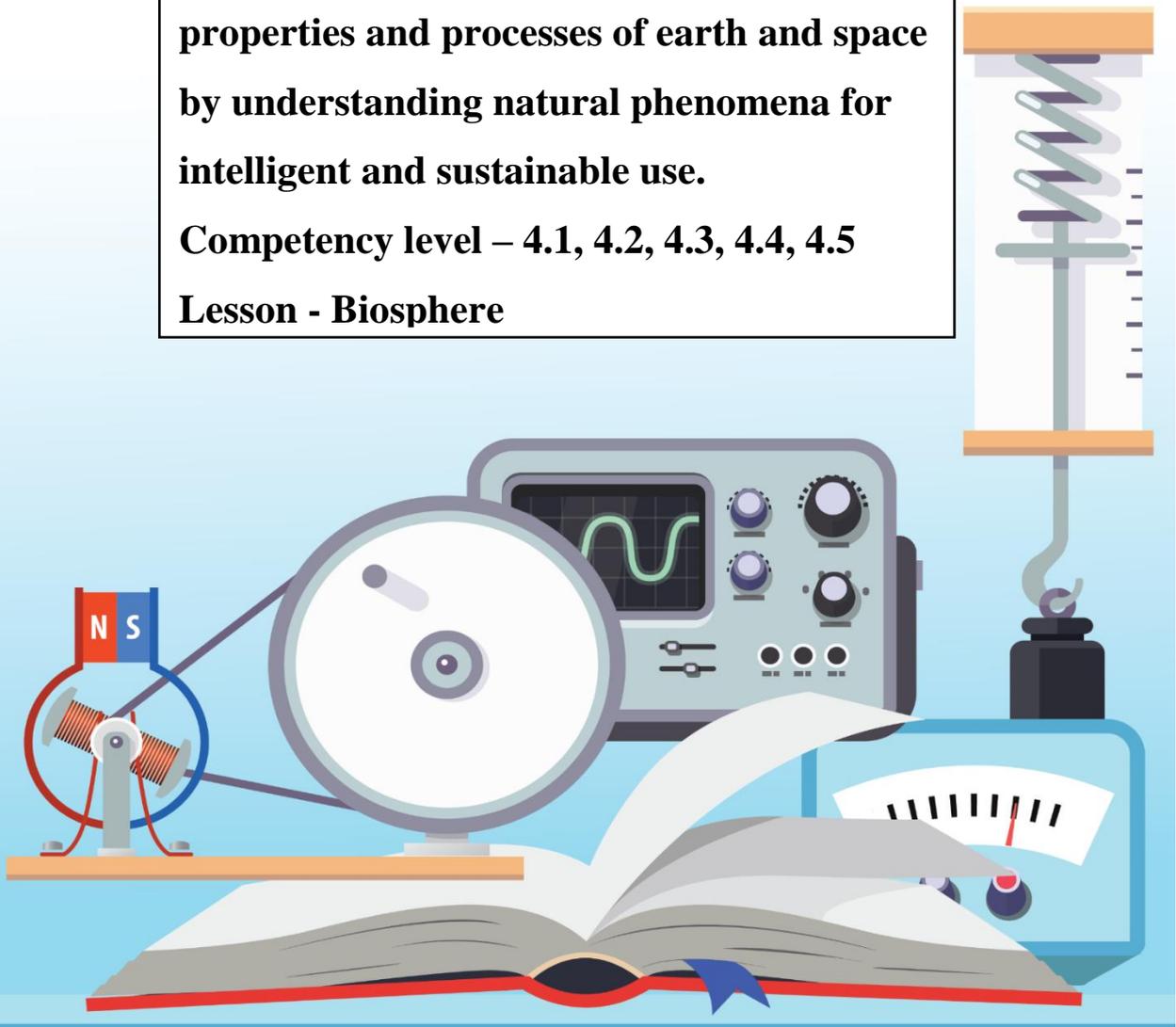


Science - Grade 11

Competency - explores the nature, properties and processes of earth and space by understanding natural phenomena for intelligent and sustainable use.

Competency level – 4.1, 4.2, 4.3, 4.4, 4.5

Lesson - Biosphere



Content - Organizational levels and interactions of biosphere, the equilibrium of ecosystems, environmental pollutants, sustainable development and environmental management

Prepared by – Provincial Department of Education, North Western Province

Subject - Science

- This is a self-study lesson pack prepared for you, who are studying in grade 11.
- When utilizing this lesson pack, it is compulsory to use the text book.
- You can answer the questions given here using the text book
- The activities which are mentioned, should be done by you and observations, data.etc. must be recorded.
- Ordinary level past paper questions and some other questions are given relevant to the lesson. Answer those questions individually.
- You may get good results by studying this lesson pack repeatedly.

Competency level- 4.1: Investigates the organizational level of the biosphere and interactions existing with it.

Organizational levels of the biosphere and interaction

LET'S IDENTIFY THE ENVIRONMENT

The physical and the biological components in which interactions takes place for the existence of organisms is the environment

1. What are included into the physical component of the environment?

2. What are included into the biological components?

3. What are considered as the environmental conditions?

4. Explain "Environmental equilibrium".

• **The organizational levels of the biosphere**

The organisms in the biosphere are organized from the simplest level to the complex level

Individual → Population → Community → Ecosystem → Biosphere

1' Describe following terms. State a feature of each level and give three examples.
(text book-2, 168-169 pages)

| Organizational level | Description | Feature | Example |
|----------------------|-------------|---------|---------|
| Individual | | | |
| Species | | | |
| Population | | | |
| Community | | | |
| Ecosystem | | | |
| Biosphere | | | |

● ACTIVITY

Select a particular location in your home garden and prepare a report about individuals, living species, physical components, environmental conditions, living populations, non-living interactions of that specific environment.

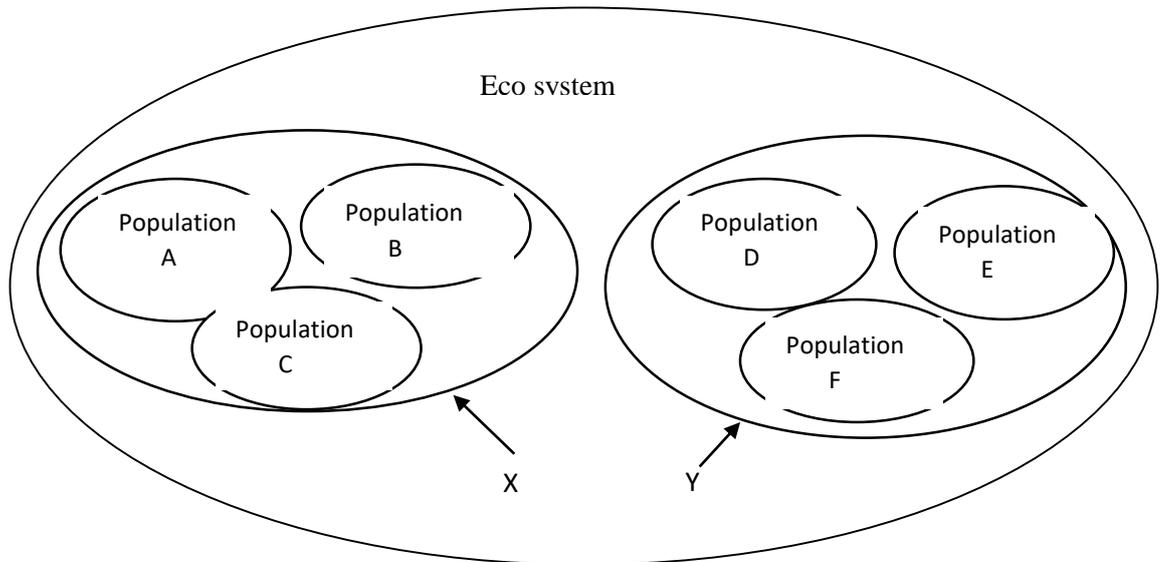
1. "Population" is defined accurately ,

- (1) All the communities and the non-living components which they interact in a particular area.
- (2) The region where living beings spread on the earth.

(3) An organism which hunt other organisms.

(4) A group of organisms belong to the same species in a particular geographical location.

(2011)



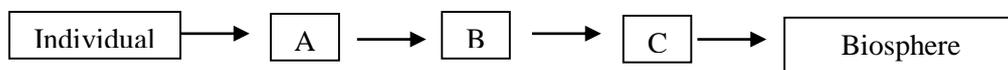
2. How certain organizational levels are arranged is given in the diagram'

(1) What is the organizational level given as X and Y letters? (2)

What are the features of a population?

(3) Write an example to indicate the features of a population? (2012)

3. The organizational level which is found in the environment of a home garden is shown from the simplest level to the complex level is given in the diagram'



(1) Name the organizational levels A, B and C are given here'

(2) The number of elephants lived in yala sanctuary in 2010" is an example for which level of organization out of them? (2013)

4. According to the organizational levels of the biosphere, the "paddy field" belongs to which organizational level ?

Growth of population and growth curve

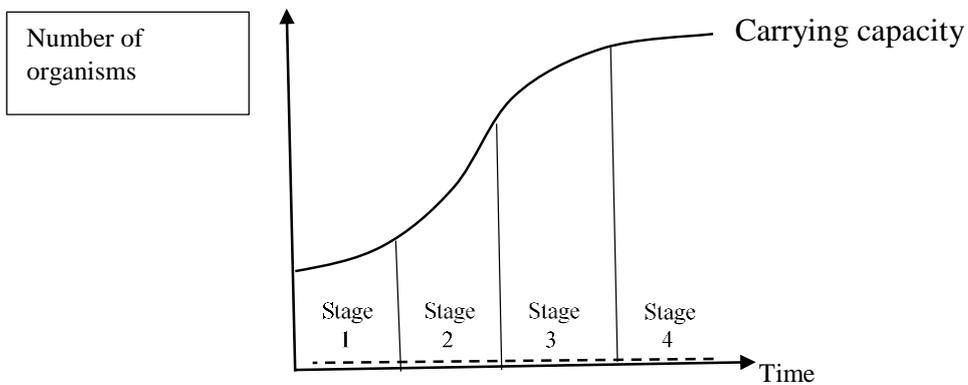
The number of organisms of a species, living in a unit area of selected habitat is called the “population density”

1. Write an example for population density.

2. What are the four factors which affect population density? (Text book - 2 169 page)

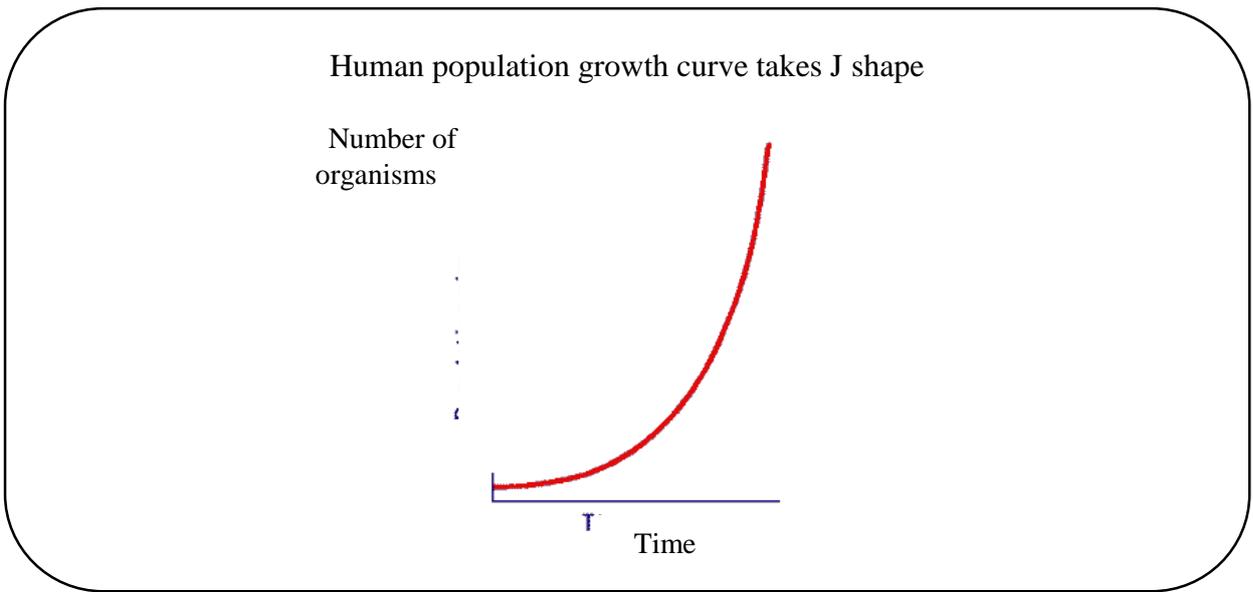
Typical growth curve of population

The number of organisms in a natural population changes with time according to a particular pattern. When this pattern is expressed in a graph it will be a sigmoid shaped (S shaped) growth curve . There are 4 main phases in it.



3. Name the main stages given here and analyze them. (Text book- 2 - 170 page)

| Stage | Name of the stage | Reason for the shape of the curve |
|-------|-------------------|-----------------------------------|
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |



4. State two main factors which have affected for rapid growth of human population.

.....

.....

5. State other factors which have affected for rapid growth of human population

.....

.....

● **Exercises**

1. Describe global ill effects due to the rapid growth of human population under following headings.

(1) Environmental problems

(2) Social problems

(3) Power crisis

2. Following is a growth curve of a population.

The completion among the organisms of population is minimum at

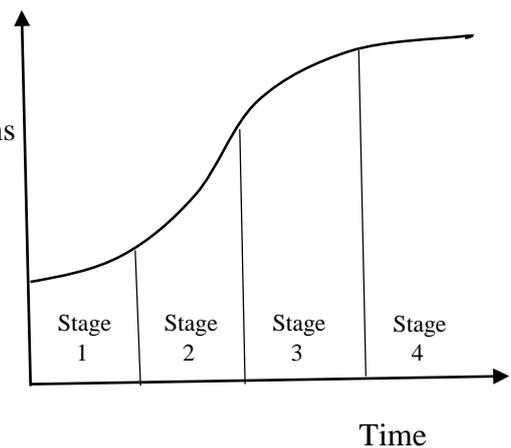
Number of organisms

(1) Stage 1

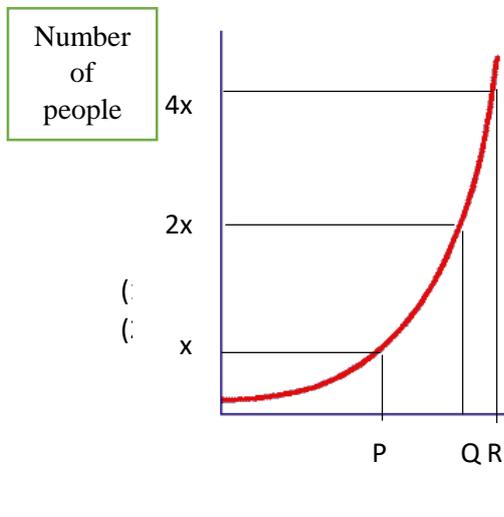
(2) Stage

(3) Stage 3

(4) Stage 4



3. Following is the growth curve relevant to the human population



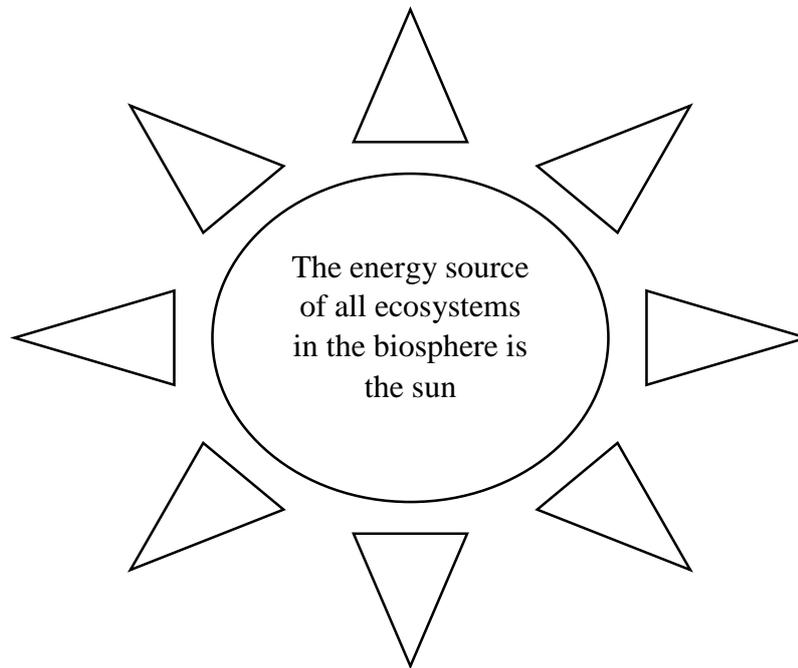
(1) Which statement out of the following gives the correct relationship between P, Q and R?

- (1) $P = Q = R$ (2) $P > Q > R$ (3) $P < Q < R$ (4) $P > Q < R$

(1) According to that, what can you say about the time taken to twice the human population?

Competency level 4.2 : Investigates the mechanisms that contribute to maintaining the balance of the ecosystem

Lesson- Flow of energy and nutrients



1. What is known as the food web?

.....

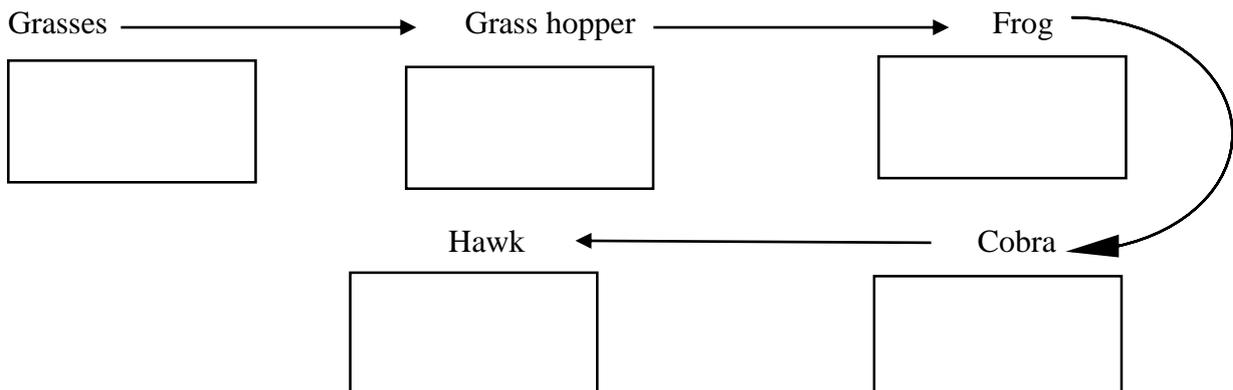
2. Construct a food web including at least five organisms.

.....

3. What is known as a food chain?

.....

4. Write the trophic level of the organisms mentioned in the following food chain in relevant box



5. What are the three groups mentioned above?

1. -----

2. -----

3. -----

All organisms can be divided into three groups on the basis of their mode of nutrition

6. State the information of the above groups in the following table'(Text book-2 page 173-174)

| Group | Information about the group | Example |
|---------------------|-----------------------------|---------|
| Autotrophs | | |
| Heterotrophs | | |
| Decomposers | | |
| Primary consumers | | |
| Secondary consumers | | |
| Tertiary consumers | | |

● **ACTIVITY**

1. Construct a food chain related to an eco-system of a pond.
2. Observe different modes of nutrition consumed by different organisms in the environment (or your home garden). Write down their relationships for foods.

● **Exercises**

1. The organisms which decompose the dead organic matters in the environment are defined as
(1) Herbivores (2) Parasites (3) Producers (4) Decomposers (2010)

2. Answer the following questions based on the given food chain

Algae → Grass hopper → Frog → Cobra → Hawk

(1) How many links are there?

(2) State examples for the organisms described below using the food chain given above

| Producer | Primary consumer | Secondary consumer | Tertiary consumer | Quaternary consumer |
|----------|------------------|--------------------|-------------------|---------------------|
| | | | | |

3. Decomposition is an important process in an ecosystem.

(a) What is known as decomposition?

.....

(b) Name two groups of organisms involve in this process

.....

(c) Explains the environmental effect of decomposition in brief.

.....

.....

Ecological pyramids

Ecological pyramids can be built up using number of organisms, bio mass and energy relationships in different trophic levels of an ecosystem

1. State three main types of Ecological pyramids.

.....

.....

.....

2. Complete the following table regarding the Ecological pyramids mentioned above.

(Text book -2 , 174 - 176 pages)

| Type of pyramid | Upright or inverted | Unit |
|-----------------|---------------------|------|
| 1. | | |
| 2. | | |
| 3. | | |

3. The following table shows the number of organisms in each trophic level, their bio mass and the energy stored in their body of organisms found in a certain eco system.

| Trophic level | Number of organisms | Bio mass (kg) | Energy stored (J) |
|--------------------------------|---------------------|---------------|-------------------|
| Producers | 1000 | 12000 | 10000 |
| 1 st level consumer | 200 | 2600 | 1000 |
| 2 nd level consumer | 30 | 45 | 100 |
| 3 rd level consumer | 3 | 20 | 10 |

Draw the ecological pyramids relevant to the above data.

● **Exercises**

(1) a) The micro-organisms can be considered as an important living component which are invisible to our naked eye, in a home garden. What is the important task of this micro organisms ? (2010)

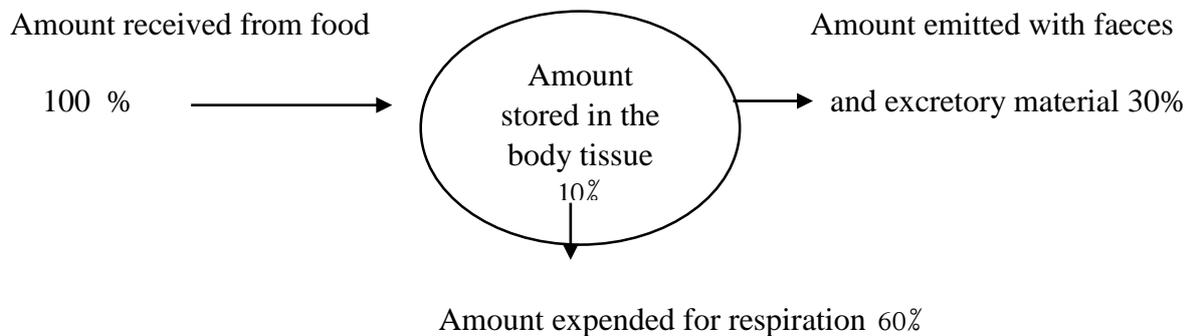
b) Write a food chain with three links using the organisms in a home garden.

- c) If the above home garden is a free living environment and a balanced eco system, draw a sketch of a graph or diagram to represent Grass hoppers, Frogs and Grass quantitatively.
2. (1) According to the organizational level of the biosphere, the “paddy field” belongs to which organizational level ?
 - (2) Write a food chain with three links which is associated with a paddy field.
 - (3) Represent the above relationship using an energy pyramid.
 - (4) “Dependence of human on plant foods is a solution for food crisis.” Explain this statement using above energy pyramid.

Flow of energy through ecosystems

The energy fixed by producers passes from organism to organism along trophic levels. Only 10% of the energy of lower trophic levels passes to the upper trophic levels .90% of energy is lost in each trophic level

The loss of energy during transferring energy from one trophic level to the next, is called energy dissipation.



3. If 3000 units of energy is received to the body of a herbivore by food.

(1) What is the amount of energy expended for respiration of the herbivore out of that energy?

.....

(2) What is the amount of energy emitted as faeces and excretory matter ?

.....

(3)What is the amount of energy stored in the body tissue of herbivore?

.....

Pay attention on the carnivore who hunts the herbivore of the next energy level.

(4) What is the amount of energy transmit to the body of that carnivore?

(5) What is the amount of energy expended for the respiration of the carnivore?

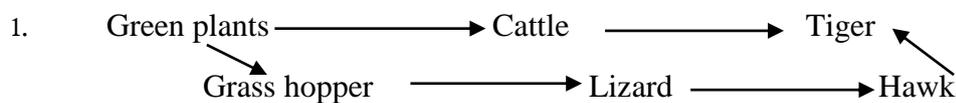
(6) What is the amount of energy expended as faeces and excretory matter of the carnivore?

(7) What is the amount of energy stored in the body tissues of carnivore?

(8) What is the amount of energy transmit and store in the body of second level carnivore who hunts the above carnivore? -----

3. Why short food chains are more efficient than long food chains?'

● Exercises



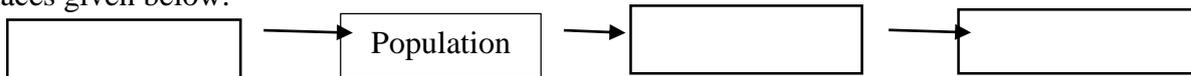
The organism with lowest energy in the food web based on the amount of energy collected in the body,

- (1) Grass hopper. (2) Tiger (3) Cattle (4) Hawk

2. Select the most efficient food chain out of the followings

- (1) Grass → Deer → Tiger
(2) Carrot → Rabbit → python → Hawk
(3) Grass → Grass hopper → Rat → Cobra → Hawk
(4) Paddy → Rat → Hornbill → Hawk

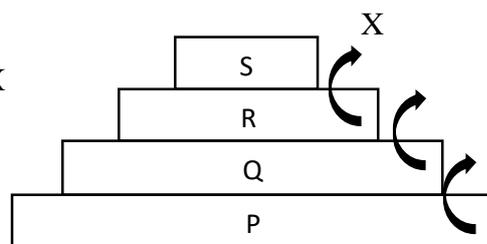
3. (1) State the organizational levels of biosphere which is found in a forest of sri lanka, on empty spaces given below.



(2) State two materials which circulate through this environment.

.....

(3) Following is an ecological pyramid which is drawn using a food chain which is found in this forest. P,Q,R,S,X represent the trophic levels.



- (1) Which letter represent the first trophic level?
- (2) The human belongs to which trophic level?
- (3) If this is an energy pyramid, what is represented by this?
- (4) Which percentage of energy out of the energy contained in P enters into the Q?
- (5) If P contains 3000 kcal of energy, what is the amount of energy contains in S ?
- (6) Why does the trophic levels of a food chain is limited maximum up to four?

4. (1) Draw a food chain associated with a forest with three links .
- (2) Show with an energy pyramid how the flow of energy takes place for the survival of organisms in the forest.
- (3) Organisms in which trophic level, the heavy metals are concentrated more when enters in to an aquatic plant?

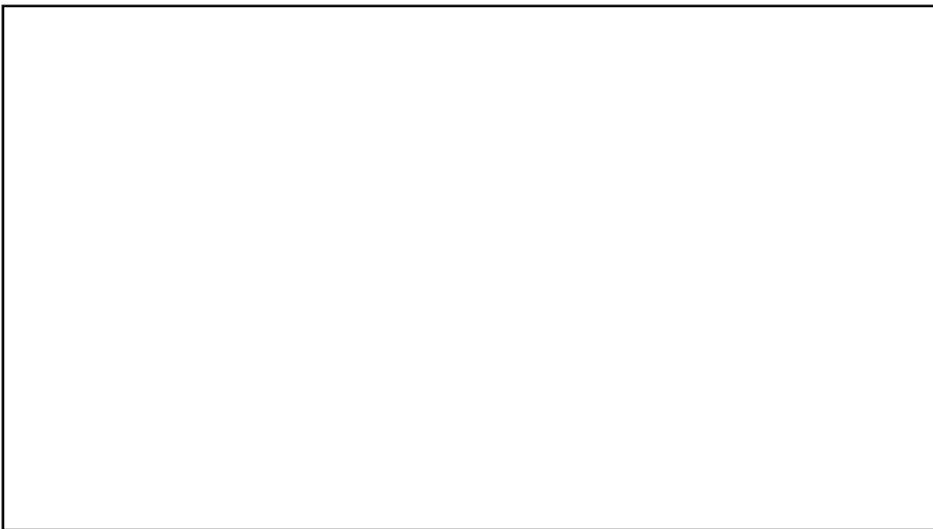
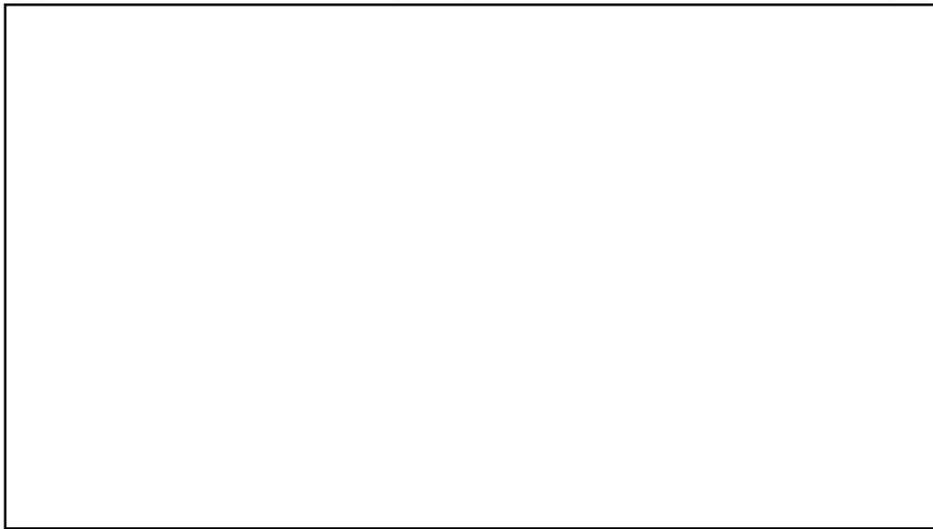
Bio geo chemical cycles

The process of cyclic circulation of essential chemical components through atmosphere, hydrosphere and lithosphere of biosphere is called bio geo chemical cycle.

1. What are the materials which circulates in this?

2. Name three types of bio geo chemical cycles.

3. Simply draw the carbon and nitrogen cycles . (Text book -2 , 178 - 179 pages)



4. What is the main method of fixing carbon in an ecosystem?

5. How are fossil fuels formed ?

6. What is the main source of nitrogen on the earth ?

7. Complete the following table regarding the three main methods of fixation of nitrogen. (Text book -2 , 179 page)

| Method | Description |
|--------|-------------|
| | |
| | |
| | |
| | |

8. Name the soil bacteria involved in following processes. (Text book -2 , 180 page)

| Process | Bacteria |
|--|----------|
| Converts the ammonium compounds in soil into nitrites | |
| Converts those nitrites into nitrates | |
| Converts nitrates which is added in to the soil in to atmospheric nitrogen | |

9. Explain how bio geo chemical cycles are important to maintain ecological balance. (Text book -2 , 178 - 180 pages)

● **Exercises**

1. Followings are three statements written by a student regarding the ecological balance.

- (a) Carbon, nitrogen and phosphorous show bio geo chemical cycles.
- (b) The flow of energy in an ecosystem takes place in two
- (c) Out of the ecological pyramids, the energy pyramids are always upright.

Correct statement / statements out of them

- (1) (a) (2) (b) (3) (a) and (c) (4) (a) and (b)

3. Which process out of the following affect immediately on carbon cycle?
- | | |
|---------------------------------|--------------------------------|
| (1) incensement of monsoon rain | (2) Burning of fossil fuels |
| (3) Depletion of ozone layer | (4) Adding fertilizers to soil |

Competency level 4.3 : Explores various types of pollutants and their adverse effects.

Different environmental pollutants and their effects

1. What is meant by environmental pollution?

2. Name three main types of environmental pollution.

1.-----2. ----- 3. -----

3. Name 8 types of waste materials which cause environmental pollution. (Text book -2 , 181 page)

| | |
|----------|----------|
| 1. ----- | 2. ----- |
| 3. ----- | 4. ----- |
| 5. ----- | 6. ----- |
| 7. ----- | 8. ----- |

● Activity

- Prepare a list of pollutants that are found in your home garden and school garden by engaging in a field trip.
- Classify them using the above method.
- If you are asked to place different waste disposal bins in your school premises, decide what type of bins to be placed mostly after analyzing the amount of different waste materials.

4. What are commonly named as pesticides?

5. Define lethal dose (LD₅₀).

6. What are the five agro chemicals which has banned selling and usage according to the gazette announcement issued on 23rd of December 2014 . (Text book-2 , 182 page)

7. What are known as industrial wastes?

8. What are the methods of releasing hydrocarbons to the environment?

9. What is known as greenhouse effect?

10. The gases which cause green house effect are called green house gases. Name 6 green house gases. (Text book -2 , 183 page)

- | | |
|----------|----------|
| 1. ----- | 2. ----- |
| 3. ----- | 4. ----- |
| 5. ----- | 6. ----- |

11. What are the methods of releasing greenhouse gases to the atmosphere?

12. What are known as heavy metals ?

13. Write 8 examples for heavy metals with their symbols. (Text book -2 , 184 pages)

- | | |
|----------|----------|
| 1. ----- | 2. ----- |
| 3. ----- | 4. ----- |
| 5. ----- | 6. ----- |
| 7. ----- | 8. ----- |

14. What are the methods of releasing heavy metals to the environment ? (Text book -2 , 184 pages)

15. The main reason for the effect of heavy metals and agro chemicals for human which are released in to the environments is ,

- (1) Enters in to the body through the skin when releasing to the environment .
- (2) Enters into the body through skin and the respiratory system.
- (3) Enters into the body since a final level of consumer of a food chain.
- (4) Enters in to the body through crops grown on the land.

● **Activity**

List out the materials and appliances that is utilized at home. Discuss the ill effects caused by different types of heavy metals to the human and the environment.

16. Tabulate the particulate waste matter which are added to the atmosphere as shown below.

| Solid particular waste | Liquid particular waste |
|------------------------|-------------------------|
| | |

17. Complete the following table regarding the gases given below,

| Type of gas | Method of releasing to the environment | Adverse effect to the human/environment |
|--------------------|--|---|
| Sulphur dioxide | | |
| Oxides of nitrogen | | |

23. What are known as nuclear wastes?

24. Write examples for nuclear wastes.

25. Write examples for domestic chemicals.

E- number is a code given by European community to indicate that the food additive is experimentally proven to assure that it is safe for human consumption.

● **Activity**

1. Identify E-numbers of food items that is brought home

- a. What are the substances denoted by those numbers?
- b. What is the purpose of adding such things?
- c. What are the ill effects of them?

2. Do an investigation about the substances such as colourings and flavours which are used for the fast foods and prepare a report.

26. Name 6 diseases caused by food additives' ^Text book -2 "189 - 190 pages&

- 1. -----
- 2. -----
- 3. -----
- 4. -----
- 5. -----
- 6. -----

27. Complete the following table regarding the household medicines

| Medicines | Disinfectants | Antiseptics |
|-----------|---------------|-------------|
| | | |

28. What are the three main components in paints.

29. What are the defects caused by excessive usage of cosmetics?

30. What are the gases released to the environment due to the combustion of fossil fuels and waste matter?

31. What are the specific features of persistent organic pollutants?

32. What are the ill effects caused by persistent organic pollutants?

33. What are the direct effects of environmental pollution? (Text book -2 ,193 - 194 pages)

34. What are the effects that may occur under following environmental conditions.

| Environmental condition | Effects |
|------------------------------|---------|
| Global warming | |
| Depletion of the ozone layer | |
| Photo chemical smog | |
| Acid rains | |

| | |
|-----------------------------|--|
| | |
| Eutrophication | |
| Increase of radiation level | |

35. Explain bio magnification

36. Write examples for bio-accumulated substances and list out their features

| Example | Features |
|---------|----------|
| | |

37. List out the indirect effects of environmental pollution. (Text book -2 ,197 - 198 pages)

● **Exercises**

1. What could be the group of chemical substances with following features?

- Persist in the environment for a long period of time.
- Spread widely in the environment.
- Highly toxic.
- Accumulate in the body of organisms along food chains.

(1) Detergents (2) Disinfectants (3) Pesticides (4) Preservatives

2. The ill effects such as melting of polar ice caps, Rising of sea level, changing of global climatic patterns are occurred due to which condition out of followings.

(1) Acid rain (2) Lightning (3) Depletion of ozone layer (4) Green house effect

3. Following is a reaction takes place when purifying gaseous pollutants



The above method of purification is mainly important to control which environmental effect? (1)

- (1) Global warming. (2) Acid rain
(3) Depletion of ozone layer (4) Reduction of the amount of light fall to the earth

4. Which component mostly contribute to deplete the ozone layer?

- (1) NH_3 (ammonia) (2) CO_2 (3) CHCl_3 (4) CH_4 (methane)

5. Change of climatic patterns is a main challenge face by the world at present. The main environmental effect caused for this is?

- (1) Depletion of ozone layer (2) Acid rains
(3) Global warming (4) Eutrophication

6. Chena cultivation was not considered as an eco friendly cultivation method in the past. At present it is considered as an eco friendly cultivation method under the sustainable development and environmental management.

- (1) Write two features related with chena cultivation to prove the above new consideration .
(2) Write two interactions between a forest and adjacent chena cultivation.
(3) Write a reason for the reduction of soil erosion associated with a chena cultivation.
(4) Write two difference in the flow of energy in a forest and a chena cultivation.
(5) The food mile decreases when obtaining vegetables from a chena instead of obtaining from a super market. Write a reason to prove this.

7. There were following things in a garbage heap

Discarded foods, Plant leaves with branches, A dead body of an animal, Pieces of polythene, Pieces of papers, Yoghut cups, Discarded batteries, Artificial clothes, Soil of a broken house

- (1) Classify the above waste matter and garbages.
(2) Name two substances which contribute to the nitrogen cycle from the above list
(3) Name two human activities which disturb the natural nitrogen cycle
(4) What are known as environmental pollutants?
(5) Describe an effect caused by environmental pollution on nitrogen cycle.

(6) Consumption of instant foods is a modern trend. Write two unfavourable conditions faced by human due to this.

8. (2015 - 1)

24. A student was able to observe a green coloured layer on the surface of a water body where waste water removed from a vegetable bed gets collected. He made the following statements according to the observation.
- A - Excessive amount of inorganic fertilizers have been used highly for the cultivation of vegetables.
 - B - The green layer is concentrated with algae.
 - C - BOD value of water in the water body has become low.
- Of the above, statements
- (1) only A and B are correct.
 - (2) only A and C are correct.
 - (3) only B and C are correct.
 - (4) all A, B and C are correct.

9. (2015 - 1)

39. Which of the following suggestions is most suitable to solve more efficiently and effectively the environmental and social problems that have arisen due to the equipment such as televisions, computers and telephones removed from the rapidly developing world under global village concept?
- (1) Minimizing the use of those equipment
 - (2) Minimizing the amount of those equipment produced
 - (3) Creating substitutions for those equipment
 - (4) Taking action to repair those equipment for reuse by the manufacturers themselves

10. (2014 - structure)

(1) Pollution of the ocean and the coastal area is one of the main environmental problems faced by Sri Lanka. Give two reasons for that situation.

(2) Give a suggestion that can be implemented to conserve the ocean and the coastal area.

(2014 Structure)

11. (2015 - Essay 8 B)

(1) Name a heavy metal ion that could be released to the environment when certain kinds of paints are used?

(2) Natural resources are used for the construction of houses and buildings. State **two** environmental damages that would occur when getting these resources from the environment.

12. (2016) 8

Which of the following chemical can be used as a disinfectant?

- i) Chlorine
- ii) Boric acid
- iii) Milk of Magnesia
- iv) Iodine

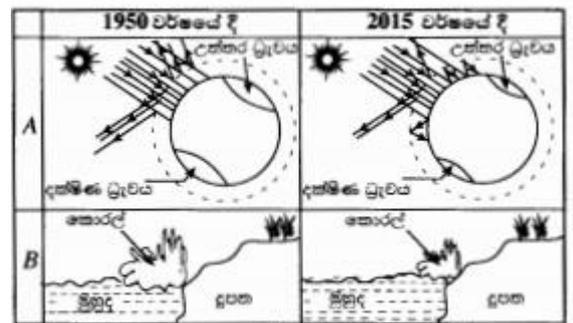
13. (2016^o-Structured Essay)

Depletion of ozone layer, Global warming, Eutrophication, Bio accumulation and Acid rains are direct effects of environmental pollution,

- i) What is meant by bio-accumulation?
- ii) What is the function of the ozone layer?
- iii) The sea level has risen by 10cm – 20cm in the past century. Which of the above effects directly responsible for this condition?

iv) Consider the diagrams A and B. (They are rough sketches.)

- a) Which of the above effects are denoted as A and B?
- b) Mention two gases responsible for the effect denoted as B. Mention one method that each gas you mentioned is released to the environment. (Write the method of releasing against each gas)



5. Some waste materials that cause environmental pollution are given below.

Florescent lamps, Polythene, Chemical fertilizers, Detergents, Animal feces.

- (1) Mention two waste materials that cause eutrophication.
- (2) Which waste material is responsible most probably for releasing mercury to the environment?
- (3) Which concept in the 4R principle of garbage management can be taken as an example for the following activities?
 - a) Use of organic fertilizer instead of chemical fertilizer.
 - b) Production of bio gas with animal faeces.
- (4) Mention two environmental friendly energy sources.

14.

15.

14. (2018 – 1)

Some activities carried out after felling trees in a forest are given below. Among them, which one contributes most to increase the carbon dioxide percentage in the atmosphere in a short period of time?

- (1) Growing vegetable crops in the area
- (2) Letting cut down parts decompose naturally.
- (3) Using parts of timber for constructions.
- (4) Burning the parts cut down.

16. Reduce, Reuse and Recycle are three, out of the principles used in waste/energy management. Which of the following is not a suitable example for “Reduce” given here?

- (1) Switching off unnecessary electric lamps.
- (2) Eating all the food served for self.
- (3) Closing the unnecessarily opened water taps.
- (4) Refrain from using polythenes

16. (2018 - 2 Part A- 1)

1. Figure 1 given below illustrates the setting of a factory located close to a settlement area and its surroundings. A few years after the commissioning of the factory, environmental problems emerged in the area.

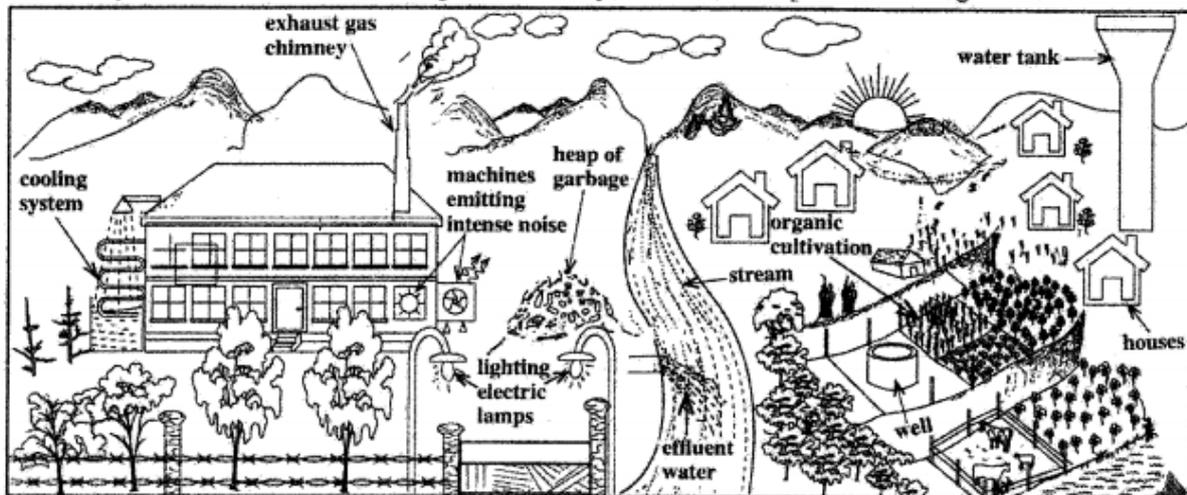


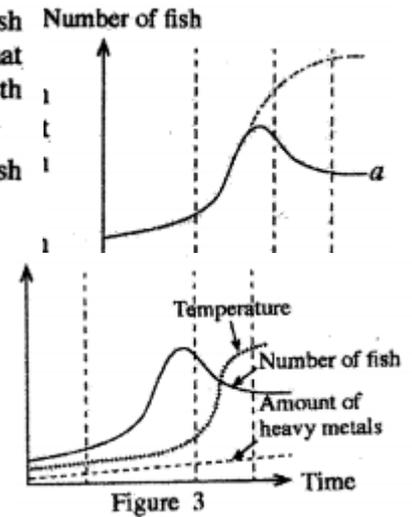
Figure 1

- (i) State two instances in which loss of energy occurs in relation to the factory as illustrated in the Figure.
- (ii) Write two problems leading to environmental pollution which may emerge due to this factory.

(iii) A group of students counted once in six months, the number of fish living in a specific area down the stream, and plotted a graph. That growth curve was found to differ from the typical population growth curve and assume the shape shown by letter *a* in Figure 2.

In which phase does the number of fish begin to decrease in the fish population?

(iv) In the stream studied, the factors—the number of fish, temperature of water and the amount of heavy metals added to the stream—were measured for a period of about four years. Figure 3 shows the result of it. What factor can be given as the nearest cause for the decrease in the fish population as shown in Figure 3?



(v) After some time, because of the entry of heavy metals into the blood of the people living in the settlements around the factory, they were subject to nervous disorders. Write schematically, using arrows, the instances of the process in which the heavy metals get into the blood like this.

(vi) State an importance of maintaining the organic cultivation shown in Figure 1 as a poly-culture .

(vii) Write two advantages of applying organic fertilizers for the cultivated land.

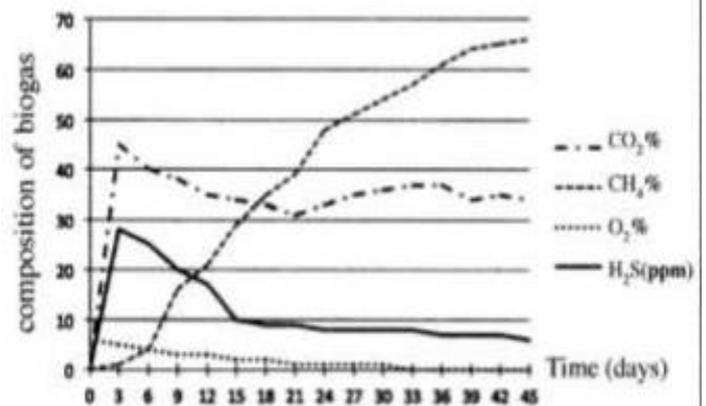
17. (2019 - 1)

Which of the following has the greatest effect on ozone layer depletion?

- (1) CFC gases (2) NO₂ gas (3) CH₄ gas (4) CO₂ gas

18. (2019 – Essay Part A)

(A) Gaseous fuel essential for the laboratory of a school is obtained from a biogas generator. Once in every three days, the composition of four types of gases contained in the biogas produced by it was determined. Those information are presented by the graph



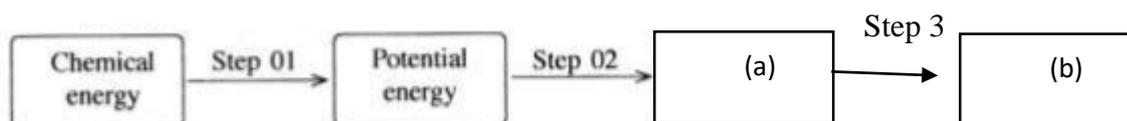
- i. In which gas has the production gradually increased during the relevant period?
- ii. How much hydrogen sulphide was present in the gaseous mixture as per the composition on the 15th day?
- iii. Biogas is produced by the action of anaerobic bacteria on plant and animal waste. By the variation of composition of which gas indicated in the graph is this justified?
- iv. Of the types of gases shown in the graph, which gas acts as a fuel?
- v. Of the waste management principles known as 4R, for which principle is the maintenance of the biogas generator an example?

(B) Fixing of a larger number of windows is a noticeable feature of the above laboratory building. State **two** aspects each by which it contributes to maintain the conditions (a) and (b) given below.

(B) Fixing of a larger number of windows is a noticeable feature of the above laboratory building. State **two** aspects each by which it contributes to maintain the conditions (a) and (b) given below.

(a) Creating a favourable environment for the laboratory users.

(b) Minimizing electricity consumption.



C) Given below are some compounds disposed to the draining gutter and the outer atmosphere during laboratory activities in a certain week.



of the above compounds, write the compound which is most relevant to each of the following statement on the dotted line given opposite to them.

- i. Contributes to increase the soil pH value.
- ii. Causes an increase in the heavy metal composition in underground water.
.....
- iii. Contributes to create an eutrophication state when accumulated in a water body
.....

iv. Contributes to produce photochemical smog as well as acid rain.

.....

19. (1) Write two unfavourable conditions that may occur in soil due to the use of high capacity combined harvesting machine (Bhoothaya).
(2) Due to these unfavourable effects, write a method how the harvest of cultivation can be increased without using this machine
(3) The use of combined harvesting machine is a cause for addition of heavy metals to the soil. How does this happen?
(4) How the use of this machine effect the maintenance of environmental balance.

(2011-1)

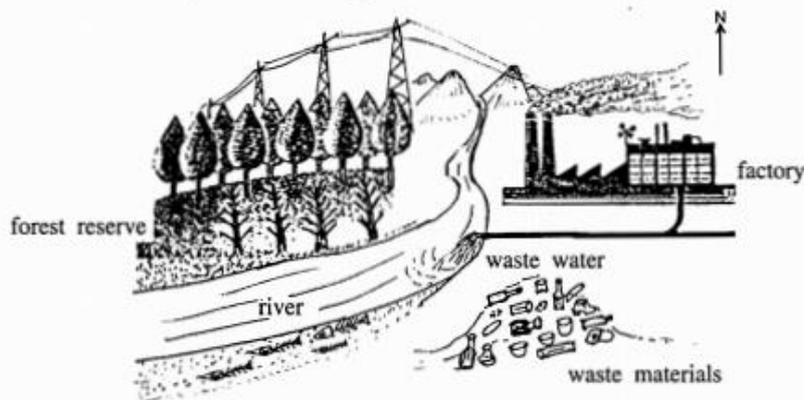
20. Deaths and destruction of property due to natural disasters are ion the increase at present.

The best measure that can be adopted to minimize losses during such a disaster is

- (1) becoming aware about the environmental pollution and taking steps to minimize it.
- (2) refraining from deforestation of hilly areas and setting fire to forests in such areas.
- (3) evacuating the disaster-prone area and resettling in safer areas.
- (4) paying attention well to warnings on disasters and preparation in advance.

21.2012- Essay

1. (A) The diagram shows a river flowing near a forest reserve and a factory constructed on one of its banks. The waste water containing the organic substances and various chemicals released from the factory is emptied into the river. From the point of receiving the waste water onwards, the river flows very slowly.



- (i) The factory has caused environmental pollution. State **one** confirmatory evidence for this referring to the diagram.
- (ii) The forest reserve reduces atmospheric pollution. State **one** way of effecting this.

Competency level 4.4 : Explores the effects of change in life style.

The factors affect the life style of human and the problems created

1. What are the factors that affect the change in life style? (Text book -2 , 198 -199 pages)

2. What are called non-contagious diseases?

3. State some non-contagious diseases which are common at present in sri lanka.

.....
.....

Chronic kidney diseases or renal failure is spreading gradually in agricultural areas in sri lanka. Gradual loss of kidney function including the urine production is known as renal failure.

4. What are the two main forms of kidney failure (Text book -2 , 200 - 202 pages)

1. ----- 2. -----

5. Complete the following table regarding the kidney failure

| Reasons | symptoms |
|----------------------|----------------------|
| | |

6. State the speciality of chronic kidney disease.

.....
.....

7. What are the factors that have been identified to be contributing to Chronic kidney Disease-----

8. What are the measures that can be taken to avoid Chronic Kidney Disease?

8. Complete the following table about the diseases mentioned . (Text book -2 , 202 - 203 pages)

| Disease | Reason | Measures can be taken to prevent |
|--------------------|--------|----------------------------------|
| Diabetes | | |
| Cancers | | |
| Heart diseases | | |
| Pulmonary diseases | | |
| Wheezing | | |
| Gastritis | | |
| Cataracts | | |

● **Exercises**

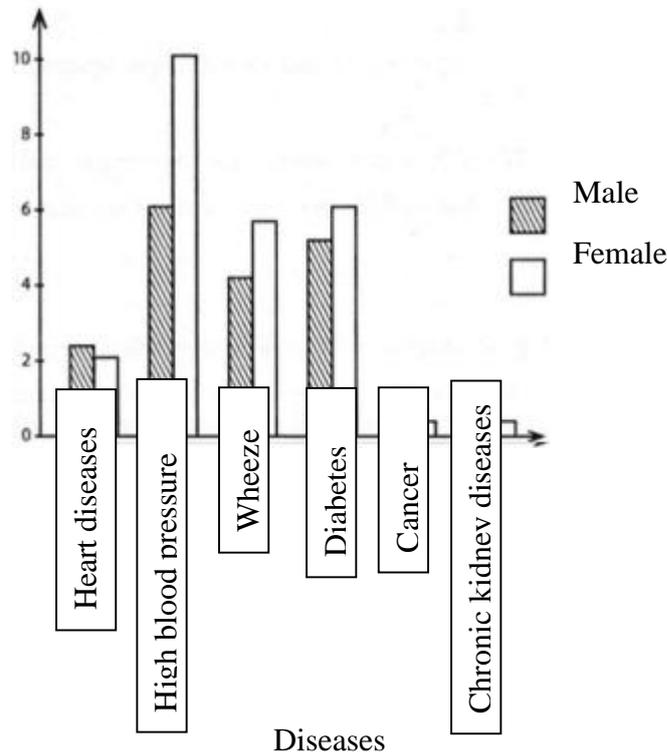
1. (2016 - 1)17

Kamal works in a glass factory for a long period of time. In a medical test it was revealed that his lung tissues are getting deteriorated gradually. Accordingly, which disease is Kamal suffering from?

1. Asbestosis 2. Bronchitis 3. Gastritis 4. Silicos

2. The graph given here has been drawn considering several diseases, according to the data gathered from a census carried out recently in Sri Lanka on people who suffered from diseases.

Percentage of people suffered from diseases



- (i) What is the category that all diseases stated in the graph generally belong to?
- (ii) Among the diseases given in the graph, from which disease do the most number of people suffer?
- (iii) According to the graph, which diseases are males which more susceptible in comparison to the females?
- (iv) a. From the disease given in the graph, name a disease which has a high tendency to affect the humans by persistent organic pollutants.
b. Write 2 special features of persistent organic pollutants.
- (v) State a fact related to agriculture that is considered as a reason for the chronic kidney disease.
- (vi) One step that Sri Lanka has taken at present to control people getting subjected to certain diseases is given below.

Introducing a colour code for soft drinks to indicate their sugar content .

Which disease given in the graph is likely to be reduced to a great extent in the coming years due to the above action?

- (vii) Write 2 bad habits that contribute for getting subjected to cancer.

Competency level 4.5: Investigates on ways to contribute to sustainable development.

Smart use of the natural resources by safeguarding the balance of the environment in such a manner that the future generation that can use them in the future is known as sustainable development.

Maintenance of natural resources by using them in an environmental friendly manner to fulfill the needs of man is known as environmental management.

1.State examples for sustainable agricultural uses and write the uses of them

(Text book -2, 204 - 205 pages)

| Examples | Uses |
|----------|------|
| | |
| | |
| | |
| | |
| | |

2.State the main parts of an ancient river of our country and write their importance

(Text book -2, 207 - 208 pages)

| Main parts | Importance |
|------------|------------|
| | |
| | |
| | |
| | |

• **ACTIVITY**

Using suitable raw materials make a model of an ancient river of our country'

3. What are the important facts about natural flavorings? (Text book; -2, 208 - 209 pages)

4. What are the important facts about local medical science? (Text book; -2, 208 - 209 pages)

5. Define following terms (Text book -2, 209 - 211 pages)

i. Carbon foot print -----

ii. Water foot print -----

iii. Food mile -----

6. State the 4R concept used in waste management. (Text book -2, 211 page)

7. What are the reasons for energy crisis?

- **ACTIVITY**

1. Audit the energy consumption of your home and make necessary recommendations and advice.
2. Investigate the electrical appliances at your home and record their power (wattage). Hence compare their level of energy consumption.

8. How to utilize natural energy in architecture?

9. Write two examples for international conventions of management and sustainable use of the environment.

- **ACTIVITY**

List out the renewable energy resources.

- **EXERCISES**

1. The authority of an industry suggest that, coal should be used as an alternative energy resource.
 - (a) What is known as carbon footprint?
 - (b) What type of change in the carbon footprint occur when coal is used instead of fire woods?
 - (c) Write two reasons for increment of water footprint if water is obtained for the factory from urban water supply instead of a natural source of water.

6. (2016 - 1 & 40)

Anil, Jagath, Sujith and Namal living in Kurunegala town have had their breakfast on a certain day as shown in the following table.

| Name | Anil | Jagath | Sujith | Namal |
|------|----------------|--|--------------------------------|--------------------------------|
| Food | Rice | String hoppers (made up of rice flour) | Bread (made up of wheat flour) | Rotti (made up of wheat flour) |
| | Dhal curry | Dhal curry | Dhal curry | Potato curry |
| | Coconut sambol | Fish curry | Coconut sambol | Coconut sambol |

Rice and coconut had been obtained from Kurunegala area and potatoes had been obtained from Nuwara Eliya area. Rice flour had been obtained from Polonnaruwa area and fish from Negambo. Dahl and wheat flour had been obtained from India and America respectively.

Accordingly, who has taken the meal with the lowest food mile?

- (1) Anil (2) Jagath (3) Sujith (4) Namal

7. What is the name of the non-particulate pollutants which are produced near a factory?

(2011)

8. (i) Pollution of ocean and its environment is a major problem faced by our country at present. Mention **two** reasons which influence this environmental problem. (2015 - Essay – Part A& 1)

(ii) State a suggestion that can be implemented for the conservation of the ocean and its coast.

9. Select the answer with non-contagious diseases '

- (1) Chronic kidney disease, Diabetes, Typhoid, Heart diseases
- (2) Chronic kidney disease, Diabetes, Heart diseases, Cataracts
- (3) Diabetes, Heart diseases, Cataracts, Tuberculosis
- (4) Diabetes, Heart diseases, cataracts, Aids

10. Sustainable development and environmental management means

- (1) Smart use of natural resources in a manner that future generation can use them.
- (2) Efficient use of lands in Sri Lanka according to the population ratio.
- (3) Development of the environment by preventing environmental pollution and safeguarding the natural resources.
- (4) Management of the environment so as to divide the resources according to the population ratio.

11. Which process make an immediate effect to the carbon cycle?

- (1) Increase of monsoon rain. (2) Burning of fossil fue
(3) Depletion of ozone layer. (4) Adding fertilizers to the soil.

12. The process which mainly affects the environmental pollution with the development of science and technology is.

- (1) Agrochemicals (2) Industrial wastes
(3) Electronic wastes (4) Household wastes

13. Consider the tasks given below

- A – Decreasing the the food mile
B – Management of energy
C – Use of traditional knowledge and technology

Tasks which are important for sustainable development are

- (1) A and B only (2) B and C only (3) A and C only (4) A, B and C all

14.

- (1) Draw a food chain associated with a forest with three links.
(2) Show with an energy pyramid how flow of energy takes place for the survival of organisms in the forest.
(3) Organisms in which trophic level, are the heavy metals concentrated more when entered into an aquatic plant?

15. Chena cultivation was not considered as an eco-friendly cultivation method in the past. At present it is considered as an eco-friendly cultivation method under the sustainable development and environmental management.

- (1) Write two features related with chena cultivation to prove the above new consideration,
- (2) Write two interactions between a forest and adjacent chena cultivation.
- (3) Write a reason for the reduction of soil erosion associated with a chena cultivation.
- (4) Write two difference in the flow of energy in a forest and a chena cultivation.
- (5) The food mile decreases when obtaining vegetables from a chena instead of obtaining from a super market. Write a reason to prove this.

(2013 – Essay – Part A 1)