy? _____
2. Which letter shows the ball when it has the maximum potential energy? _____
3. Which letter shows the ball when it has the least potential energy? _____
4. Which letter shows the ball when it has the least kinetic energy? _____
5. Which letter shows the ball when it has just a little more kinetic energy than A? ____
6. Which letter shows the ball when it has just a little more potential energy than letter C? _____
7. Which letter shows the ball when it has just a little less potential energy than letter F? _____
8. Which letter shows the ball when it has just a little more kinetic energy than letter G? _____
9. Which letter shows the ball when it has just a little less kinetic energy than letter D? _____
10. Which letter shows the ball when it has just a little less potential energy than letter C? ____

11. Which sequence correctly shows a *resulting increase in potential energy*?

A. C, D, E, F
B. B, F, E, C
C. D, E, B, F
D. A, G, F, C

12. Which sequence correctly shows a *resulting increase in kinetic energy*?

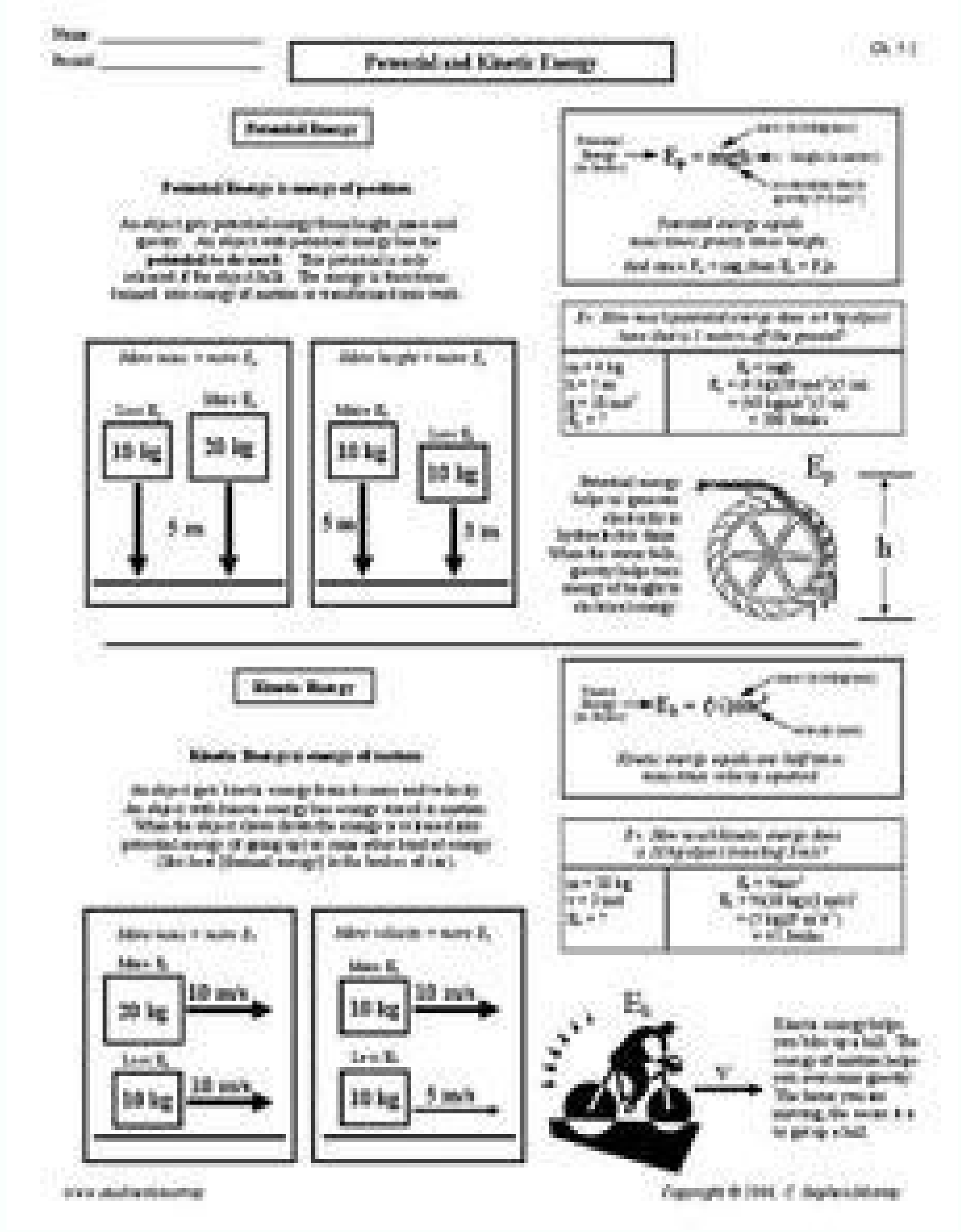
A. E, F, B, G
B. B, F, E, C
C. D, E, B, F
D. A, B, C, D

13. Which sequence correctly shows a *resulting decrease in kinetic energy*?

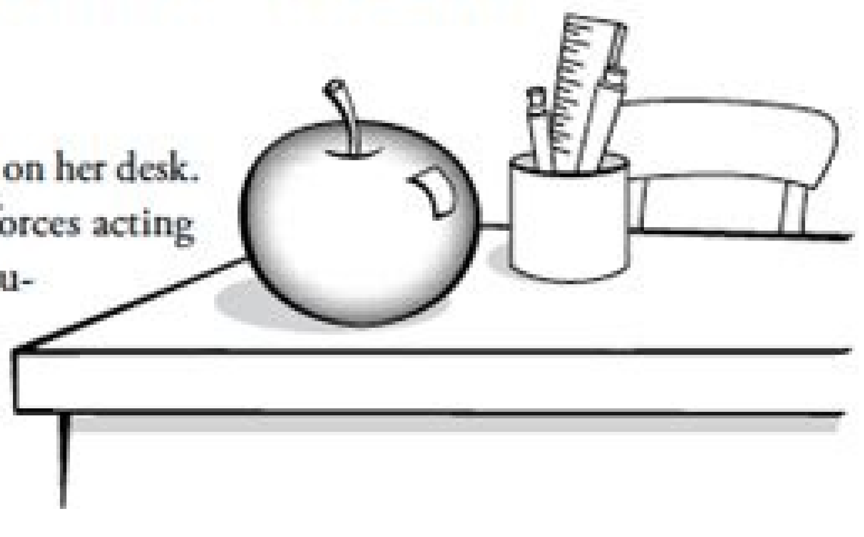
A. E, F, B, G
B. B, F, E, C
C. D, E, F, G
D. A, G, F, C

14. Which sequence correctly shows a *resulting decrease in potential energy*?

A. E, F, B, G
B. A, B, C, D
C. D, E, B, F
D. A, G, F, C



Apple on a Desk



Mrs. Canales pointed to an apple sitting on her desk. She asked her students to describe any forces acting on the apple. This is what some of her students said.

Archie: "The only force acting on the apple is air pressure."

Sam: "There is one force acting on the apple. Gravity is the force that pulls on the apple."

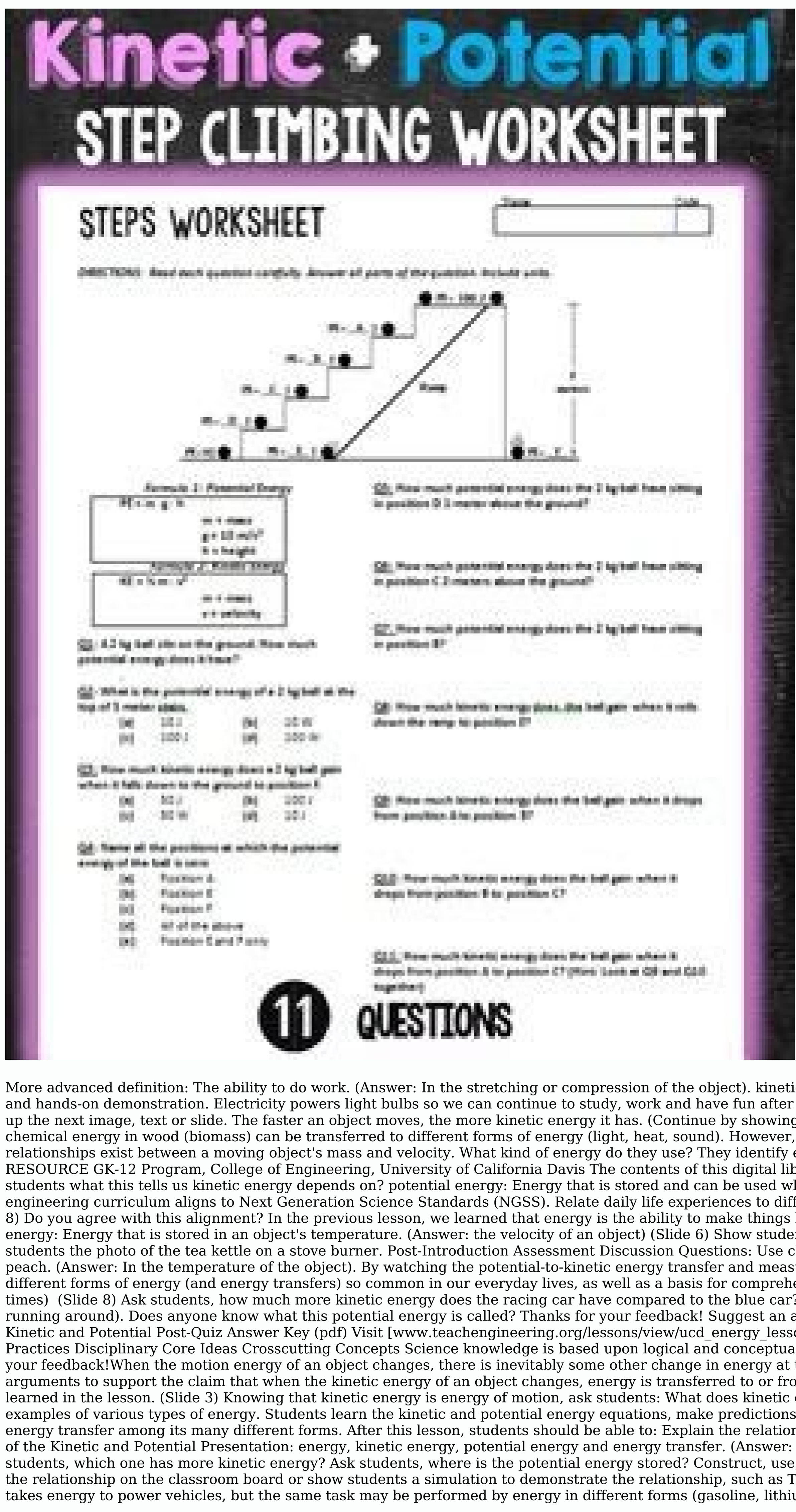
Soledad: "There are two forces: the desk pushes up on the apple and gravity pulls downward on the apple."

Misha: "There are many forces acting on the apple; but, it is the holding force in the apple that keeps it on the desk."

Tess: "There are no forces acting on the apple because the desk stops any forces from acting on it."

Which student do you most agree with? ______________________

Explain your thinking. What rule or reasoning did you use to decide if there were any forces acting on the apple?



More advanced definition: The ability to do work. (Answer: In the stretching or compression of the object). kinetic energy: The energy of moving objects. Gravity is the force that pulls things down to Earth. How do you use them? The associated activity, Making Moon Craters, also provides opportunities to discuss and review key concepts with a fun and hands-on demonstration. Electricity powers light bulbs so we can continue to study, work and have fun after dark. Energy is in use everywhere and comes in many different forms. Last modified: May 27, 2022 (Answer: Gravitational energy). A PowerPoint® presentation and post-quiz are provided. The presentation is animated, so clicking brings up the next image, text or slide. The faster an object moves, the more kinetic energy it has. (Continue by showing the presentation and delivering the content in the Lesson Background section.) Teach the lesson using the 15-slide PowerPoint file, Kinetic and Potential Presentation, along with the notes included below each slide. For example, the chemical energy in wood (biomass) can be transferred to different forms of energy (light, heat, sound). However, these contents do not necessarily represent the policies of the National Science Foundation, and you should not assume endorsement by the federal government. They learn that energy can be neither created nor destroyed and that relationships exist between a moving object's mass and velocity. What kind of energy do they use? They identify everyday examples of these energy types, as well as the mechanism of corresponding energy transfers. © 2014 by Regents of the University of Colorado; original © 2013 University of California Davis Eric Anderson, Jeff Kessler, Irene Zhao RESOURCE GK-12 Program, College of Engineering, University of California Davis The contents of this digital library curriculum were developed by the Renewable Energy Systems Opportunity for Unified Research Collaboration and Education (RESOURCE) project in the College of Engineering under National Science Foundation GK-12 grant no. Ask students what this tells us kinetic energy depends on? potential energy: Energy that is stored and can be used when needed. Why? (Slide 4) Show the images of the blue car and truck. After students are done, give them time to share their answers with the class. Heat. Remind students that energy can be converted from one form to another. This engineering curriculum aligns to Next Generation Science Standards (NGSS). Relate daily life experiences to different types of energy. For example, at slides 7 and 8 have students answer to fill in the blanks (before the answers are shown) to demonstrate their understanding. DGE 0948021. Then conclude by administering the post-quiz. (Grades 6 - 8) Do you agree with this alignment? In the previous lesson, we learned that energy is the ability to make things happen. Watch this activity on YouTube chemical energy: Energy that is stored in the chemical bonds of molecules. Require students to use the energy terminology learned in the lesson (and provided in a word bank on the slide). thermal energy: Energy that is stored in an object's temperature. (Answer: the velocity of an object) (Slide 6) Show students the equation for the kinetic energy of a non-rotating solid object: KE = (1/2) x mass x velocity^2. Anything in motion has kinetic energy. (Answer: Elastic energy) What other examples of elastic energy can you think of? (Slide 12) Show students the photo of the tea kettle on a stove burner. Post-Introduction Assessment Discussion Questions: Use class discussions and student writing assignments to evaluate student knowledge. (Answer: Thermal energy) What other examples of thermal energy can you think of? (Slide 13) Show students the images of the wood and little girl eating a peach. (Answer: In the temperature of the object). By watching the potential-to-kinetic energy transfer and measuring the resulting impact craters, students directly see the effect that the height and mass of an object has on the overall energy of that object. A firm understanding of energy types and energy conversion is essential to understanding the different forms of energy (and energy transfers) so common in our everyday lives, as well as a basis for comprehending more advanced concepts in engineering, physics, renewable energy, electrical generation and other fields. (Answer: the mass of an object) (Slide 5) Now show students the images of the blue car and the racing car. (Answer: 2 times) (Slide 8) Ask students, how much more kinetic energy does the racing car have compared to the blue car? Also, you may be active during recess or during gym because you eat meals to maintain your physical strength; in this case, the chemical energy stored in food (in the form of chemical bonds) is converted into kinetic energy (perhaps running around). Does anyone know what this potential energy is called? Thanks for your feedback! Suggest an alignment not listed above Kinetic and Potential Presentation (pptx) Kinetic and Potential Presentation (pdf) Kinetic and Potential Post-Quiz (docx) Kinetic and Potential Post-Quiz (pdf) Kinetic and Potential Post-Quiz Answer Key (docx) Kinetic and Potential Post-Quiz Answer Key (pdf) Visit [www.teachengineering.org/lessons/view/ucd_energy_lesson02] to print or download. Thanks for your feedback! Click to view other curriculum aligned to this Performance Expectation This lesson focuses on the following Three Dimensional Learning aspects of NGSS: Science & Engineering Practices Disciplinary Core Ideas Crosscutting Concepts Science knowledge is based upon logical and conceptual connections between evidence and explanations.Alignment agreement: Thanks for your feedback!Use mathematical representations to describe and/or support scientific conclusions and design solutions.Alignment agreement: Thanks for your feedback!When the motion energy of an object changes, there is inevitably some other change in energy at the same time.Alignment agreement: Thanks for your feedback!Energy may take different forms (e.g. energy in fields, thermal energy, energy of motion).Alignment agreement: Thanks for your feedback! Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object. energy: The ability to make things happen. Fireplaces, electrical heaters and gas furnaces provide warm indoor air so we can survive when the weather is freezing. Make sure students communicate using the energy terms learned in the lesson. (Slide 3) Knowing that kinetic energy is energy of motion, ask students: What does kinetic energy depend on? Post-Quiz: In addition, administer the Kinetic and Potential Post-Quiz to assess students' understanding of the relationship between mass, velocity and the kinetic energy of an object, as well as their ability to identify examples of various types of energy. Students learn the kinetic and potential energy equations, make predictions, and collect and graph data. Can you think of some more examples of energy conversion from one form to another? Further, the concept that energy can be neither created nor destroyed is reinforced, as students see the pervasiveness of energy transfer among its many different forms. After this lesson, students should be able to: Explain the relationship between a moving object's kinetic energy and its mass and velocity. Pre-Lesson Assessment Definition Review: To verify students' understanding of concepts learned in the previous lesson, ask them to define the terms listed on slide 2 of the Kinetic and Potential Presentation: energy, kinetic energy, potential energy and energy transfer. (Answer: 4 times) (Slides 9) Tell students, we know that potential energy is stored energy, but what ways can it be stored? (Slide 10) Show students the photos of the roller coaster, downhill mountain biking and an elevated water tank. Ask students, which one has more kinetic energy? Ask students, where is the potential energy stored? Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object. For students to get a better sense of how KE varies with mass and velocity, it is helpful to graph the relationship on the classroom board or show students a simulation to demonstrate the relationship, such as The Ramp from PHET Interactive Simulations at . (Slide 15) Using the writing prompt on this slide (and description in the Assessment section), assign students to write about three fictional superpowers, and then read them to the class. It takes energy to power vehicles, but the same task may be performed by energy in different forms (gasoline, lithium-ion batteries, etc.), as designed by engineers to meet specific functional requirements. Students makes sense of kinetic and potential energy, including various types of potential energy: chemical, gravitational, elastic and thermal

energy. Ask students, where is the potential energy stored for these examples? (Slide 2) As a class, verify students' understanding of concepts learned in the previous lesson by asking them to define the following terms: energy, kinetic energy, potential energy and energy transfer. Listen to student responses. (Slide 14) Make the final point that even though we've talked about many forms of energy, they are all different forms of the same thing. Energy can be stored in chemicals (food, batteries), height (gravitational), elastic stretching, etc. elastic energy: Energy that is stored in the stretching or compression of objects. Lesson Summary Assessment Superpower Writing: Use the writing prompt on slide 15 to assess learning from this lesson: You are a superhero! You have three energy superpowers! Write a paragraph explaining: What are your superpowers? Now ask students, which one has more kinetic energy? Often, gravitational energy (a form of potential energy) is converted to kinetic energy to make things move fast. Gasoline is necessary to power automobiles, ships and airplanes so that we can travel long distances. Ask students what type of potential energy is stored? (Answer: In the object’s height). Throughout the Kinetic and Potential Presentation are many opportunities for quick assessments of understanding. (Slide 7) Now revisiting the car and truck example, ask students how much more kinetic energy does the truck have compared to the car? It can be stored and then employed to do things for us. The presentation contains review questions and activities that ask students to use their new energy knowledge. Ask students what this tells us kinetic energy also depends on? What other examples of gravitational energy can you think of? (Slide 11) Show students the images of coiled metal springs, rubber bands and a mattress. Given that both vehicles are traveling at the same speed (Listen to student responses, guiding them to say that the truck does). And food, grown with the energy from the sun, is our fundamental source of energy to support our lives. Identify different forms of kinetic and potential energy. Making Moon Craters - During a class demonstration, a weighted plastic egg is dropped into a tray of flour from different heights as a way to model asteroids hitting the moon's surface. Everywhere you look, in all sorts of different forms, energy is present and important in our daily lives. (Answer: Chemical energy) One of the most important concepts about energy is that energy can be neither created nor destroyed; it can only be transferred, or converted, from one form to another. The higher an object, the more gravitational energy it has. In fact, all types of human activities require the input of energy. This energy is released during chemical reactions. (Grades 6 - 8) More Details View aligned curriculum Do you agree with this alignment? gravitational energy: Energy that is stored in the height of objects. In this case, they both have the same mass. The two quantities, mass and velocity, thus define the kinetic energy of an object. NGSS Performance Expectation MS-PS3-5.