YOUNG SCIENTIST ACTIVITY BOOK

CLASS - VII

Sample Pages

EDUHEAL FOUNDATION
• LEARNING FOR LIFE •

DISCOVER ● INVENT ● EXPERIMENT ● EXPLORE

CLASS - VII

SYLLABUS GUIDELINES

CLASS - VII

Questions	Key concepts	Activities/ Processes
1. Food		
Sources of food		
What are the various sources of our food?	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.
Utilisation of food		
How do plants and animals utilise their food?	Types of nutrition, nutrition in amoeba and human beings, Digestive system - human, ruminants; types of teeth; link with transport and respiration.	Effect of saliva on starch, permanent slide of *Amoeba*. Role play with children.
2. Materials		
Materials of daily use		
Do some of our clothes come from animal sources? Which are these animals? Who rears them? Which part of the animals yield the yarn? How is the yarn extracted?	Wool, silk-animal fibres. Process of extraction of silk, associated health problems.	Collection of different samples of woollen and silk cloth. Activities to differentiate natural silk and wool from artificial fibres. Discussion
What kinds of clothes help us to keep warm? What is heat? What is the meaning of 'cool'/'cold' and 'warm' hot? How does heat flow from/to our body to / from the surroundings?	Heat flow; temperature.	Experiment to show that 'hot' and 'cold' are relative. Experiments to show conduction, convection and radiation.
Different kinds of materials		
Why does turmeric stain become red on applying soap?	Classification of substances into acidic, basic and neutral; indicators.	Testing solutions of common substances like sugar, salt, vinegar, lime juice etc. with turmetic, litmus, china rose. Activity to show neutralisation.
How things change/react with one another		
What gets deposited on a *tawa/kburpti/kudal* if left in a moise state? Why does the exposed surface of a cut bringal become black?	Chemical substances; in a chemical reaction a new substance is formed.	Experiments involving chemical reactions like rusting of iron, neutralisation (vinegar and baking soda), displacement of Cu from $CuSO_4$ etc. *Introduce chemical formulae without explaining them.*
Why is seqwater salty? Is it possible to separate salt from seawater?	Substance can be separated by crystallisation.	Making crystals of easily available substances like urea, alum, copper sulphate etc. using supersaturated solutions and evaporation.

3. The World of the Living ***Surroundings affect the living*** Why are nights cooler? How does having winters and summers affect soil? Are all soils similar? Can we make a pot similar? Can we make a pot with sand? Is soil similar when you dig into the ground? What happens to water when it falls on the cemented/bare ground?	Climate, soil types, soil profile, absorption of water in soil suitability for crops, adaptation of animals to different climates.	Graph for daily changes in temperature, day length humidity etc.; texture of various soils by wetting and rolling; absorption/percolation of water in different soils, which soil can hold more water.
The breath of life Why do we/animals breathe? Do plants also breathe? Do they also respire? How do plants / animals live in water?	Respiration in plants and animals.	Experiment to show plants and animals respire; rate of breathing, what do we breathe out? What do plants 'breathe' out? Respiration in seeds; heat release due to respiration. Anaerobic respiration, root respiration.
Movement of substances How does water move in plants? How is food transported in plants? Why do animals drink water? Why do we sweat? Why and how is there blood in all part of the body? Why is blood red? Do all animals have blood? What is there in urine?	Herbs, shrubs, trees; Transport of food and water in plants; circulatory and excretion system in animals; sweating.	Traslocation of water in stems, demonstration of transpiration, measurement of pulse rate, exercise etc. Discussion on dialysis, importance; experiment on dialysis using egg membrane.
Multiplication in plants Why are some plant parts like potato, onion swollen - are they of any use to the plants? What is the function of flowers? How are fruits and seed formed? How are they dispersed?	Vegetative, asexual and sexual reproduction in plants, pollination-cross, self pollination; pollinators, fertilisation, fruit, seed.	Study of tuber, corm, bulb etc; budding in yeast, T.S./L.S. ovaries, w.m. pollen grains; comparison of wind pollinated and insect pollinated flowers; observing fruit and seed development in some plants; collection and discussion of fruits/seeds dispersed by different means.
4. Moving Things, People and Ideas ***Moving objects*** Why do people feel the need to measure time? How do we know how fast something is moving?	Appreciation of idea of time and need to measure it Measurement of time using periodic events. Idea of speed of moving objects-slow and fast motion along a straight line.	Observing and analysing motion(slow or fast) of common objects on land, in air, water and space. Measuring the distance covered by objects moving on a road in a given time and calculating their speeds. Plotting distance vs. time graphs for uniform motion. Measuring the time taken by moving objects to cover a given distance and calculating their speeds. Constancy of time period of a pendulum.
5. How Things Work ***Electric current and circuits*** How can we conveniently represent an electric circuit? Why does a bulb get hot? How does a fuse work?	Electric circuit symbols for different elements of circuit. Heating effect of current. Principle of fuse.	Drawing circuit diagrams. Activities to show the heating effect of electric current. Making a fuse

How does the current in a wire affect the direction of a compass needle? What is an electromagnet? How does an electric bell work?	A current-carrying wire has an effect on a magnet. A current-carrying coil behaves like a magnet. Working of an electric bell.	Activity to show that a current-carrying wire has an effect on a magnet. Making a simple electro-magnet. Identifying situations in daily life where electromagnets are used. Demonstration of working of an electric bell.
6. Natural Phenomena ***Rain, thunder and lightning*** What causes storms? What are the effects of storms? Why are roofs blown off?	High-speed winds and heavy rainfall have disastrous consequences for human and other life.	Making wind speed and wind direction indicators. Activity to show "life"due to moving air. Discussion on effects of storms and possible safety measures.
Light Can we see a source of light through a bent tube? How can we throw sunlight on a wall? What things given image that are magnified or diminished in size? How can we make a coloured disc appear white?	Rectilinear propagation of light. Reflection, certain surfaces reflect light. Real and virtual images. White light is composed of many colours.	Observation of the source of light through a straight tube, a bent tube. Observing reflection of light on wall or white paper screen. Open ended activities allowing children to explore images made by different objects, and recording observation. Focussed discussions on real and virtual images. Making the disc and rotating it.
7.Natural Resources ***Scarcity of water*** Where and how do you get water for your domestic needs? Is it enough? Is there rough water for agricultural needs? What happens to plants when there is not enough water for plants? Where does a plant go when it dies?	Water exists in various forms in nature. Scarcity of water and its effect on life.	Discussions. Case study of people living in conditions of extreme scarcity of water, how they use water in a judicious way. projects exploring various kinds of water resources that exist in nature in different regions in India; variations of water availability in different regions.
Forest products What are the products we get from forests? Do other animals also benefit from forests?What will happen if forests disappear?	Interdependence of plants and animals in forests. Forests contribute to purification of air and water.	Case study of forests.
Waste Management Where does dirty water from your house go? Have you seen a drain? Does the water stand in it sometimes? does this have any harmful effect?	Sewage; need for drainage/sewer systems that are closed.	Survey of the neighbourhood, identifying locations with open drains, stagnant water, and possible contamination of ground water by sewage. Tracing the route of sewage in your building, and trying to understand whether there are any problems in sewage disposal.

Light

Light is an essential part of our life. Without it, we couldn't see the world around us. Light is also an important form of energy on which we depend on every day. But how does light search us and how does it affect the way we see our world.

Like us light actually moves from one place to another. Of course, we don't see it moving because it's moves very very fast at 186,000 miles a second. Light is the fastest thing in the universe. Light always travel in straight lines, or rays unless it bends or bounces off an object surface. We saw light moving here and there through reflection, refraction and in every colour around us.

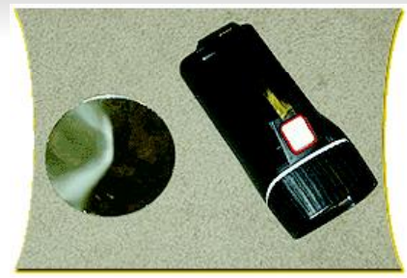
Let's talk about reflection

Rays of light reflect, or bounce off, objects just like a ball bounces on the ground. This reflection of light enables us to see everything around us. Take a look out of your window: you see everything in the natural world (that doesn't produce its own light) because it reflects the light of the Sun. We can see the Moon because the Sun's light is reflected off the Moon's surface.

Light can reflect in different ways, changing the way objects look. Light reflects more off light-coloured surfaces than dark-coloured ones. You also see different types of reflection when you see an image reflected in a mirror or a spoon. A flat mirror reflects an exact, though reversed, image of an object because the reflected light rays travel at parallel paths. But a convex surface, like the outside of a spoon, causes light rays to spread out, distorting the reflected image. What do you think happens when an image is reflected off a concave surface, like the inside of a spoon?

Try seeing your image in the spoons on both outer and inner surfaces. Also you can use plate or bowl.

What You'll Need



1 torchlight

1 mirror

What To Do

- ☺ Place the torchlight on a table and turn off the lights in the room.

- ☺ Now place a mirror in front of the beam of light.

  What happens to the beam?

Now try to focus the beam of light on different objects in the room by turning only the mirror.

Now let us study refraction through another activity.

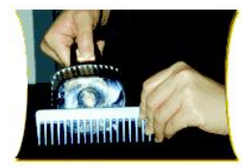
The speed of light isn't always the same. It actually slows down when it moves through some transparent materials, like glass or water. When light slows down, it changes direction. This "refraction" of light is the reason a straw in water looks bent or broken and why objects viewed through a glass bottle appear distorted.

In the same way light reflects differently off different surfaces, it also refracts differently depending on the shape of the material. This can make refraction very useful. For example, the curve of eyeglasses directs light rays into the eyes more effectively. Magnifying lenses also use refraction: the convex lens bends the light rays so the image appears larger.

What You'll Need

- ☺ torchlight
- ☺ wide-toothed comb
- ☺ clear bottles or glasses
- ☺ Water
- ☺ Cooking oil
- ☺ Construction paper (optional)

What To Do



☺ Place the torchlight on the table and lean the comb against it.

☺ Turn the torchlight on and turn off the lights in the room. Notice the light beams that are shinning through the comb's teeth. (NOTE: If you cannot see distinct, individual light beams, try wrapping a piece of construction paper around the end of the flashlight. This will help direct and focus the light beam.)

☺ Fill the small glass bottle or glass halfway with water and place it in front of the beams of light shining through the comb's teeth.

- What happens to the beams of light?
- Do the beams of light change direction?
- A focal point is where beams of light meet. Where is the focal point?

Try This

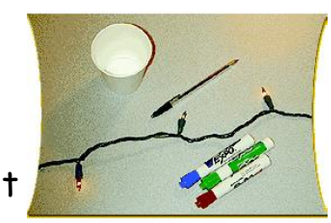
Now fill your glass bottle or glass with cooking oil instead of water and try the experiment again. Are the results the same? Do the light beams refract differently through the cooking oil than in water? Is the focal point the same?

Have you heard white light?

White light is a combination of all colours in the colour spectrum. It has all the colours of the rainbow. Combining primary colours of light like red, blue, and green creates secondary colours: yellow, cyan, and magenta. All other colours can be broken down into different combinations of the three primary colours.

Objects appear one colour or another because of how they reflect and absorb certain colours of light. For example, a red flower looks red because it reflects red light and absorbs blue and green light. A yellow banana reflects red and green light, and absorbs the rest.

What You'll Need



☺ 1 white paper cup

☺ Red, green, and blue markers

☺ Strand of brightly coloured Deepawali Light

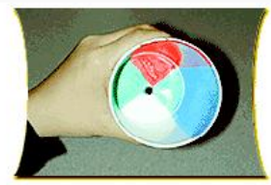
☺ 1 pencil or pen

What To Do

☺ Colour the inside of a white paper cup with the three primary colours of light: red, blue, and green. Leave one of the stripes

white (There should be four equal stripes in red, blue, green, and white.)





☺ Use a pencil to punch a hole in the bottom of the cup.

☺ Plug in the strand of Deepawali lights. Take a red light from the strand and stick it through the hole in the bottom of the cup.

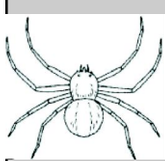
☺ Look at the red, blue, and green sections in the cup. For better results, turn off the room light.

- What happens to the colours inside the cup? Do they still look the same, or do the colours in the cup change?

More adventure

Try the experiment using the blue and green lights. What happens to the colours inside the cup? Use what you learned about the colours of light to explain why the colours change.

I am an arachnida, climbing up the spout
As you see, I've eight legs - that's what I'm all about
If I had just six legs
I would be an insect. As surely you could tell!

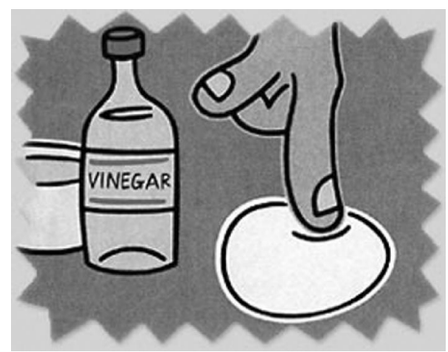


Spiders are members of the arachnida family and are identified by the fact that they have eight legs. Insects are defined as having six legs and three body parts (head. thorax and abdomen).

See Inside An Egg

You must have eaten eggs... imagine a raw egg without the hard shell? Come lets do this experiment and see...

You Will Need



- ☺ one raw egg (with shell)
- ☺ vinegar
- ☺ large bowl

Here's how

1. Put a raw egg (in its shell) into a bowl and cover it completely with vinegar.
2. Wait two days, then drain off the vinegar. When you touch the egg, it will feel rubbery. Be careful not to break the membrane, and wash your hands after you touch the egg. (Throw it away after the experiment.). Hold the egg and see. You can see the yolk moving up and down on moving the egg upside down. (Do it very carefully as the membrane is very delicate).

You Know Why?

Vinegar is an acid which dissolves the calcium in the eggshell. It's calcium that makes the shell hard. But a thin, flexible membrane just under the shell still holds the egg's shape.

Balloon Blow-Up!

What You'll Need

- ☺ A bottle with a narrow neck (preferably pepsi or coke bottle)
- ☺ Vinegar
- ☺ Baking soda
- ☺ Funnel or straw
- ☺ Water
- ☺ Balloon

Here's how ?

1 Pour about 15 cm of liquid—half vinegar and half water—into the bottle.

2 Use the funnel to fill the ballon half full of baking soda. (If you don't have a funnel, you can use a straw to load the balloon. Stick the straw into the baking soda, and put your finger over the top of the straw. Lift the straw out, put it into the balloon, and blow or tap gently.)

3 Stretch the open end of the balloon over the neck of the bottle. Make sure it's tight! Let the heavy end of the balloon droop down, so no baking soda goes in the bottle.

4 Hold onto the ballon at the bottle neck, and pick up the heavy part of the balloon so that all the baking soda falls into the vinegar at the bottom of the bottle.

5 Wow! Hear the fizz? There are thousands of bubbles! And look at what's happening to the balloon...

Wow! I didn't know that!

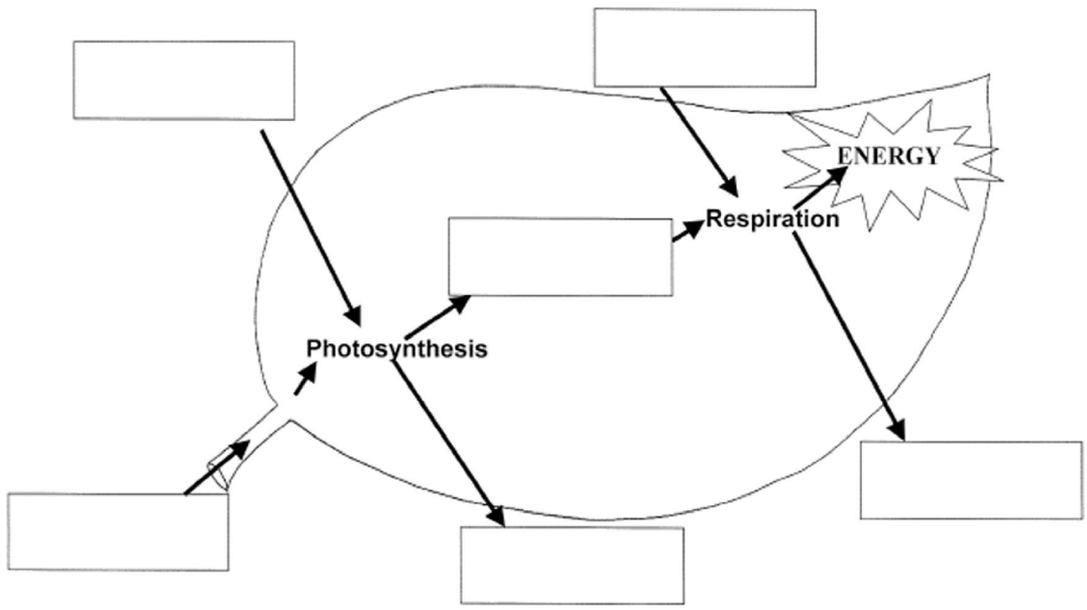
Fizzy liquids like cold drinks get into your tummy faster than other liquids. The bubbles in soda tickle the tummy and make you burp!

DANCING RAISINS

Now that your can of soft drink soda (eno will also do) is open, pour it into a glass. Drop in five or six small raisins. Watch tiny bubbles form all over them. In a minute or so, the raisins will start to wiggle around and dance. Then they'll float up to the top of the soda. After a minute, they'll sink back down again. If you tap on the side of glass, they'll sink right away. How long will they keep dancing?

Plant Kitchen

Following is the diagram of Plant kitchen-leaf. Leaves are the sites for making food in the plant with the help of carbon dioxide and water taken from environment. Cut the following resources and products and place them at their right position in plant kitchen.



carbon dioxide	sunlight	Water
food	oxygen	carbon dioxide

Nationwide Interactive Science Olympiad, 2007

Sample Paper

SCIENCE

1. Match & choose the correct answer-

(i) Green pigment in plants necessary for photosynthesis	(o) Rhizobium
(ii) Parasitic plant that lacks chlorophyll	(p) Pitcher plant
(iii) Plant that derives nutrition from insects	(q) Lichen
(iv) Association between algae & fungi	(r) Chlorophyll
(v) The roots of leguminous plants contain	(s) Cuscuta

(a) i-s; ii-q; iii-o; iv-p; v-r (b) i-r; ii-s; iii-p; iv-q; v-o
(c) i-r; ii-s; iii-q; iv-o; v-p (d) i-r; ii-q; iii-o; iv-p; v-s

2. Carbohydrates are broken down in the digestive system to
(a) glucose (b) starches (c) cellulose (d) amino acids.

3. Meeta placed a cold spoon in a glass of hot milk. After sometime when she touched the spoon, it become very hot. The cold spoon become hot because of
(a) conduction (b) convection
(c) radiation (d) none of these

4. Three students were given colourless liquids A, B, C of water, lemon juice and mixture of water and lemon juice respectively. After testing these liquids with pH paper, following sequences in colour change of pH paper were reported :
I) blue, red and green II) orange, green and green
III) green, red and red IV) red, red and green
The correct sequence of colours observed is
(a) I (b) II (c) III (d) IV

5. Which of the following statement(s) is /are correct?

i. Fishes respire through air-bladder
ii. Blood is red because of the presence of haemoglobin
iii. RBCs protects us from diseases
iv. In human beings urea is the nitrogenous excretory product.
v. Roots absorb water from soil in plants.

(a) i, ii, iii (b) ii, iv, v (c) ii, iii, iv (d) i, iv, v

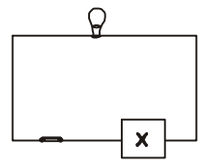
6. Which of the following are important steps in sexual reproduction of flowering plants

(i) fertilization (iii) seed dispersal
(ii) pollination (iv) fragmentation
(a) i, ii (b) i, iii (c) i, ii, iii (d) i, ii, iii, iv

7. Calculate the speed of a swimmer who swims 150 m in 88s.

(a) 1.7 m/s (b) 1.1 m/s (c) 1.9 m/s (d) 2.0 m/s

8. In the diagram what essential part of an electric circuit is missing at position X?



(a) wires (b) on/off switch
(c) source of electric current (d) load

9. While driving, the driver looks at a mirror on his rear side to look at the vehicles coming from behind. This mirror is

(a) concave (b) convex
(c) plane (d) magnifying lens

10. What causes the rainbow of colours you see on a CD?

(a) Diffraction (b) Reflection (c) Diffusion (d) Refraction.

MENTAL ABILITY

11. If in a certain language FASHION is coded as FOIHSAN, how is PROBLEM coded in that code?

(a) ROBLEMP (b) PELBORM (c) problem (d) problem

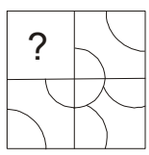
12. A is 40 m South-west of B. C. is 40 m South-east of B. Then, C is in which direction of A?
(a) East (b) West (c) North-east (d) South

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

13. (a) Regard (b) Refer (c) Remind (d) Report

Direction : In each of the following questions, complete the missing portion of the given pattern by selecting from the given alternatives (a), (b), (c) and (d).

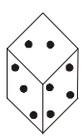
14.



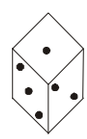
(x)

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

15.


(i)


(ii)


(iii)

Find the number of dots on the face opposite the face bearing 3 dots.
(a) 5 (b) 6
(c) 4 (d) cannot be determined

COMPUTER

16. <B> HTML </B> will give result
(a) *HTML* (b) **HTML** (c) <u>HTML</u> (d) HTML

17. BASIC and FORTRAN are
(a) Machine languages (b) Assembly languages
(c) Low level languages (d) High level languages

18. **Virus** is a program written using one of the computer languages to cause damage to the data, the information stored in the computer, or the hardware of the computer. The most common damage done by a virus is
(a) Erase or corrupt useful data from the hard disk
(b) Increase the file size of command file by several 1000 bytes
(c) Affect hardware components
(d) Slow down the computer

19. An "automatic teller machine" (ATM) represents
(a) Data communication (b) Floppy disk marking
(c) Programming (d) Debugging

20. Which is most important when entering a computer password?
(a) It is typed exactly as it was originally entered
(b) It is checked for password viruses
(c) It is typed in italic bold type
(d) It is changed each time

Answer key :-

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