YOUNG SCIENTIST ACTIVITY BOOK

CLASS - VI

Sample Pages

EDUHEAL FOUNDATION
• LEARNING FOR LIFE •

DISCOVER ● INVENT ● EXPERIMENT ● EXPLORE

CLASS - VI

SYLLABUS GUIDELINES

CLASS - VI

Questions	Key concepts	Activities/ Processes
1. Food ***Sources of food*** What are the various sources of our food? What do other animals eat?	Plant parts and animal products as sources of food; herbivores, carnivores, omnivores.	Germination of seeds such as mung, chick pea etc.; preparing a chart on food habits of animals and food culture of different regions of India.
Components of food What is our food made up of? Why do we eat a variety of food?	Carbohydrates, fats, proteins, vitamins, minerals, fibres, their sources and significance for human health; balanced diet; diseases and disabilities due to food decifiencies.	Studying the variety of food in different regions in India; preparing a menu of balanced diet in the context of the diversity of foods eaten in different parts of the country. Classifying foods according to food components; test for starch, sugars, proteins and fats.
Cleaning food How do we separate the grains after harvesting the wheat / rice crop?	Threshing, winnowing, hand picking, sedimentation, filtration.	Discussion on threshing, winnowing, hand-picking; experiments on sedimentation, filtration. Separating mixture of salt and sand.
2. Materials ***Materials of daily use*** What are our clothes made of ? How did people manage when there were no clothes?	Different types of cloth materials - cotton, wool, silk and synthetic. Development of clothing materials.	Whole class discussion. Simple activities to distinguish among different types of cloth.
Are some of our clothes made of materials obtained from plants? In what kinds of places do these plants grow? Which parts of the plants are used for making clothes?	Plant fibre, especially cotton and jute; production of cotton, just and other locally available plant fibres; types of soil required for the growth of different fibrous plants.	Whole class discussion. Field survey/ collecting information on locally available plant fibres (coconut, silk cotton, etc.)
Different kinds of materials What kinds of things do we see around us?	Grouping things on the basis of common properties.	Collecting and grouping things on the basis of gross properties e.g. roughness, lustre, transparency, solubility sinking/floating using prior knowledge, through experiments.
How things change/react with one another In what ways do things change on being heated? Do they change back on being cooled? Why does a burning candle get shorter?	Some changes can be reversed and others cannot be reversed.	Experiments involving heating of air, wax, paper, metal, water to highlight effects like burning, expansion / compression, change of state.

How much salt can be dissolved in a cup of water?	Solubility, saturated solutions. Amount of substance dissolving varies with temperature. At the same temperature amounts of different substances that dissolve varies.	Discussion on other changes which cannot be reversed - growing up, opening of a bud, Experiments for testing the solubility of commonly available substances. Experiments on the effect of heating and cooling on solubility. Comparison of solubilities of different substances using non-standard units (eg. spoon, paper cone).
3. The World of the Living ***Things around us*** Are all things around us living? What is the difference between living and non-living? Are all living things similar? Do all living things move? Where do plants and animals live? Can we grow plants in the dark?	Living / non-living characteristics; habitat; biotic, abiotic (light, temperature, water, air, soil, fire)	Listing of things around us, listing of characteristics after making observations say on size, colour, shape etc., categorisation; observations on habitat; observing germination of seeds, also observing under dark conditions; growth and development of domestic animals, hatching of bird's eggs etc', developing drawing skills.
The habitat of the living How does habitat affect plants and animals? How do fish live in water?	Habitat varies - aquatic, deserts, mountains etc. - plants and animals show adaptation; other plant part modifications like tendrils, thorns etc. Animals in deserts and water.	Listing the diverse set of living organisms around us; prepare herbarium specimens of different leaves, plants; studying modifications in plants and animals; observing how different environmental factors (water availability, temperature) affect living organisms;
Plants - form and function What is the structure and function of various parts of the plants - stem, leaf and roots? How do different flowers differ from one another? How does one study flowers?	Morphological structure and function of root, stem and leaves. Structure of the flower, differences.	Studying plant parts-types of stems, roots, leaves, seeds; experiment to show conduction by stem, activity to show anchorage by roots, absorption by roots. Study of any flower, counting number of parts, names of parts, cutting sections of ovary to observe ovules.
Animals - form and function What is inside jour bodies? How do animals move? Do all animals have bones in their bodies? How do fishes move? And birds fly? What about snakes, snails, earthworms?	Structure and functions of the animal body; Human skeletal system, some other animals e.g. fish, bird, cockroach, snail.	Activities to study X-rays, find out the direction in which joints bend, feel the ribs, backbone etc. Observation / discussion on movement and skeletal system in other animals.
4. Moving Things, People and Ideas ***Moving*** How did people travel from one place to another in earlier times? How did they know how far they had travelled? How do we know that something is moving? How do we know how far it has moved?	Need to measure distance (length). Measurement of length. Motion as change in position with time.	Measuring lengths and distances. Observation of different types of moving objects on land, in air, water and space. Identification and discrimination of various types of motion. Demonstrating objects having more than one type of movement (screw motion, bicycle wheel, fan, top etc.)

		Observing the periodic motion in hands of a clock/watch, sun, moon, earth.
5. How things work ***Electric current and circuits*** How does a torch work? Do all materials allow current to flow through them?	Electric current : Electric circuit (current flows only when a cell and other components are connected in an unbroken loop) Conductor, Insulator.	Activity using a bulb, cell and key and connecting wire to show flow of current and identify closed and open circuits. Making a switch. Opening up a dry cell. Experiment to show that some objects (conductors) allow current to flow and others (insulators) do not.
Magnets What is a magnet?	Magnet	Demonstrating how things are attracted by a magnet. Classification of objects into magnetic / non-magnetic classes.
Where on a magnet do things stick?	Poles of a magnet	Activity to locate poles of a magnet; activity with iron filings and paper. Activities with suspended bar magnet and with compass needle.
How is a magnet used to find direction?	A freely suspended magnet always aligns in a particular direction. North and South poles.	Activities to show that like poles repel and unlike poles attract.
How do two magnets behave when brought close to each other?	Like poles repel and unlike poles attract each other.	
6. Natural Phenomena ***Rain, thunder and lightning*** Where does rain come from? How do clouds form?	Evaporation and condensation, water in different states. Water cycle.	Condensation on outside of a glass containing clod water, activity of boiling water and condensation of stem on a spoon. Simple model of water cycle. Discussion on three states of water.
Light Which are the things we can see through?	Classification of various materials in terms of transparent, translucent and opaque.	Discussion, observation; looking across different materials at a source of light.
When are shadows formed? Do you get a shadow at night - when there is no light in the room, moonlight or other source of light? What colour is a shadow?	A shadow is formed only when there is a source of light and an opaque material obstructs a source it. A shadow is black irrespective of the colour of the object.	Discussion; observing shadow formation of various objects of different shapes, and of same shape and of same shape and different colours; playing and forming shadows with the hands in sunlight, in candle light, and in a well its region during daytime; making a pinhole camera and observing static and moving objects.
On what kinds of surfaces can we see images?	Reflecting surfaces; images are different from shadows.	Observing differences between the image and the shadow of the same object.

7. Natural Resources ***Importance of water*** What will happen to soil, people, domestic animals, rivers, ponds and plants and animals if it does not rain this year? What ;will happen to soil, people, domestic animals, plants and animals living in rivers and points, if it rains heavily?	Importance of water, dependence of the living on water. Droughts and floods.	Estimation of water used by a family in one day, one month, one year. Difference between need and availability. Discussion. Activitiy : plant growth in normal, deficient and excess water conditions.
Importance of air Why do earthworms come out of the soil when it rains?	Some animals and plants live in water; some live on land and some live in upper layers of soil; but all need air to breath/to respire.	Discussion.
Waste Do you throw away fruit and vegetable peels and cuttings? Can these be reused? If we dump them anywhere, will it harm the surroundings? What if we throw them in plastic bags?	Waster; recycling of waste products; things that rot and things that don't. Rotting is supported by animals / animal and plant products.	Survey of solid waste generation by households; estimation of waste accumulated (by a house/village/colony etc.) in a day, in a year, discussion on 'what is waste'; Activity to show that materials rot in soil, this is affected by wrapping in plastics.

Bulbs as Heaters !

Increase the wattage, increase the heat.

Have you ever felt that in winter when you switch on all the lights of your room, you feel warmer and when you do the same in summer you feel hotter ? Lets do this activity....

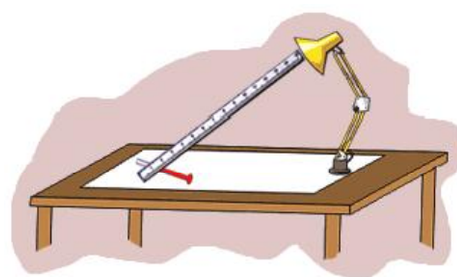
What do you need ?

1. A goose-neck style lamp (one shown in fig.)
2. An extension cord.
3. Different wattage of incandescent light bulbs - 25 watt, 40 watt, 60 watt, 100 watt, 150 watt.
4. Compact Fluorescent light bulbs - 7 watt, 23 watt - They are commonly available now.
5. Thermometer.
6. A ruler to measure distance from the thermometer to the light bulb.
7. A white towel.
8. A watch or stop watch to measure the time.
9. A piece of paper and pencil to record your observations.

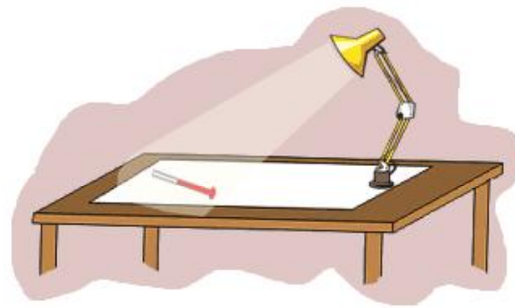
What to do?

1. Put the towel on a table.

   Put the goose neck lamp on the end of the towel on the table.



2. Put the thermometer under the light of the lamp and measure the distance from the bulb.
3. Make sure the lamp is unplugged and then screw in the smallest wattage light bulb.
4. Measure the temperature and write down the starting temperature.
5. Angle lamp over thermometer and turn on lamp.
6. Leave lamp shining on the thermometer for at least five minutes.



7. Start watch and at the end of five minutes read the temperature and mark down what the final temperature is.

Repeat the steps above with each different light bulb.

☺ Allow the lamp and desk to cool for half an hour between each bulb.

☺ Do not unscrew the light bulb right after turning off the lamp as the bulb may be hot and can burn you.

☺ Unplug the lamp before changing the bulb.

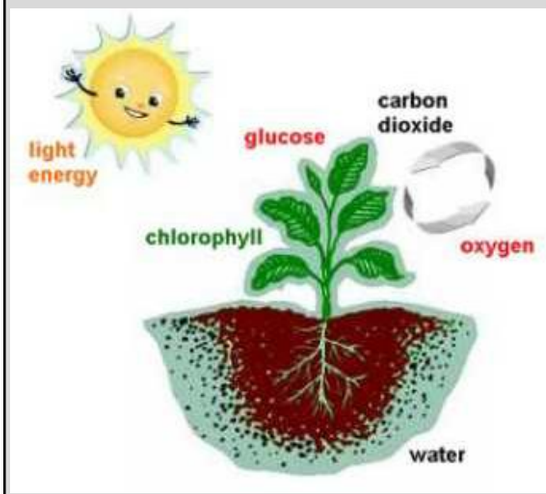
☺ Make sure the distance between the thermometer and the light bulb is the same for each different bulb. The thermometer should be in the same spot.

☺ The starting temperature for thermometer should be about the same for each light bulb.

What you'll discover!

Incandescent lights which have filaments give off heat as well as light energy. The higher the wattage of the light bulb the higher the temperature. A compact fluorescent bulb gives off very little heat energy because they do not use filaments and cause a light to glow hot.

In home or office, lots of incandescent lights means more use of electricity. Therefore, to conserve electricity use compact fluorescent lights in place of incandescent bulbs.



Mary Mary quite contary
How does your garden grow?
Water, air and seeds to sow
Sunlight, chlorophyll...
Photosynthesis you know!

These are all the processes necessary for a plant to grow. Chlorophyll is the green pigment in leaves that absorbs sunlight. This is the process of photosynthesis; plants use energy from sunlight to make food from water and carbon dioxide.

Plastic Milk???

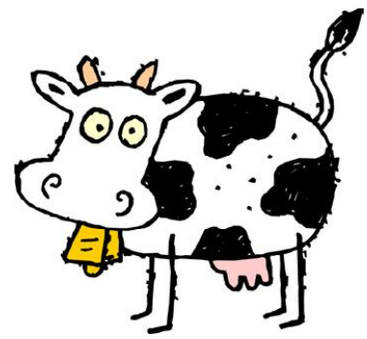
Till now you knew that milk is used to make different types of yummy dishes, sweets etc. that your mama prepares for you.

But here you can try your hand at changing things by turning milk into PLASTIC ! Start with a glass of milk; add a "secret ingredient" and magic ! Solid, soft, mouldable plastic.

What do you Need?

- ☺ 1 cup whole milk
- ☺ Small saucepan
- ☺ Measuring spoons
- ☺ White vinegar (acetic acid)
- ☺ Empty glass jar (cleaned)
- ☺ Wax paper

Be careful : Ask some elderly person at your home to help you.



What do you do?

Pour the **milk** into the saucepan and add **2 teaspoons of vinegar** Heat the solution over medium heat while stirring frequently. The milk will boil and begin to form tiny lumps (called **Curd**) in a clear liquid (known as **whey**).

Slowly pour off the liquid from the saucepan into the sink, and then spoon the curd into the jar.

Next, add 1 teaspoon of vinegar to the curd and let the mixture stand for about one or two hours. The curd will form a **yellow blob** at the bottom of a clear liquid. The blob is actually fat, minerals and the protein called casein (milk protein).

After warming for some time pour out the liquid and remove the rubbery yellow blob from the jar.

Wash the blob with water and knead it until it gets the consistency of dough.

Now it's your chance to show off the artist in you: Mould the plastic into any shape you wish - animals, birds, flower etc., then place it on the wax paper and let it dry overnight to harden.

Do you want to take your artistic skills even further? The hardened plastic can be painted with acrylic paints, so go ahead and give your creation some colour!

The Science Behind it!

The combination of heat and vinegar (acetic acid) causes the Casein from the milk to clump together and come out of solution (i.e. precipitate). Casein is an ingredient used in making plastic which is why the blob resembles plastic. This casein plastic hardens when the curds dry out.

Don't underestimate the importance of what you've just done...casein plastics are commonly used to make glue, paints, and paper.

There are many things in your kitchen/home which can make something to play and something to study. Contact Eduheal Foundation to know more about how you can make your house your science lab.

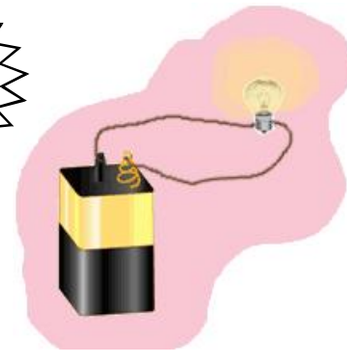
Electricity : Open and Short Circuits

Does the "short circuit" mean the electricity takes a shorter route?

What do you need?

1. Torchlight battery - DO NOT USE ANYTHING HIGHER THAN A NINE-VOLT BATTERY.
2. Small light bulb.
3. Wire to connect battery and bulb terminal (bare wire, not plastics or rubber covered)
4. Wire clippers

Safety Note: Ask an elderly person to help you !



What to do?

1. Cut three pieces of wire.
2. Connect the wires from the battery terminals to the bulb terminals - bulb will light up.

3. Take third piece of bare wire and drop across the two bare wires leading between the terminals - notice what happens. The bulb should go out or stop. (Be careful; it may even burst).

4. Take the third wire that was lying across the other two wires. Take the wire clippers. Cut one of the wires leading from the battery to one of the bulb terminals. The bulb should also go out.

What you'll Discover!

When the third piece of wire was dropped across the two wires leading to and from the bulb the wire created a "short circuit." This doesn't mean that electricity took a shorter course, it just took an easier path. It is normally used to describe a fault or accidental connection. A short circuit may cause a fire.

When you cut the wire with the clippers, you created an "open" circuit.

Humpty Dumpty sat on a wall
Humpty Dumpty had a great fall
Gravity helped to dump him so fast
And now he lies upside down in the grass

Gravity is the force that pulls all objects towards Earth.

You Are Wrong If You Say That ....

- ☺ Stars and constellations appear in the same place in the sky every night.
- ☺ The moon can only be seen during the night.
- ☺ The solar system contains only the sun, the nine planets and the moon.
- ☺ Meteors are falling stars.
- ☺ All stars are of the same size.
- ☺ Rain occurs when clouds get scrambled and melt.
- ☺ Rain occurs when clouds are shaken.
- ☺ Gas makes things lighter.
- ☺ Humans are responsible for the extinction of the dinosaurs.
- ☺ The eye is the only organ for sight; the brain is the only organ for thinking.
- ☺ Sunlight is different from other sources of light because it contains no colours.
- ☺ When white light passes through a coloured filter, the filter adds colour to the light.
- ☺ A charged object can only attract other charged objects.

- ☺ An object at rest has no energy.
- ☺ Energy is truly lost in many energy transformations.
- ☺ If an object is at rest, no forces are acting on the object.
- ☺ Large objects exert a greater force than small objects.
- ☺ Velocity is another word for speed. An object's speed and velocity are always the same.
- ☺ Objects float in water because they are lighter than water.
- ☺ Objects sink in water because they are heavier than water.
- ☺ Light always passes straight through a transparent material without changing direction.
- ☺ Colours appearing in soap films are the same colours that appear in a rainbow.
- ☺ Mass and weight are the same and they are equal at all times.
- ☺ All metals are attacted to a magnet.
- ☺ Seasons are caused by the earth's distance from the sun.

Be a young scientist and find out **why** ?

Baa baa black sheep have you any wool?
Yes sir yes sir it's a good insulating material!

Insulation prevents the transfer of energy. If it stops the transfer of heat energy then it is known as thermal insulation. Sheep's wool is a good thermal insulator and so will keep the sheep nice and warm!

Nationwide Interactive Science Olympiad, 2007

Sample Paper

SCIENCE

1. Of the following, which is the correct progression in the food chain?
   (a) Producer – Herbivore – Carnivores
   (b) Herbivores – Producers – Carnivores
   (c) Producers – Carnivores – Herbivores
   (d) Carnivores – Herbivores – Producers

2. Choose the wrong statement
   (a) Obesity in a type of deficiency disease
   (b) Scurvy is caused due to vit. C deficiency
   (c) Vit. A is found in plenty in carrots.
   (d) In rickets, the bones become soft and legs become bow shaped.

3. Choose the mismatched one -
   (a) Jute fibre - stem
   (b) Wool - fleece & hair
   (c) Silk fibre - cotton
   (d) Cotton fibre - flower

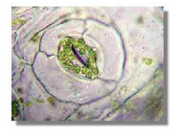
4. Which of the following works on the same phenomenon/method
   i. Rain from clouds ii. Salt obtained from sea
   iii. Grains separated from husk
   iv. wet clothes dry when spread under sun
   (a) i & iv (b) ii & iii (c) ii & iv (d) i & ii

5. Match the following -

   (i) Conduction of water (m) 

(ii) Transpiration (n) 

(iii)Photosynthesis (o) 

(iv) Absorption of water (p) 

(v) Reproduction (q) 

(a) i-o, ii-m, iii-n, iv-q, v-p (b) i-q, ii-p, iii-n, iv-o, v-m
(c) i-n, ii-m, iii-p, iv-o (d) i-p, ii-q, iii-o, iv-n,v-m

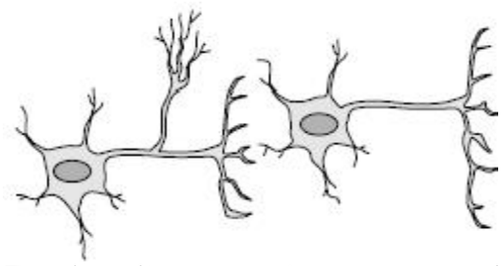
6. 

What type of motion is shown in the give figure.
(a) Linear motion (b) Rectilinear motion
(c) Periodic motion (d) Circular motion

7. Nishant put an object in front of a beam of light, immediately a dark sharp shadow was formed. What type of object did Nishant place in front of light.
(a) Transparent object (b) Translucent object
(c) Opaque object (d) None of these

8. Choose the correct statements.
(i) The filament gives off light in a bulb
(ii) Bulb stops glowing when current flows through the circuit
(iii) Rubber is a good conductor of electricity
(iv) A cell has a positive and a negative terminal.
(a) i & iii (b) ii & iii (c) i & iv (d) ii & iv

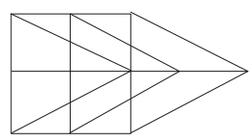
9. When a bar magnet is freely suspended, it aligns along
(a) North-South direction (b) North-East direction
(c) South-West direction (d) Any direction

10. 

In the diagram above, one cell creates and releases chemicals that travel to a second cell and quickly induce that cell into action. This diagram represents part of the _____
(a) Endocrine system (b) Skeletal system
(c) Muscular system (d) Nervous system

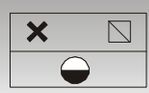
MENTAL ABILITY

11. How many triangles and parallelograms are there in the following figure?

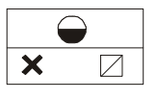
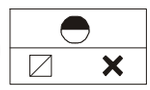
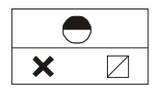
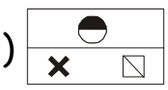


(a) 21, 17 (b) 19, 13 (c) 21, 15 (d) 19, 17

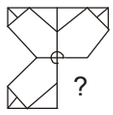
12. In the following questions, choose the correct water image of the figure (X) from amongst the four alternatives.



(x)

(a)  (b)  (c)  (d) 

13. In the following question complete the missing portion by selecting from the given alternatives.



(a)  (b)  (c)  (d) 

14. If *cushion* is called pillow, pillow is called mat, mat is called bedsheet and bedsheet is called cover, which will be spread on the floor?

(a) Cover (b) Bedsheet (c) Mat (d) Pillow

15. Arrange the given words in alphabetical order and tick the one that comes last.

(a) Abandon (b) Actuate
(c) Accumulate (d) Acquit

COMPUTER

16. The information stored in a computer is called

(a) Memory (b) database (c) Hard-disc (d) CD

17. Which software in used specially by Accountants?

(a) C++ (b) FORTRAN (c) Tally (d) Both(a) & (b)

18. Which is a word processor?

(a) Ms word (b) Ms Excel (c) Power point (d) All the three

19. A set of well defined rules or instructions for the solution of a problem in a finite number of steps is called

(a) Boolean (b) Abacus (c) Barcoding (d) Algorithm

20. Electronic mail is the

(a) transmission of letters, messages and memos over a communications network

(b) Distribution of all information.

(c) Both (a) and (b)

(d) None of the above

Answer key :-

1. (a)	2. (a)	3. (d)	4. (c)	5. (b)
6. (c)	7. (c)	8. (c)	9. (a)	10. (d)
11. (d)	12. (c)	13. (c)	14. (b)	15. (b)
16. (b)	17. (c)	18. (d)	19. (d)	20. (a)