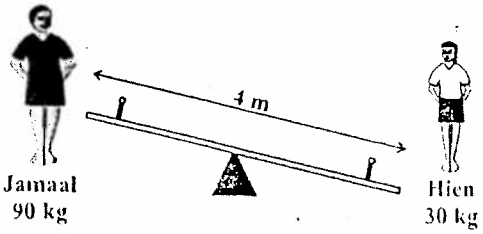
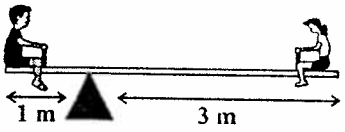
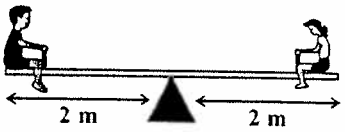
NEA Physics Review Test

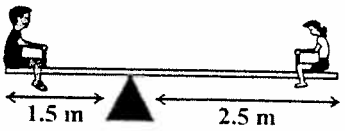
Use the diagram below to answer question 16.

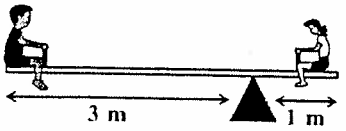


16. Jamaal and Hien want to use the teeter-totter. Where will Jamaal and Hien need to place the teeter-totter so that Hien can lift Jamaal?

O A.


O B.


O C.


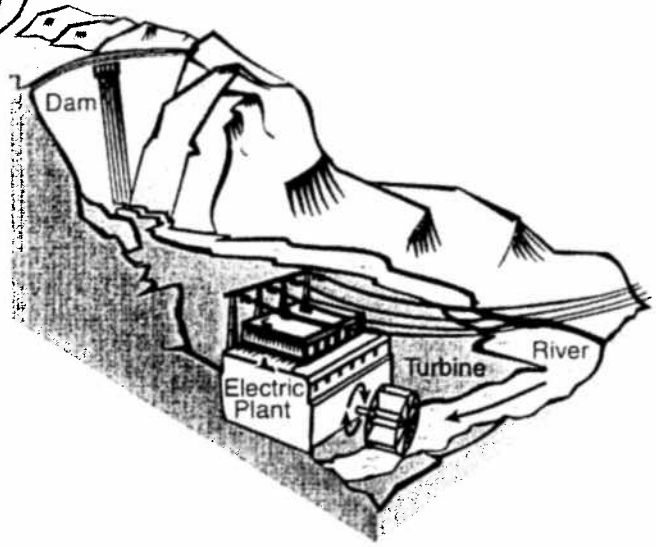
O D.


10. Scientists have proposed generating electricity in space by using solar panels and then sending the electricity to Earth by microwaves. Which would be an impact of this technological development on society?

A. less space for government weather satellites
B. more dependence on natural resources
C. increased cost of research and development
D. greater probability of destructive weather phenomena

26. While roasting a marshmallow, everything except the insulated handle gets hot. Which statement explains why the metal gets hot even though just the tip is held over the fire?

A. Heat is transmitted by radiation.
B. The metal is a good conductor.
C. The metal is a good insulator.
D. Warm air surrounding the flame heats the metal.



14. As a river flows past a turbine in a hydroelectric power plant, the potential energy of the water behind the dam changes to

A. chemical energy.
B. mechanical energy.
C. nuclear energy.
D. radiant energy.

12. You are riding in the passenger front seat of a car with your seat belt on. Suddenly the car stops. Your body moves

O A. backward.
O B. forward.
O C. to the right.
O D. to the left.

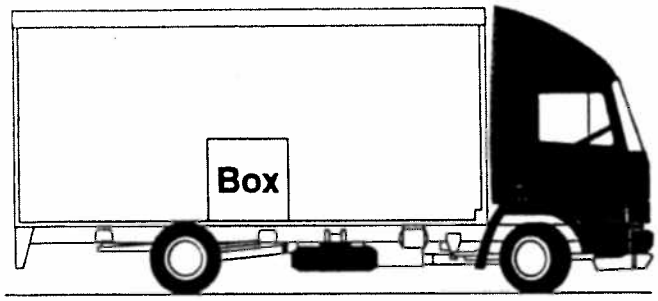
27. A dam is built to produce electrical energy. The greatest negative impact of this technological development is the

O A. flooding behind the dam.
O B. silt that builds up behind the dam.
O C. production of electricity for industry.
O D. traffic from construction vehicles.

18. What determines the gravitational pull on an object on the surface of the Moon?

A. the surface features of the Moon
B. the mass of the Moon
C. the rotational speed of the Moon
D. the distance of the Moon from Earth

Use the picture below to answer question 1.



1. Suppose you place a box of weights in the middle of a truck and quickly accelerate the truck forward. How will the box move relative to the truck?

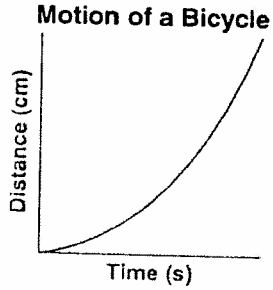
   O A. forward
   O B. backward
   O C. to the left
   O D. to the right

8. It takes 2 seconds for a beach ball to move 4 meters down a stream. Which of the following **best** describes the speed of the beach ball?

$$\text{Speed} = \frac{\text{distance}}{\text{time}}$$

   O A. 0.5 meter per second
   O B. 2.0 meters per second
   O C. 6.0 meters per second
   O D. 8.0 meters per second

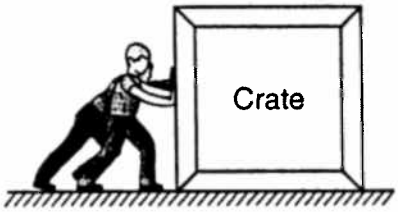
Use the graph below to answer question 18.



18. The best description for the motion of a bicycle in the above graph is that the bicycle

   O A. is at rest.
   O B. is speeding up.
   O C. is slowing down.
   O D. has a constant speed.

❶ The diagram below shows two students pushing a heavy crate across a floor.



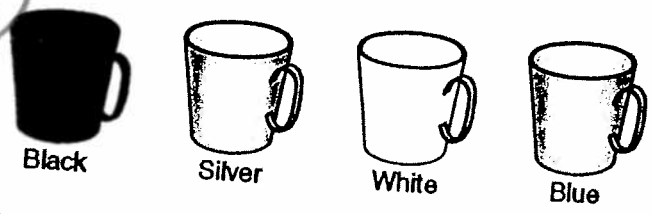
One student pushes with a force of 40 N and the other student pushes with a force of 100 N. What is the resulting force from the two students pushing the crate?

A. 60 N
B. 100 N
C. 140 N
D. 4000 N

11. Darnel had several objects made of the same material but of different sizes. He dropped each of the objects from the top of a stepladder and measured the time it took each to hit the floor. Which variable did Darnel change in this experiment?

   O A. the distance each object fell
   O B. the mass of the objects he dropped
   O C. the time it took each object to hit the floor
   O D. the acceleration of each falling object

Use the pictures below to answer question 23.

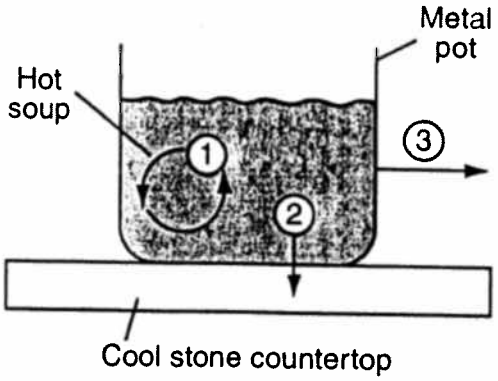


23. Which color cup absorbs the most energy when placed in the sun?

   O A. black
   O B. silver
   O C. white
   O D. blue

14 P

9 A metal pot with hot soup in it is placed on a cool stone countertop, as shown in the diagram below.



The numbered arrows show the transfer of heat from the pot of soup to the surrounding environment. Which list identifies each method of heat transfer?

A. 1 — conduction; 2 — convection; 3 — radiation
B. 1 — convection; 2 — conduction; 3 — radiation
C. 1 — radiation; 2 — radiation; 3 — convection
D. 1 — convection; 2 — conduction; 3 — conduction

15 P

3 The table below shows the approximate wavelengths of violet and red colors.

Color	Wavelength
Violet	400 nanometers
Red	700 nanometers

What range of wavelengths is visible to human eyes?

A. less than 400 nm
B. more than 700 nm
C. less than 400 nm and more than 700 nm
D. more than 400 nm and less than 700 nm

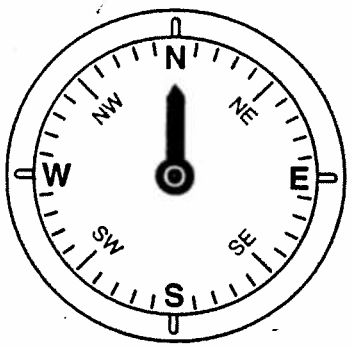
16 P

15 Which device produces mechanical energy?

A. a battery
B. an electric motor
C. a lightbulb
D. a solar cooker

17 P

6 The picture below shows a compass.



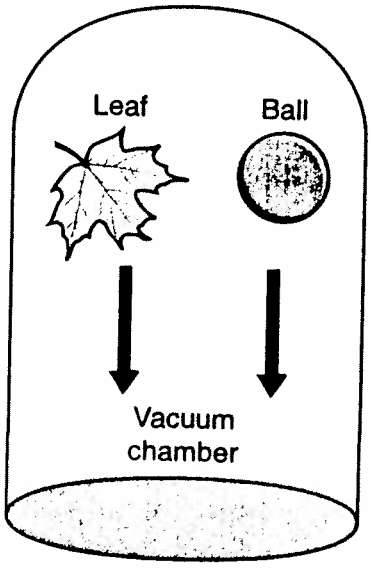
Compass

The needle of the compass is pointing toward the magnetic north pole of Earth. What would cause the needle of the compass to point toward the east?

A. light waves
B. heat energy
C. an electrical current near the compass
D. a gravitational force near the compass

18 P

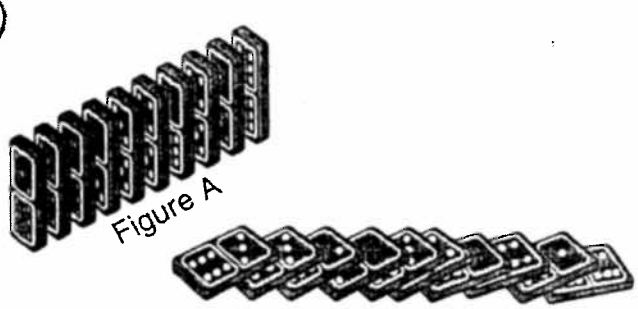
11 A vacuum chamber has no air in it. The diagram below shows a leaf and a ball released at the same time from the top of a vacuum chamber.



What will a student observe?

A. The leaf and the ball do not reach the bottom of the chamber.
B. The leaf reaches the bottom of the chamber first.
C. The ball reaches the bottom of the chamber first.
D. The leaf and the ball reach the bottom of the chamber together.

Use the diagram below to answer question 28.



28. Suppose there were ten dominos standing in a row (Figure A) with a space between them smaller than the length of a domino. What would be the **direction** of a force used to make the dominos fall from left to right as in Figure B?

- O A. The force would be in the same direction as the motion.
- O B. The force would be from the side.
- O C. The force would be in the opposite direction to the motion.
- O D. The force would be from above.

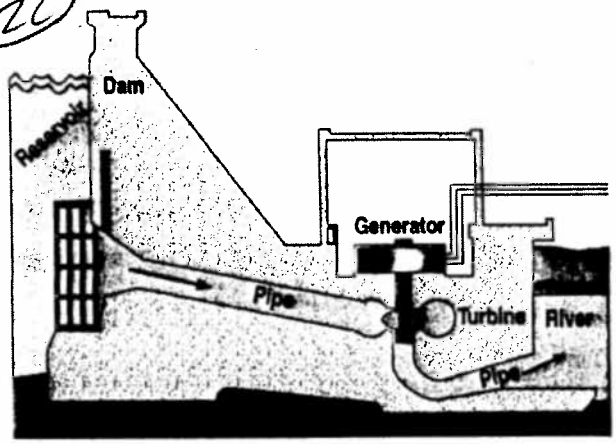
7. Which statement tells an advantage of using nuclear power plants instead of power plants that burn fossil fuels to produce electricity?

- O A. There are no waste disposal problems with nuclear power plants.
- O B. Nuclear power plants are not as dangerous as fuel-burning power plants.
- O C. Nuclear power plants produce less air pollution than fuel-burning power plants.
- O D. People do not mind living near nuclear power plants.

24. For every action there is an equal and opposite reaction. Which of the following descriptions **best** exhibits this law?

- O A. No matter how hard you kick a soccer ball, it eventually slows down.
- O B. When you exert more force on an object, it accelerates.
- O C. When two ice hockey players collide, both are pushed backward.
- O D. When no additional rockets are fired, space vehicles travel at a constant speed.

1. The diagram below shows a hydroelectric dam for producing electricity.



What type of energy transformation occurs in this production of electricity?

- A. chemical energy to heat energy
- B. mechanical energy to electrical energy
- C. electrical energy to mechanical energy
- D. heat energy to chemical energy

6. Suppose a force is accelerating an object. If the force is increased and the mass of the object stays the same, what happens to the motion of the object?

- A. The object stops.
- B. Its acceleration decreases.
- C. Its acceleration increases.
- D. Its acceleration remains the same.

3. What is the **best** conductor of heat?

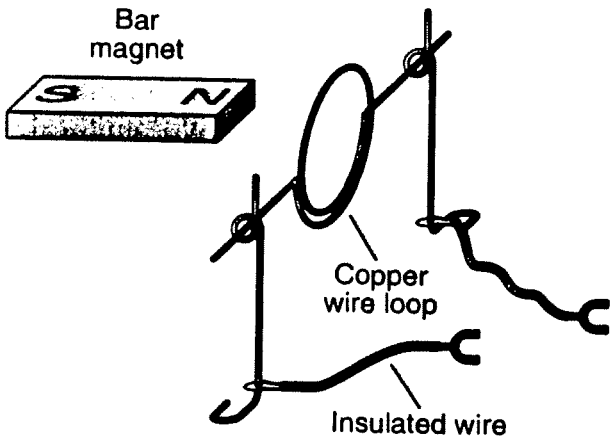
- O A. glass
- O B. wood
- O C. metal
- O D. plastic

4. Which energy source was developed through the invention of the atomic bomb?

- A. nuclear
- B. solar
- C. geothermal
- D. hydropower

26 P

7 The diagram below shows a copper wire loop situated near a bar magnet.



What needs to be connected to the insulated wire to complete the circuit and to make the copper wire loop rotate?

A. a battery
B. a lightbulb
C. a digital meter
D. an electromagnet

27 P

7 Giant redwood trees change energy from one form to another. How is energy changed by the trees?

A. They change chemical energy into kinetic energy.
B. They change solar energy into chemical energy.
C. They change wind energy into heat energy.
D. They change mechanical energy into solar energy.

28 P

1 What effect does gravity have on a person living on Earth?

A. It causes a person to have mass.
B. It causes a person to have weight.
C. It causes a heavy person to fall faster than a light person.
D. It causes a heavy person to fall slower than a light person.

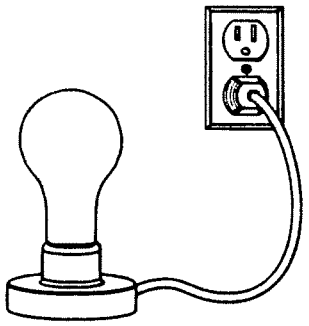
For question 34, write the name that fills in the blank.

29 P

34. The three laws of motion were formulated by _____

30 P

10 The picture below shows a lit bulb.



Which sentence explains what happens to the electric energy as the light shines?

A. The electric energy gets used up.
B. The electric energy changes into light and heat energy and is destroyed.
C. The electric energy is created again after it produces light and heat energy.
D. The electric energy changes into light and heat energy and is not destroyed.

31

13 Scientists who study the universe have observed many different types of energy in outer space. Which type of energy have the scientists been **unable** to detect in outer space?

A. infrared light
B. microwave
C. sound
D. X-ray

32 P

11 A boy on a skateboard is rolling along a flat paved walk. His skateboard hits a patch of gravel and slows down. Which phrase **best** explains what causes the skateboard to slow down?

A. mass of the gravel
B. mass of the skateboard
C. friction from the gravel
D. gravity on the skateboard

33 P

Joanna is designing an experiment to see how force affects the motion of more massive and less massive carts. Which variable must she control?

O A. the distance each cart moves
O B. the mass of each cart
O C. the time each cart moves
O D. the amount of force on each cart

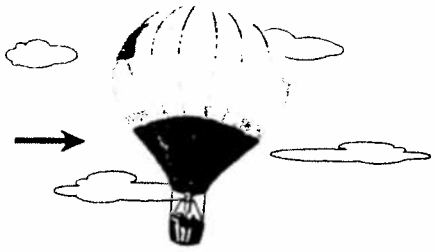
6

CONSTRUCTED RESPONSE

(34) 34. Convection involves heat energy moving from one place to another by moving molecules. Name two P states of matter that transfer heat energy by convection.

Use the picture to the right and the formula below to answer question 17.

$$\text{Speed} = \frac{\text{distance}}{\text{time}}$$



(35) 17. A hot air balloon moves 500 meters in 100 seconds. What is the P speed of the hot air balloon?

(36) 2.36a. Explain in as much detail as possible how light and sound are alike.

P36b. Explain in as much detail as possible how light and sound are different.

a b

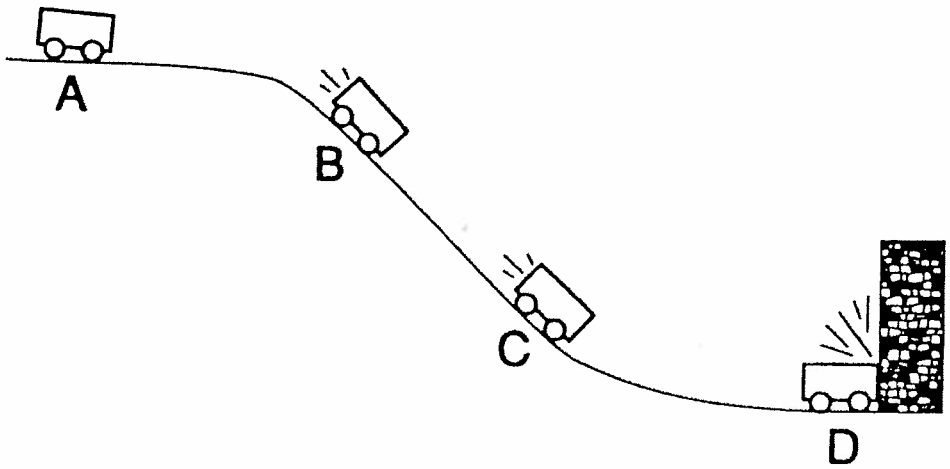
> ***A body at rest remains at rest, or a body in motion remains in motion in a straight line at a constant speed unless it is acted upon by a force.***

(37) 3. Explain in detail several ways that Newton's First Law of Motion (shown above) affects everyday life.

P

(38) 1. Describe several factors that will affect how far a ball will travel when it is kicked. Explain how P the ball is influenced by each factor.

(39)

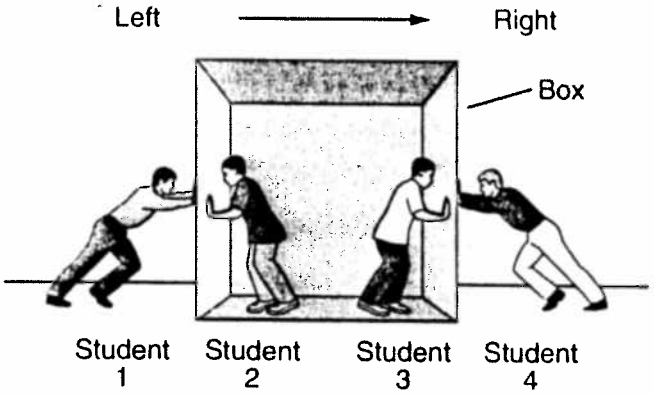


4. The cart on the top of the hill rolls down the hill and hits the wall at the bottom. Discuss how the P laws of energy and motion would apply at points A, B, C and D in this situation.

CONSTRUCTED RESPONSE

(40) P

21 In the diagram below, four students are pushing a rigid box with unequal forces from different positions. As a result, the box starts moving toward the right.



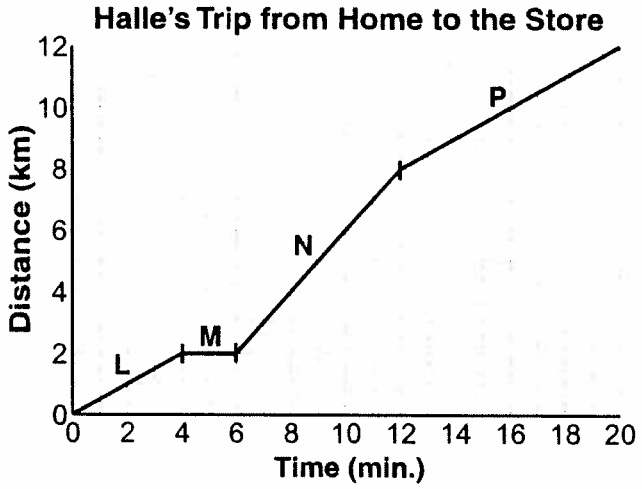
40 a. Identify which student(s) is causing the box to move to the right.

40 b. Explain what the effect on the box will be if students 2 and 3 stop pushing on the box.

40 c. Explain what the effect on the box will be if student 1 stops pushing on the box.

(41) abc P

20. Halle drove from home to the store. The time and distance data for her trip are recorded in the graph below.



41 a. Calculate the speed of the car for each line segment—L, M, N, and P—of the trip and include the units.

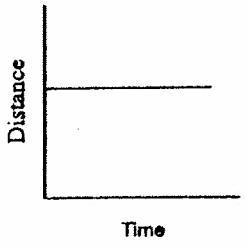
41 b. Calculate the average speed for the entire trip.

41 c. Describe what might be happening during minutes 4–6.

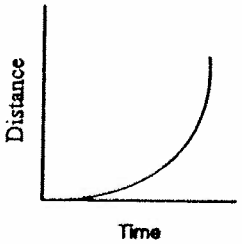
(42)

Which graph shows an object that is moving forward at a constant speed?

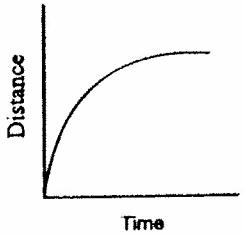
A.



B.



C.



D.