



Unit summary note

Std 6, Unit-2, The Essence of Change

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Activities mentioned in the picture in page17

- Farmer is digging the ridge
- Loud speaker is working
- Ducks are swimming
- Driving a tractor
- Street light is glowing
- Children are playing

Energy

Energy is the ability to do work. Light, heat, sound, electricity, mechanical energy and chemical energy are some forms of energy. Food, fuels, sun etc. are source of energy.

Is sound a form of energy? Can we do any work using sound? See the video in the following link to clear your doubt.

https://www.youtube.com/watch?v=v-kkKYKYmUc&list=PL9AshZEiXvDmRkmFK7oTXy8DLQwU_C46N&index=25

Situation	Forms of energy used
Riding motor vehicles	Energy from fuels (Chemical energy)
Drying cloths	Energy from sun (Heat energy)
Bulbs glowing	Electrical energy
Loudspeaker is working	Electrical energy
Digging the ridge	Energy from food (Chemical energy)

When a bulb glows



When a filament bulb glows, both light energy and heat energy are produced. But in normal case, we make use of light energy only. In incubators, we make use of heat energy from the bulb to hatch the eggs.

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<https://play.google.com/store/apps/details?id=com.basith.sastracheppuapp>.



Different forms of energy

Mechanical energy

Working of an engine involves mechanical energy. We make use of mechanical energy while operating a mixer grinder, to move vehicles, to work a flour mill and so on.

Chemical energy

Chemical energy is the energy contained in substances. All substances contain chemical energy. Fuels such as petrol, diesel, coal, LPG, fire wood etc. contains chemical energy in a high quantity. Foods we eat also contain chemical energy. Battery store electric energy as chemical energy in them.

Situation	Forms of energy produced	Forms of energy make use of
A torch is lit	Light, heat	Light
A candle is burning	Light, heat	Light (For seeing) Heat (For melting something)
Fire wood is burning in the oven	Light, heat	Heat
An electric bulb is lit	Light, heat	Light for seeing, heat for hatching eggs.
A cracker is bursting	Light, heat, sound	Light and sound

Inference we can reach from this table:

- Different forms of energy are produced while doing various activities.
- We are not making use of all types of energy that are produced in various situations.
- Some forms of energy are getting lost in some situations

Transformation of energy

No	Situation	Form of energy undergo change	Forms of energy produced		
			1	2	3
1	When a sparkler is lit	Chemical energy	Light	Heat	Sound
2	While riding a motorcycle	Chemical energy	Mechanical energy	Heat	Sound
3	While operating a mixer grinder	Electrical energy	Mechanical energy	Heat	Sound
4	While operating an electric motor	Electrical energy	Mechanical energy	Heat	Sound
5	While ironing dress	Electrical energy	Heat	-	-

Inference from this table: Energy can be transformed from one form to another

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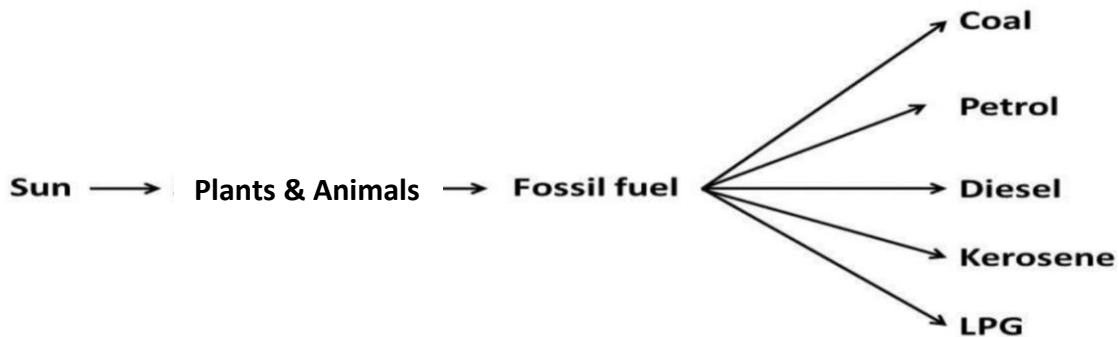
To see some experiments related with energy transformation, click on the following links.

1. https://www.youtube.com/watch?v=x8SjlSKyjrW&list=PL9AshZEiXvDmRkmFK7oTXY8DLQwU_C46N&index=24
2. https://www.youtube.com/watch?v=rGoQcVdfXDk&list=PL9AshZEiXvDmRkmFK7oTXY8DLQwU_C46N&index=16
3. https://www.youtube.com/watch?v=jjZvyw-bAAU&list=PL9AshZEiXvDmRkmFK7oTXY8DLQwU_C46N&index=4
4. https://www.youtube.com/watch?v=E3rpLnEerDc&list=PL9AshZEiXvDmRkmFK7oTXY8DLQwU_C46N&index=7
5. https://www.youtube.com/watch?v=U9hObjSeDEU&list=PL9AshZEiXvDmRkmFK7oTXY8DLQwU_C46N&index=5
6. https://www.youtube.com/watch?v=U9hObjSeDEU&list=PL9AshZEiXvDmRkmFK7oTXY8DLQwU_C46N&index=5
7. https://www.youtube.com/watch?v=b4H6GE72RU4&list=PL9AshZEiXvDmRkmFK7oTXY8DLQwU_C46N&index=8
8. https://www.youtube.com/watch?v=MMfLQ1HGhoY&list=PL9AshZEiXvDmRkmFK7oTXY8DLQwU_C46N&index=12
9. https://www.youtube.com/watch?v=U7nit3hFZ-8&list=PL9AshZEiXvDmRkmFK7oTXY8DLQwU_C46N&index=10
10. https://www.youtube.com/watch?v=tKOtLMjK22w&list=PL9AshZEiXvDmRkmFK7oTXY8DLQwU_C46N&index=17
11. https://www.youtube.com/watch?v=SYJcZRjp64&list=PL9AshZEiXvDmRkmFK7oTXY8DLQwU_C46N&index=14
12. https://www.youtube.com/watch?v=U7nit3hFZ-8&list=PL9AshZEiXvDmRkmFK7oTXY8DLQwU_C46N&index=10
13. https://www.youtube.com/watch?v=sH6Ns2ZCUc0&list=PL9AshZEiXvDmRkmFK7oTXY8DLQwU_C46N&index=15
14. https://www.youtube.com/watch?v=gfRPxbEsxhE&list=PL9AshZEiXvDmRkmFK7oTXY8DLQwU_C46N&index=22
15. https://www.youtube.com/watch?v=x6m1cErjasE&list=PL9AshZEiXvDmRkmFK7oTXY8DLQwU_C46N&index=19
16. https://www.youtube.com/watch?v=9fEcXHOIYt0&list=PL9AshZEiXvDmRkmFK7oTXY8DLQwU_C46N&index=23
17. https://www.youtube.com/watch?v=PSjzqp06QRo&list=PL9AshZEiXvDmRkmFK7oTXY8DLQwU_C46N&index=18
18. https://www.youtube.com/watch?v=kENL1Dy2s20&list=PL9AshZEiXvDmRkmFK7oTXY8DLQwU_C46N&index=21
19. https://www.youtube.com/watch?v=ILz7LioQ43g&list=PL9AshZEiXvDmRkmFK7oTXY8DLQwU_C46N&index=6
20. https://www.youtube.com/watch?v=Vehajvz6nO8&list=PL9AshZEiXvDmRkmFK7oTXY8DLQwU_C46N&index=11

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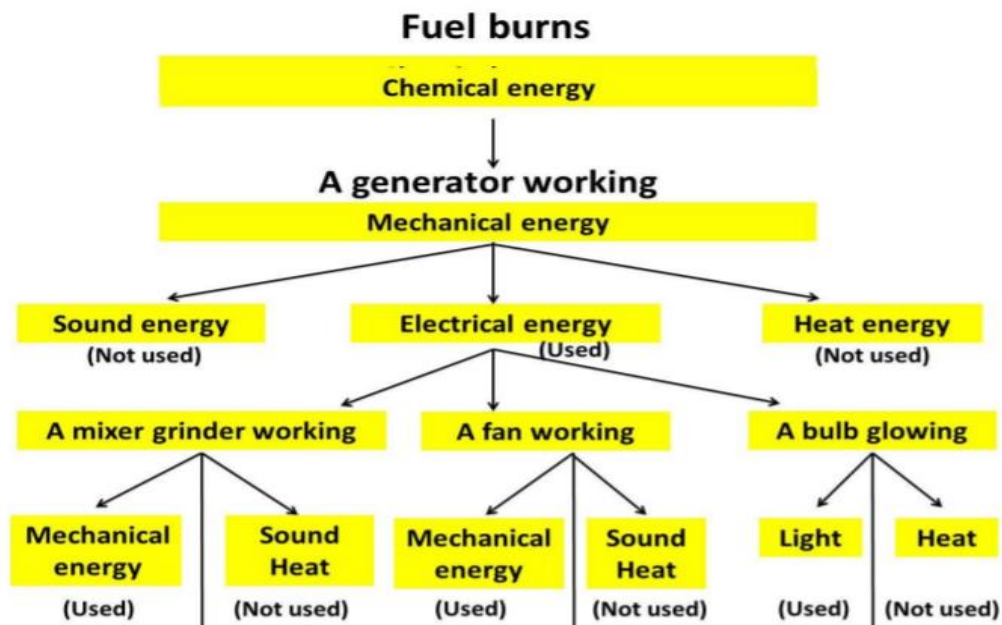
Flow chart



How many changes

Situation	Energy conversions taking place
Bulb glowing	Electrical energy \rightarrow Light + Heat
Working an electric motor to pump water	Electrical energy \rightarrow Mechanical energy + Sound + Heat
Lighting a match stick	Chemical energy \rightarrow Light + Heat + Sound
Working a mixer grinder	Electrical energy \rightarrow Mechanical energy + Sound + Heat
Listening to the news on a radio	Electrical energy \rightarrow Sound
Charging a mobile phone	Electrical energy \rightarrow Chemical energy + Heat

Flow chart



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Energy changes in some more situations



- **Which form of energy undergoes change in each situation? What are the forms of energy produced?**
 - Firewood burns - Chemical energy transforms in to heat and light.
 - Lights a fire cracker - Chemical energy changes in to light, heat and sound
 - Lights a torch - Chemical energy transforms in to light and heat
- **Which situation in the given picture does not use light energy?**
 - Firewood burns
- **In which situation is sound energy produced?**
 - While lighting a fire cracker
- **In which situation is heat energy made use of?**
 - While fire wood burns.

When ice melts (Experiment note-1)

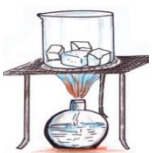
Aim

To find out how change of state happen to substances.

Materials

Beaker, ice cubes, tripod stand, spirit lamp, wire gauze, watch glass.

Procedure



Take some ice cubes in a beaker. Place the beaker above the wire gauze which is kept over the tripod stand. Heat the beaker using the spirit lamp. After the ice melts completely, close the beaker using watch glass and continue heating for some time.

Observation

On heating, ice melts and turns to water. On further heating, it turns to steam. After some time, water drops are seen on the watch glass.



Inference

Ice absorbs heat energy and changes into water, its liquid state. Water further absorbs heat energy and gets converted into steam. When steam loses heat energy it again changes into water. So state of a substance is related with its temperature level. If we are keeping the water in a refrigerator, it will lose more heat energy and will become ice again.

To see experiment related with change of state click on this link

<https://www.youtube.com/watch?v=KTJcnZ7whtE&list=PL9AshZEiXvDnouMvDpzxJqn7nz5Kel14T&index=6>

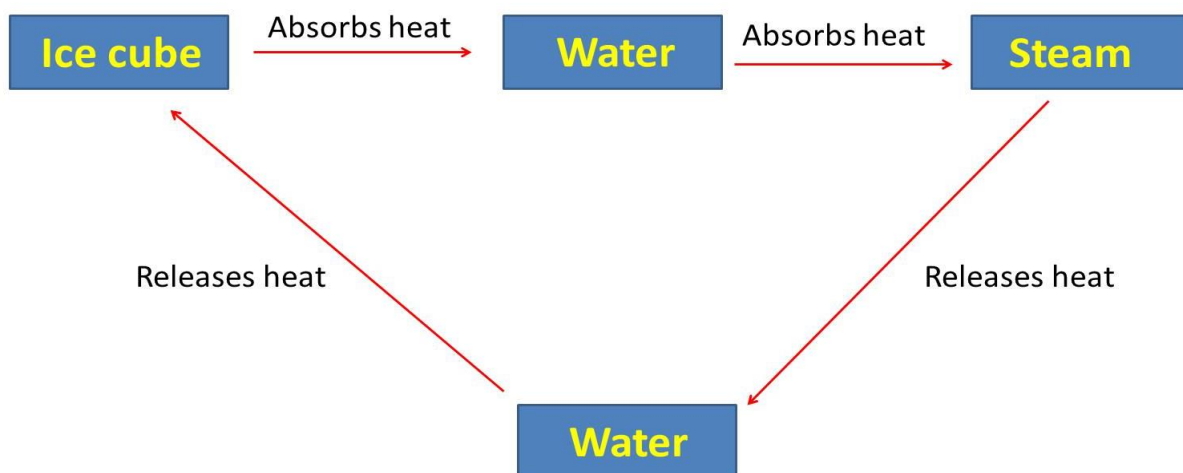
Change of state

Substances undergo change of state when they absorb or release adequate heat energy. On absorbing heat energy, they change from the solid state to the liquid state and then to the gaseous state. Substances get converted from the gaseous state to the liquid state and then to the solid state by releasing heat energy.

To see an interesting experiment of sticking ice cubes together using the phenomena of change of state of substance, click on this link

<https://www.youtube.com/watch?v=yKKbAKysWjg&list=PL9AshZEiXvDnouMvDpzxJqn7nz5Kel14T&index=4>

Flow chart



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- **Is energy absorbed or released when steam is changed into water and then into ice?**
Energy is released when steam is changed in to water and then in to ice.
- **Which among the three states has the maximum amount of energy?**
Steam
- **Which state has the minimum amount of energy?**
Ice

How to make wax models?

For making a wax egg, take an egg shell and fill molten wax in it. After setting the wax, break the egg shell and remove it. For making a wax doll, take an old plastic doll and make a small hole on its head. Fill molten wax in it through this hole. After setting the wax, tear off the doll using a cutting blade.

To see interesting videos of making dolls using wax and ice, click on these links

<https://www.youtube.com/watch?v=f08bvoq3ia8&list=PL9AshZEiXvDnouMvDpzxJqn7nz5Kel14T&index=2>

<https://www.youtube.com/watch?v=goji8mOKBDw&list=PL9AshZEiXvDnouMvDpzxJqn7nz5Kel14T&index=1>

Uses of change of state of substances in our daily life

We make plastic buckets, chairs, metal pots, and metal instruments using change of state of substances. Steel furniture, engines and spare parts of vehicles, machines, door locks etc. are also made using change of state of metals. In our kitchen, we can cook some food items using steam and prepare ice cubes by making use of the change of state of water.

Physical change

Change in the physical properties of a substance such as state, shape or size is termed as physical change. Expansion, melting, breaking, tearing etc. are all physical changes. New substances are not formed during physical changes. Eg:-

A. Change in state: Heating solid ghee, heating wax, heating lac, boiling water, making ice.

B. Change in size or shape: Cutting vegetables, heating PVC pipe to expand, tearing paper, breaking a bottle, crumpling a paper



Permanent change (Experiment note-2)

Aim

To find out whether all changes are physical changes?

Materials

Spirit lamp, sugar, steel spoon

Procedure

Take some sugar on a steel spoon and heat it sometime using a spirit lamp

Observation

The sugar melts first. Then its colour changes in to yellow and then to brown. Finally it changes to black carbon.

Inference

On heating sugar, a new substance that is carbon is formed. In physical changes, new substances are not formed. So, heating sugar is not a physical change

To see the experiment of heating sugar, click on this link.

<https://www.youtube.com/watch?v=nJ29QOxxb44&list=PL9AshZEiXvDnouMvDpzxJqn7nz5Kel14T&index=7>

Comparison of heating sugar and wax

When wax is heated	When sugar is heated
Absorbs heat	Absorbs heat
Melts	Melts
Do not changes colour	Changes colour
No new substance is formed	New substance is formed

Chemical change

The process in which substances change into new substances by absorbing or releasing energy is termed a chemical change. Chemical change is a permanent change. Eg:- Heating sugar, burning paper, burning magnesium ribbon, firing a cracker etc.



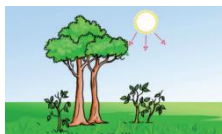
To see an experiment on chemical change, click on this link.

<https://www.youtube.com/watch?v=dnYtFwT3zRs&list=PL9AshZEiXvDnouMvDpzxJqn7nz5Kel14T&index=10>

Different types of chemical changes

- Iron rods rust
- Mangoes ripen
- Colour of cloths changes when exposed to sun light
- The colour of film changes while taking X-ray
- Organic matters decay
- Reaction of vinegar with baking soda

Changes taking place during photosynthesis

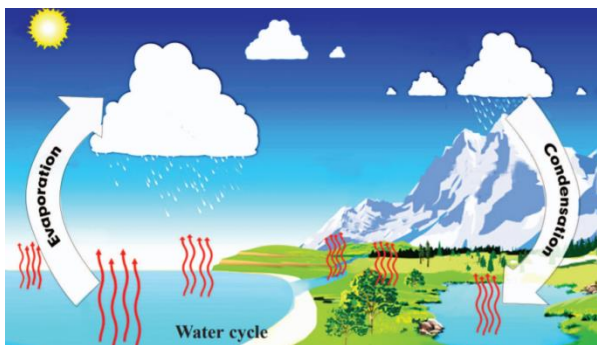


During photosynthesis, a new substance named glucose is formed. So it is a chemical change. Here, the light energy from the sun is converted in to chemical energy which is stored in glucose.

To see a vide on this topic, click on this link

<https://www.youtube.com/watch?v=84Zv0nITOGU&list=PL9AshZEiXvDliKbw3pxDbolYQCAfmEHp3>

Changes behind the rain



Water in water bodies evaporate by absorbing heat from the sun and form water vapor. This is a physical change. Water vapor reaches on the top part of atmosphere and changes as cloud by releasing heat. When clouds cools, that is, when release heat again, they changes as water drops to form rain. Formation of clouds and rain are also physical changes, since the change is only in the state.

To see an animation video of rain, click on the following link

https://www.youtube.com/watch?v=0_c0ZzZfC8c

To see an experiment on the topic, 'how cloud is formed' click on the following link

<https://www.youtube.com/watch?v=uzCKCsxJYTk&list=PL9AshZEiXvDnouMvDpzxJqn7nz5Kel14T&index=16>

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Changes taking place in our kitchen

Physical change	Chemical change
Making ice	Cooking rice
Dissolving sugar in water	Making curd
Making steam to cook idly	Spoiling of food
Cutting vegetables	Ripening banana
Melting solid ghee	Melting butter
Melting solid coconut oil	Burning match stick
Breaking coconut	Burning fire wood in the oven

Let us assess

1. The blister caused by steam is more severe than the same caused by boiling water at the same temperature.

- Do you agree with the statement?
- Justify the statement on the basis of physical change.
Yes, I agree with the statement. Steam has more energy than boiling water.

2. We know that heat is emitted along with light when a bulb glows.

- LED lamps are better than filament bulbs for maximum reduction in the consumption of electrical energy. Explain.
- Are there situations where filament bulbs are used for producing heat energy? Give examples.
In filament bulb, a large amount of heat is also produced along with light. So it consumes more electrical energy than an LED bulb. In incubators, filament bulbs are used to produce heat for hatching eggs.

3. Thunder and heavy rain during the monsoon. Rahim and Deepa, who have learnt about conservation of energy, are engaged in a game related to it. Let's take a look at it. When one of them mentions a situation, the other indicates the change of energy involved in it.

Deepa	Raheem
When it rains	The clouds releases heat energy
When water vapor releases heat energy	Clouds are formed
Sound energy is produced	When thunder happens
When lighting happens	Light energy is produced
Electrical energy is produce	When lightning happens

See the videos given in the next page also to understand the concepts in this unit well.

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1. <https://www.youtube.com/watch?v=P304u6MpiUU&list=PL9AshZEiXvDnouMvDpzxJqn7nz5Kel14T&index=5>
2. https://www.youtube.com/watch?v=clJHr1j2_Q&list=PL9AshZEiXvDnouMvDpzxJqn7nz5Kel14T&index=8
3. <https://www.youtube.com/watch?v=Q95sj8QDA5U&list=PL9AshZEiXvDnouMvDpzxJqn7nz5Kel14T&index=11>
4. <https://www.youtube.com/watch?v=d1hc18Spo5Q&list=PL9AshZEiXvDnouMvDpzxJqn7nz5Kel14T&index=13>
5. <https://www.youtube.com/watch?v=VjmJSFrZ5gQ&list=PL9AshZEiXvDnouMvDpzxJqn7nz5Kel14T&index=15>
6. <https://www.youtube.com/watch?v=qmvGf5b5vri&list=PL9AshZEiXvDnouMvDpzxJqn7nz5Kel14T&index=14>
7. <https://www.youtube.com/watch?v=F7Y9j84z5xs&list=PL9AshZEiXvDnouMvDpzxJqn7nz5Kel14T&index=17>

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<https://play.google.com/store/apps/details?id=com.basith.sasthracheppuapp>.

പാഠഭാഗങ്ങളുടെ കൂടുതൽ പി.ഡി.എഫ്. ഫയലുകളും വീഡിയോകളും ലഭിക്കാൻ TECH Malappuram ശാസ്ത്രാധ്യാപക കൂട്ടായ്മ വികസിപ്പിച്ച ശാസ്ത്രച്ചെപ്പ് ആപ്പ്, **പ്ലേസ്റ്റോറിൽ** നിന്നും ഡൗൺലോഡ് ചെയ്ത് ഇൻസ്റ്റാൾ ചെയ്യുക
<https://play.google.com/store/apps/details?id=com.basith.sasthracheppuapp>.