Green Talk (EVS) – 5

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Students can attempt these questions differently according to their own choice, knowledge, situation and experience, however sample answers are given for their guidance.

Chapter 1

Warm Up Activity

Do it yourself

Time to Think

Mundan ceremony is performed by Hindus. It is the first haircut of the child performed in his/her first or third year of life at a specific date on an auspicious time. The head is shaved off completely to ward off undesired traits of past life.

Janeyu is a holy thread worn by every Brahmin in India. It is also worn by Kshatriyas and Vaishyas though the type of thread worn by different sects is different. This ceremony marks the sharing of responsibilities of elders by a male between ages of seven to thirteen years. It is worn on the right shoulder amidst chanting of "gayitri mantra".

Quiz Time

In India different communities have different traditions for wedding ceremonies. In Sikh community the bride walks behind the groom holding on to a long piece of cloth kept on the groom's shoulder. They go round the holy book of Sikhs called "Guru Granth Sahib" four times while the 'ragis' sing the holy words of 'lavan'.

? Yes, my likes have changed as I have grown. Earlier, I used to play with dolls, now I like to read books and chat with friends. I enjoy watching animated movies.

Friendly Activity

- When my mother was my age she lived with her paternal grandparents, one paternal uncle, his wife and two children, one unmarried paternal aunt, father, mother, two brothers and one sisters.
- They lived in Agra in Uttar Pradesh.
- Her favourite:
  1. Flower: Rose
  2. Food: Chana Poori
  3. Dress: Salwar Suit
  4. Colour: Pink
  5. Fruit: Mango
  6. Game: Pithoo
  7. Book: Oliver Twist
- She got married in 1981 at the age of 21 years.

Time to Think

Yes, I was to be a musician.

Summative Assessment

A. 1. Extended family consists of family members who do not live in the same house with us.

2. Renu is fond of her uncle and aunt because they are very loving and caring and Renu gets along well with their daughters Tisha and Kajal.

3. Her uncle and aunt care a lot about their daughters. Renu likes their being flexible in their decisions regarding their daughter. They are ready to listen and agree to their daughter's choice and Renu likes this thing about them.

4. The word 'sanskar' is a word in Hindi language meaning traditions. These refer to traditional ceremonies or rites carried out such as 'namkaran sanskaar' means the ceremony of naming a child and 'vivah sanskaar' means the wedding ceremony.

5. Family traditions or values are social norms and standards as defined by a family. These values are passed on from generation to generation in a family. For example, in most of Indian families we see that printed invitations bear the name of paternal grandparents and the invitation goes out in their name for occasions of wedding ceremonies. This is a mark of respect for elders which passes on from one generation to the next. There are many other traditions that may be followed by individual families for example, 'prasad' and special prayers are offered by the senior-most lady of the house every pooranmashi (full moon day).

B. 1. There are seven members in my family. They are my grandfather, grandmother, aunt, father, mother, my sister Rachna and myself.

2. Yes, There are members of my family who do not live in the same house with me. My uncle Ravi lives in Bengaluru because he has a job there. His wife and a son live with him there. My aunt Surekha also does not live in our house. She is married and lives with her family.

3. My grandfather is the decision maker in my family.

4. I live in a joint family. My family members are my grandmother, two uncles, their wives, four cousins, father, mother and one brother. It is fun to live in a big family. My mother and two aunts help each other in running the house. I never get bored because we are six children in the family. We go to school together and play with each other. Sometimes we have fights but our grandmother resolves them quickly. We all care for each other. Grandmother tells us stories and we respect our elders.

5. I help my family by keeping my toys and books in place. If my shoes are dirty I take them off before entering the house. I help my mother in laying the table and removing dishes after meals. I run errands for elders in the family.

C. 1. Renu saw some photographs of her mother as a young girl.

2. Renu learnt rangoli design from her grandmother.

3. Kajal is a medical student.

4. Kajal believed that women could be good at any kind of jobs.

5. Everyone changes as they grow older.

D. 1. False, 2. True, 3. False, 4. True, 5. False.

Formative Assessment

1. Grandmother told me my mother used to love animals and when she was a young girl she used to bring small puppies from the road to the house and give them milk to drink. Whenever my mother was unwell she used to call up all her friends and relatives to come and spend time with her. Once there were 26 guests in the house and my grandmother found it difficult to handle the guests while looking after her sick daughter.

2. & 3. Do it yourself.

Chapter 2

Warm Up Activity

	Your Like	Your dislike	Your friend's like	Your friend's dislike
Food	Sandwiches	Karela	Poori-alloo	Karela
Dress	Skirts	Lehnga choli	Skirts	Salwar-kameez
Colour	Peach	Orange	Pink	Brown
Game	Cricket	Basketball	Cricket	Basketball
Music	Soft melody	Classical	Classical	Loud Western

Friendly Activity

My height— 4 feet 3 inches

Father's height— 5 feet 11 inches

Mother's height— 5 feet 3 inches

Sister's height— 3 feet 6 inches

Time to think

If I don't like the food in the party I will not make noise instead I will eat just a little portion quietly.

Quiz Time

My uncle's daughter named Mandeep is like Avdesh. She too has a great knowledge of computers and wins prizes.

Summative Assessment

A. 1. (b), 2. (c), 3. (a)

B. 1. People who are vegetarian do not like the smell of fish, meat etc.

2. Every person in a family is unique.

3. Piyush's father is the tallest in the family.

4. We have five sense organs.

5. The sense organs make our link to the world.

C. 1. wrong, 2. Right, 3. Right, 4. Wrong.

D. 1. My grandfather is the tallest in my family.
2. I am 6 inches shorter than my mother.
3. My mother has the longest hair in my family.
4. My brother dances well in my family.
5. My mother sings well in my family.
6. My grandfather has the loudest laugh in my family.
7. My mother speaks the softest in my house.

E. 1. The five sense organs of our body are nose, eyes, tongue, ears and skin.

2. The main parts of the brain are cerebrum, cerebellum and medulla.

3. People whose one or more of their sense organs are not working are called special people. They may not be able to see, hear, speak or walk.

4. Blind people may be able to read books and magazines by using a special script called braille.

Formative Assessment

1.

Your special Habit or Trait	It is similar to
Dark skin colour	My grandmother
Dimples on my cheeks	My mother
Loud laughter	My uncle
Curly hair	My father
Will be very quiet when upset	My mother

2. The habits that I have inherited from my family are talking loudly, laughing loudly, colour of my skin, curly hair and dimples on cheeks. Some habits that I have learnt from my environment are to remain calm and not to shout or use bad words even if you are angry, patience, wait for your turn, do not break queues or push people, do not interfere in other people's affair and do not spread gossip.

3. Our culture plays a significant role in determining our preferences. We can observe this by observing different communities for example, western people mostly eat non-spicy food and Indians prefer spicy food. Punjabis mostly eat non-vegetarian food while Jains do not eat onions and garlic. Christians prefer wearing dresses while Muslim women mostly prefer long shirts with salwars. South Indians are seen to be soft spoken while Punjabi community is considered loud.

4. My paternal grandfather wears spectacles. My maternal grandmother and grandfather both wear spectacles. My father inherited his weak eyesight from his father (my paternal grandfather). My brother also has weak eyesight. He has inherited his weak eyesight from my father. My father's name is Kuldeep Singh.

5. Do it yourself.

Chapter 3

Warm Up Activity

Running, jumping, exercising

Friendly Activity

Breathing becomes faster after running as you need more oxygen.

Summative Assessment

A. 1. (c), 2. (b), 3. (a), 4. (b), 5. (b)

B. 1. The term breathing refers to the process of taking in air (inhaling) and releasing air out of the body(exhaling).

2. We need oxygen by cells of the body to carry out functions of cells and life processes.

3. The process of breathing involves inhaling and exhaling. Inhaling is taking in air through our nose and/or mouth. This air goes through the wind pipe into lungs where oxygen is taken up and carbon dioxide is given out by blood. Carbon dioxide is carried out through wind pipe and released out as waste or used up air through the nose. The process of releasing air out of the body is known as exhaling.

4. In physical exercise more oxygen is used up by the body therefore breathing becomes faster.

5. Inhalation and exhalation are opposite

processes as in inhalation we breathe in air and air with more oxygen is taken inside the body while in exhalation used air is released out of the body and we breathe out used air with little oxygen and more carbon dioxide.

6. In winters the outside air temperature is colder than our body temperature inside so the air we blow out is warmer. We blow this warm air to warm up our hands in winters.

C. 1. True, 2. False, 3. True, 4. False.

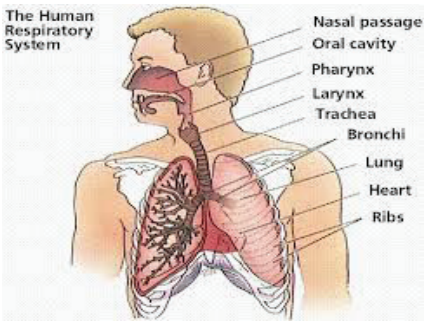
D. 1. We should do physical exercises because it improves our blood circulation.

2. Villagers blow air through a narrow pipe to light chullah because by blowing they supply air needed for burning fire.

3. The mirror becomes hazy when we breathe out through our mouth because air from our mouth contains water vapour. This water vapour gets cooled down on hitting the mirror and undergoes condensation and is converted to liquid form of water droplets which settle on the mirror and make it hazy.

4. We blow air on hot drink to cool it because the temperature of the drink is higher than temperature of air that we blow out. When we blow air the warm air rises up and cooler air takes its place on the hot surface, this air gets warmed by the hot drink and is again replaced by cooler air we blow. In this process the hot drink gets cooled down by blowing air on it.

Formative Assessment



Chapter 4

Warm Up Activity

Do it yourself

Quiz Time

The dishes that can be prepared from rice are pulao, biriyani, khichri, poha, idli etc. Dishes that can be prepared from wheat are roti, dalia, poori, bread, noodles etc.

Time to think

Wheat and rice is available in the market throughout the year because these are stored in granaries and can be stored safely for more than a year.

Quiz Time

Crop	Time taken for maturity of crop	Sowing season
Maize	2 months	June – August/ Oct–Dec
Wheat	4 months	Winter(October – December)
Rice	3 months	March–Aug/June–Oct/ Nov–Feb
Gram	5 months	Sep–Dec
Potato	5 months	Winter(Aug-Dec)/Summer (Feb–July)

Friendly Activity

Tractor, Shovel, Sickle.

Summative Assessment

A. 1. Early man was a food gatherer. He gathered food from wild plants and trees in forests. Later they started hunting animals for food. They learnt after many years that plants grew from seeds that fell in the ground.

2. Small farmers barely manage to grow enough food to meet the requirements of their family for their survival needs. This type of farming is called subsistence farming. When farming is done at a large scale by growing enough crop to sell in the market to make a profit it is called commercial farming.

3. The agricultural practices that help the farmers in cultivation of crops are:

- ❖ Preparation of soil by tilling or ploughing
- ❖ Sowing healthy, good quality seeds. Nowadays farmers use High Yielding Variety (HYV) of seeds.
- ❖ Removing weeds
- ❖ Spraying insecticides and pesticides
- ❖ Adding manure and fertilizers
- ❖ Irrigation is important for agriculture. Farmers can use different sources for irrigation like wells, tube wells, ponds, rivers, canals, lakes and dams. They can use methods like drip or sprinkler irrigation.

4. Harvesting of crops is a process of cutting and gathering crops on maturity. It can be done manually by using sickles or with machines.
5. After harvesting the crops are threshed, winnowed and stored.
   - ❖ Threshing is the practice of separating inedible chaff from edible part of crop.
   - ❖ Winnowing is the process where threshed crops are tossed in the air to separate lighter particles of chaff, dirt and pests from grain. A winnowing fan is used for this.
   - ❖ Storage is another important agricultural practice to protect the crop from rats, moisture and insects. They are dried in the sun and then stored in jute bags, metallic bins or large granaries and silos.
6. Grains are dried in the sun before storing to dry the extra moisture in them.
7. Government can help in improving the conditions of farmers in the following ways:
   - ❖ Making agricultural loans easily available to farmers at low interest rates.
   - ❖ Providing them with adequate irrigation facilities.
   - ❖ Making available good quality seeds, fertilizers, machines etc at subsidized prices.
   - ❖ Ensure a good price to the farmers for their produce.
8. 'Tilling of land' is a process of loosening the soil using ploughs or tractors. It is an important part of cultivation because loose soil allows easy penetration of roots deep into the soil so that the plant gets sufficient support and nutrients from soil. Tilling also turns the soil up and the nutrition rich soil is turned to the top to supply better nutrients to the seeds. For growing crops 'irrigation of fields' is extremely important because plants need water for growing and surviving. Germination of seeds can't take place in dry conditions and rainfall is different in different places, therefore to ensure sufficient supply of water for crop growth, irrigation is important.

B. 1. Agriculture by early men— The methods, tools and techniques of agriculture were different in earlier times. Early men did not have knowledge of high yielding varieties of seeds. They used animals like ox, buffaloes and cows for ploughing, seeds were sown manually, water wheels were used for irrigation, harvesting was done manually using sickles, threshing was also done manually.

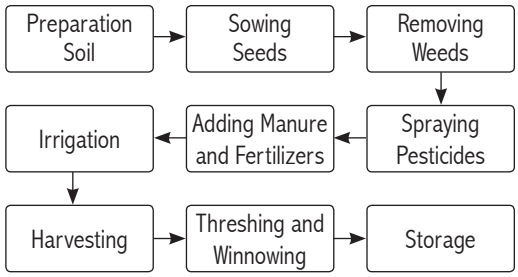
2. Cultivation of crops— Crops are grown on a large scale in fields. They cannot be grown at any time of the year or any place. Every crop is sown at a particular time of the year and harvested at particular time of the year when the crop is ripe. Every crop needs a particular type of climate and soil for cultivation.
3. Agriculture— Then and now— Agricultural tools, methods, tools and practices have changed over a period of time. The tools and machinery like tractors, harvesters and threshers are available now whereas then ploughing was

done with help of animals, harvesting and threshing were also done manually. Then farmers did not know about fertilizers, manures, insecticides and pesticides which are available now. The methods used for irrigation then were by canals, wells and water wheel but now tube wells, sprinkler irrigation and drip irrigation are practiced.

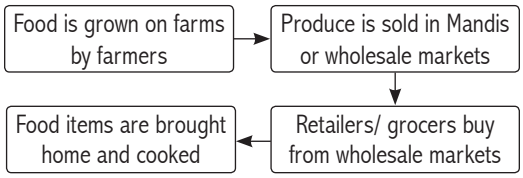
C. 1. Weeding is done using a sickle.
2. A tractor is used for sowing.
3. Harvesting is done using a harvester.

Formative Assessment

1. Flow chart showing stages of crop production



2. Flow chart showing how food comes to our plate



3. Sugarcane Farming
Sugarcane crop is widely grown in India. It belongs to bamboo family and is used for making gur, khandsari and sugar. It needs 10 to 15 months for maturing. Hot and humid climate is suitable for growth of sugarcane. In the later part of its growth it needs about 20 degrees temperature for acquiring juice and becoming thick. Too heavy rainfall reduces the sugar content. Sugarcane can be grown on any type of soil that can retain moisture but deep rich loamy soils are most favorable. Sugarcane exhausts the fertility of the soil quickly. It is grown by stem cutting method because growing by seeds is more time consuming and less yielding. Seed material called setts are taken from short crop of sugarcane free from pests and diseases. These are soaked in slurry before planting. Sugarcane is planted in ridges and furrows. For weed control a system called intercropping is used where intercropping is done with Soybean, black gram or groundnut. It needs a lot of manual labour for cultivation processes like sowing, hoeing and weeding, irrigating, cutting and carrying sugarcane to factories. The main seasons for planting of sugarcane are early December-January, mid Feb – March and late April-May. When sugarcane is ripe earthing-up is done manually. Dry cane leaves are removed. The sugarcane is loaded in tractors and transported.

Chapter 5

Warm Up Activity

Burger, chowmein, pizza, French fries.

Quiz Time

If bread is kept for 3 – 4 days in open, fungus begins to grow on it thus making it unfit for eating.

Friendly Activity

Boiling, Pickling and making jams, refrigeration and canning.

Summative Assessment

A. 1. (c), 2. (c), 3. (a), 4. (c), 5. (c), 6. (b)

B. 1. The process by which food materials are given a suitable physical or chemical treatment to prevent their spoilage is called food preservation.

2. We preserve food to increase the storage period of food, to make it possible to get food items in off season and from far-off places and also to reduce food wastage.

3. Rice and wheat are preserved for a long time by dry storage method. They are dried and packed in containers. They are also preserved by making chips and papads by adding salt and spices.

5. Food gets spoiled due to moisture and germs from air that thrive on it in and

contaminate the food.

6. Boiling the milk kills the milk spoiling bacteria in it so the milk remains good for a long period of time.

8. Sugar is used as a preservative in jams and jellies.

C. Frooti— Mango juice, Mango jam, Mango papad and fresh mangoes.

D. Pasteurization, Pickling, sweetening, sweetening, drying and adding salt and spices.

Formative Assessment

1. Do it yourself
2. (i) Do it yourself
   (ii) Potato is washed, cleaned and dried. It is then cut into thin slices and fried.

Chapter 6.

Warm Up Activity

In our daily life we use water to drink, brush our teeth, bathing, washing clothes, mopping the floors, watering the plants, cooking and washing dishes.

Friendly Activity

Sita's mother can reuse this water for watering the plants and cleaning the house.

Time to think

Earthen pots are used in summers for storing water because they do not get heated easily and keep the stored water cool.

Quiz Time

Some underground sources of water are wells, hand-pumps and tube wells.

Quiz Time

We get water from pipeline by Delhi Jal board. Yes, once we were faced with irregular supply of water in our area for two days because the pipeline had been damaged and repair work took time.

Summative Assessment

A. 1. (a), 2. (c), 3. (c), 4. (a), 5. (c)

B. 1. A baoli is a huge well with steps to reach the bottom. They are very deep and broad. In earlier times these were built to overcome scarcity of water. Rain water could be stored in them. These baolis ensured constant supply of water. People also used the steps as cool resting place in hot summers.

2. Pulley system is attached on top of the well. It is useful in pulling up water out of the well with ease because less force is required to pull up heavier loads with a pulley system.

3. Irrigation is the system of supplying water to crops at different intervals of time. Water may be supplied to the fields from wells, canals, tubewells, tanks or a combination of these sources.

4. Drip irrigation method delivers small but frequent amount of moisture to the root area of each plant by means of narrow plastic tubes. This method ensures minimum loss of water through evaporation.

5. Piao means offering people water to drink free of cost. Yes, piaos still exist in India. In many places earthen pots filled with water are kept. People can take water from these pots to drink without paying any money for it.

6. Water wheels are still used for irrigation in some places. Some water wheels have paddles attached to the rim. They turn the wheel as the water fills in them. Some water wheels have buckets attached to the wheel. As each bucket fills with water it becomes heavy and moves downwards. This pulls the wheel around. Such wells with water wheel are called rehat.

7. Rainwater harvesting is a simple and economical method of collecting and storing run-off water such as rain water in reservoirs in rainy season. Our government is trying to encourage rain water harvesting. In this method rain water flowing from roof tops, courtyard etc is directed to a deep hole in the ground or it may be collected in tanks on roof tops. Rainwater harvesting has many advantages.

- ❖ This water can be used at the time of need for irrigation or other purposes like cleaning and washing.
- ❖ It increases the level of ground water.
- ❖ Incidents of floods and droughts decrease.
- ❖ Water problem gets solved.

C. 1. Baoli— Gandak ki baoli in Delhi and Chand Baoli in Rajasthan
2. Sources of irrigation— canals and wells
3. Modern means of irrigation— sprinkler system and Drip or trickle irrigation

D. 1. Baoli, 2. rain.

Formative Assessment

1. Do it yourself
2. Some daily activities in which we often see water wastage are:
   - ❖ Leaving the tap open while brushing teeth, applying soap on clothes or utensils for cleaning. We should close the tap when water is not needed to stop wastage of water.
   - ❖ Sometimes we wash the vegetables under running water of tap. In this case we can stop wastage by washing the vegetables in a bowl and reusing that water for cleaning or watering plants.
   - ❖ We often throw the water after mopping the floor because the water becomes muddy. We can use this muddy water to water plants.
   - ❖ Leaking taps also waste a lot of water by continuous dripping. We should get the tap repaired as early as possible.
3. Yes, water harvesting system is present near my house. A local social service agency has sponsored it and the water is being used to maintain a large public park and a green belt area near it.

Chapter 7. Water – A Unique Substance

Warm Up Activity

Smell, Colour, Taste, Shape.

Quiz Time

Oil paints are used for outer walls of the house because oil does not mix with rain water so the paint does not get spoilt.

Quiz Time

Plants kept in the aquarium to supply the water with oxygen and remove carbon dioxide from water that the fish breathe out. This circulation keeps the water clean and fit for breathing and survival of fish in the aquarium.

Time to think

Paper is heavier than water so it sinks in water but wood of size, shape and volume does not sink in water because wood is lighter than water.

Summative Assessment

A. 1. (a), 2. (b), 3. (c), 4. (c), 5. (a)

B. **Solute**— A substance that dissolves in a liquid is called solute.

Solvent— The liquid in which a substance dissolves is called the solvent.

Solution— The combination of solute and solvent is called a solution.

C. 1. Oil does not mix with water.
2. Sugar dissolves in water.
3. Oxygen is a gas that is soluble in water.
4. Sugar and water mixed would make a solution.
5. The leaves of fixed plants are flat and plate like.

D. Do it yourself

Formative Assessment

1. & 3. Do it yourself

3. Mahatma Gandhi, Father of nation, is also called Bapu. He was an eminent leader of struggle for freedom our country from British rule. He led India to freedom following the principle of non-violence. In my opinion Gandhi ji was a great leader and a man of high values and principles. I admire most his strength of character, honesty and principle of non-violence. He led the struggle for

India's independence without resorting to violence. Dandi march is an admirable move to put forward the firm Indian stand. As their demands were not met by British Viceroy Lord Irwin, Gandhi set off with a group of followers to the sea side at Dandi to defy the "salt laws" on March 12 and reached on 5 April. The British held the monopoly on production and sale of salt. By making salt at Dandi Gandhi ji paved a way for Civil Disobedience Movement. Dandi march was a way to tell the British that Indians will not accept the unreasonable laws imposed on them and they valued their independence.

Chapter 8.

Warm Up Activity

Do it yourself

Friendly Activity

Do it yourself

Quiz Time

Tea is called anytime drink because like lunch and dinner time there are no fixed times for having tea. We can drink it anytime we like.

Time to think

If there is an uncontrolled increase in the number of plants then animals will not be able to produce enough carbon dioxide for photosynthesis in plants and if there is uncontrolled increase in number of animals then they will need more oxygen for breathing than the plants can produce, also there will be a shortage of food for animals because animals ultimately depend on plants for food. If there is a drastic increase in numbers of both animals and plants then there may be a shortage of living space or habitat for both.

Time to think

If any link in the food chain is missing the entire food chain gets disbalanced thus disturbing the balance of nature.

Summative Assessment

A. 1. (b), 2. (c), 3. (c), 4. (b), 5. (b), 6. (c), 7. (a)

B. 1. Photosynthesis is a process by which green plants make food. Green plants have a pigment called chlorophyll in their leaves. Plants absorb carbon dioxide from air, water from their roots and in presence of sunlight convert water and carbon dioxide into sugars and oxygen.

2. Leaves are called the kitchen of the plant.

3. All living things that cannot make their own food either eat plants or animals for food. If they eat animals those animals in turn eat plants. So we can say that all living things directly or indirectly depend on plants for food.

4. Pitcher plant and Venus flytrap are two insectivorous plants.

5. Venus flytrap has a jaw-like leaf trap. Once an insect touches the hair on the leaf, the jaws shut in a fraction of a second and the plant secretes juices that drown and dissolve the insect. Pitcher plant has vase-shaped leaves. Insects fall inside these and are drowned in the liquid inside.

6. A food chain is a sequence of organisms in which each is a food for the next. All food chains begin with plants because they are producers. Then come the plant-eaters followed by animal eaters which are in turn eaten by other animals. The chain ends in decomposers. An example of food chain in forests may be: plants and leaves eaten by giraffes or deer, deer or giraffe is in turn eaten by lion or tiger, these are hunted by man, meat of lion or tiger is eaten by scavengers like eagles or hyena. When these animals die, they are decomposed by decomposers in soil and these decomposed materials supply nutrients to soil for plant growth.

   An example of food chain in grasslands may be: flowers are eaten by caterpillars which are eaten by frogs which are eaten by snakes which are eaten by owls. Or grass is eaten by goat which is eaten by man. On dying man is either cremated and gets decomposed by decomposers in soil.

7. Organisms eat more than one kind of food so food chains get interlinked. Many interlinked food chains make a food web.

8. Tea came to India from China. Coffee was brought to India when a pilgrim named Baba Budan, from Yemen, visited India in 7th century. He brought coffee seeds and planted them in Karnataka.

9. (a) Maize reached India about 300 years ago through Europeans. It was originally grown in Central America.

   (b) A man named Samuel Strokes from USA came to India in 1916. He brought apple saplings with him from Central Asia.

10. Parasitic plants depend on other plants for their food. For example, dodder plant twines itself around other plants and sucks nutrients and water from them.

C. 1. Mushroom is the odd one out because it does not make its own food.

2. Venus flytrap is the odd one out because it is an insectivorous plant.

3. Dodder is the odd one out because it is a parasitic plant.

4. Black pepper is the odd one out because it is a spice.

5. Plant is the odd one out because all others are names of animals.

D. 1. Parasitic plants (i) Corpse flower, (ii) Therber stemsucker (iii) Dodder (iv) Australian Christmas Tree

2. Insectivorous plants (i) Pitcher plant (ii) Venus flytrap (iii) Sundew

3. Herbivorous animals (i) Goat (ii) Cow (iii) rabbit

4. Carnivorous animals (i) Eagle (ii) Tiger (iii) Fox

5. Omnivorous animals (i) Monkey (ii) Bear (iii) Dog

6. Scavengers (i) Hyena (ii) Vulture (iii) Jackal

7. Plants of Indian origin (i) Brinjal (ii) Rice (iii) Sugarcane

8. Plants of foreign origin (i) Maize (ii) Tea (iii) Coffee

Formative Assessment

1. 'Giving' is very important to me. I have been taught that 'giving' to others will give you happiness in return. I try to give away my old toys and books to someone who needs them but can't afford to buy new ones. I also try to give happiness to my elders by listening to them, obeying them and running small errands for them. When someone thanks me for my actions it gives me great joy.

2. The correct match is:

   First picture— 3. Dispersal of seeds by wind,

   Second picture— 5. Seedlings growing away from a tree

   Third picture— 2. Dispersal of seeds by human beings

   Fourth picture— 4. Seedlings growing near the tree

   Fifth picture— 1. Dispersal of seeds by animals

3. Do it yourself

Chapter 9.

Warm Up Activity

People live in forests depend on forest produce for their daily needs. They drink water from springs and rivers passing through the forest. They use plant materials like wood, bamboo and thatch to make their houses. They also use animal skins and animal products. They use wood from the forest for cooking and heating purposes. They use herbs growing in the forest for treatment and as medicine. They depend on plants and animals of the forest for food. They gather honey, gum, resins, medicinal herbs and wood and sell the forest produce in nearby markets. They also weave baskets for sale.

Friendly Activity

Sacred Grove	Location
Pavitrashetralu	Andhra Pradesh

Gumpa forests	Arunachal Pradesh
Sarna, Devlas	Chhattisgarh
Beed, Bani	Haryana
Dev Bhoomi	Himachal Pradesh
Sarna	Jharkhand
Devkad	Karnataka
Sarpa Kavu	Kerala
Devrai	Maharashtra
Mauhak	Manipur

Time to think

In our daily life we can plant more trees to protect the environment. We can keep our surroundings clean and not cut trees or pull out plants.

Time to Think

The main aim of van mahatsava is to create awareness in people of the importance of forests.

Summative Assessment

A. 1. (c), 2. (c), 3. (c), 4. (c), 5. (a)

B. 1. Forests are important because they provide us with wood for building, firewood, furniture etc. Forests also provide a home for wildlife. They keep the environment clean by providing oxygen and using up carbon dioxide. Forests prevent soil erosion and prevent floods.

2. The different types of forests are coniferous forest, evergreen forests, deciduous forests, thorny forests and tidal forests.

Coniferous forests— These are found in mountainous and hilly areas. The trees in these forests are tall and have needle shaped leaves. Paper is made from the pulp of these trees.

Evergreen Forests— These are found in hot and wet regions. The trees in these forests remain green throughout the year and do not shed their leaves. These are tall trees with a broad canopy on top.

Deciduous forests— These are also called monsoon forests. The trees of these forests shed their leaves in dry season.

Thorny forests— These are found mainly in desert areas. The trees and shrubs have long roots, sharp thorns and small leaves.

Tidal forests— These are found in delta regions of Ganga and Brahmaputra rivers. These forests grow both in salt water and fresh water. These are also called mangrove forests.

3. Deforestation is cutting down of forests. Deforestation has many negative impacts on our environment as well as lives of people. Many animals suffer a loss of habitat due to deforestation. Many forests produce are lost due to cutting of trees such as honey, wood, herbs and medicines etc. It also leads to disturbance in balance of nature as it leads to reduced rainfall, soil erosion, landslides, floods and famines. Life of tribals is also affected because they depend of forests for their livelihood. These tribals have to leave their homes and go to distant places in search of work.

4. Tribal people earn their livelihood from forest produce. They collect honey, resin, lac, fruits, vegetables, nuts, herbs, gum and wood from the forest and sell them. They also make products using bamboo plant and sell them. They make perfumes and handicraft from sandalwood and rosewood. They have also learnt to make herbal pesticides.

5. A sacred grove is a vegetation area with a variety of plants and animals. This area is dedicated to a deity or God worshipped by the tribals. Cutting trees and hunting animals is strictly prohibited in these areas.

6. Chipko movement is a green movement started by common people to save the forests. It was first started by the women in Garhwal in 1970s and 80s to stop commercial logging. The contractors were cutting down trees at an alarming rate in this area which was leading to landslides and floods in this region. When the contractors came to cut trees the women

embraced the trees and refused to move. They did not allow the men to cut trees. The contractors were helpless and had to leave. This movement then spread to many other areas and many forests were saved.

7. We can conserve the forests by growing more trees. The government has marked many areas as wildlife sanctuaries, national parks and biosphere reserves. Cutting trees and hunting is prohibited in these areas. Green belts have been introduced in many areas by the municipal corporations.

C. 1. Reforestation means growing a depleting forest once again by growing trees in that area while deforestation is the opposite of reforestation. Deforestation means cutting down trees and destroying the forest cover.

2. Mountain forests are found in hilly areas while tidal forests are found in delta regions of Ganga and Brahmaputra rivers. The trees in mountain forests are tall and have needle like leaves where as in tidal trees the roots of trees grow into the water area. The pulp pf trees from mountain forests is used to make paper while the wood from tidal forest trees is used to make boats.

3. Evergreen forests are found in hot and wet regions while coniferous forests are found in mountainous and hilly areas. The trees in mountain forests have needle like leaves where as in evergreen forests the trees have a broad canopy on top.

D. 1. Kikar— (e) thorny forests
2. Rosewood— (c) evergreen forests
3. Sundari— (a) tidal forests
4. Mahua— (d) deciduous forests
5. Fir— (b) mountain forests

Formative Assessment

1. Jhajjar in Uttar Pradesh was a forest area but now there is no forest there.
2. Do it yourself
3. Living things we receive from forests— animals and birds for circus and zoo and pets.
4. Non-living things we receive from forests— wood, cane, bamboo, honey, herbs for medicines, spices, fruits, vegetables.
5. Do it yourself
6. Chipko movement

Chapter 10.

Warm Up Activity

Do it yourself

Time to think

We should show care and concern towards animals because they help us in many ways. Animals are also sensitive and understand feelings of love, care and cruelty. Animals can be our friends and helpers if we care for them. We can care for them by giving them food and shelter. We should not hurt them. If they are sick we should take them to a vet doctor.

Friendly Activity

Bull, ox, deer

Quiz Time

Some acts that animals perform in a circus are driving a bicycle, playing with a large ball, sitting, standing, jumping and bowing down when instructed.

Summative Assessment

A. 1. (c), 2. (a), 3. (a), 4. (c)

B. 1. Eggs, honey, milk, curd, fish and meat are some food items provided by animals.

2. Besides food animals provide us with many other useful products like leather, raw material for clothing like wool and silk. Animals also give us oils used for making medicines and curing various ailments. Dung of animals is used as manure and fuel. Dead bodies of animals decay and get decomposed and are used as manure. Corals are used for making decorative handicraft items. Feathers of birds can be used for decoration. Pearls from oysters are used for making ornaments.

3. People depend on animals in many ways. Some people depend on animals to earn their livelihood. Dairy farmers get milk from cows and buffaloes. Farmers use oxen

for agriculture. Poultry farmers get eggs from hens. Donkeys, mules, elephants and camels are used to carry loads. Horses, cows, buffaloes, oxen and camels are used to draw carts. Silk manufacturers depend on silk worms and wool manufacturers depend on sheep and goats. Fir articles are made from many animal firs. Many animals like snakes, monkeys and bears are used by snake charmers and madaris for entertaining people to earn their livelihood. Many animals like parrots, lions, tigers, horses, bears, monkeys, dogs, elephants etc are trained and used for circus performances.

4. Snake charmer shows his tricks with a snake while animals used by madaris are monkey and bear.

5. Some madaris are cruel to their animals, they sometimes keep the animal hungry or beat the animal to train him. Madaris remove the teeth and nails of bear cubs. They also put a rope in the bear's nostrils which may sometimes choke the bear. Animals are often abandoned by madaris when they get old.

C. This is a picture of a snake charmer. About 10–15 years back it was common to see snake charmers coming to the lane and children crowding around them. They used to come with their cloth covered baskets hanging from bamboo poles slung on their shoulders. A snake charmer opened his basket and roused the snake by playing a flute like instrument called 'been'. The snake appears to dance on the music but scientists say that snakes do not have ears so cannot hear the music. The snake only responds to the movement of the instrument. Snake charmers are a rare sight now-a-days because of strict actions by animal activists and enforcement of strict wildlife laws. Also, it is illegal to keep snakes as pets. The profession of handling snakes by snake charmers was passed on from one generation to the next. However, now the younger generation is no longer interested in this occupation because they cannot sustain their families on such a low income. People, including children have lost interest in the performances of snake charmers as they get to see a lot more on TV channels and they do not have time to spare from their busy schedules.

1. right, 2. wrong, 3. right, 4. wrong.

Formative Assessment

1. Do it yourself
2. Bull fight is being watched in an arena, elephant performance is being watched in a circus and giraffe and chimpanzee are being watched in the zoo.

Chapter 11.

Warm Up Activity

Sense organ used by dogs— nose, snake – skin, insect – antennae

Quiz Time

A snake responds to the movement of the 'been' which he can see. The movement of the snake is a response to a threatening movement of the 'been', the snake rises up in defense and sways as the instrument sways.

Time to think

Animals talk to each other either to warn each other of danger of enemy or inform each other of presence of food. They also express grief, joy and need for excitement.

Quiz Time

Animals that have eyes but no eyelids sleep with their eyes open. For example, fish, all snakes, insects, crabs, shrimps, prawns. Some cattle and rabbit also sleep with their eyes open.

Summative Assessment

A. 1. (b), 2. (elephant), 3. (b), 4. (a), 5. (b)

B. 1. Animals need sense organs to survive in their surroundings. They need to protect themselves from enemies, find food and communicate with each other.

2. Dogs are used in rescue operations because they have a very sharp sense of smell and

can locate things and people with this sense.

3. Bats locate the direction and distance of food through a special sense of hearing called echolocation. They produce sounds that strike an object in their path and echo back. These echoes help the bat in judging the direction and distance of food.
4. Many animals use body movements to communicate. For example, a dog wags his tail to show affection to his master, he barks when an intruder comes in, to warn his master or scare away the intruder.
5. Bats sleep by hanging upside down on branches of trees. Migratory birds sleep while flying.
6. Antennae are a pair of hair like structures on the head of insects. These are helpful because insects can feel their surroundings with help of antennae.
7. Different animals sleep in different ways. Cats and dogs sleep with their eyes closed. Birds sleep while flying. Bat sleeps hanging upside down from branches of trees. Horse sleeps while standing. Dolphin sleeps with one eye open.

C. 1. ant, 2. snake, 3. dog.

Formative Assessment

1. Snake – skin, Tiger – sense of hearing, mosquito – antennae, dog – smell
2. Tiger—
   - ❖ It marks the area with its urine.
   - ❖ Its sense of hearing is very sharp.
   - ❖ Its roar can be heard upto 3 km away.
   - ❖ Its whiskers are very sensitive and can sense the vibrations in air.
   - ❖ It can find us by the smell of our body.
   - ❖ It can see six times better at night than all of us.

Chapter 12.

Warm Up Activity

Act is throwing garbage from the house on the street.

Reason People want to keep their homes clean and do not care for their surroundings.

Suggestion One should throw the garbage in the common large bins kept by the municipality or hire someone to do this job.

Act is A man bathing cattle in a river or pond.

Reason Local water bodies are easily accessible and are free of cost.

Suggestion Take the water from the river or pond in buckets and bathe your animal where waste water does not pollute the main source of water.

Act is emission from cars and factories polluting the atmosphere.

Reason industrialization and increase in traffic.

Suggestion to reduce pollution due to vehicles we can use car pools and get the cars serviced at regular intervals. Factories should be located away from residential units.

Friendly Activity

Who would be exposed to these sounds daily?

Quiet whimper……..all people

Normal conversation…..all those who can hear

Road vehicles…….those travelling on roads particularly if they are walking on roadside

Rock music……. People attending parties with loud music, those going to clubs or youngsters listening to music

Jet planes……people working at the airport or living near it.

Quiz Time

Pollutants are substances that harm or destroy the purity of something.

Time to Think

To keep the environment clean and safe is a collective responsibility because all of us are living in it and using it. A single organization cannot take the responsibility for acts of all people so all people need to contribute to keep the environment clean.

Summative Assessment

A. 1. Main agents of environmental pollution are smoke from industries and vehicles; noise from loud speakers, machines and vehicles; non-biodegradable waste from households and industries; excessive use of pesticides; washing clothes and bathing animals in lakes and rivers; leakage from oil tankers, toxic gases and liquids released in water bodies or air.

2. Land pollution is pollution of soil that reduces or destroys its fertility. It is caused when solid wastes are dumped on land or harmful chemicals get mixed with soil.

3. Causes of land pollution:
   - ❖ Excessive use of pesticides and fertilizers on a piece of land.
   - ❖ Dumping of non- biodegradable industrial and household wastes on land.

4. Noise pollution is caused by pressure of noise in atmosphere. Loud sounds of machinery, vehicles, loud speakers, aeroplanes and loud music cause noise pollution.

5. Noise pollution causes irritation and can cause high blood pressure and loss of hearing power.

6. Water gets polluted due to human activities, industrial and household wastes are released in water, washing clothes and bathing animals in rivers and oil spills from tankers.

7. Global warming is the increase in temperature of earth due to greenhouse effect. Global warming results in increase in average temperature of the earth, melting of glaciers, increase in level of sea water and submergence of low lying areas.

8. We can control pollution by disposing off waste in proper manner, using only the required quantity of pesticides and fertilizers, keeping sources of drinking water clean, disposing wastes in water only after treating them, reducing noise levels and using eco-friendly fuels.

B. Correct matches

Column A	Column B
Major pollutants	e) natural and human activities
Air pollution	a) Respiratory problems
Land pollution	b)infertility of soil
Noise pollution	c) Aeroplane and vehicles
Water pollution	d) typhoid

C. 1. True, 2. False, 3. False, 4. True, 5. True

Formative Assessment

1. & 2. Do it yourself

3. The best way to reduce these causes of pollution is throw the garbage in covered bins. Waste should be separated into bio-degradable and non-biodegradable waste. Biodegradable waste can be dumped in pits for making manure for crops while non-biodegradable waste should be separated into recycled or reused.

Chapter 13.

Warm Up Activity

Mosquito— dengue, malaria
Housefly— diarrhea, typhoid

Quiz Time

Diseases caused by mosquitoes are malaria, dengue, chikungunia, yellow fever and dog heart worm.

Friendly Activity

1. Yes, I have seen many such places.
2. Such places spread foul smell, larvae of mosquitoes breed in such places, insects and germs spread diseases in such areas.
3. Yes, larvae can be seen in stagnant water.

Summative Assessment

A. 1. (c), 2. (b), 3. (a), 4. (c)

B. 1. When mosquitoes bite a person, plasmodium from the mosquito enter the blood of humans and reaches the liver. The plasmodium multiply inside the live

and red blood cells. When the mosquito bites the person again, it sucks the infected blood. This mosquito bites a healthy person and injects infected plasmodium thus spreading the disease.

2. Symptoms of dengue are high fever, headache, joint and muscle pain, vomiting and rashes.
3. Symptoms of malaria are high fever, chills, flu, headache, muscle ache, tiredness, nausea, vomiting and diarrhea.
4. Mosquitoes lay eggs in standing and stagnant water.
5. We can destroy mosquito eggs by spraying DDT or kerosene on standing water, filling the ditches where mosquitoes breed and change the water of room coolers and spray kerosene oil on water.
6. We can protect ourselves from mosquitoes by spraying insecticides or disinfectants, using mosquito nets and mosquito repellants in rooms, wearing clothes that cover our arms and legs and keeping the unscreened doors and windows shut.

C. Do it yourself

D. 1. Mosquito that spreads dengue Aedes mosquito.
   2. Mosquito that spreads malaria female anopheles mosquito.

Formative Assessment

1. Do it yourself
2. Diseases prevalent in slums are typhoid, yellow fever, influenza, diarrhea, malaria, dengue, hepatitis.

3. & 4. Do it yourself

Chapter 14.

Warm Up Activity

Earthquake, Landslide, Flood

Friendly Activity

Landslides occur when mountain masses of rock Earth and debris fall down slippery slopes or river banks. They destroy anything that comes in its path block roads, break lines of communication, affects agricultural production. Landslides are recurring in the Himalayan region.

Quiz Time

In case of an earthquake, I will try and move under a strong table or stand against a corner of a strong wall.

? In case my hand or leg gets burnt, I keep it under running water for 10 minutes and then apply burn-heal ointment.

? Yes, I got stitches on my chin when I fell off a sofa and hit the corner of a table.

Summative Assessment

A. 1. (c), 2. (c), 3. (a), 4. (d), 5. (c)

B. 1. Natural calamities are caused by nature.
   2. A fracture is a crack in a bone.
   3. An earthquake occurs due to sudden movements inside the earth.
   4. Emergency services are provided by hospitals.
   5. During heavy rains, the water level in river starts increasing.

C. 1. Earthquake, tsunami, tornado, floods, famines and cyclones are some natural calamities.
   2. Cyclone refers to any spinning storm that rotates around a low-pressure center called the eye of the storm.

      Precautionary measures before and after a cyclone:

      - ❖ Follow warnings on radio or TV.
      - ❖ Evacuate the area.
      - ❖ If evacuation is not possible secure all the doors and windows.
      - ❖ Keep an emergency kit ready. It should contain a first-aid box, battery operated radio and torch.
      - ❖ When a cyclone hits, turn off electricity and take shelter in a strong part of the house, such as a basement.

- ❖ Move out only when an all clear signal is issued.

3. An earthquake is a sudden movement within the earth's crust which shakes the earth and causes tremors.

   Precautionary measures during an earthquake:

   - ❖ If you are inside a building, stay there and move under a strong table or stand along an interior wall.
   - ❖ Avoid standing near doors, windows, large mirrors, hanging objects and heavy furniture.
   - ❖ If you are outside a building, go to an open area where falling objects are unlikely to strike. Move away from buildings, power lines and trees.

4. We can ensure our safety during floods and tsunamis by following the warnings on radio or television and evacuating the area.

5. The government and NGOs help disaster affected people by arranging rescue operations and providing emergency services in hospitals. Fire brigade and police help them in getting out of affected areas and reaching safer places. They help the affected people by providing them with food, clothes and medicines.

6. We should deal with a disaster bravely. We should not panic and follow the instructions and warnings given on radio or television. We should evacuate the area if possible but it is not possible we should keep a first aid kit ready. We should try to help other affected people by giving them first-aid or helping them to reach safer places.

7. First-aid is the immediate medical help given to a victim before proper medical aid arrives. First aid given in case of:

   (a) **Fracture**: Avoid moving the fractured area. To prevent movement of the area, a splint should be used which can be made with a piece of wood, cardboard or folded newspaper.

   (b) **Nose-bleeding**: Make the victim sit on a chair with head forward and pinch his nostrils for a few seconds. Let him breathe through the mouth.

   (c) **Sprain**: Apply a cold compress made by wrapping ice cubes in a towel. Apply some ointment to the area and then tie a crepe bandage around the sprain for support.

D. A few years back there was a storm that hit Delhi. My uncle lives there. At the time of storm he was driving his car. The wind was so strong that his car was blown off the road. He was lucky that his car landed on a heap of sand. It was stuck there and got covered with more sand. He saw some vehicles flying up and getting stuck in branches of trees. It was a horrible sight with trees getting uprooted and falling, people on the street being blown away and getting injured by flying objects. The storm was strong but lasted only a few minutes. As the wind speed slowed, fire brigade, police men and many people moving around got up and began helping each other. Some people came out from their homes and shoveled the sand off from my uncle's car. They broke open the window and pulled him out. An ambulance was called and my uncle was taken to a hospital nearby. He had suffered two fractures and some minor injuries. The doctors were very helpful and gave him the required treatment.

E. 1. **Natural disaster**: These are sudden natural events that cause a tremendous loss of life and property.

   2. **Floods**: Due to heavy rains or breach in a dam the water level rises and submerges the surrounding areas. This occurrence is called a flood.

   3. **Drought**: A long period of no or low rainfall causing serious shortage of water and food, is called drought. It leads to crop failure and starvation.

   4. **Tsunami**: When severe earthquakes occur under water in oceans, huge waves called tsunamis are produced. These waves may

be as high as 30 meters and travel at speeds between 250 to 900 km per hour; causing destruction in coastal areas.

F. 1. UNICEF: United Nations International Children's Fund

2. UNDP: United Nations Development Programme

3. VIDE: Volunteers of India Development and Empowerment

4. WHO: World Health Organization

5. OXFAM: Oxford Committee for Famine Relief

Formative Assessment

1. Flood prone areas in the world are Guangzhou, Miami, New York, New Orleans, Mumbai, Nagoya, Tampa, Boston, Shenzen, Osaka, Florida, Myanmar, Bangladesh and portions of coastal India.

   Mostly flood prone areas are known so as a precaution people have changed their lifestyle in the following ways:

   - Back flow valves are installed in drains, toilets and sewer connections to prevent flood water from entering.
   - Construction is avoided in low lying areas.
   - In case the place is located near a large water body like a sea, a strong boundary wall is built to keep out the water level on rising. Care is taken to maintain the boundary wall and a watch is kept for cracks or breaches in the boundary
   - In flood prone areas there is a shortage of drinking water so people build strong and high, covered water tanks to ensure sufficient water supply in time of need.
   - Sanitation gets affected very badly during a flood so the drains are built wide and kept clean to allow the free flow of water.
   - Streets are kept very clean so that solid waste materials may not choke the drains meant for draining flood water.
   - Rain water harvesting reduces the load on drains and increases sub-soil water level.
   - Regular inspection and repair of dams and embankments of rivers or canals is done.
   - Afforestation is done where possible or more trees are grown in such areas to bind soil. Trees also reduce the force of charging water therefore reduces the impact on buildings.
   - Storm drains are built in low lying areas which are covered with mesh so that only water flows through and not debris or leaves.
   - Houses in low lying areas build high embankments near the streets so that water from streets does not flow to houses quickly.
   - People keep high boots handy so that when they walk in water the chances of snake bites and injury by flowing objects is reduced.
   - Sometimes flood waters are diverted towards less populated areas.
   - Dams are constructed in such areas.
   - Beaches are made more wide so that they may absorb the impact of flood water due to increase in sea level.
   - People keep themselves informed about evacuation routes, location of emergency shelters, warning signals and community's emergency plans.
   - People keep power back-ups, pumps for draining out water and fire extinguishers in homes and work places.

   Drought prone areas in the world are Ethiopia, Eritrea, Somalia, Sudan, Uganda, Afghanistan, China (northern Shanxi), Iran, Morocco, parts of India (high probability regions are Kutch region of Gujarat and western part of Rajasthan. Low probability regions are adjoining parts of Punjab, Haryana, west Uttar Pradesh, west Madhya Pradesh, middle portion of Maharashtra, interiors of Karnataka, south Telengana region, small portion of north-

east Bihar, adjoining portion of west Bengal), Pakistan (Baluchistan, Thar desert located beyond the left bank flood plains of the Sutluj and Indus Rivers), Bangladesh (sylhet region, Bogra and Noakhali), and Sri Lanka.

Drought prone areas are known, so as a precaution people have changed their lifestyle in the following ways:

- Conservation of surface water is given a priority.
- Water is used stringently by people. Wastage of water is strictly controlled and water rationing is taken up.
- Rain water harvesting and recycling of water is being adopted by people for conservation of water.
- Low dams and water reservoirs are constructed in these areas.
- Watershed management is being introduced at village level. Drop irrigation system and lift irrigation systems have been introduced in many areas.
- Authorities make programmes for development of ground water resources in these areas.
- Proper selection of crop is done for drought-affected areas. For example, farmers in Sri Lanka grow short-term paddy varieties in low lands and drought resistant crops in uplands.
- Improved and modern storage facilities are used for storing grain.
- Buffer stocks of food grains are kept by the government authorities.
- Export and import of essential commodities is regulated strictly.
- Fire-wood cutting and deforestation are not allowed in these areas. Growing more trees is encouraged. Tree plantation programmes are taken up.
- Alternate employments like handicraft industries and cottage industries are encouraged.
- Water resource systems, distribution of food and water systems and improvement of irrigation systems are given top priority in planning and execution in these areas.
- During drought periods, the authorities declare the region as "drought prone area". This declaration exempts people of paying land revenue and authorities maintain a regular supply of food and fodder.

2. Do it yourself
3. 1. Landslide, 2. Cyclone, 3. Earthquake, 4. Drought, 5. Flood

Chapter 15.

Warm Up Activity

Rag pickers, sewer cleaner

Yes, we have seen many such people around. Rag pickers often wander around on streets picking up paper and cans etc. from road sides or garbage heaps. Sewer cleaners are seen to clean sewer lines.

Friendly Activity

Dirty work: cleaning toilets, collecting garbage, washing clothes, washing utensils, sweeping and mopping, cleaning drains, serving food to people, clearing and cleaning tables.

Clean work: doctor, engineer, bank officer, administrative work in offices, running own shop, business or factory.

Some jobs are considered dirty because they involve work where one has to clean other person's dirt or filth like cleaning toilets, sweeping roads, clearing drains etc.

Summative Assessment

A. 1. (b), 2. (c), 3. (a), 4. (c), 5. (b)

B. 1. Work is an activity taken up by an individual.

2. People work for money, job satisfaction, social welfare, community service, to keep busy, for security or to meet and communicate with people.

3. Job satisfaction is a sense of achievement that makes one feel good about ones' self.

4. Any work done with a sense of shame will not be respected by yourself and others. Such work will not be performed satisfactorily.
5. Government provides loans, education and jobs to people of lower caste in the society.
6. Dignity of labour means to respect people all people who do any kind of work.
7. There are many jobs that people do for us like cleaning toilets, sweeping and mopping the floors, removing garbage from our houses and work places, washing utensils, washing clothes and polishing shoes.

C. 1. False, 2. True, 3. False, 4. False, 5. True, 6. False, 7. True, 8. True

D. 1. Sweeping roads— sweeper, 2. Collecting garbage— sweeper, 3. Delivers newspaper— delivery boy, 4. Irons your clothes— dhobi, 5. Mends your shoes— cobbler, 6. Examines you when you are sick— doctor, 7. Brings milk to your door— milkman.

Formative assessment

1. The woman's behavior is not correct because maid is working to earn money and she deserves the same respect which others get.
2. I interviewed a sweeper, a housemaid, a rag picker, a toilet cleaner and a waiter in a restaurant. I asked each why they do jobs of this kind. The sweeper and toilet cleaner told me that their forefathers did this work and now they don't know any other work so they are doing it. The housemaid, rag picker and waiter told me that they do this work because they are not educated or trained for any other profession. They have the capability for this work and had an opportunity to do it. All of them said that they are working to support their families. All of them said they are not respected by people around them however attitudes are changing with time. The younger people respect them to some extent. They said that with their work they are contributing to the society by maintaining cleanliness around them. If they gave up their work lives of people will not function smoothly.
3. Most of the people in our country treat some jobs as dirty as its origins are deep rooted. In Indian society the society was divided into caste system from ancient times. The upper castes were considered superior and were not supposed to do any cleaning work. The lower castes were assigned the job of serving the upper castes. In some Indian societies divisions were caste based while in other communities there were also divisions based on financial status of rich and poor. The discrimination on basis of work is so deep rooted that even in present times the dignity of labour is not there. Some jobs are still considered dirty. The government has made laws and socially the trends are changing but they have not been totally changed. These trends do not exist in European countries and America. All work is respected and you can see a waiter or a garbage collector enjoying a meal in the same restaurant with an industrialist. They are not ashamed of doing the work they get.
4. & 5. Do it yourself

Chapter 16.

Warm Up Activity

Local Games	Martial Arts	Field Games
Vallam Kali, Chess, Mallakhamb, Scrabble, Kabaddi, Hopscotch, Gulli-danda	Thang-da, Karate, Kalaripayattu, Thoda, Silambam	Cricket, Hockey, Tennis, Volleyball, badminton

Friendly Activity

Hopscotch, Skipping, Kho-kho

Quiz Time

Martial art traditionally popular in Punjab is 'Gatka'.

Summative Assessment

A. 1. Hu tu tu– (d) Maharashtra
   2. Do do– (c) Nepal
   3. Guddo– (a) Sri Lanka
   4. Hadudu– (b) Bangladesh

B. 1. Local games that are mostly played in villages are kikli, hopstoch or stapoo,

marbles, kabaddi, seven tiles and gulli danda.

2. My favourite local game is kikli.
3. Wrestling is a modern name for traditional game of kushti.
4. Nats are acrobats. They can be men, women or children showing various acts of gymnastics like walking on a tight rope by balancing with help of a pole. Nats perform on roadsides and survive on money given to them by the onlookers.
5. Every year on Onam festival a boat race called Vallam Kali is organized. It is a huge snake shaped boat which is rowed by about 150 oarsmen. This boatrace has become a tourist attraction.
6. Martial arts means art concerned with waging a war. It refers to a sport in which fighting and defense skills are tested. Performers use their face and body as a medium to perform. Internationally popular martial arts are judo and karate. Indian martial arts are kalaripayattu, thoda, silambam, cheibigad-ga and thang-da.

C. 1. Archery– It is practiced with a bow and arrow which were the weapons used earlier as weapons of self-defense and hunting. Now archery is practiced as a sport which has been included in Olympic games since 1972.

2. Kabaddi– It is an ancient game played between two teams of seven to nine players each. It is a game requiring skill and power of holding breath along with strength.
3. Wrestling– It is the modern version of a traditional Indian sport called kushti. In this game two opponents face each other in a physical battle of strength, trying to pull the opponent down on ground.
4. Chess– This is board game that was played in ancient times to divide land among the clans. Now it tests the skills of brain, tactics and patience.
5. Kho-kho– It is a simple and enjoyable game. It is played between two teams of 12 members each, who avoid being touched by a member of the opponent team.

Formative Assessment

1. Manipur– Thang-da, Tamil Nadu– Silambam, Kerala– Kalaripayattu.
2. Children and youngsters used to get together and play the local games together but these days interests of children and youngsters have changed to indoor sports, computers, computer aided games and sports that are internationally recognized. Children and young people don't get time to play in localities now. For these reasons local games are neglected by people.

Chapter 17.

Warm Up Activity

Means of transport that do not need fuel to run are– camel cart, rickshaw.

Friendly Activity

1. LPG, 2. Petrol, diesel. 3. Kerosene

Summative Assessment

A. 1. (c), 2. (b), 3. (b), 4. (b)

B. 1. Fossil fuels are fuels that are non-renewable and take millions of years to form. They are exhaustible. For example, coal and petroleum.

2. Fossil fuels were created from deposits of plants and animals that got buried millions of years ago.
3. Coal is produced by mining. It is extracted from deposits under the earth. It was formed in millions of years due to heat and pressure acting on buried plant and animals.
4. Petrol, diesel and kerosene are used as fuels. Kerosene is used in lighting lamps and in cooking stoves. Petrol is used for running vehicles like cars, scooters, motorcycles, aeroplanes etc. and for machinery in factories. Diesel are used in cars as well as trucks, tractors and buses and also for

running generators.

5. We get petrol and diesel for our vehicles from petrol pumps.
6. We can save fuel by switching off the engine of the vehicle at red lights of long duration. We should use public transport systems like buses, autos and metros instead of private transport like car, scooter and motorcycles. We should walk or use bicycles for travelling short distances. The vehicles should be well maintained and we should prefer using eco-friendly fuels. All gadgets like fans, lights, television should be switched off when not required.

C. 1. Renewable sources of energy are those sources which have ample supply of raw material and can be replenished easily like solar energy, bio-gas, wind energy and electricity. Non-renewable sources of energy are those sources which can't be renewed or replenished easily. It takes millions of years to form them and they are exhaustible resources like coal and petroleum.

2. CNG is natural gas used in vehicles in the form of compressed natural gas (CNG). It is known as green fuel and is clean and eco-friendly. LPG is also a form of natural gas in the form of liquid petroleum gas which is used in homes for cooking.

D. 1. CNG is being encouraged for use in vehicles because it is a clean fuel and on burning it does not emit harmful gases. It is an eco-friendly fuel.

2. Prices of petrol and diesel are rising up because these are exhaustible fuels with limited supply but increasing demand. As lesser amounts remain, high prices control their use.

E. Do it yourself

Chapter 18.

Warm Up Activity

Jantar Mantar, Purana Quila, Red Fort, Qutub Minar, Tomb of Nizamuddin Auliya, Humayun's Tomb.

Friendly Activity

1. Meenakshi Temple, 2. Gol Gumbaz, 3. Red Fort

Summative Assessment

A. 1. (c), 2. (c), 3. (b), 4. (b), 5. (a), 6. (c)

B. 1. Monuments are called so because they are a reflection of the architectural style of the period they were built in. They depict the social, political, religious and cultural life of people of that era.

2. We need to preserve our heritage buildings because they tell us about our past culture, beliefs and life of people and art of that period.

3. Shah Jahan built the Taj Mahal in memory of his beloved wife, Mumtaz Mahal. Taj is among the wonders of the world. It is located on the banks of River Yamuna in Agra, in Uttar Pradesh. It is known for its beauty and as the jewel of Muslim art in India. It was completed in 22 years by 20,000 craftsmen. Its beauty is beyond description and it shines like a diamond on a full-moon night. It is made of white marble standing on a square plinth and consisting of a symmetrical building with an arch-shaped doorway topped by a large dome and finial. The tomb is the central focus of the entire Taj Mahal complex surrounded by gardens laid in geometrical designs.

   It has four minarets, one at each corner of the plinth. The dome is onion-shaped and decorated with a lotus design. The decorative elements were created by paint, stucco, carvings, stone inlays of semi-precious and precious gemstones and passages from Quran.

4. Construction of Qutub Minar was started by Qutub-ud-din Aibak in 1193 and completed by Iltutmish. The monument is 70 meters high and has steps from top to bottom. It is the highest stone tower

in India. It is made of red sandstone. The minar is divided by projecting balconies which are decorated with honeycomb design.

5. Sun Temple is situated at Konark in Odhisa. It was built by Ganga King Narsimha Deva— I in the thirteenth century. The temple shows the chariot of Sun God pulled by seven carved horses representing seven days of the week. There are two rows of twelve wheels which represent time, unity, justice, perfection and completeness. This monument is known for its splendid architecture and sculptures of gods, goddesses and animal figures with floral or geometric designs.

6. Charminar is situated in Hyderabad city in Andhra Pradesh. It is a gateway with four towers. It is a splendid piece of architecture which is four hundred years old. It was built in 1591 by Quli Qutub Shah to celebrate the eradication of plague epidemic from the city. It is built with granite, lime and mortar and looks very beautiful when illuminated at night.

7. Hawa Mahal is designed to allow free flow of cool breeze through its rooms. Sawai Raja Jai singh built Hawa Mahal for the royal family to live there in hot summers of Rajasthan.

8. (a) Golden Temple is the holy place of Sikhs located in Amritsar, Punjab. It is also known as Harmandir Sahib. The construction of the gurudwara started under the fourth Sikh guru, Guru Ram Das, and was completed by his successor, Guru Arjan Dev. The foundation stone was laid by a fakir, Mian Mir. The domes of the temple are covered with gold. Maharaja Ranjit Singh did this sewa of gold plating the domes.

   (b) Victoria memorial is made of white marble and is situated in Kolkata. It was built in memory of Queen Victoria. Its artistic collections depict the story of British rule in India.

9. Ajanta and Ellora caves found in Aurangabad are famous Buddhist relics. The walls of these caves are covered with paintings depicting life of Lord Buddha. The most famous temple here is Kailash temple which is built out of a single rock.

10. To protect these monuments we should not damage or harm the structure in any way. We should not scribble on the walls, or throw garbage in or around the monuments. We should cooperate with the caretakers of the building and inform them if someone is trying to harm the building.

C. 1. Taj Mahal, 2. Ajanta and Ellora caves, 3. Qutub Minar, 4. India Gate, 5. Fatehpur Sikri, 6. Ashoka Pillar

D. 1. We should not remove anything— (b) from the walls of a monument.

   2. We should not scribble— (a) on the walls of a monument.

   We should not throw garbage— (d) inside the monument.

   We should give our cooperation— (c) in keeping the monument neat and clean.

Formative assessment

1. Red Fort, Taj Mahal, Qutub Minar, Meenakshi Temple, Gol Gumbaz, Victoria Memorial, Sanchi Stupa, Ajanta Ellora, Hawa Mahal, Golconda Fort.

2. Jantar mantar in Delhi was constructed in 1724 by Maharaja Jai Singh of Udaipur. It was an astronomical observatory built by him with other observatories he built in Ujjain, Varanasi and Mathura. He was given the task of revising the calendar and astronomical tables by Mughal Emperor Mohammad Shah. The primary purpose of the observatory was to compile astronomical tables, predict the movements of Sun, moon and planets. He found the existing astronomical instruments very small to take exact measurements so he built these larger

and more accurate instruments. It consists of thirteen architectural astronomy instruments. Now the exact measurements cannot be taken because of the tall buildings around it.

3. It is important to protect our heritage buildings because we learn a lot about history, culture, style of living, architecture, religious and cultural practices, beliefs and art of the era in which they were constructed. These buildings tell us a story of their times. With time these structures will be destroyed if they are not protected. We can make people aware by holding discussions and debates on television, organizing contests and essay writing competitions in schools and including them in educational syllabus.
4. The Kabba—Kabba is a cuboid shaped building in Mecca, Saudi Arabia. It is the most sacred site in Islam, oldest and top the most famous monuments in the world. The Quran states that the Kabba was constructed by Abraham (Ibrahim in Arabic) and his son Ishmael after the latter had settled in Arabia. The building has a mosque built around it, the Masjid al-Haram. All Muslims around the world face the Kabba during prayers. This is called Qiblah. One of the five pillars of Islam requires every Muslim to perform the Hajj pilgrimage at least once in their lifetime.
5. The Egyptian Pyramids— These are ancient pyramid shaped masonry structures located in Egypt. There are 138 pyramids discovered in Egypt by 2008. Most were built as tombs for Egyptian Pharaohs or kings during old and middle kingdom periods. These are some of the oldest cultural monuments. The earliest pyramid is the pyramid of Djoser (constructed 2630 – 2611 BCE) and was designed by the architect Imhotep.

Chapter 19.

Warm Up Activity

These are pictures of Edmund Hillary and Tenzing Norgay. They are famous because they were the first men to reach the summit of Mount Everest.

Friendly Activity

1. Crampons are special climbing boots to give a grip on snow and ice.
2. Ice axe is used for digging and breaking ice.
3. Harness helps to keep safe by attaching the mountaineers to each other.
4. Carabineer is a metal loop used as a connector.
5. Snow goggles protect eyes from snow.
6. Helmet is used to keep safe from falling rocks and stones.

Time to think

People make such difficult trips to satisfy their urge for adventure.

Quiz Time

The countries whose flag has scaled Mount Everest are Nepal, United States, Japan, India, United Kingdom, New Zealand, Italy, Austria, France and Poland.

Time to Think

When Mrs. Indira Gandhi asked Rakesh Sharma how India looked from space, he said, "Saare jahaan se accha".

Summative Assessment

A. 1. (a), 2. (b), 3. (c), 4. (c)

B. 1. People take up adventurous activities because they find them exciting.

2. The difficulties mountaineers have to face are rough paths, cliffs and avalanches on the way. The main danger is from falling rocks, falling ice blocks, snow storms, rain and lightning. The air pressure is very low so they have to carry load of oxygen cylinders. Low air pressures cause altitude sickness, breathlessness and tiredness to climbers.

3. Bachendri Pal was the first Indian and fifth woman in the world to climb Mount Everest in 1984. She also climbed the Gangotri and Rudragaria peaks before Mount Everest. She trekked ahead while climbing Mount Everest in spite of injuries on her head at

the height of 24,000 feet; when all her male counterparts headed back. She climbed an altitude of 4000 m at the age of 12. She was the first girl in her village to acquire M.A. in Sanskrit and B.Ed. degree. She was judged the best student at Nehru Institute of Mountaineering. She received Padmashree and Arjuna award.

4. Mountaineers need very good footwear to give them a grip on slippery snow. They need good ankle support to climb.
5. Kalpana Chawla and Sunita Williams both are of Indian origin and both were American citizens and astronauts who went into space.
6. People who go out into space are called astronauts.

C. Sleeping bag, oxygen cylinder, snow goggles, rope, ice axe, piton, harness, crampon.

D. 1. False, 2. True, 3. False, 4. False, 5. True.

Formative Assessment

1. Adventure activities are important as inculcate many positive characteristics in a person. They train a person to remain calm, disciplined and take sensible decisions in difficult situations. These activities train the person physically and mentally. Such activities bring you closer to nature and reality of human nature.
2. Bachendri Pal (compiled from various sources)– Bachendri Pal was born in May 24, 1954 in a village called Nakuri in Garhwal to parents— Shri Kishan Singh Pal and Smt. Hansa Devi. Her father was a border tradesman who supplied groceries from India to Tibet. From her early childhood, Bachendri Pal was a strong-spirited child, full of zip and excelled in both academics and sports. It was at the initiation of her school principal that she was sent to college for higher studies. There she actively participated in sports and even bagged a gold medal in rifle shooting. Bachendri Pal went on to become the first girl to graduate from her village. Later on, she completed her M.A. in Sanskrit and then went on to complete her B. Ed. Driven by her passion for adventure; she enrolled in the Nehru Institute of Mountaineering, which opened a whole slew of avenues for her. Bachendri Pal got her first taste of mountaineering thrill while still at school, at the age of 12, when she along with her friends scaled a 13,123 ft. high peak during a school picnic. In 1982, during her course at Nehru Institute of Mountaineering, she got the chance to mount Gangotri I (21,900 ft.) and Rudugaria (19,091 ft.). It was during this time, she got the job of an instructor at the National Adventure Foundation, an adventure school for women mountaineers. Soon after the completion of her mountaineering course, she got the chance to join the fourth expedition team headed for India's Mount Everest Mission, the Everest-84. She along with her team members commenced their climb on May 1984. However, a sudden landslide at Lhotse glacier left her and her team members injured. However, Bachendri Pal remained undeterred and continued her climb until she reached the peak of the Everest on 23 May 1984 at 1:07 p.m., thereby becoming the first Indian woman in the world to climb the Mt. Everest. Presently, she is working as the Chief of Adventure Programs of Tata Steel Adventure Foundation of Tata Group. There she gives training to the management teams to bolster up their team spirit by teaching them skills to survive in challenging situations.

Awards and Accolades: Bachendri Pal had bagged several awards and recognitions during her mountaineering career. In 1984, she received the first Gold Medal closely followed by a Padmashree in 1985 and the Arjuna Award in the year 1986. In 1990, her name was listed in the Guinness Book of World Records for being the first Indian women to summit the Mt. Everest. She received the National Adventure Award in 1994 and a prestigious Yash Bharati Award from the Uttar Pradesh Government in 1995. In 1997, she received the honorary D.Litt. from the University of Garhwal and was also honored with the prestigious Mahila Shiromani Award. It was in

this year that her name entered the Limca Book of Records. Contribution Apart from training corporate and scaling great heights, Bachendri Pal has made significant contribution in training women in mountaineering and river rafting. In 1985, Bachendri led an Indo-Nepalese Everest Expedition women's team. This expedition made seven world records and created a benchmark in Indian mountaineering. In 1993, she organized the Indo-Nepalese Women Everest Expedition and in 1994, she took part in the River Ganga Rafting Expedition from Haridwar to Kolkata. She also led the First Indian Women Trans-Himalayan Expedition including eight women, covering 4,500 km trek via Siachen Glacier.

Apart from this, Bachendri Pal also works as an active guide, training women in mountaineering and river rafting.

3. The patterns made by stars in the night sky are called constellations. The sky was divided up into 88 different constellations in 1922. This included 48 ancient constellations listed by the Greek astronomer Ptolemy as well as 40 new constellations.

   Some famous constellations are:

   (a) **Orion:** Orion is one of the most visible constellations. Because of its location, it can be seen throughout the world. Orion is named after a hunter from Greek mythology.

   (b) **Ursa Major:** Ursa Major is visible in the northern hemisphere. It means "Larger Bear" in Latin. The Big Dipper is part of the Ursa Major constellation. The Big Dipper is often used as a way to find the direction north.

   (c) **Ursa Minor:** Ursa Minor means "Smaller Bear" in Latin. It is located near Ursa Major and also has the pattern of a small ladle called the Little Dipper as part of its larger pattern.

   (d) **Draco:** The Draco constellation can be viewed in the northern hemisphere. It means dragon in Latin.

   (e) **The Zodiac:** The zodiac constellations are the constellations that are located within a band that is about 20 degrees wide in the sky. This band is considered special because it is the band where the Sun, the Moon, and the planets all move. There are 13 zodiac constellations. Twelve of these are also used as signs for the zodiac calendar and astrology.
   - ❖ Capricornus
   - ❖ Aquarius
   - ❖ Pisces
   - ❖ Aries
   - ❖ Taurus
   - ❖ Gemini
   - ❖ Cancer
   - ❖ Leo
   - ❖ Virgo
   - ❖ Libra
   - ❖ Scorpius
   - ❖ Sagittarius
   - ❖ Ophiuchus

4. Rakesh Sharma (Information collected from various sources)

   Career: Test Pilot and Cosmonaut

   Early Life: On January 13th 1949, Rakesh Sharma was born in the district of Patiala located in the state of Punjab. He received his early education from St. George's Grammar School in Hyderabad. In 1966, he joined National Defense Academy as an Air Force plebe. Rakesh proved to be a focused and dedicated student and by 1970, he was commissioned into the Indian Air Force to become a pilot.

   Career: In 1970, after joining the Indian Air Force as a test pilot, his passion for flying opened up several opportunities such as being a part of war operations against Pakistan. He flew various Mikoyan-Gurevich aircrafts starting from 1971. Rakesh swiftly progressed through many levels and in 1984 he was appointed as the Squadron Leader and pilot of the Indian Air Force. After some years, he was asked to go on an extraordinary mission as a combined space program between Indian Space Research

Organization and the Soviet Intercosmos. He spent eight days journeying around the Earth's orbit in a space station called Salyut 7. The flight Soyuz T-11 also carried two other astronauts from Soviet Union. On 3rd April 1984 when the space flight took off, Rakesh had made history by being the first Indian to travel in space. His responsibilities included capturing multi-spectral images of the Northern part of India with a view to construct a hydroelectric power station close to the Himalayas. In an interview to the press, he described this experience as the best feeling ever. Rakesh also said that the space venture involved rigorous training (zero gravity exercises) for him and Rakesh Malhotra, his colleague. A few years later he retired from the Indian Army as a Wing Commander to become a part of Hindustan Aeronautics Limited (HAL) as a test pilot. He was posted in the Nashik Division. He then shifted to National Flight Test Center (NFTC) in Bangalore and began to work on Light Combat Aircraft program, along with a few others. In 2006, Sharma took part in a conference involving a gathering of the best scientists of ISRO, who were responsible for one of India's space missions. Currently, he has retired from his services and is now the chairperson for the Automated Workflow.

Awards and Accolades: Apart from the first Indian to be on space, he has been awarded by the Government for his gallantry on successfully completing the given mission. The Hero of Soviet Union and the Ashoka Chakra Award were two of the accolades given to honor his courageous deeds.

Kalpana Chawla

Early Life: Kalpana Chawla was born on the 1st of July, 1961 in a small town in Karnal located in the state of Haryana. Her parents, Banarasi Lal Chawla and Sanjyothi had two other daughters named Sunita and Deepa and a son named Sanjay. Kalpana was the youngest in her family. She got educated at the Tagore Public School and later enrolled into Punjab Engineering College to complete her Aeronautical Engineering Degree in 1982. In the same year, she moved to the US. She got married to Jean-Pierre Harrison in 1983. In 1984, she completed her M.S. in Aerospace Engineering from the University of Texas in Arlington. In 1988, she obtained a Ph.D. in the same subject from the University of Colorado at Boulder.

Career: Kalpana Chawla was a certified flight instructor who rated aircrafts and gilders. She also held a commercial pilot license for single and multi-engine airplanes, hydroplanes and gliders. Kalpana was a licensed Technician class Amateur Radio person certified by the Federal Communication commission. Owing to her multiple degrees in Aerospace, she got a job in NASA as the Vice President of the Overset Methods, Inc. in 1993. She was extensively involved in computational fluid dynamics research on Vertical/Short Takeoff and Landing. It was not until 1995 that she became a part of the NASA 'Astronaut Corps'. Three years later, she was selected for her first mission i.e. to travel around the Earth in a space shuttle. This operation consisted of six other members. Kalpana was responsible for organizing the Spartan Satellite but she was unsuccessful in her role due to its malfunction. It was found that due to technical errors, the satellite defied control of ground staff and flight crew members. Following this, she was vindicated. On the other hand, Kalpana Chawla created history for being the first Indian woman to travel in a space shuttle. She had the privilege of journeying as far as 10.4million km. This approximately adds up to 252 times around the Earth's orbit that comprised of 372 hours in space. After the Spartan Satellite incident, she was given a technical position. Her excellent work was recognized and awarded. In 2000, she was again assigned on her second flight mission as a part of Flight STS-107. Kalpana's responsibility included microgravity experiments. Along with her team members, she undertook a detailed research on advanced technology development, astronaut health & safety, the study of Earth

and space science. During the course of this mission, there were several mishaps and cracks were detected in the shuttle engine flow liners. This delayed the project until 2003.

Death: It was on February 1st 2003 that the space shuttle, STS-107, collapsed over the Texas region when it re-entered the Earth›s atmosphere. This unfortunate event ended the lives of seven crew members including Kalpana.

Achievements and Accolades: Despite living in America, Kalpana Chawla was considered the pride of India. She was the first Indian woman to travel in a space shuttle for 372 hours and complete 252 rotations around the Earth's atmosphere. Her achievements have been an inspiration to many others in India and abroad. There are many science institutions named after her. During her lifetime, Kalpana Chawla was awarded with three awards namely the Congressional Space Medal of Honor, NASA Space Flight Medal and the NASA Distinguished Service Medal.

Sunita Williams

She was born on September 19, 1965 in Euclid, Ohio, but considers Needham, Massachusetts to be her hometown. She was married to Michael J. Williams. They have no children. Her parents, Dr. Deepak and Mrs. Bonnie Pandya, reside in Falmouth, Massachusetts.

Education: Needham High School, Needham, Massachusetts, 1983. B.S., Physical Science, U.S. Naval Academy, 1987. M.S., Engineering Management, Florida Institute of Technology, 1995.

Special honors: Awarded Navy Commendation Medal (2), Navy and Marine Corps Achievement Medal, Humanitarian Service Medal and various other service awards.

Experience: Williams received her commission as an Ensign in the United States Navy. Williams was selected for United States Naval Test Pilot School. She was deployed onboard USS Saipan when she was selected for the astronaut program.

She has logged more than 3000 flight hours in over 30 different aircraft.

NASA experience: Selected by NASA in June 1998, she went through rigorous training. She also holds the record total cumulative spacewalk time by a female astronaut. In addition, Williams, who has spent a total of 322 days in space on two missions, now ranks sixth on the all-time U.S. endurance list, and second all-time for a female. Sunita Williams has worked in Moscow with the Russian Space Agency on the Russian contribution to the International Space Station (ISS) and with first Expedition Crew to the ISS. After the return of Expedition-1, Williams worked within the Robotics branch on the ISS Robotic Arm and the follow on Special Purpose Dexterous Manipulator.

Sunita Williams currently lives and works aboard the International Space Station.