

123. What is the gravitational potential energy of a 64.0 kg person at 5334 m above sea level?
124. A spring has a force constant of 550 N/m. What is the elastic potential energy stored in the spring when the spring is compressed 1.2 cm?
125. What is the kinetic energy of a 0.500 g raindrop that falls 0.250 km? Ignore air resistance.
126. A 50.0 g projectile is fired upward at 3.00×10^2 m/s and lands at 89.0 m/s. How much mechanical energy is lost to air resistance?
127. How long does it take for 4.5×10^6 J of work to be done by a 380.3 kW engine?
128. A ship's engine has a power output of 13.0 MW. How much work can it do in 15.0 min?
129. A catcher picks up a baseball from the ground with a net upward force of 7.25×10^{-2} N so that 4.35×10^{-2} J of net work is done. How far is the ball lifted?
130. A crane does 1.31×10^3 J of net work when lifting cement 76.2 m. How large is the net force doing this work?
131. A girl exerts a force of 35.0 N at an angle of 20.0° to the horizontal to move a wagon 15.0 m along a level path. What is the net work done on it if a frictional force of 24.0 N is present?
132. The *Queen Mary* had a mass of 7.5×10^7 kg and a top cruising speed of 57 km/h. What was the kinetic energy of the ship at that speed?
133. How fast is a 55.0 kg sky diver falling when her kinetic energy is 7.81×10^4 J?
134. A hockey puck with an initial speed of 8.0 m/s coasts 45 m to a stop. If the force of friction on the puck is 0.12 N, what is the puck's mass?
135. How far does a 1.30×10^4 kg jet travel if it is slowed from 2.40×10^2 km/h to 0 km/h by an acceleration of -30.8 m/s²?
136. An automobile is raised 7.0 m, resulting in an increase in gravitational potential energy of 6.6×10^4 J. What is the automobile's mass?
137. A spring in a pogo stick has a force constant of 1.5×10^4 N/m. How far is the spring compressed when its elastic potential energy is 120 J?
138. A 100.0 g arrow is pulled back 30.0 cm against a bowstring. The bowstring's force constant is 1250 N/m. What speed will the arrow leave the bow?
139. A ball falls 3.0 m down a vertical pipe, the end of which bends horizontally. How fast does the ball leave the pipe if no energy is lost to friction?
140. A spacecraft's engines do 1.4×10^{13} J of work in 8.5 min. What is the power output of these engines?
141. A runner exerts a force of 334 N against the ground while using 2100 W of power. How long does it take him to run a distance of 50.0 m?
142. A high-speed boat has four 300.0 kW motors. How much work is done in 25 s by the motors?
143. A 92 N force pushes an 18 kg box of books, initially at rest, 7.6 m across a floor. The coefficient of kinetic friction between the floor and the box is 0.35. What is the final kinetic energy of the box of books?
144. A guardrail can be bent by 5.00 cm and then restore its shape. What is its force constant if struck by a car with 1.09×10^4 J of kinetic energy?
145. A 25.0 kg trunk strikes the ground with a speed of 12.5 m/s. If no energy is lost from air resistance, what is the height from which the trunk fell?
146. Sliding a 5.0 kg stone up a frictionless ramp with a 25.0° incline increases its gravitational potential energy by 2.4×10^2 J. How long is the ramp?
147. A constant 4.00×10^2 N force moves a 2.00×10^2 kg iceboat 0.90 km. Frictional force is negligible, and the boat starts at rest. Find the boat's final speed.
148. A 50.0 kg circus clown jumps from a platform into a net 1.00 m above the ground. The net is stretched 0.65 m and has a force constant of 3.4×10^4 N/m. What is the height of the platform?

Chapter 6 Momentum and Collisions

149. If a 50.0 kg cheetah, initially at rest, runs 274 m north in 8.65 s, what is its momentum?
150. If a 1.46×10^5 kg whale has a momentum of 9.73×10^5 kg•m/s to the south, what is its velocity?
151. A star has a momentum of 8.62×10^{36} kg•m/s and a speed of 255 km/s. What is its mass?
152. A 5.00 g projectile has a velocity of 255 m/s right. Find the force to stop this projectile in 1.45 s.
153. How long does it take a 0.17 kg hockey puck to decrease its speed by 9.0 m/s if the coefficient of kinetic friction is 0.050?