مذكرة مراجعة وفق الهيكل الوزاري منهج انسباير

تاريخ إضافة الملف على موقع المناهج: 2025-03-09 13:17:13

المزيد من مادة علوم:	ملفات ا كتب للمعلم ا كتب للطالب ا اختبارات الكترونية ا اختبارات ا حلول ا عروض بوربوينت ا أوراق عمل منهج انجليزي ا ملخصات وتقارير ا مذكرات وبنوك ا الامتحان النهائي ا للمدرس

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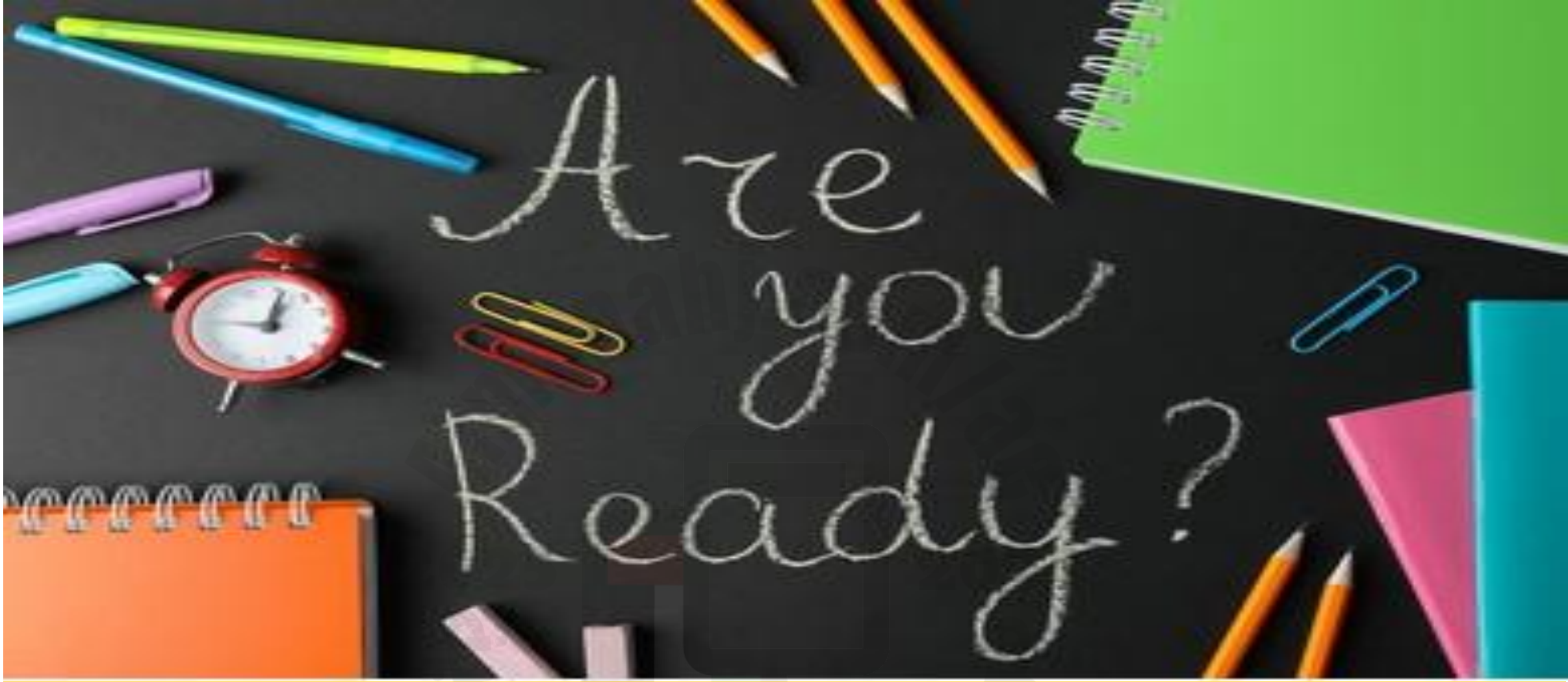
التواصل الاجتماعي بحسب الصف التاسع العام

صفحة المناهج الإماراتية على فيسبوك					
المواد على تلغرام	التربية الاسلامية	اللغة العربية	اللغة الانجليزية	الرياضيات	

المزيد من الملفات بحسب الصف التاسع العام والمادة علوم في الفصل الثاني

1	حل أسئلة امتحان نهائي سابق
2	مراجعة عامة للامتحان باللغتين العربية والانجليزية
3	حل أسئلة الامتحان النهائي القسم الالكتروني منهج انسباير
4	أسئلة مراجعة نهائية وفق الهيكل الوزاري منهج انسباير
5	تجميعة قوانين المعادلات الرياضية مع أمثلة محلولة



Grade 9 General Term 2 Revision Booklet

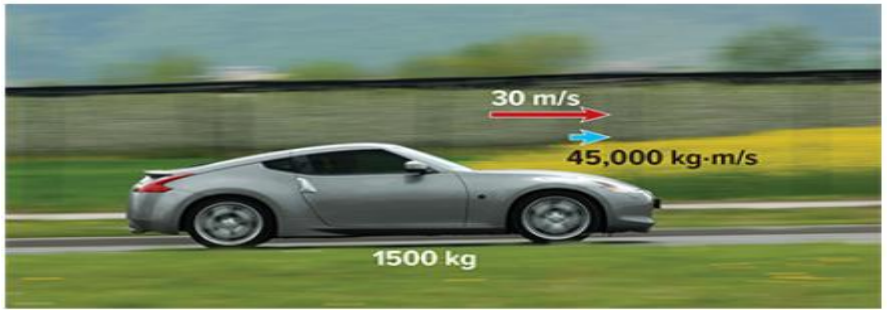
2024- 2025

Done By: Nehal Abdelhamid

Al Shawamekh School

Calculate the momentum to different objects and compare between them

Page (48-49)



Car Momentum	Truck Momentum
P=mv P=1500x30= 45000 kg.m/s east	P=mv P=30000x30= 900000 kg.m/s east
Truck has bigger Momentum because it has more mass	

EXAMPLE Problem 2

SOLVE FOR MOMENTUM At the end of a race, a sprinter with a mass of 80.0 kg has a velocity of 10.0 m/s east. What is the sprinter's momentum?

Identify the Unknown: momentum: p

List the Knowns: mass: $m = 80.0\ \text{kg}$
velocity: $v = 10.0\ \text{m/s east}$

Set Up the Problem: $p = mv = (80.0\ \text{kg}) \times (10.0\ \text{m/s}) \text{ east}$

Solve the $p = (80.0\ \text{kg})\,(10.0\ \text{m/s}) \text{ east} = 800.0\ \text{kg·m/s east}$

Calculate the momentum to different objects and compare between them

$$\rho = mv$$

12. What is the momentum of a car with a mass of 1300 kg traveling north at a speed of 28 m/s?

m= 1300 kg v= 28m/s

$\rho = mv$

$\rho = 1300 \times 28 =$

36,400 kg.m/s north

13. A baseball has a momentum of 6.0 kg·m/s south and a mass of 0.15 kg. What is the baseball's velocity?

ρ = 6 kg.m/s m= 0.15 kg

$\rho = mv$

$v = \frac{\rho}{m}$

$v = \frac{6}{0.15}$ = 40 m/s south

14. Find the mass of a person walking west at a speed of 0.8 m/s with a momentum of 52.0 kg·m/s west.

ρ = 52 kg.m/s v = 0.8 m/s

$\rho = mv$

$m = \frac{\rho}{v}$

$m = \frac{52}{0.8}$ = 65 kg

Calculate the momentum to different objects and compare between them

Page (48-49)

1) An object's momentum includes its _____.

- position and velocity
- displacement and acceleration
- velocity and mass
- position and time

2) Compare the momenta of a 6300-kg elephant walking 0.11 m/s and a 50-kg dolphin swimming 10.4 m/s.

elephant: $p = mv = 6{,}300\ \text{kg} \times 0.11\ \text{m/s} = 693\ \text{kg·m/s}$

dolphin: $p = mv = 50\ \text{kg} \times 10.4\ \text{m/s} = 520\ \text{kg·m/s}$

The size of the elephant's momentum is about 1.3 times larger than the size of the dolphin's momentum.

4)

Runner	Distance Covered (km)	Time (min)
Ling-Ling	12.5	42
LaToya	7.8	38
Bill	10.5	32
José	8.9	30

If all four runners have the same mass, who has the smallest momentum?

- Ling-Ling
- LaToya
- Bill
- José

Analyse and interpret speed-time graphs (calculate acceleration

Page (42, 43, 44, 51, 52)

Q1: describe the change speed ?

Speed Increase from 0 km to 20 km/h then down to 10km /h then speed up to 30 km /h then stop

Then speed up again then stop then constant and come to stop.

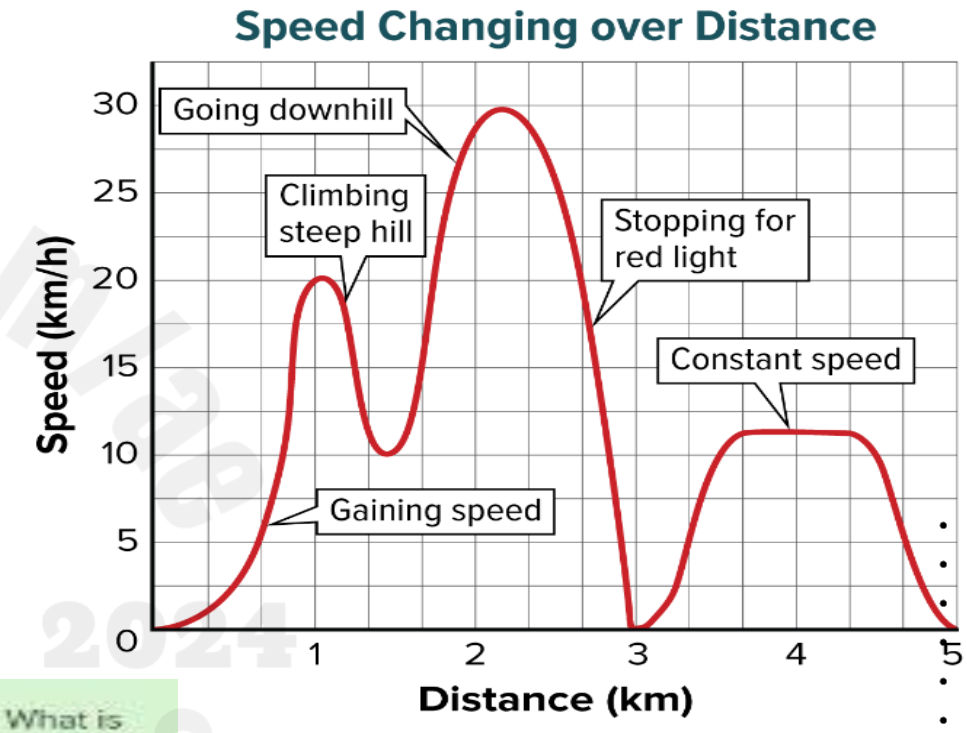
Q2: use figure up to calculate average speed if the trip took 15 min ?

$$s = \frac{d}{t}$$

$$s = \frac{5}{15} = 0.33 \text{ km/min}$$

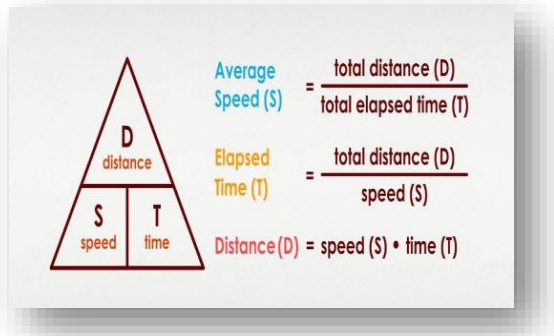
Or

$$s = \frac{5}{0.25} = 20 \text{ km/h}$$



CALCULATE SPEED A car traveling at a constant speed covers a distance of 750 m in 25 s. What is the car's speed?

Identify the Unknown:	speed: s
List the Knowns:	distance: $d = 750$ m time: $t = 25$ s
Set Up the Problem:	$s = \frac{d}{t} = \frac{750 \text{ m}}{25 \text{ s}}$
Solve the Problem:	$s = \frac{750 \text{ m}}{25 \text{ s}} = 30 \text{ m/s}$



Analyse and interpret speed-time graphs

Page (42, 43, 44, 51, 52)

1. A passenger elevator travels from the first floor to the 60th floor, a distance of $210\ \text{m}$, in $35\ \text{s}$. What is the elevator's speed?

d= 210 m t= 35 s

$s = \frac{d}{t}$

s = 210/35

6 m/s

2. A motorcycle is moving at a constant speed of $40\ \text{km/h}$. How long does it take the motorcycle to travel a distance of $10\ \text{km}$?

d= 10 km s=40 km/h

$t = \frac{d}{s} = \frac{10}{40}$ = 0.25 h

15 min

ATTENTION!
IMPORTANT

3. How far does a car travel in $0.75\ \text{h}$ if it is moving at a constant speed of $88\ \text{km/h}$?

s= 88 km/h t=0.75 h

d= st

d = 88 x 0.75

66 km

calculate acceleration or distance-time graphs (calculate speed)

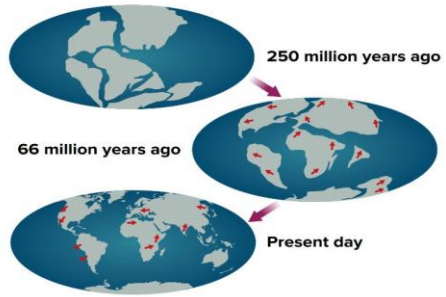
Page (42, 43, 44, 51, 52)

1) Which of the following do you calculate when you divide the total distance traveled by the total travel time?

average speed
constant speed
variable speed
instantaneous speed

2) The movement of the Australian plate pushes Australia north at an average speed of about 17 cm per year. What will Australia's displacement be in meters in 1,000 years?

instantaneous speed
170 m north
170 m south
1700 m north
1700 m south



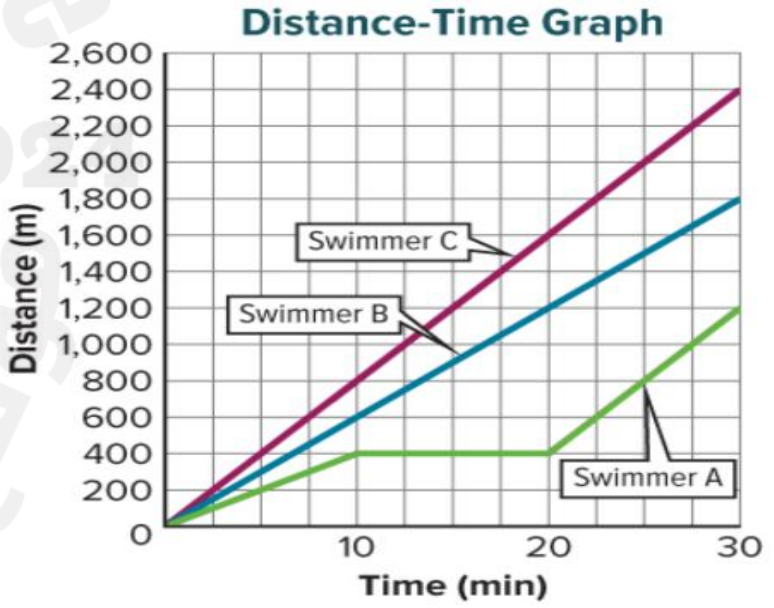
3.The graph shows the motion of three swimmers during a 30-min workout. Which swimmer had the highest average speed over the 30-min time interval? Explain.

Swimmer C; the line representing her motion has the largest slope.

4.Did all the swimmers swim at a constant speed? Explain how you know.

Swimmers B and C swam at constant speeds because their motion is shown by straight lines. Swimmer A did not swim at a constant speed because her line changes slope during the workout

3)



calculate acceleration or distance-time graphs (calculate speed)

Page (42, 43, 44, 51, 52)

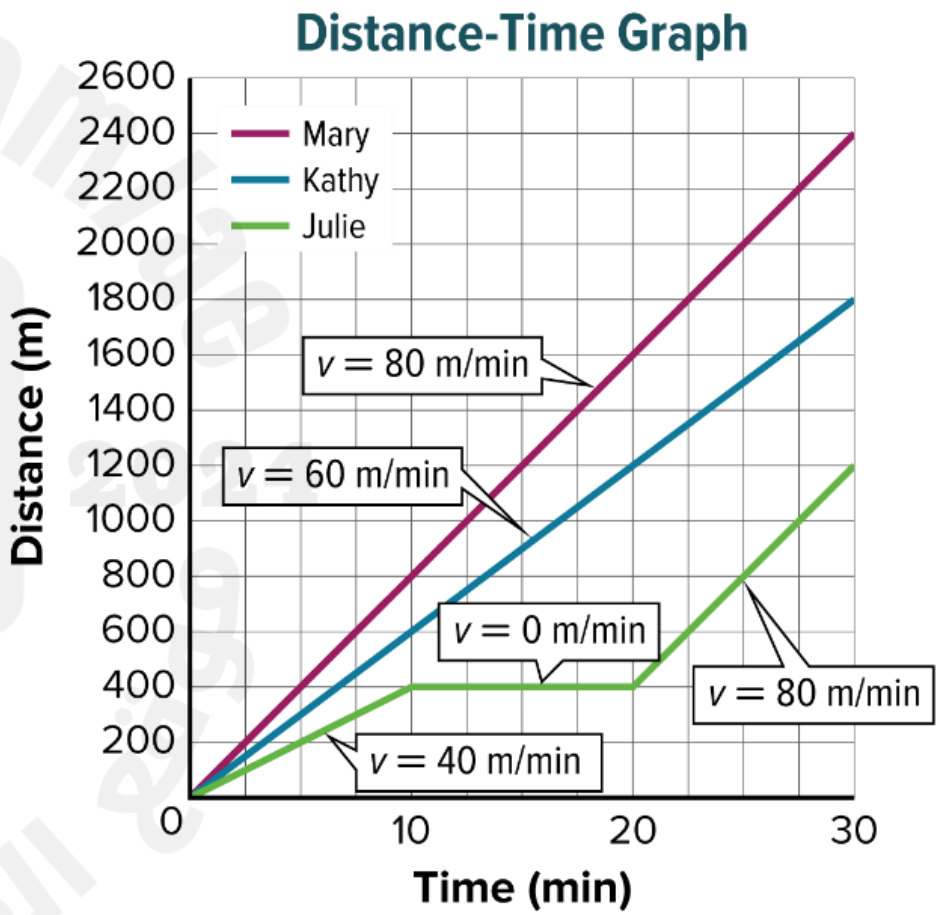
Q4: use figure to answer question

1- Which is faster or has a greater speed ? Mary

2- Identify the part of graph that show one of swimming resting for 10m ?

Juli Between (10:20) min – slop = 0

3- The slope of line on distance -time graph equals the object is .... .? speed



calculate acceleration or distance-time graphs (calculate speed)

Page (42, 43, 44, 51, 52)

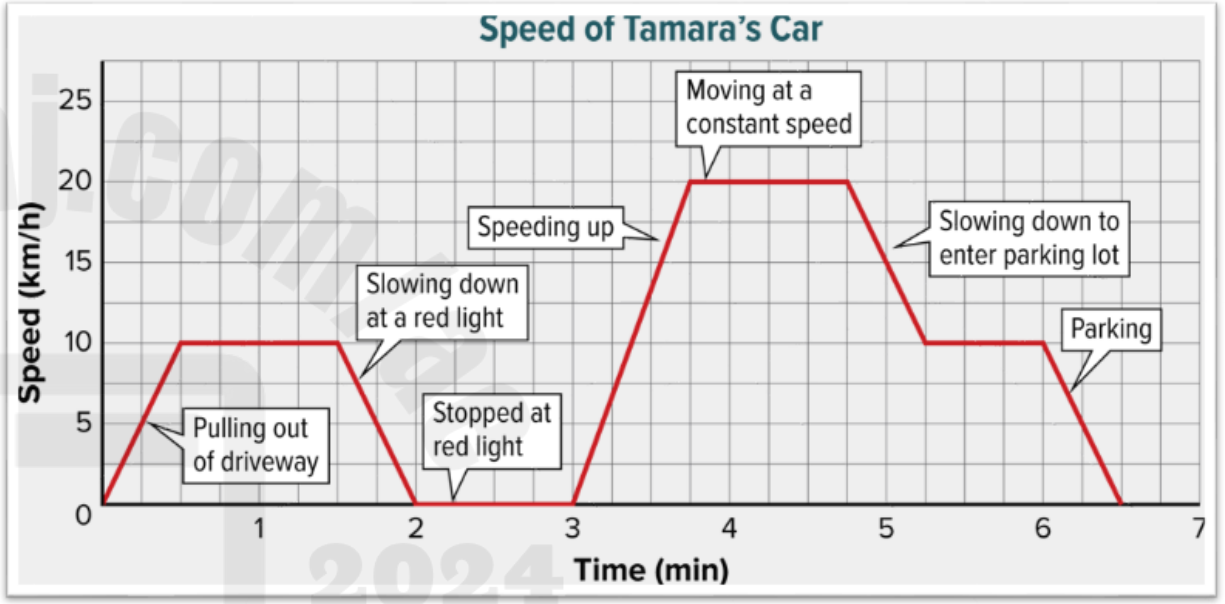
Use the figure up to answer questions

1- Which tamara car is not accelerated ? B , D , F, W

2- Which tamara car is increase speed ? A , E

3- The slope of line on speed-time graph is the object represent ? Acceleration

4- Calculate the acceleration between minutes 3:4



$t = 4-3 = 1$ min

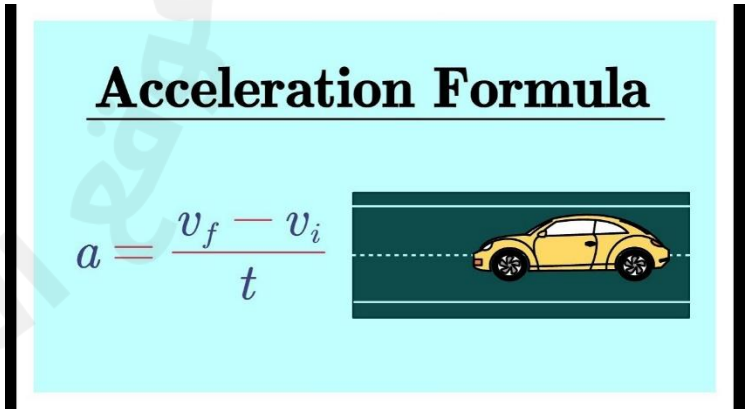
$v_1 = 0$ $v_2 = 20$ km/h

$$a = \frac{v_2 - v_1}{t}$$

$$a = \frac{20-0}{1} = 20 \text{ km/ min north}$$

Or

$$a = \frac{20-0}{1x60} = 0.33 \text{ km/ } s^2 \text{ north}$$



calculate acceleration or distance-time graphs (calculate speed)

EXAMPLE Problem 3

CALCULATE ACCELERATION A skateboarder has an initial velocity of 3 m/s west and comes to a stop in 2 s. What is the skateboarder's acceleration?

Identify the Unknown: acceleration: a

List the Knowns: initial velocity: $v_i = 3$ m/s west

final velocity: $v_f = 0$ m/s west

time: $t = 2$ s

Set Up the Problem: $a = \frac{(v_f - v_i)}{t} = \frac{(0 \text{ m/s} - 3 \text{ m/s})}{2 \text{ s}}$ west

Solve the Problem: $a = \frac{(0 \text{ m/s} - 3 \text{ m/s})}{2 \text{ s}} = -1.5 \text{ m/s}^2$ west

Acceleration Formula

$$a = \frac{v_f - v_i}{t}$$

$t = 20$ s $v_2 = 80$ m/s $v_1 = 0$

$$a = \frac{v_2 - v_1}{t}$$

$$a = \frac{80 - 0}{20} = 4 \text{ m/s}^2 \text{ north}$$

22. An airplane starts at rest and accelerates down the runway for 20 s. At the end of the runway, its velocity is 80 m/s north. What is its acceleration?

1) An object traveling in a circular path is accelerating because its _____.

- mass changes
- direction changes
- speed changes
- momentum changes

2) Will a thrown ball or a dropped ball hit the ground first when dropped or thrown from the same height?

- The dropped ball will hit the ground first.
- The thrown ball will hit the ground first.
- Both the balls hit the ground at the same time.
- The less massive ball will hit the ground first.

4) In which of the following conditions does the car not accelerate?

- A car moves at 80 km/h on a flat, straight highway.
- The car slows from 80 km/h to 35 km/h.
- The car turns a corner.
- The car speeds up from 35 km/h to 80 km/h.

Calculate work with a force parallel to motion and a force perpendicular to the motion

Page (89)

EXAMPLE 1

Solve for Work You push a refrigerator with a horizontal force of 100 N. If you move the refrigerator a distance of 5 m while you are pushing, how much work do you do?

Identify the Unknown: work: W

List the Knowns: applied force: $F = 100\ N$ distance: $d = 5\ m$

Set Up the Problem: $W = Fd$

Solve the Problem: $W = (100\ N)(5\ m) = 500\ J$

Check the Answer: Check to see whether the units match on both sides of the equation.

units of W = (units of F) × (units of d) = N × m = J

Work Equation

work (in joules) = applied force (in newtons) × distance (in meters)

$W = Fd$

F=80N d=5m
W= Fd
W= 80x5= 400 J

1. A couch is pushed with a horizontal force of 80 N and moves a distance of 5 m across the floor. How much work is done in moving the couch?

W= Fd
F= 100 d=50
W= 100x0.5= 50 J

2. How much work do you do when you lift a 100-N child 0.5 m?

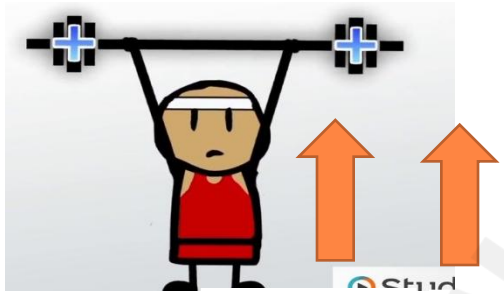
W= Fd
W= 240,000 d=40
$F = \frac{240{,}000}{40} = 6000\ N$

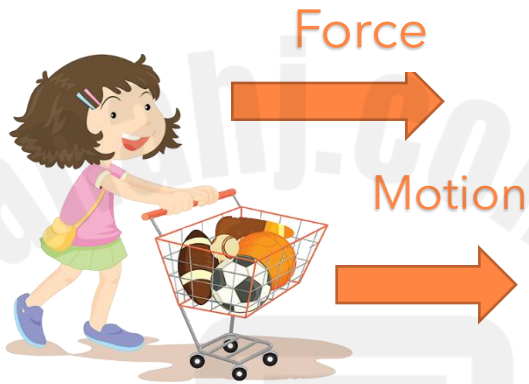
3. The brakes on a car do 240,000 J of work in stopping the car. If the car travels a distance of 40 m while the brakes are being applied, how large is the average force that the brakes exert on the car?

Force and direction of motion

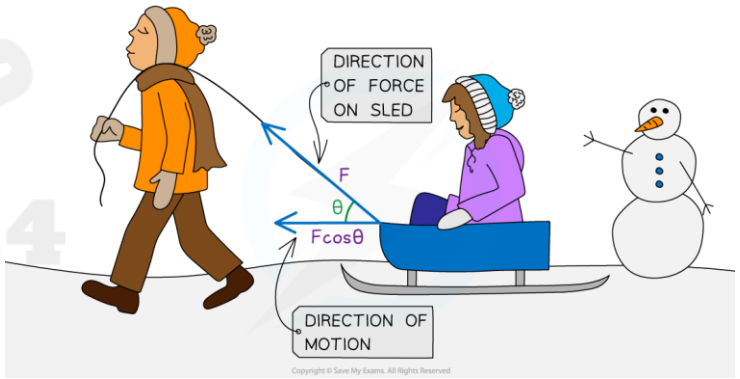
القوة واتجاه الحركة

1-Draw the direction of force and the direction of motion

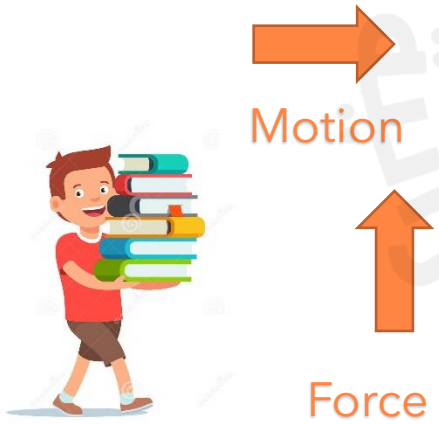




When Force is parallel to motion the work is Maximum



2-Draw the direction of force and the direction of motion



When the When the force is perpendicular to motion the work is zero

When Force form an angle to motion the work is between 0 and Maximum

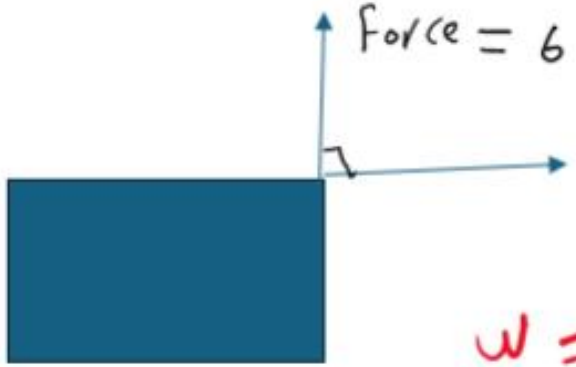
Calculate work with a force parallel to motion and a force perpendicular to the motion

Q: calculate the work for each the following

force = 50 N

distance = 3 m

W = Force x distance = 50 x 3 = 150 J



force = 6 N

distance = 2 m

W = 0 J because perpendicular between force and distance

Work Equation

work (in joules) =
applied force (in newtons) x distance (in meters)

$W = Fd$

Calculate the percent efficiency of a machine

EXAMPLE 2

Solve for Efficiency You do 20 J of work in pushing a crate up a ramp. If the output work from the inclined plane is 11 J, then what is the efficiency of the inclined plane?

Identify the Unknown: efficiency: e

List the Knowns: work in: $W_{in} = 20\ J$
work out: $W_{out} = 11\ J$

Set Up the Problem: $e = \frac{W_{out}}{W_{in}} \times 100$

Solve the Problem: $e = \frac{11\ J}{20\ J} \times 100$
$e = 55$ percent

Efficiency Equation

$$\text{efficiency (\%)} = \frac{\text{output work (in joules)}}{\text{input work (in joules)}} \times 100$$

$$e = \frac{W_{out}}{W_{in}} \times 100$$

$W_{out} = 800\ J$ $W_{in} = 2000\ J$

$$e = \frac{W_{out}}{W_{in}} \times 100$$

$$a = \frac{800}{2000} \times 100 = 40\ \%$$

5. Find the efficiency of a machine that does 800 J of work if the input work is 2000 J.

$e = 84\ \%$ $W_{in} = 75\ J$

$$84 = \frac{W_{out}}{75} \times 100$$

$$W_{out} = \frac{84 \times 75}{100} = 63\ J$$

6. The input work on a pulley system is 75 J. If the pulley system is 84 percent efficient, then what is the output work from the pulley system?

Calculate the mechanical advantage of a simple machine

EXAMPLE 3

Solve for Mechanical Advantage A crate weighs 950 N. If you can use a pulley system to lift that crate with a force of only 250 N, then what is the mechanical advantage of the pulley system?

Identify the Unknown: mechanical advantage: MA

List the Knowns: output force: $F_{out} = 950\ N$

input force: $F_{in} = 250\ N$

Set Up the Problem: $MA = \frac{F_{out}}{F_{in}}$

Solve the Problem: $MA = \frac{950\ N}{250\ N}$

$MA = 3.8$

Mechanical Advantage Equation

$$\text{mechanical advantage} = \frac{\text{output force (in newtons)}}{\text{input force (in newtons)}}$$

$$MA = \frac{F_{out}}{F_{in}}$$

$F_{in} = 125\ N$ $F_{out} = 2000\ N$

$$MA = \frac{F_{out}}{F_{in}}$$

$$MA = \frac{2000}{125} = 16$$

8. Calculate the mechanical advantage of a hammer if the input force is 125 N and the output force is 2,000 N.

$MA = 15$ $F_{out} = 3000\ N$

$$MA = \frac{F_{out}}{F_{in}}$$

$$15 = \frac{3000}{F_{in}}$$

$$F_{in} = \frac{3000}{15} = 200\ N$$

9. **CHALLENGE** Find the force needed to lift a 3,000-N weight using a machine with a mechanical advantage of 15.

Calculate the percent efficiency of a machine

1) Approximately how much work do you do when you lift your 10.0 kg sister to a height of 1.5 m?

_____ 147 J ≈ 150 J

2) Which simple machines represent variations of an inclined plane?

- ☐ lever
- ☐ wheel and axle
- ☐ wedge
- ☐ pulley
- ☐ screw

3) Which factor increases as the efficiency of a machine increases?

- ○ output work
- ○ input force
- ○ input work
- ○ friction

4) A particular lever is 90.0% efficient. If 50.0 J of work are done on the lever, then how much work does the lever do on its load?

_____ 45.0 J

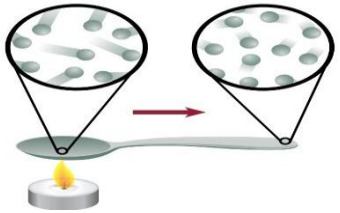
5) The mechanical advantage of a pulley system is 4.00. Using this pulley system, how much force do you need to exert to lift a 500.0 N box?

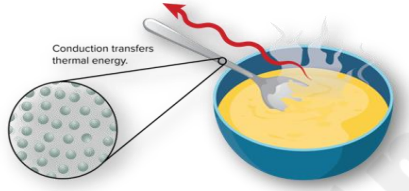
_____ 125 N

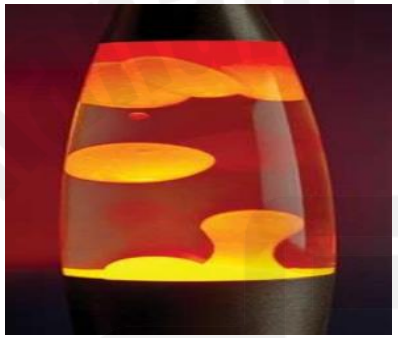
List methods of transferring heat energy and compare between their characteristics

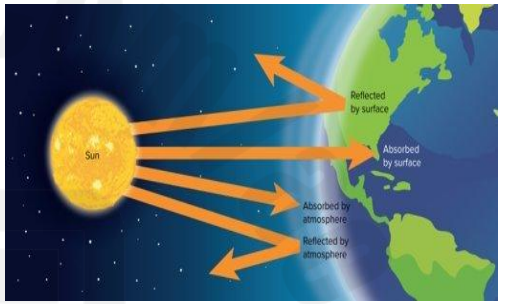
Page (120, 121, 122, 123, 124, 125, 129, 130, 131)

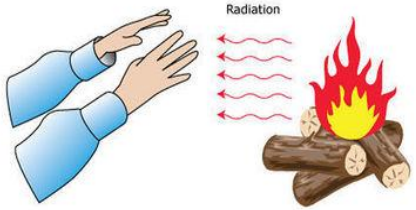
Method	Conduction	Convection	Radiation
Transfer Energy	By Collision	By moving warm and cold fluids	By electromagnetic waves
Type of matter	Solid	Liquid and gas	Air and space











Why do chefs often prefer pots that are good conductors of thermal energy?
because it is good conductor of thermal energy

5. Conduction can occur in solids, liquids, and gases. Explain why solids and liquids are better conductors than gases.

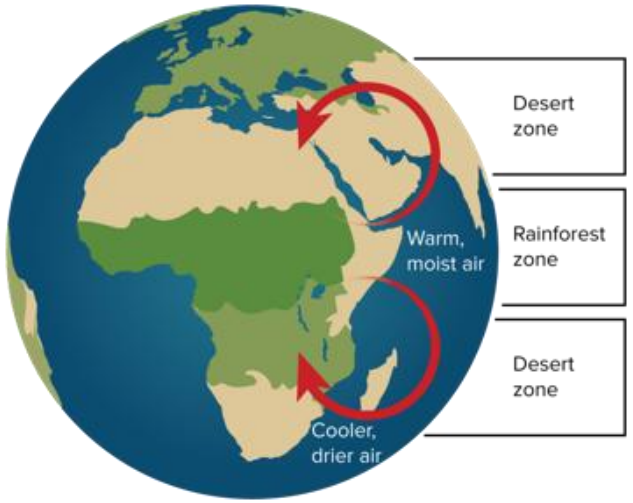
Solids and liquids are better conductors of thermal energy because collisions occur much more frequently between the particles of solids and liquids than between the particles of gases

Q: which is not true about the figure

A. The warmer stove heat cooler water
B. Warmer objects always heat cooler objects.
C. A cold pot heats a hot stove.

List methods of transferring heat energy and compare between their characteristics

Page (120, 121, 122, 123, 124, 125, 129, 130, 131)



Sunlight on Earth is most intense at the equator. Convection currents form around Earth's equator as a result. As this air rises, it cools and loses its moisture in the form of rain that sustains the rainforests near the equator. The convection currents then carry the dry air farther north and south. Deserts have formed where this air descends.

Figure 12 Tiny pockets of air help reduce the transfer of the people's thermal energy to the colder, outside air

Thick jacket trap air. The air slows the transfer of your body thermal energy into surrounding

Both the seal and penguin has a thick layer of fat that reduces the transfer of thermal energy into surrounding

The scaly skin of the desert spiny lizard reflects the Sun's rays and keeps the animal from becoming too hot

List methods of transferring heat energy and compare between their characteristics

Page (120, 121, 122, 123, 124, 125, 129, 130, 131)

Q: which the following used scaly skin for control heat

A. Antarctic seal

B. Emperor penguins

C. Spiny lizard

Q: which the following have thick layer of fat

A. Antarctic seal

B. Emperor penguins

C. Both Antarctic seal and Emperor penguins

D. Spiny lizard

Q:Which the following Not thermal insulator ?

A. Air

B. Wood

C. Fiberglass

D. Metals

State the first and second law of thermodynamics, and assign system and surroundings and the affect for work done on system and surrounding

Page, 129, 130, 131)

Q1- If a couch is a system, What are the surroundings?

Everything else is surroundings

Q2- How does work done on the system?

By pushing and pulling.

Q3- How does the couch heat the floor?

By friction.

Q4- What happens to the thermal energy of the system?

It increases due to friction with the floor

Q4- What is the relation between the work done on this system and the heat from it?

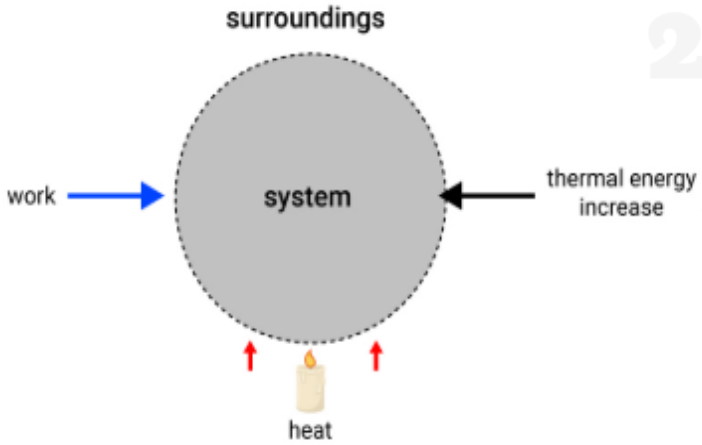
Both are about equal

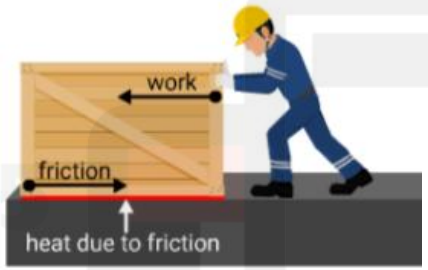
State the first and second law of thermodynamics, and assign system and surroundings and the affect for work done on system and surrounding

Page, 129, 130, 131)

The First Law of Thermodynamics

States the increase in thermal energy of that system equals the **sum** of the **thermal energy transfers** into that system and the **work done** on that system.

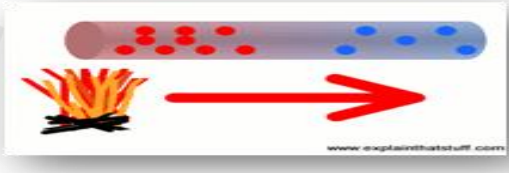




The Second Law of Thermodynamics

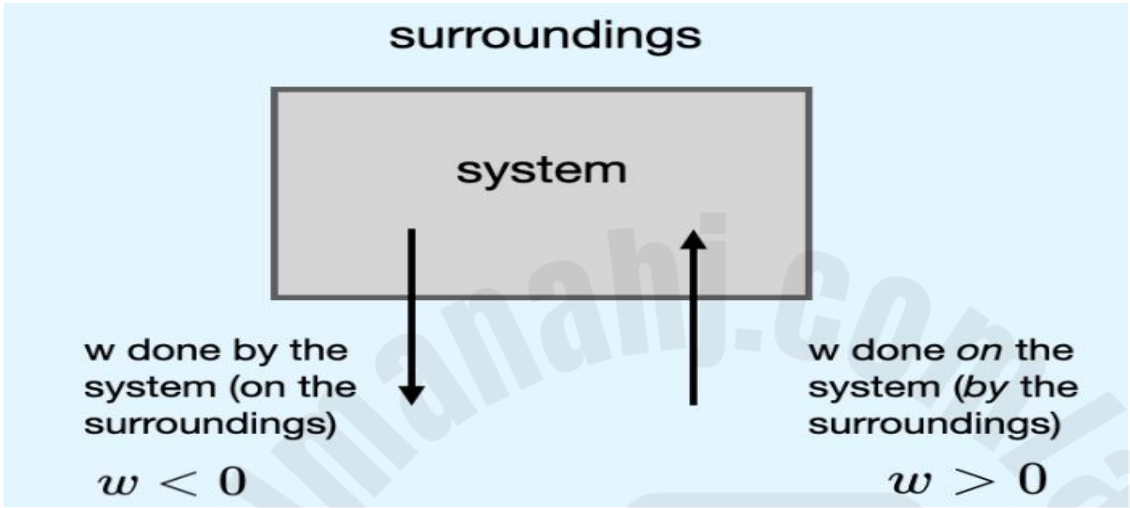
States that energy spontaneously spreads from regions of higher concentration to regions of lower concentration.

Figure 17 Thermal energy could never spontaneously spread from this cat to the warmer radiator.



State the first and second law of thermodynamics, and assign system and surroundings and the affect for work done on system and surrounding

Page, 129, 130, 131)

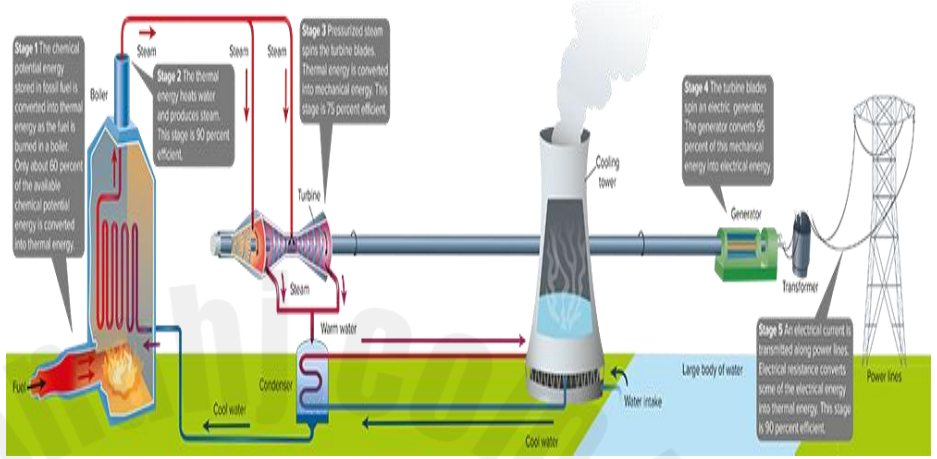


	Work Done ON the System	Work Done BY the System
Definition	Energy is transferred **into** the system, increasing its internal energy.	Energy is transferred **out of** the system, decreasing its internal energy.
Effect on System	Internal energy **increases.**	Internal energy **decreases.**
Effect on Surroundings	Surroundings **lose** energy.	Surroundings **gain** energy.
Sign Convention	Work is **positive** ($W > 0$).	Work is **negative** ($W < 0$).
Example	Compressing a gas in a piston.	Expanding gas pushing a piston outward.

How is chemical potential energy stored in fossil fuels converted to electrical energy in a power plant?

Page (196-197)

Stage 1
Fuel burned in a boiler or combustion chamber converts 60 % of chemical potential energy into thermal energy.



Stag 2
Thermal energy heats water and produces steam. (This stage is 90% efficient)

Stage 3
The steam spins the turbine blades, converting thermal energy into mechanical energy. (This stage is 75% efficient)

Stag 4
The turbine blades spin an electric generator, converts 95% of mechanical energy into electric energy.

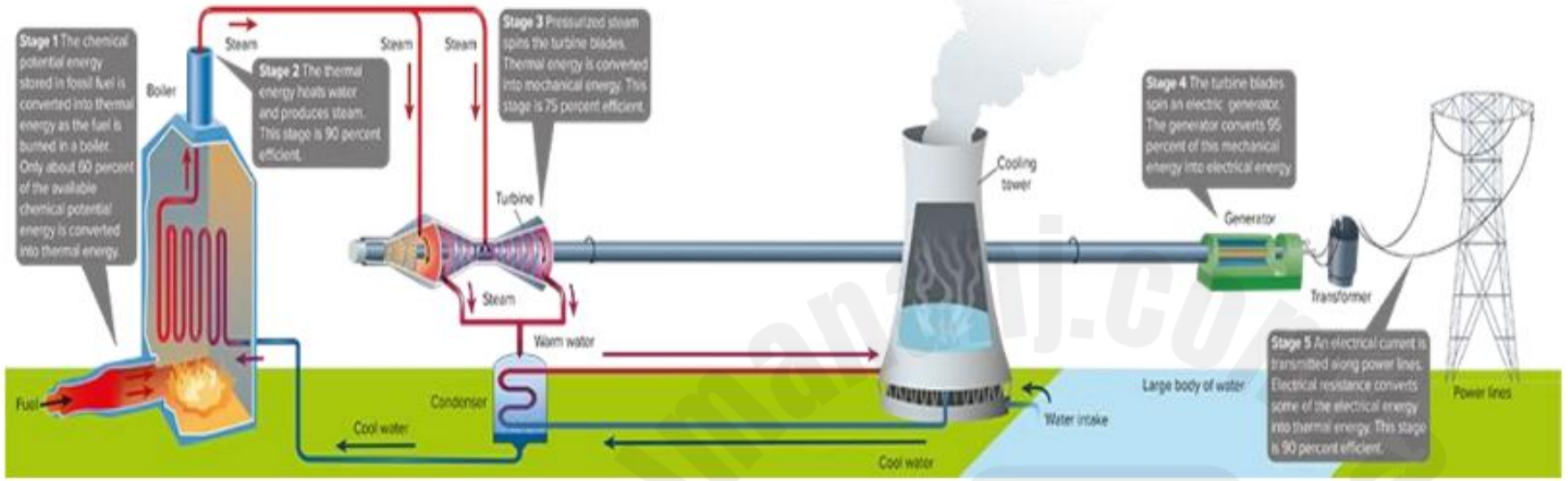
Stage 5
the electric current is transferred along power lines. (This stage is 90% efficient)

1.explain how nuclear power plants generate electricity?
Burning fuel convert chemical energy into thermal energy, used to heat water to produce steam that spins turbine then, spin generator which converts mechanical energy to electricity.

Chemical potential energy → Thermal energy → Mechanical energy → Electrical energy

How is chemical potential energy stored in fossil fuels converted to electrical energy in a power plant?

Page (196-197)



Q1; which stage in this process is the most inefficient?

A. stage 1

B. stage 2

C. stage 3

D. stage 4

Q2: which transfer true

A. Chemical → thermal energy → mechanical energy → electrical

B. Chemical → mechanical energy → thermal → electrical

C. mechanical → thermal energy → electrical energy → chemical

compare between the stages in a power plant

Page (196-197)

Stage	Process Description	Energy Conversion
1. Combustion	Fossil fuels (coal, oil, or natural gas) are burned in a boiler, releasing heat energy.	Chemical → Thermal
2. Steam Generation	Water absorbs the thermal energy and turns into high-pressure steam.	Thermal → Mechanical
3. Turbine Rotation	The pressurized steam spins a turbine, converting thermal energy into mechanical energy.	Thermal → Mechanical
4. Electricity Generation	The turbine is connected to a generator, which converts mechanical energy into electrical energy.	Mechanical → Electrical
5. Transmission	Electrical energy is transmitted through power lines to homes and businesses.	Electrical → Usable Power

The effect of burning fossil fuels on the environment

Page (196-197)

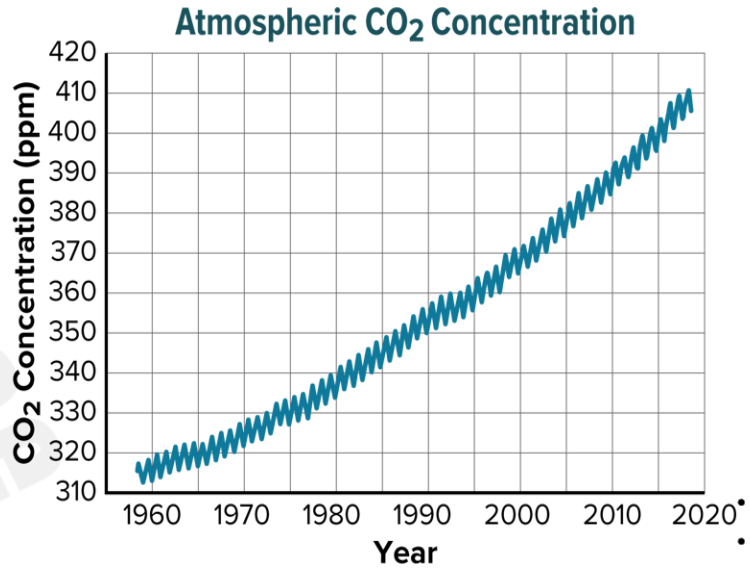
- ✓ Releases much of CO_2 into the atmosphere, which can cause breathing problems.
- ✓ The increase in CO_2 is the main reason of global climate change.

- ✓ **Non-renewable resources:** are resources that cannot be replaced by natural processes as quickly as they are used.

Such as Petroleum, Natural gas and coal

Disadvantages of Non-Renewable Energy

- ✓ All fossil fuels are non-renewable
- ✓ Cause air pollution
- ✓ It can damage environment.



4. Why are fossil fuels considered to be a nonrenewable resource?

We are using fossil fuels faster than they can be replenished.

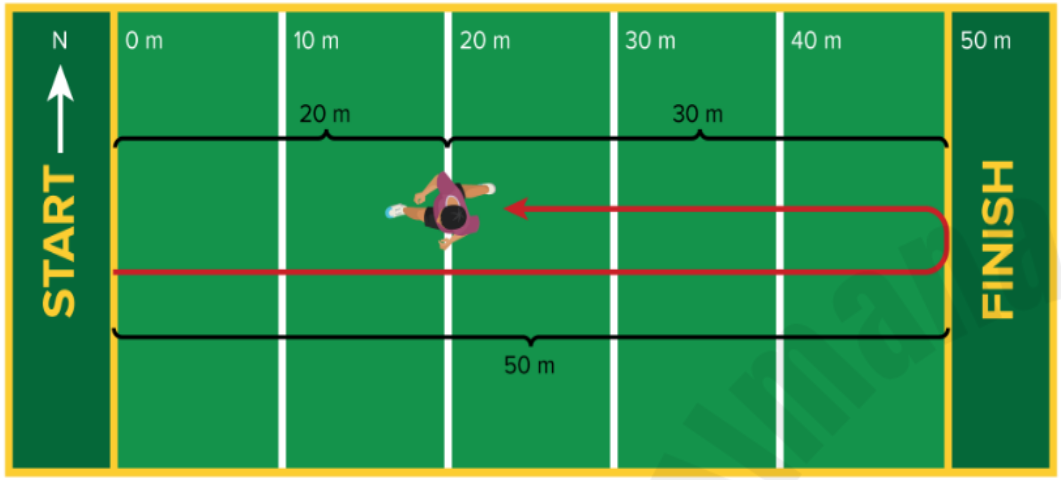
Q: compare between fossil fuel and with renewable energy

Compare	Non-renewable as Fossil fuel	Renewable as sun
pollution	Pollution release carbon dioxide	No Pollution not release carbon dioxide
Example	Petroleum – natural gas-coal	Wind -sun -water energy
Replaced	Cannot be replaced quickly	Replaced quickly

Calculate the distance and displacement?

Page (39-40)

1 figure 3 an object displacement is not the same as total distance what is true



A. Displacement 20 m east and distance 80m
B. Displacement 20 m west and distance 80m
C. Displacement 80 m east and distance 80m
D. Displacement 80 m east and distance 20m

2 A runner at a track meet completes exactly one lap around a 400 m track.

What is the runner's distance and displacement traveled in a complete one lap?

The runner's traveled distance is 400 m, and his displacement is 0 m
The runner's traveled distance is 300 m, and his displacement is 100 m
The runner's traveled distance is 0 m, and his displacement is 400 m
The runner's traveled distance is 200 m, and his displacement is 200 m

3

A. Distance 10 m and displacement 10 m west
B. Distance 10 m and displacement 10 m north
C. Distance 10 m and displacement 10 m east
D. Distance 10 m and displacement 0 m west

4

A. Distance 5 m and displacement 5m west
B. Distance 10 m and displacement 15m east
C. Distance 15 m and displacement 5m west
D. Distance 15 m and displacement 5m east

Describe how reference points affect a point of view and observing moving objects to describe its motion

Page (38-46-47)

A coordinate system like map the reference point at origen, identfy the position of orange car

1

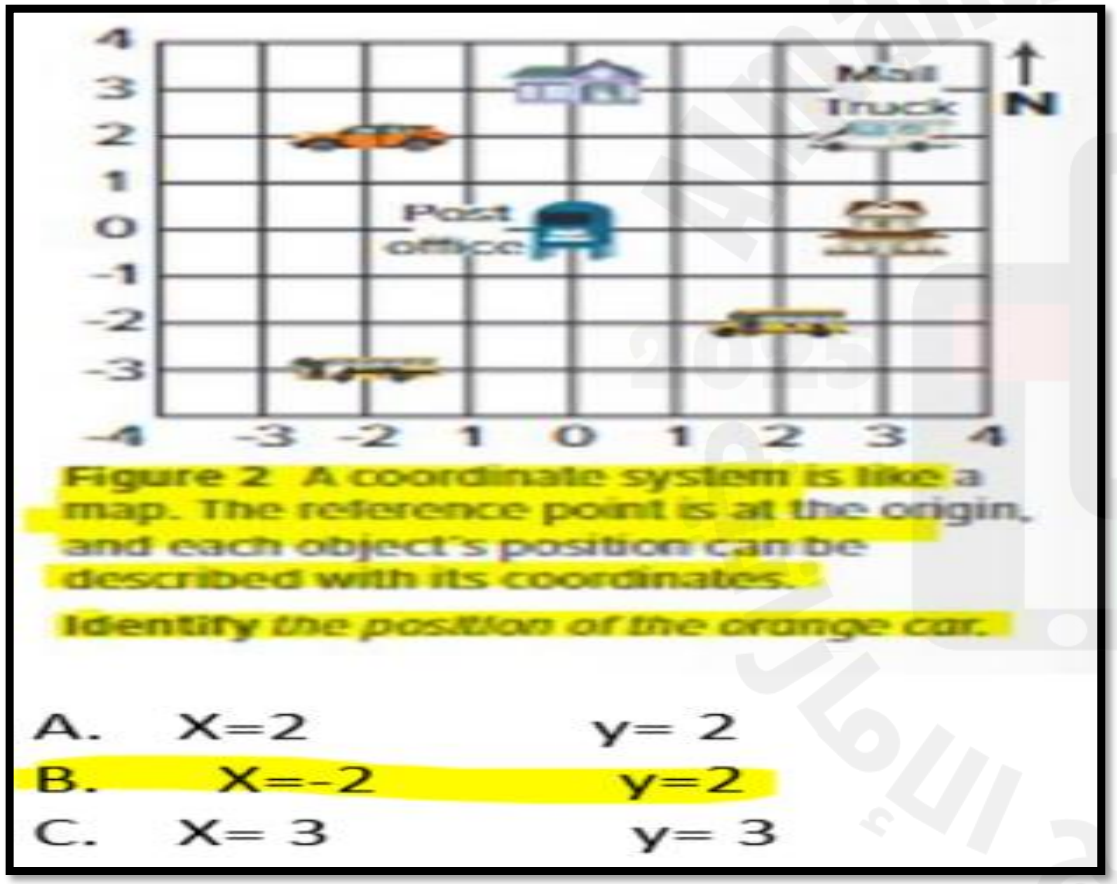


Figure 2 A coordinate system is like a map. The reference point is at the origin, and each object's position can be described with its coordinates.

Identify the position of the orange car.

A. X=2 y= 2

B. X=-2 y=2

C. X= 3 y= 3

2

Figure 1 As the mail truck follows its route, it stops at each mailbox along the street.

Explain How would you know the mail truck has moved?

Q2: The reference point for describing the movement of the truck is

A. tree

B. mailbox

C. River

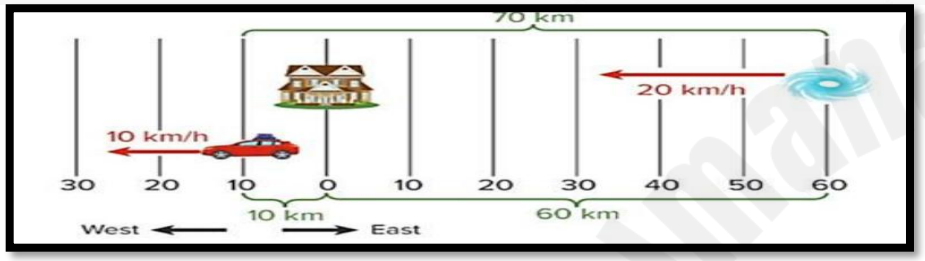
Describe how reference points affect a point of view and observing moving objects to describe its motion

Page (38-46-47)

وصف السؤال:

Study the figures below, the house is the reference point, which of the following figures represent the car movement at velocity = 10 km/h west, ?and 20 km away from its reference point

1



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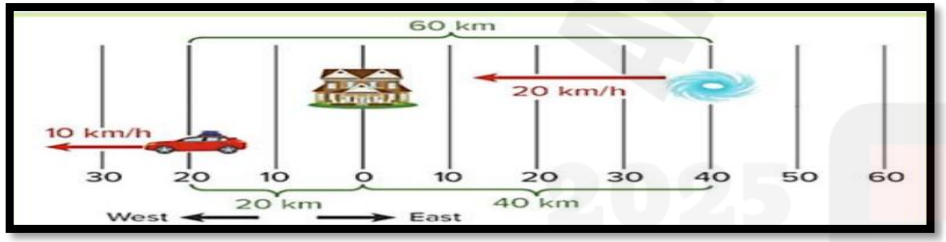

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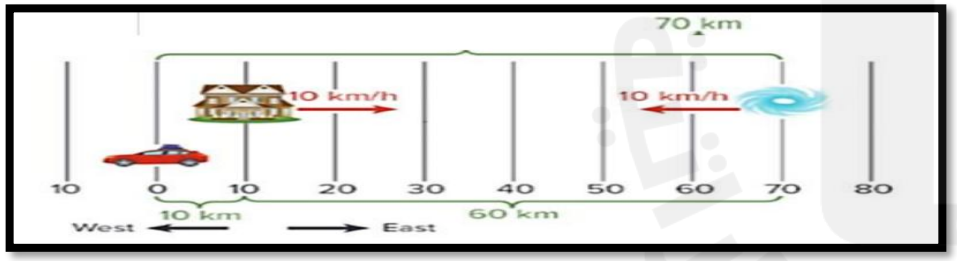

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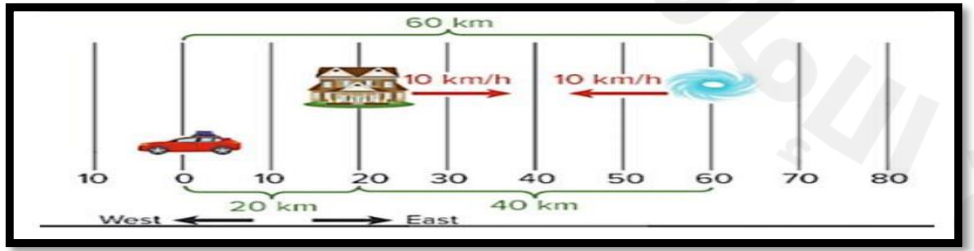
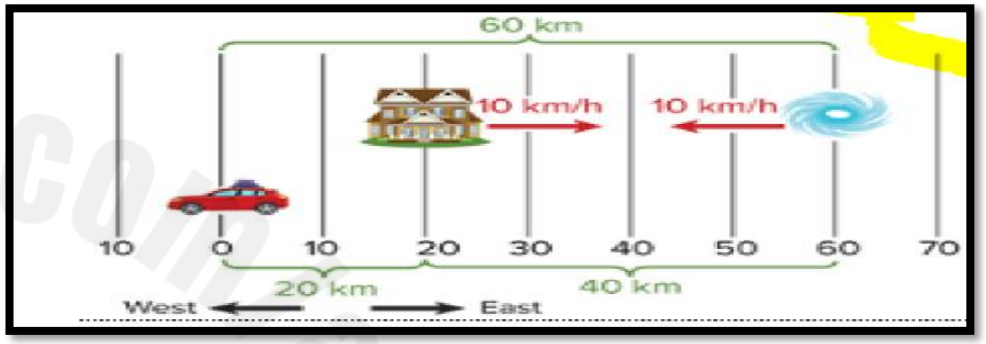


Figure 13 If the car is chosen as the reference point, the hurricane appears to be moving toward the car at 10 km/h, and the house is moving away from the car at 10 km/h.

1



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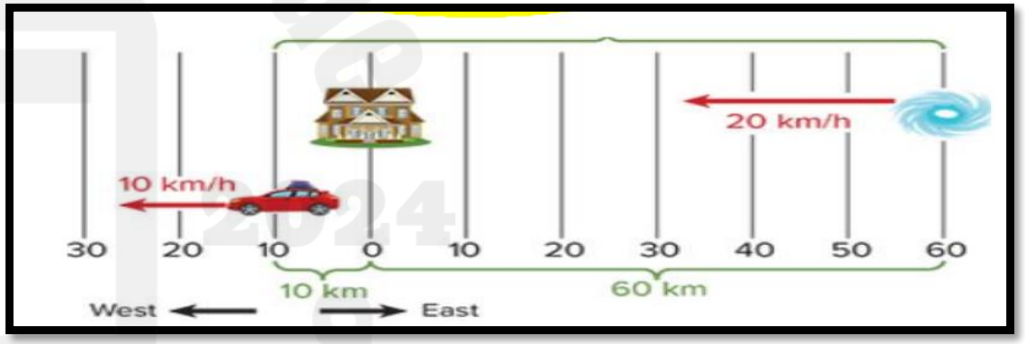
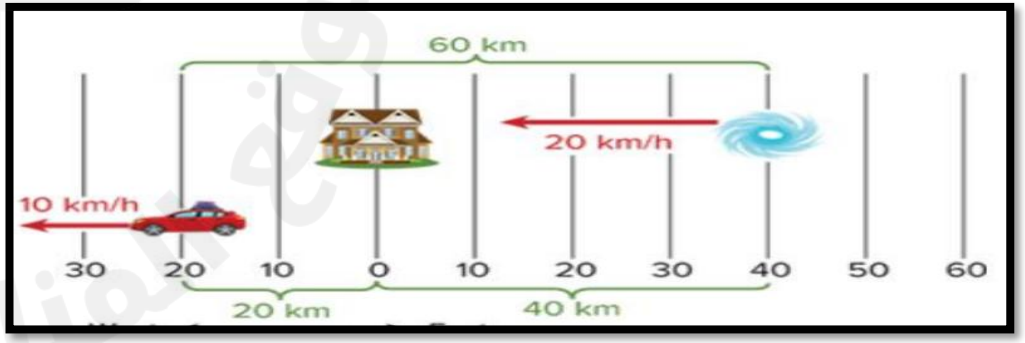


3



List the 6 types of simple machines with examples and describe how simple machines are important in easing work

Page (91-93)

Lever

Wheel and axle

Pulley

Inclined plane

Wedge

Screw

Q: which is the following not simple machine?

A. Wedge B. Screw c. inclined plane D. scissors

Which cannot be done by a machine?

A) increase force

B) increase work

C) change direction of a force

D) increase velocity

Q; How are machines useful for each figure.

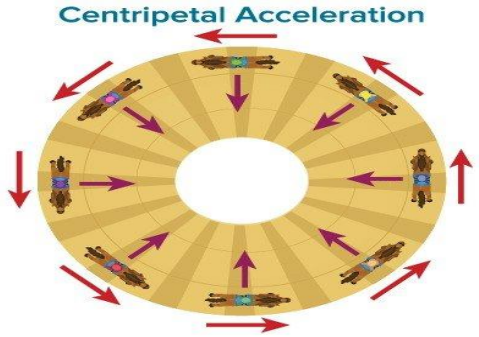
Increase speed.

change direction of force

Increase force.

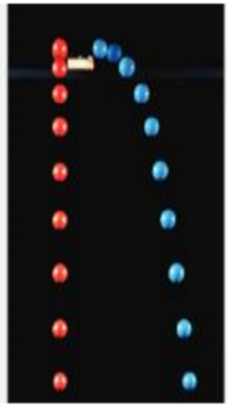
Describe the motion in two dimension and explain how object accelerate in circular motion and in projectile motion

Page (53-54)



The acceleration of each horse is toward the centre of the carousel.

Q: if you are throwing and dropping the balls from the same height which true



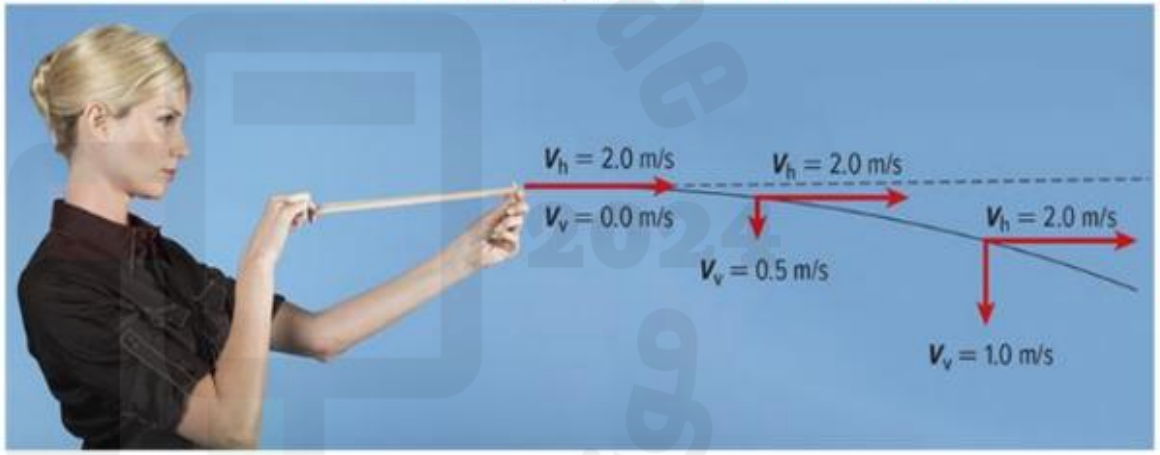
A. The ball dropping reach the ground the first.
B. The ball throwing reaches the ground the first.
C. Both arrive the same time.

Projectile motion

If you have tossed a ball to someone, you have probably noticed that thrown objects do not travel in straight lines. They curve downward. That is why quarterbacks, dart players, and archers aim above their targets. Anything that is thrown or shot through the air is called a projectile. Earth's gravity causes projectiles to follow a curved path.

Horizontal and vertical motion When you throw or shoot an object, such as the rubber band in **Figure 18,** the force exerted by your hand gives the object a horizontal velocity. For example, after the rubber band is released, its horizontal velocity is constant. The rubber band does not accelerate horizontally. If there were no gravity, the rubber band would move along the straight dotted line in **Figure 18.**

but vertical have accelerate = 9.8



Q: which true about horizontal and vertical motion

horizontal	vertical motion
Change velocity	Change velocity
Velocity constant	Change velocity
No accelerate	No accelerate

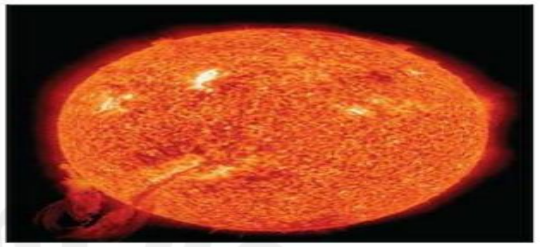
Differentiate forms of energy and list the formula for KE and calculate for the unknown

Page (96-97)

Forms of Energy

Chemical Energy

Electrical Energy



Radiant Energy

SOLVE FOR KINETIC ENERGY A jogger with a mass of 60.0 kg is moving forward at a speed of 3.0 m/s. What is the jogger's kinetic energy from this forward motion?

Identify the Unknown: kinetic energy: KE

List the Knowns: mass: $m = 60.0\ \text{kg}$ speed: $v = 3.0\ \text{m/s}$

Set Up the Problem: $KE = \frac{1}{2}mv^2$

Solve the Problem:

$$KE = \frac{1}{2}(60.0\ \text{kg})(3.0\ \text{m/s})^2$$

$$KE = \frac{1}{2}(60.0\ \text{kg})(9.0\ \text{m}^2/\text{s}^2)$$

$$KE = 270\ \text{J}$$

Kinetic Energy

$K.E. = \frac{1}{2}MV^2$

M: Mass (Kg)

V: Velocity (m/s)

$KE = \frac{1}{2}MV^2$

M= 0.15 kg V= 40 m/s

$KE = \frac{1}{2}(0.15)(40)^2$

120 J

16. A baseball with a mass of $0.15\ \text{kg}$ is moving at a speed of $40.0\ \text{m/s}$. What is the baseball's kinetic energy from this motion?

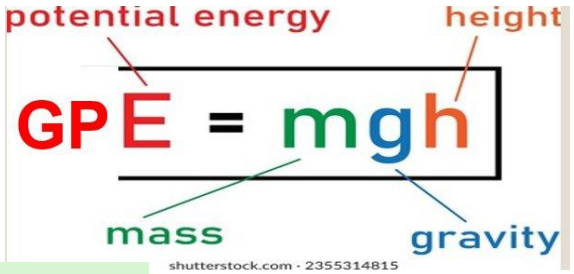
list the formula for GPE and calculate for the unknown

Page (99-100)

Q: use the figure to answer the following questions.

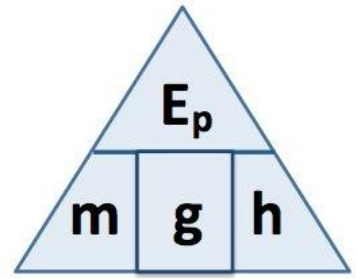
1- Which type of energy does the blue and green vase have it? GPE

2- Which vase has more GPE and why? Blue



SOLVE FOR GRAVITATIONAL POTENTIAL ENERGY A 4.0-kg ceiling fan is placed 2.5 m above the floor. What is the gravitational potential energy of the Earth-ceiling fan system relative to the floor?

Identify the Unknown:	gravitational potential energy: GPE
List the Knowns:	mass: $m = 4.0\ \text{kg}$ gravity: $g = 9.8\ \text{N/kg}$ height: $h = 2.5\ \text{m}$
Set Up the Problem:	$GPE = mgh$
Solve the Problem:	$GPE = (4.0\ \text{kg})\,(9.8\ \text{N/kg})\,(2.5\ \text{m}) = 98\ \text{N} \cdot \text{m} = 98\ \text{J}$



m=8 g=9.8 h=1.25
GPE= 8 x 9.8 x 1.25
GPE= 98 J

18. An 8.0-kg history textbook is placed on a 1.25-m high desk. What is the gravitational potential energy of the textbook-Earth system relative to the floor?

2) **Approximately how much kinetic energy does an object have from its motion if its mass is 150-kg and it is moving at a speed of 5.0 meters per second?**

- ○ 57,000 J
- ○ 1900 J
- ○ 400 J
- ○ 3800 J

4. A 0.50-kg apple is 2.0 m above the reference level. What is the GPE of the apple-Earth system?

9.8 J

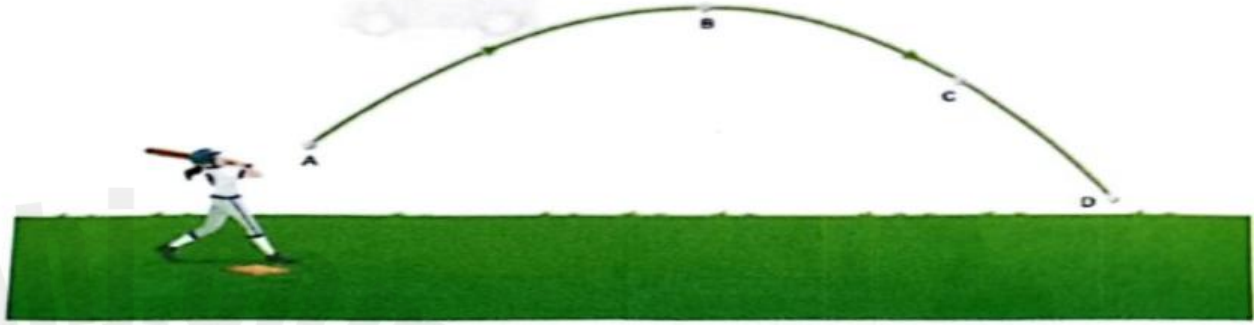
State the law of conservation of energy, explain how mechanical energy transforms, and compare between the KE & GPE for an object at a specific position for projectile motion and for swing motion

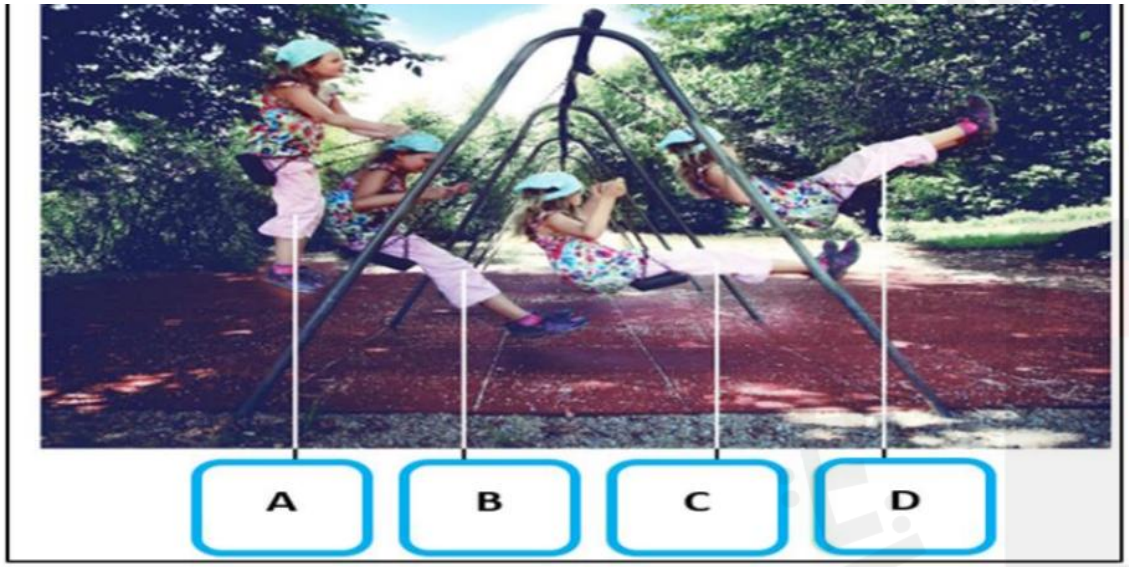
Page (101-103-104)

The Law of Conservation of Energy

States that energy cannot be created or destroyed. Energy can only be converted from one form to another or transferred from one place to another.

The **total energy remains constant.**





Ball position	Kinetic Energy (KE)	Potential Energy (PE)
A	highest	lowest
B	lowest	highest
C	increasing	decreasing
D	highest	lowest

1. Which types energy on A, B ,C ?
   A: KE B: GPE C: KE
2. which energy transformed? KE to GPE

Q: use figure to answer questions

1. Which position has the greater gravitational energy GPE? A
2. Which types of energy is in position c? KE
3. Which energy transformed? KE to GPE

State the law of conservation of energy, explain how mechanical energy transforms, and compare between the KE & GPE for an object at a specific position for projectile motion and for swing motion

Page (101-103-104)

1) Which sequence describes the energy conversions in a car engine?

- ○ mechanical to thermal to chemical
- ○ chemical to thermal to mechanical
- ○ thermal to mechanical to chemical
- ○ kinetic to potential to mechanical

2) Fill in the blanks using the available answer choices.

A roller coaster starts at the top of a hill and rolls to the top of a lower hill. If mechanical energy is constant, then the kinetic energy from the roller coaster's motion is greater on the top of _____ hill.

(Blank 1)

Blank 1 options

- the lower
- the higher
- neither

3) The mechanical energy of a bicycle at the top of a hill is 6000 J. The bicycle stops at the bottom of the hill by applying the brakes. If the gravitational potential energy of the bicycle-Earth system is 2000 J at the bottom of the hill, how much mechanical energy was converted into thermal energy?

_____ 4000 J

Compare thermal energy, heat, and temperature and relate thermal energy to mass, motion, number of particles, kinetic energy and temperature

Page (114-115-116-117)

1) **___ is the thermal energy that is transformed from a material with a higher temperature to one with a lower temperature.**

- ○ Heat
- ○ Work
- ○ Potential energy
- ○ Kinetic energy

2) **When you measure the temperature of an object, you are measuring**

- ○ the average chemical energy of its particles.
- ○ the sum of its kinetic and potential energies.
- ○ the average kinetic energy of its particles.
- ○ the specific heat of the object.

3) Fill in the blanks using the available answer choices.

Which of the metals in the table would experience the largest temperature increase for a given amount of heat input? _____ (Blank 1)

Material	**Specific Heat [J/(kg·°C)]**
Aluminum	897
Copper	385
Gold	129
Tin	227
Zinc	388

Blank 1 options

- aluminum
- copper
- gold
- tin
- zinc

Compare thermal energy, heat, and temperature and relate thermal energy to mass, motion, number of particles, kinetic energy and temperature

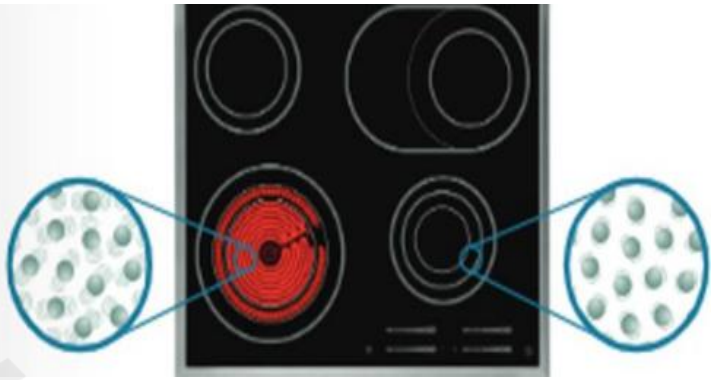
Page (114-115-116-117)

Which is true about the figure

1- particles that make up the burner, which of the following energy

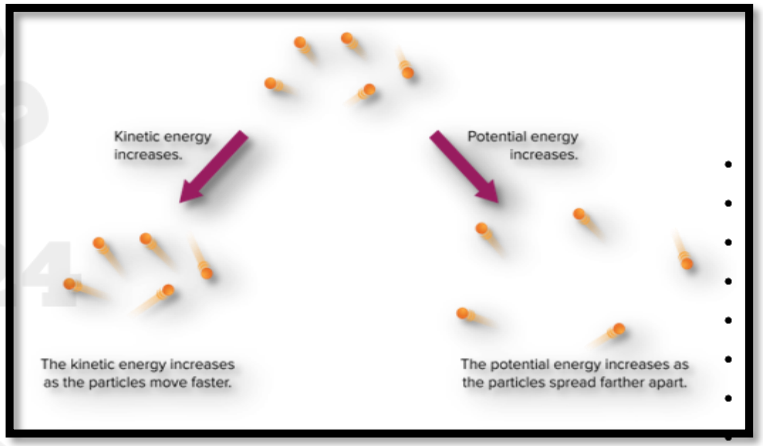
on of the burner particles?

Thermal
Nuclear
Kinetic
Potential



2-

A. The particles that make up the left burner are moving faster than the particle right burner.
B. The particles that make up the right burner are moving faster than the particle left burner.
C. The same temperature the particles in left and right.
D. The same kinetic energy the particles in left and right.



Q: the average kinetic energy of particles of matter is called.

A. Heat
B. Thermal energy
C. Temperature
D. Potential energy

Q: Which is true about thermal energy?
A. increase kinetic energy decrease thermal energy.
B. increase mass increase thermal energy.
C. Increasing temperature decreases thermal energy.

Q: which is not true about the figure
A. Kinetic energy increases the particles moving faster.
B. potential energy increases the particles spread farther apart.
C. Kinetic energy increases the particles moving slower.

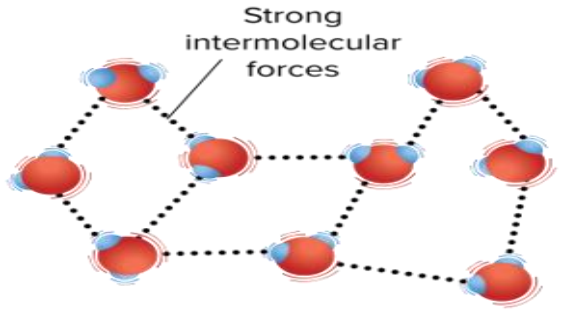
Relate specific heat to the energy needed to increase the temperature of an object one degree and calculate specific heat for the unknown

Page (117-118)

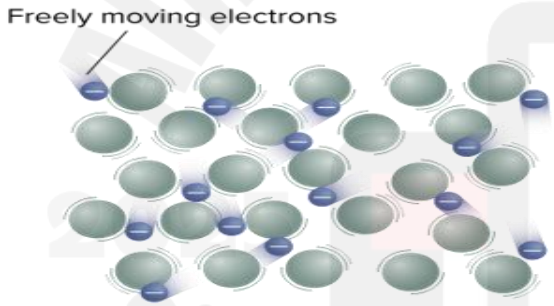
Specific Heat: is the amount of heat needed to raise the temperature of 1 kg of that material by 1°C.
Scientists measure specific heat in joules per kilogram degree Celsius [J/(kg · °C

Substance	Specific Heat [J/(kg·C)]
Water	4200
Wood	1700
Sand	830
Carbon (graphite)	710
Iron	450

Why Water has more specific heat than Iron?



Water molecules have strong attraction



The electrons in metals move easily

Thermal Energy Equation

$$\text{change in thermal energy (J)} = \text{mass (kg)} \cdot \text{temperature change (°C)} \cdot \text{specific heat} \left(\frac{\text{J}}{\text{kg}\cdot\text{°C}}\right)$$

$$Q = m(T_f - T_i)C$$

SOLVE FOR THERMAL ENERGY A wooden block has a mass of 20.0 kg and a specific heat of 1700 J/(kg · °C). Find the change in thermal energy of the block as it warms from 15.0°C to 25.0°C.

Identify the Unknown: change in thermal energy: Q

List the Knowns:
mass: $m = 20.0\ \text{kg}$
final temperature: $T_f = 25.0°\text{C}$
initial temperature: $T_i = 15.0°\text{C}$
specific heat: $C = 1700\ \text{J/(kg·°C)}$

Set Up the Problem: $Q = m(T_f - T_i)C$

Solve the Problem:
$Q = (20.0\ \text{kg})(25.0°\text{C} - 15.0°\text{C})(1700\ \text{J/(kg} \cdot °\text{C}))$
$= (20.0\ \text{kg})(10.0°\text{C})(1700\ \text{J/(kg} \cdot °\text{C}))$
$= 340{,}000\ \text{J}$

Relate specific heat to the energy needed to increase the temperature of an object one degree and calculate specific heat for the unknown

Page (117-118)

SOLVE FOR THERMAL ENERGY A wooden block has a mass of 20.0 kg and a specific heat of 1700 J/(kg · °C). Find the change in thermal energy of the block as it warms from 15.0°C to 25.0°C.

Identify the Unknown: change in thermal energy: Q

List the Knowns:
mass: $m = 20.0\ \text{kg}$
final temperature: $T_f = 25.0°\text{C}$
initial temperature: $T_i = 15.0°\text{C}$
specific heat: $C = 1700\ \text{J/(kg}\cdot°\text{C)}$

Set Up the Problem: $Q = m(T_f - T_i)C$

Solve the Problem:
$Q = (20.0\ \text{kg})(25.0°\text{C} - 15.0°\text{C})(1700\ \text{J/(kg} \cdot °\text{C))}$
$= (20.0\ \text{kg})(10.0°\text{C})(1700\ \text{J/(kg} \cdot °\text{C))}$
$= 340{,}000\ \text{J}$

Thermal Energy Equation

change in thermal energy (J) = mass (kg) · temperature change (°C) · specific heat $\left(\frac{\text{J}}{\text{kg}\cdot°\text{C}}\right)$

$$Q = m(T_f - T_i)C$$

Q=m(T1-T2)C
m= 50 C= 1000 T1= 20 T2= 30
Q=m(T2-T1)C
Q=(50)(30-20)(1000)
Q= 500,000 J

1. The air in a room has a mass of 50 kg and a specific heat of 1000 J/(kg · °C). What is the change in thermal energy of the air when it warms from 20°C to 30°C?

Compare thermal energy, heat, and temperature and relate thermal energy to mass, motion, number of particles, kinetic energy and temperature

Page (114-115-116-117)

4) Describe how the motions of the particles that make up an object change when the object's temperature increases.

The particles that make up an object move faster as that object's temperature increases

5) Explain why water is often used as a coolant.

Water has a high specific heat.

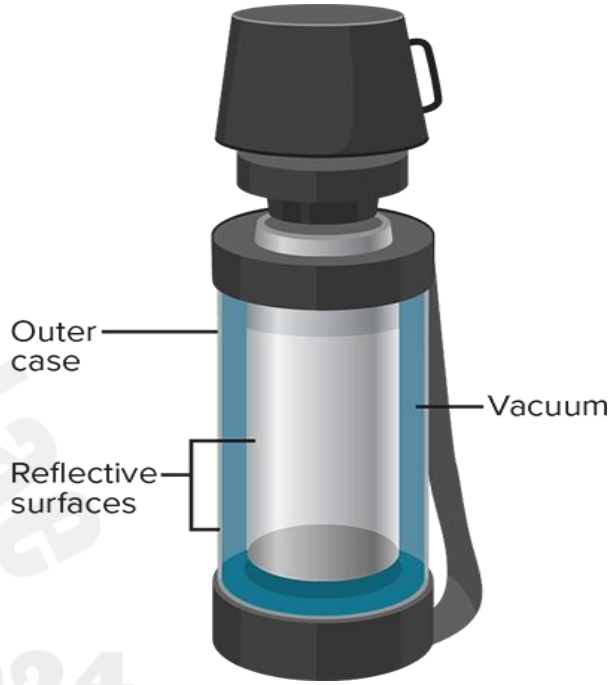
6) Explain whether the following statement is true: For any two objects, the one with the higher temperature always has more thermal energy.

False. because the swimming pool has a much larger mass, the swimming pool has far more thermal energy.

Design systems that control heat to a specific purpose

Page (124- 1125-126)

A thermos bottle reduces energy transfers between the bottle's contents and its surroundings.
There is very little air between the two surfaces of a thermos bottle. This minimizes transfers of thermal energy by conduction and convection.
Thermos bottles also often have reflective surfaces, which minimize energy transfers by radiation.



Q: what the primary purpose of thermos ?

A. A cooking
B. Heating
C. Keeping liquids hot or cold
D. Water filtration

Q: which material is commonly used as insulation in thermos ?

A. Aluminum
B. Plastic
C. Glass
D. Vacuum

Design systems that control heat to a specific purpose

Page (124- 1125-126)

1) Fill in the blanks using the available answer choices.

The transfer of energy through matter by the direct contact of particles is called

— conduction —

Blank 1 options
- conduction
- confluence
- convection
- radiation

2) _____ **is the transfer of energy in the form of electromagnetic waves.**

3) Which type of energy transfer does not require matter?

- ○ work
- ○ conduction
- ○ radiation
- ○ convection

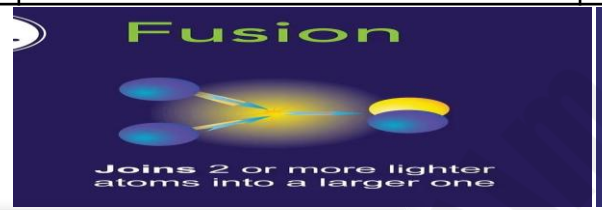
4) Which of the following types of thermal energy transfer is primarily responsible for heating the water?

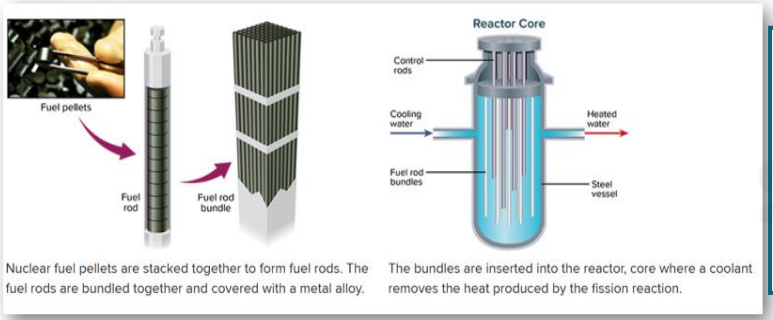
- ○ convection and radiation
- ○ conduction
- ○ convection
- ○ conduction and convection

Compare between Fusion and fission

Page (199-200)

	Fusion	Fission
Definition	Nuclei combine to form large nucleus	Nucleus splits to small nucleus
Amount of energy release	Grater than	Less than
Location	Stars	Nuclear power plant





Nuclear fuel pellets are stacked together to form fuel rods. The fuel rods are bundled together and covered with a metal alloy.

The bundles are inserted into the reactor, core where a coolant removes the heat produced by the fission reaction.

- ✓ **A Nuclear Reactor: uses energy from nuclear reactions to generate electricity.**
- ✓ **All reactors contain fuel that can undergo fission and control rods that are used to control the nuclear reaction.**

1.what is the name of this figure?
nuclear power plant
2. used to
generate electric energy

1) In what part of a nuclear reactor does fission occur?

- coolant
- turbine
- generator
- core

2) Which of the following is true of nuclear fuel for power plants?

- It is usually plutonium oxide.
- It must be kept away from the reactor core.
- It must have nuclei that can undergo fission.
- It is easily obtained without risk to the environment.

Q: write advantage and disadvantage nuclear power plant?

Advantage nuclear power plant	Disadvantage nuclear power plant
No release carbon dioxide	expensive
Generate electricity	Take long time to building power plant
	Release radioactive waste

Explain how nuclear wastes are disposed

Page (204-205)

Nuclear waste: is any radioactive material that results when radioactive materials are used.

Low-level nuclear waste

It is a by-product of electricity generation, the medical industries, and food preparation.
It is stored in split safe container and buried hundreds of meters belowground.

High-level waste

High-level waste is generated in nuclear power plants and by nuclear weapons programs.
Stored in steel-lined concrete pools filled with water or in airtight canisters.

Q: the disposal of nuclear waste

A. combustion

B. thrown into water.

C. Stored in spill -safe containers and buried hundreds of meters belowground.

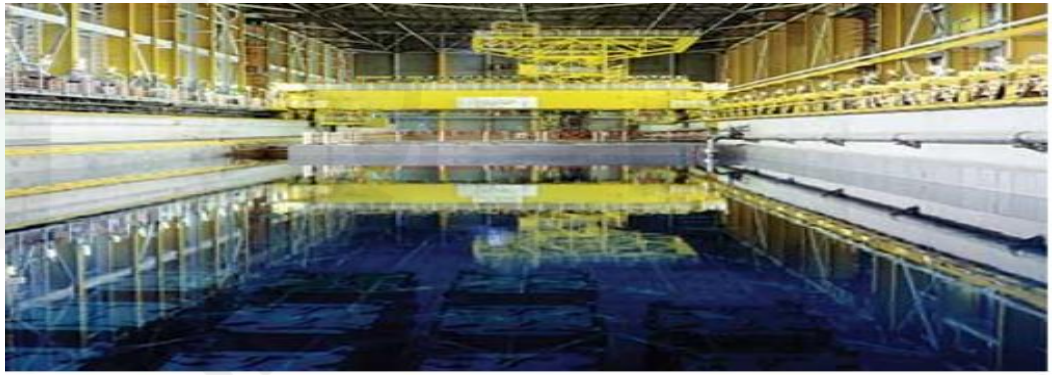


Figure 16 Spent nuclear fuel is stored in spill-safe containers at nuclear power plants and often submerged within specially designed pools.

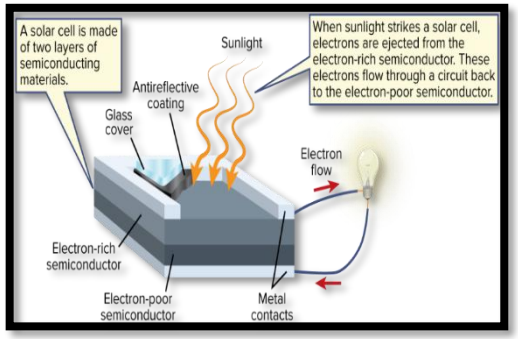
Explain renewable energy resources based on their principles, efficiency, environmental impact, and role in sustainability.

Page (207-208-209)

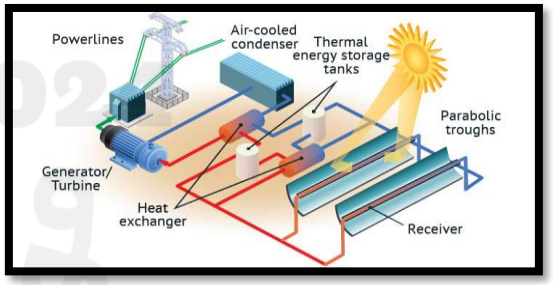
- ✓ **A Renewable Resource:** is an energy source that is replaced by natural processes faster than humans
- ✓ **Example:** Solar energy – wind Energy – Hydro Energy

1- Ways to use Solar Power

1- A photovoltaic cell: converts radiant energy directly into electrical energy.
Photovoltaic cells are also called solar cells.
Solar cells are made of two layers of semiconducting material sandwiched between two layers of conducting metal.



2-A parabolic trough: is a solar-concentrating power plant.
The trough focuses the sunlight on a tube that contains a heat-absorbing fluid, such as synthetic oil or liquid salt.
Sunlight heats the fluid, which circulates through a boiler, where it turns water to steam that spins a turbine to generate an electric current.



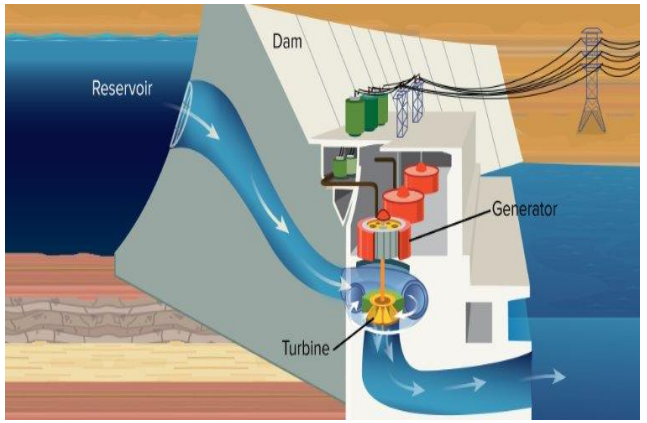
Q: how do solar cell convert energy?
A. chemical to electrical
B. electrical to radiant energy
C. radiant energy to thermal energy
D. radiant energy to electrical energy

Q; which primary function of solar cell
A. Generating energy from wind
B. Convert sunlight to electrical.
C. Producing geothermal power

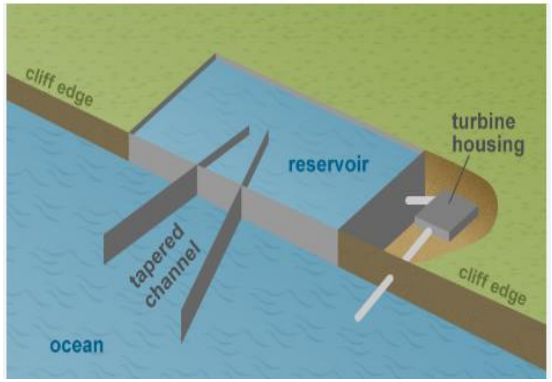
Explain renewable energy resources based on their principles, efficiency, environmental impact, and role in sustainability.

Page (207-208-209)

2-Hydroelectricity



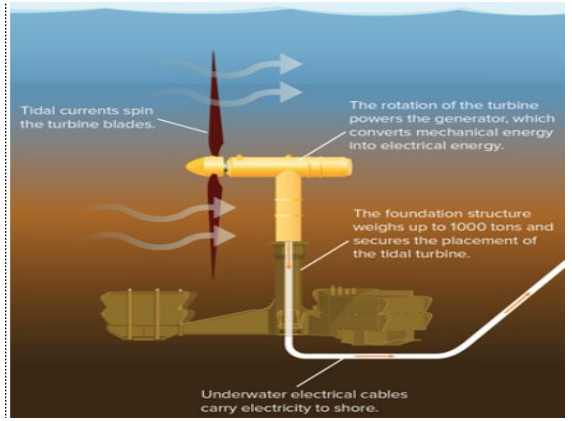
- ✓ **Hydroelectricity** Is the electric current produced from the energy of moving water.
- ✓ Hydroelectric power plants convert **mechanical energy** into **electrical energy** with almost no pollution.
- ✓ They are almost **twice as efficient** as fossil fuel-burning or nuclear power plants.
- ✓ The rushing water held behind a dam spins a turbine, converting **gravitational potential energy** to **mechanical energy** and then to **electrical energy**.
- ✓ Dams and hydroelectric power plants, however, can disturb the natural ecosystems.



- ✓ **Hydroelectricity Power** can also be produced in the ocean by

1- Waves. **2- Tides**

- ✓ As waves enter the channel, they spin turbines, converting mechanical energy into electrical energy.



2- Tide

- ✓ Gravity from the Sun and Moon causes ocean tides
- ✓ The differences between high and low tide can generate hydroelectric power.
- ✓ Energy from the ocean is nearly pollution free.
- ✓ The efficiency is similar to that of hydroelectric power plants.

Explain renewable energy resources based on their principles, efficiency, environmental impact, and role in sustainability.

Page (207-208-209)

3- Wind Energy

- ✓ **Windmills** convert wind energy into electrical energy.
- ✓ As the wind blows, it spins a propeller connected to an electric generator.
- ✓ The greater the wind speed and the longer it blows, the greater the amount of wind energy converted into electrical energy.

Disadvantages

1- Only a few places have enough wind to meet our energy needs.

2-Windmills can be noisy and disruptive

Advantages

They do not use non-renewable resources or cause pollution.

Figure 22 Wind energy is converted to electrical energy as a spinning propeller turns a generator.

1) Which of the following sources of electrical power is most efficient?

- ○ nuclear power plants
- ○ coal power plants
- ○ solar cells
- ○ hydroelectric dams

2) All of these are considered renewable sources of energy except

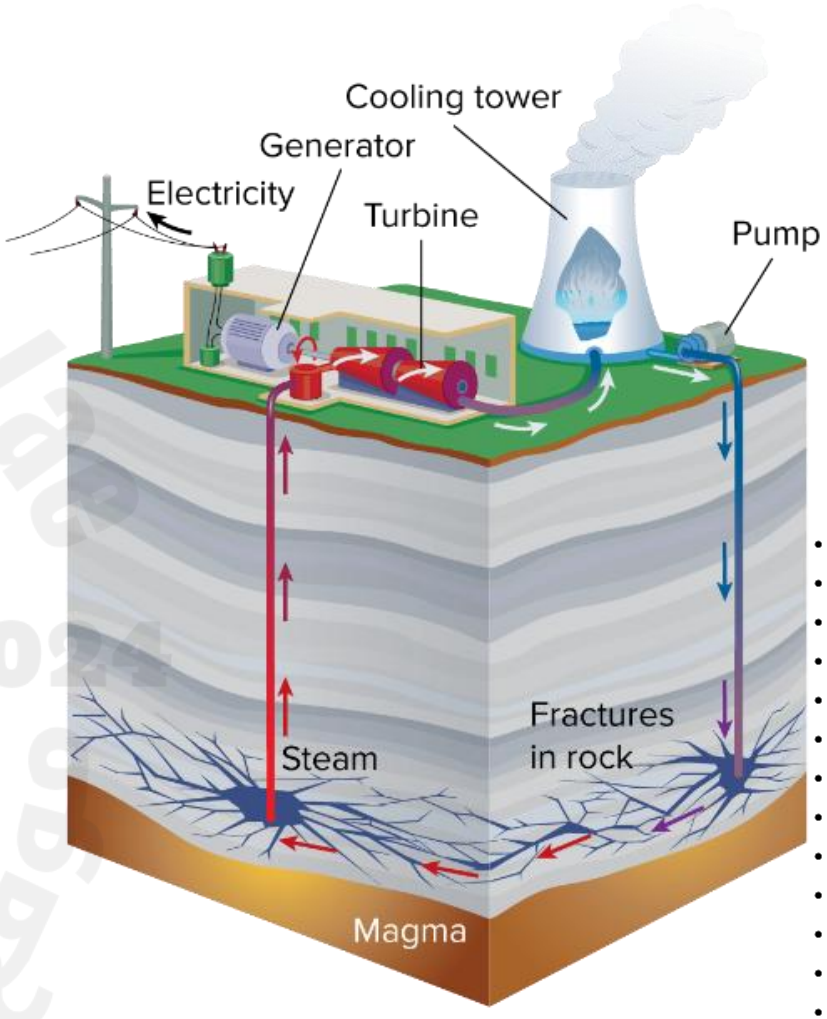
- ○ hydroelectric dams.
- ○ solar cells.
- ○ wind turbines.
- ○ nuclear power plants.

Explain renewable energy resources based on their principles, efficiency, environmental impact, and role in sustainability.

Page (210)

4- Geothermal energy

- ✓ **Geothermal energy:** Is the thermal energy that is contained in and around magma.
- ✓ Geothermal energy can be converted into electrical energy.
- ✓ Water is pumped into the ground through a well, where it contacts hot rock and changes into steam.
- ✓ The steam returns to the surface, where it spins a turbine that power an electric generator.



Advantages

Geothermal power plants are a source of clean energy.

Disadvantages

Use of geothermal energy is limited to areas where magma is close to surface.

Describe the impact of human activity on air and the types of air pollution

Page (217)

Types of Air pollution

1- Natural Sources, such as forest fires and volcanic eruptions.

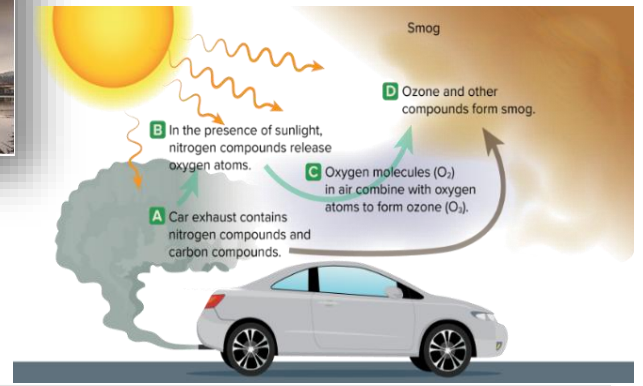
2- Manufactured Sources, such as cars, farming, and construction.

Photochemical Smog : Is the pollution that results from the reaction between sunlight and car exhaust

3- Chlorofluorocarbons (CFCs) , are another type of air pollution. They leak from old air conditioners and refrigerators and can destroy the ozone layer.

4- Sulfur-, Nitrogen-, and Carbon-based compounds from vehicles and factors react with moisture in the air, they form acids.

, it is called acid precipitation. It can corrode metals and cause harm to plants and animals.



3) **Burning renewable organic matter, such as sugarcane fibers, can produce electricity. Such renewable organic matter is called**

- ○ hydroelectric energy.
- ○ biomass fuel.
- ○ geothermal energy.
- ○ fossil fuel.

1. **What are some of the effects of acid rain?**

   Soil and groundwater become more acidic. Increased acidity can damage trees and buildings. It also kills fish when streams and lakes become to acidic.

2. **How does nature play a role in the development of smog?**

   Photochemical smog forms with the aid of light. Sulfur, nitrogen, and carbon-based compounds are released into the air when fossil fuels are burned and react with oxygen.