

My First Vignette

Page: login
Default
Next: problem

Page: problem
Vimeo: <https://player.vimeo.com/video/585518552>
Text: A truck is moving at a constant velocity of 20.0 m/s along a long, straight road for which the legal speed limit is 35 mi/h. At the instant when the truck passes a stationary police car that is parked at rest along the road, the police car begins to accelerate with a constant acceleration of 4.00 m/s² in the same direction as the truck. The truck continues to move at its same constant velocity. At what time and position will the police car catch the truck?
Next: q1

Page: problemStatement pop-up
Text: Same as problem text

Page: q1
Vimeo: 364638348
Text: Whenever you solve a physics problem, you always want to decide what physics concepts you are going to use *before* you start the problem.
Question: Q1: Choose the physics concept(s) that should be used to solve this problem.
Answers: A. Conservation of Mechanical Energy
($KE_i + PE_i = KE_f + PE_f$)
B. Newton's 2nd Law ($F_{net} = ma$)
C. Both A and B above
Next: A=q1a B=q1b C=q1c

Page: q1a incorrect
Vimeo: 364638321
Text: It's a good choice, but only part of the story. Once we find the speed with Conservation of Mechanical Energy, how can we find the tension?
Next: q1

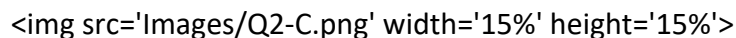
Page: q1b incorrect
Vimeo: 364638287
Text: Once we find the speed at the bottom of its trajectory, we can use Newton's 2nd Law to find the tension. How can we find the speed at the bottom of the trajectory?

Next: q1

Page: q1c CORRECT

Vimeo: 364638251

Text: We can use the law of conservation of mechanical energy to find the speed of the tire at the point of maximum tension (the bottom of the trajectory):
$$\text{Initial Mechanical Energy} = \text{Final Mechanical Energy}$$
 Once we find the speed we will need to use the vertical component of Newton's 2nd Law to find the tension:



Next: q2

Page: q2

Vimeo: 521442099

Text: The problem asks us to determine the final temperature of the system and how much ice, if any, is left when the system has reached equilibrium. Since the system is in an equilibrium state at the end of the problem, we need to recognize what that means here.

Question: Q2: Which statement(s) is/are true about any system when it has reached thermal equilibrium? Choose all statements that are true.

Answers: A. All components of the system are in the same state, such as all are liquids.
B. All elements of the system have reached the same temperature.
C. The transfer of energy has stopped.

Next: **Multiple-select:** BC=q2d C=q2c B=q2b default=q2a

Page: q2a incorrect

Vimeo: 521442129

Text: Included in your answer is the idea that when in equilibrium, all components of the system are in the same state, such as all are liquids. Although that can be true, it doesn't have to be the case. For example, if you drop a heated metal object in room temperature water, they will eventually reach the same temperature but the metal will remain a solid.

Next: q2

Page: q2b incorrect

Vimeo: 521442169

Text: Yes, thermal equilibrium means that all elements of the system have reached the same temperature. However, this isn't the only correct answer here.

Next: q2

Page: q2c incorrect
Vimeo: 521442202
Text: Yes, thermal equilibrium means that all transfer of energy has stopped. However, this isn't the only correct answer here.
Next: q2

Page: q2d CORRECT
Vimeo: 521442252
Text: Thermal equilibrium means that all parts of the system have reached the same temperature. It doesn't mean that all parts of the system are in the same phase, as for example, water and ice can co-exist in the same container if they are both at a temperature of 0 °C. In addition, energy moves from objects at higher temperature to those at lower temperature. Because thermal equilibrium means that all parts of the system are now at the same temperature, the transfer of energy has stopped. Great job!
Note: Mark this as the last page for SCORM.
Next: completion

Page: completion
Default