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SOLUTIONS BOOK

CLASS 8

Science · Curiosity

CHAPTER 3

Health: The Ultimate Treasure

Complete Questions and Activities Solutions

In-text Questions | Keep the curiosity alive | Discover, design, and debate

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Every question is followed by its answer. Question numbers above are clickable and the PDF bookmarks panel lets you jump to any exercise set or question. Figures are reproduced from the NCERT textbook (© NCERT) for educational use.

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3.1

CLASS 8 SCIENCE · CHAPTER 3

In-text Questions

Solutions · 18 questions

Directions (Questions 1–18): These are the questions and activities that appear inside the chapter (Probe and ponder, Activities 3.1 to 3.7 and the questions in the text), numbered in the order in which they appear. Activities that depend on your own observations give model answers.

QUESTION 1 *Probe and ponder · p. 28*

How does your body respond to an infection such as common cold?

ANSWER

The common cold is caused by a virus that enters through the respiratory tract. The body responds in several ways to fight it.

a How the body responds

- The **immune system** recognises the pathogen and attacks it.
- The body shows **symptoms and signs**: nasal congestion and discharge, sore throat, cough, fever and body ache (Table 3.1).
- We feel tired and need rest, which helps the body recover. Staying at home also stops the virus from spreading to others.
- Antibiotics do not work against a virus, so the body’s own defence and rest are important.

Therefore, the immune system fights the cold virus, and symptoms such as fever, cough and congestion appear while the body recovers.

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QUESTION 2 *Probe and ponder · p. 28*

We rarely see cases of smallpox or polio these days, but diseases like diabetes and heart problems are more common. Why?

ANSWER

Communicable diseases such as smallpox and polio have been controlled, while non-communicable diseases are rising.

Reason	Explanation
Vaccination	Smallpox was eradicated by mass vaccination and vaccines have made diseases such as polio rare.
Better hygiene and sanitation	Clean water, toilets and hygiene reduce the spread of communicable diseases.
Change in lifestyle	People eat more processed food and get less exercise, which leads to diabetes, heart disease and obesity.
Longer life	People now live longer, and non-communicable diseases are more common in older age.

Therefore, vaccines and sanitation control communicable diseases, while lifestyle changes and longer lives increase non-communicable diseases.

QUESTION 3 *Probe and ponder · p. 28*

Could climate change lead to new types of diseases?

ANSWER

It could, and scientists consider this a serious possibility. Climate change affects the places where disease-carrying organisms can live and multiply.

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a Possible ways

- Warmer weather and changed rainfall can help mosquitoes (vectors of malaria and dengue) breed in more places and for longer seasons.
- Floods contaminate drinking water and can spread diseases such as cholera and typhoid.
- Heat, smoke and pollution can lead to more breathing problems such as asthma.
- Changes in habitats can bring pathogens into new areas or into contact with new hosts.

Therefore, climate change may spread existing diseases to new areas and may help new ones to emerge.

QUESTION 4 *Probe and ponder · p. 28*

How do emotions like stress or worry affect us and make us sick?

ANSWER

Health is physical, mental and social well-being, so the mind and body affect each other.

a Effects of stress and worry

- Stress and worry can cause headaches, tiredness, loss of appetite or overeating, and difficulty in sleeping.
- In Activity 3.1, a lonely boy had headaches, lost weight and could not sleep.
- Poor sleep and poor eating weaken the body, so we may fall ill more easily.
- Yoga, meditation, sleep, and time with family and friends help to manage stress.

Therefore, stress and worry harm both the mind and the body, which is why mental health is a part of health.

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QUESTION 5 *Probe and ponder · p. 28*

Why do some groups of people get affected more than others during disease outbreaks?

ANSWER

Whether a person falls ill depends on the strength of the body's defence and on the surroundings.

Factor	Effect
Immunity	Very young children, the elderly and people with other diseases or poor nutrition have a weaker defence.
Vaccination	Unvaccinated people are at greater risk of vaccine-preventable diseases.
Living conditions	Crowded places, dirty surroundings, unsafe water and poor sanitation help pathogens to spread.
Access to health care	People who cannot reach a doctor early may become more seriously ill.
Habits	Poor hygiene or unhealthy lifestyle makes infection more likely.

Therefore, differences in immunity, surroundings, and access to care make some groups more affected in an outbreak.

QUESTION 6 *Probe and ponder · p. 28*

Share your questions.

ANSWER

This is an open activity. Some model questions that you can ask about health are given below.

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a Model questions

- Why do we get fever when we are infected?
- How do vaccines protect us from diseases?
- Why do antibiotics not work against the cold?
- How does air pollution affect our health?
- How can yoga reduce stress?

Therefore, write your own questions in the space given in the textbook and look for their answers as you study the chapter.

QUESTION 7 *Section 3.1 · p. 29*

What do the news clippings on the notice board tell you about people's health in our country? Is being healthy just about not having diseases?

ANSWER

The clippings show many problems related to lifestyle, environment and disease, and also some ways to protect health. Being healthy is more than not having diseases.

a What the clippings tell us

- **Lifestyle diseases:** 11.4% of India's population is diabetic, more than 100 million people are diabetic, 28.6% Indians are obese, and fast food is a leading cause.
- **Environment:** air pollution is a public health emergency; the monsoon increases malaria and dengue cases.
- **Mental and social health:** too much screen time causes dry eye, obesity, sleep problems and anxiety; social media is raising loneliness.
- **Prevention:** handwashing reduces infection by 50%, safe water reduces water and vector-borne diseases, yoga reduces anxiety, and reducing oil and sugar in the diet is a "diet mantra".

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b Is health only the absence of disease?

No. Health also includes feeling good physically, staying positive and having strong relationships.

Therefore, health is physical, mental and social well-being, and not just freedom from disease.

QUESTION 8 *Activity 3.1 · p. 29*

Activity 3.1: Let us read. Think and Reflect: What was the cause of the boy's health problems? How did his habits and surroundings affect his well-being?

ANSWER

A Grade 8 student felt lonely in a new school and spent more time on his phone and social media. This made him feel worse.



Fig. 3.1: Aspects of health

a Cause of the problems

- The boy had **no friends** in a new environment and busy parents, so he felt lonely (a social and mental problem).
- He coped by spending long hours on the phone and social media, which made him feel worse.

b Effect of habits and surroundings

- He stopped trying to make friends, had headaches, lost weight and could not sleep well, so loneliness affected his body also.
- The doctor advised less screen time and meeting a counsellor, and the school counsellor helped him to make friends.

Therefore, loneliness and excessive screen time harmed his mental, social and physical health.

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QUESTION 9 *Activity 3.2 · p. 30*

Activity 3.2: Let us list. List some good habits that your parents, teachers, or elders encourage you to follow. How many are already a part of your daily routine? Which would you like to start following? Now add habits that are not good for your health. What should we do and what should we avoid to keep ourselves healthy?

ANSWER

The answer depends on your own routine. A model list is given below.



Fig. 3.2: How to be healthy

a Good habits

- Keep yourself clean by maintaining personal hygiene.
- Eat a healthy and balanced diet.
- Exercise regularly.
- Make time to relax or meditate every day, and get enough sleep.

b Habits that are not good

- Spending too much time on mobile phones or other digital screens.
- Eating fast food and other junk food every day.
- Sleeping very late or not getting enough sleep.
- Skipping meals, especially breakfast.
- Smoking, alcohol and addictive drugs.

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c What to do and what to avoid

What we should do	What we should avoid
Eat a balanced diet with fruits, vegetables and whole grains	Processed, fatty or sugary food and drinks
Stay physically active (play, walk, run, cycle)	Too much screen time
Get enough sleep; practise yoga and pranayama	Tobacco, alcohol and addictive drugs

Therefore, healthy habits support a healthy body and mind, while the unhealthy habits listed should be avoided.

QUESTION 10 *Activity 3.3 · p. 31*

Activity 3.3: Let us compare. Look at Fig. 3.3a and Fig. 3.3b. Which playground would you like to play in, and why?

ANSWER

Most of us would like to play in the playground of Fig. 3.3a.



Fig. 3.3(a): Clean playground



Fig. 3.3(b): Polluted playground

Point	Fig. 3.3(a)	Fig. 3.3(b)
Surroundings	Clean, well-maintained and beautiful	Polluted, dirty and unhygienic
Air and pests	Clean air, green trees	Smoke from factories, flies and mosquitoes
Effect on health	Children can play and stay healthy	People may fall sick more often

Therefore, we prefer the playground in Fig. 3.3(a) as clean surroundings keep us healthy, while the dirty one spreads diseases.

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QUESTION 11 *Activity 3.4 · p. 33*

Activity 3.4: Let us find out. Check the information in Table 3.1 by referring to books, trusted websites or your teacher, and add any missing details. Study the table and think about what simple steps can help prevent each disease.

ANSWER

Table 3.1 groups diseases by the way they spread. The preventive steps follow from the route of spread.

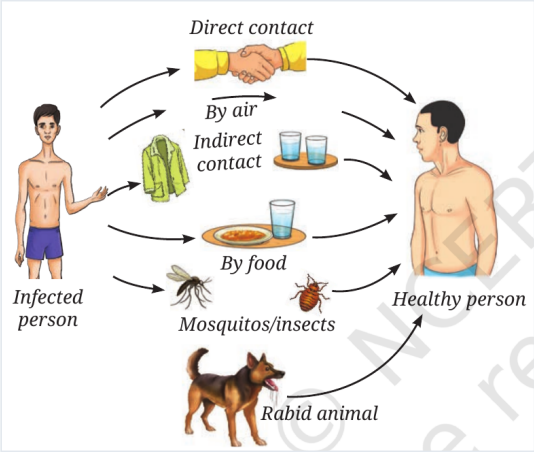


Fig. 3.4: Common methods of transmission of diseases

a Prevention by route of spread

Spread through	Diseases in Table 3.1	Simple preventive steps
Air	Common cold and influenza, chickenpox, measles, tuberculosis	Cover the mouth and nose; wear a mask; wash hands; do not share personal items; isolate the patient; vaccination (chickenpox, measles, TB)
Contaminated water and food	Hepatitis A, cholera, typhoid, ascariasis	Drink boiled water; eat properly cooked food; maintain personal hygiene and sanitation; vaccination (hepatitis A, cholera, typhoid)
Insects (vectors)	Malaria, dengue	Use mosquito nets and repellents; wear long-sleeved clothes; control mosquito breeding; avoid still water

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b Causal agents

Viruses cause cold and influenza, chickenpox, measles, hepatitis A and dengue; bacteria cause tuberculosis, cholera and typhoid; protozoa cause malaria; and worms cause ascariasis.

Therefore, knowing how a disease spreads shows how to prevent it, and simple hygiene prevents many of them.

QUESTION 12 *Section 3.4.1 · p. 35*

Are diseases always caused by infections?

ANSWER

No. Diseases are of two major types.

Type	Cause	Examples
Communicable	Pathogens such as bacteria, viruses, fungi, worms and protozoa; they spread from one person to another	Typhoid, dengue, flu, chickenpox, COVID-19
Non-communicable	Not caused by pathogens and do not spread; linked to lifestyle, diet, environment or lack of nutrients	Cancer, diabetes, asthma, deficiency diseases (scurvy, anaemia, goitre)

Therefore, diseases are not always caused by infections; non-communicable diseases are caused by lifestyle, diet or the environment.

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QUESTION 13 *Section 3.4.2 · p. 36*

What will happen if I take excess amount of any of the minerals or vitamins?

ANSWER

Minerals and vitamins are needed in small amounts, and a lack of them causes deficiency diseases. Too much is also harmful.

a **Explanation**

- Taking more than the body needs does not make us healthier; some vitamins and minerals are stored in the body and in excess can be harmful.
- Excess intake can upset the body's balance, for example too much common salt can raise blood pressure.
- So a balanced diet is the best source. Vitamin or mineral supplements should be taken only when advised by a doctor.

Therefore, a balanced amount is best, because both too little and too much of vitamins and minerals can harm the body.

QUESTION 14 *Activity 3.5 · p. 36*

Activity 3.5: Let us survey. Find out the three most common lifestyle-related diseases in your neighbourhood, talk to a doctor, nurse or health worker about lifestyle changes, and fill in Table 3.2.

ANSWER

The diseases in your neighbourhood may differ. A model Table 3.2 is given.

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a Table 3.2: Non-communicable diseases

S. No.	Disease	Signs and symptoms	Suggested lifestyle change(s)
1	Obesity	Excess body weight and fat, tiredness, breathlessness on small effort	Eating a balanced diet and exercising regularly
2	Diabetes	Frequent urination, excessive thirst, weight loss, tiredness, slow healing	Balanced diet with less sugar and oil, regular exercise, keeping a healthy weight, regular check-ups
3	High blood pressure	Often no symptoms; sometimes headache or dizziness	Less salt and fried food, regular exercise, managing stress, avoiding tobacco, regular check-ups
4	Heart disease	Chest pain, breathlessness, tiredness	Healthy diet low in oil, regular exercise, no tobacco, managing stress

Therefore, most lifestyle-related diseases can be prevented or managed with a healthy diet, exercise and regular check-ups.

QUESTION 15 *Activity 3.6 · p. 37*

Activity 3.6: Let us read. Odisha — community-led sanitation campaign. What do you infer from this case study? Find out about such community campaigns held in your location. Share in your class and discuss with your peers about the impact of such initiatives.

ANSWER

In Bhadrak district, Odisha, a community sanitation campaign helped more people build and use toilets.

a Inference

- Open defecation was reduced significantly, and child health improved, with fewer cases of diarrhoea and infections.
- Simple steps like **good sanitation** can greatly reduce the spread of communicable diseases.

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b Campaigns in your location

Ask your teacher, elders or local health centre about campaigns such as cleanliness drives, handwashing days, vaccination camps or mosquito control drives. Write for each the aim, who organised it and its impact, and discuss in class.

Therefore, community campaigns for sanitation and hygiene can improve health and reduce communicable diseases.

QUESTION 16 *Section 3.5 · p. 37*

You would have noticed that some people get sick more frequently than others, although living in a similar environment. Do you know why?

ANSWER

The reason is the natural ability of the body to fight diseases, which is called immunity.

a Explanation

- The immune system is a special system of the body that fights against diseases.
- People differ in the strength of their immunity, so some people fall sick more often even in the same surroundings.
- Immunity can be gained through vaccines (acquired immunity), and is helped by good food, sleep and a healthy lifestyle.

Therefore, some people get sick more often because their immunity (the body’s ability to fight disease) is different.

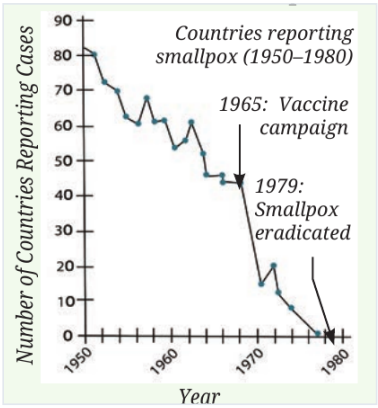
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QUESTION 17 *Section 3.5 · p. 38*

Do you know when the first vaccine was discovered?

ANSWER

The first vaccine was discovered in the late 1700s by the English doctor Edward Jenner.



Smallpox: number of countries reporting cases (1950–1980)

a How it was discovered

- Smallpox was a deadly disease that caused blisters and killed millions. A milder disease, cowpox, seen in cows, could also infect humans.
- Jenner discovered that people who had cowpox did not get smallpox. He tested this by injecting cowpox sap into a boy, who showed no illness when exposed to smallpox.
- This led to the first vaccine, and mass vaccination eventually helped to eradicate smallpox worldwide (the graph shows cases falling after the 1965 vaccine campaign to 1979).

Therefore, the first vaccine, against smallpox, was discovered by Edward Jenner in the late 1700s.

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QUESTION 18 *Activity 3.7 · p. 41*

Activity 3.7: Let us infer. Study the infographic given in Fig. 3.5b. How do you think the antibiotic resistance has been developed in bacterial pathogens? What precautions may be taken to reduce antibiotic resistance?

ANSWER

Antibiotic resistance develops when bacteria survive an antibiotic and multiply.

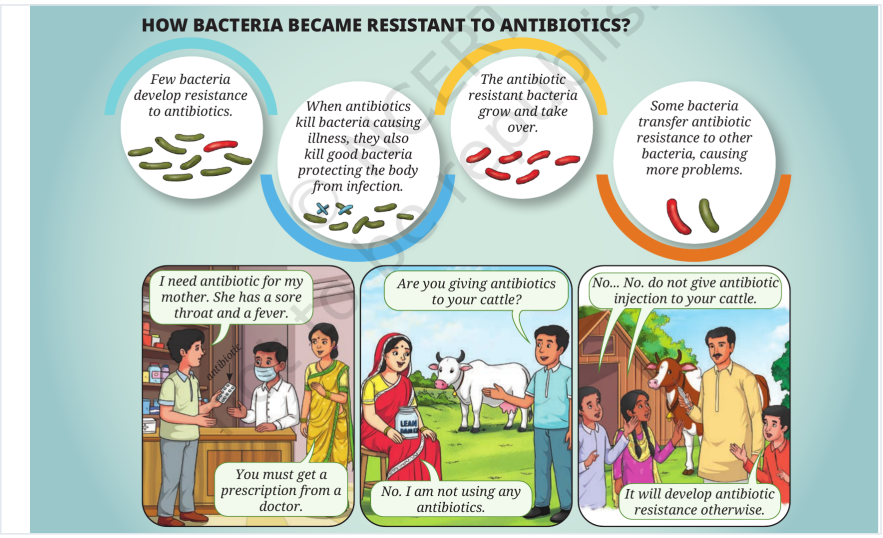


Fig. 3.5(b): Development of antibiotic-resistant bacteria and preventive measures

a How resistance developed

- A few bacteria develop resistance to the antibiotic, and the antibiotic kills the other bacteria and also the good bacteria that protect the body.
- The resistant bacteria then grow and take over, and some bacteria transfer resistance to other bacteria.
- It speeds up when antibiotics are taken when they are not required, taken in an incomplete dose, or given to cattle.

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b Precautions

- Use antibiotics only when prescribed by a doctor, in the correct dose and for the right duration.
- Do not buy antibiotics without a prescription and do not give them to cattle without need.
- Avoid unnecessary use so that antibiotics stay effective for future generations.

Therefore, misuse of antibiotics makes bacteria resistant, and using them wisely reduces the problem.

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3.2

CLASS 8 SCIENCE · CHAPTER 3

Keep the curiosity alive

Solutions · 11 questions

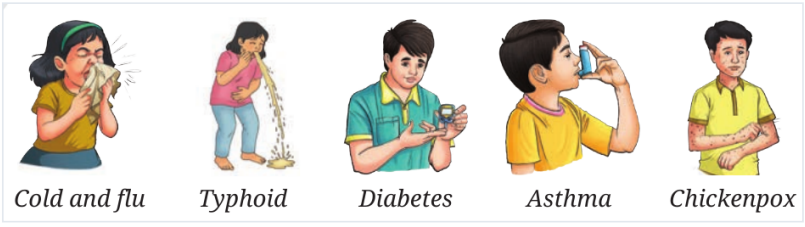
Directions (Questions 1–11): These are the exercise questions at the end of the chapter (pages 42 to 45). For multiple-choice questions the correct option is given first, followed by the reason.

QUESTION 1 *Keep the curiosity alive*

Group the diseases shown in the images as communicable or non-communicable.

ANSWER

Communicable diseases are caused by pathogens and spread from person to person. Non-communicable diseases are not caused by pathogens and do not spread.



Cold and flu, Typhoid, Diabetes, Asthma, Chickenpox

Disease	Group	Reason
Cold and flu	**Communicable**	Caused by a virus, spreads through the air
Typhoid	**Communicable**	Caused by bacteria, spreads through contaminated food and water
Diabetes	**Non-communicable**	Linked to lifestyle, hormones and diet; not caused by pathogens
Asthma	**Non-communicable**	Linked to environment (such as dust and pollution); does not spread

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Disease	Group	Reason
Chickenpox	**Communicable**	Caused by a virus, spreads through the air

Therefore, cold and flu, typhoid and chickenpox are communicable, while diabetes and asthma are non-communicable.

QUESTION 2

Keep the curiosity alive

Diseases can be broadly grouped into communicable and non-communicable diseases. From the options given below, identify the non-communicable diseases.
(i) Typhoid (ii) Asthma (iii) Diabetes (iv) Measles
(a) (i) and (ii) (b) (ii) and (iii) (c) (i) and (iv) (d) (ii) and (iv)

ANSWER

Correct option: (b) (ii) and (iii).

Disease	Type	Reason
(i) Typhoid	Communicable	Caused by bacteria
(ii) Asthma	**Non-communicable**	Not caused by pathogens, does not spread
(iii) Diabetes	**Non-communicable**	Linked to lifestyle, not caused by pathogens
(iv) Measles	Communicable	Caused by a virus

Therefore, the non-communicable diseases are asthma and diabetes, so the answer is (b).

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QUESTION 3 *Keep the curiosity alive*

There is a flu outbreak in your school. Several classmates are absent, while some are still coming to school coughing and sneezing.
(i) What immediate actions should the school take to prevent further spread?
(ii) If your classmate, who shares the bench with you, starts showing symptoms of the flu, how can you respond in a considerate way without being rude or hurtful?
(iii) How can you protect yourself and others from getting infected in this situation?

ANSWER

Flu is a viral disease that spreads through the air and through contact with the infected person's personal items.

a **(i) Actions by the school**

- Ask students with symptoms to stay at home and rest, and keep them away from others (isolation) until they recover.
- Make students and teachers wear masks and cover the mouth and nose while coughing or sneezing.
- Arrange handwashing with soap and water, and keep classrooms clean and well ventilated.
- Inform parents and the health authorities, and tell students not to share towels, handkerchiefs and other personal items.

b **(ii) Responding to a classmate**

- Speak gently and show concern, for example: "You look unwell, you should rest and meet a doctor."
- Suggest that the classmate wears a mask and tell the teacher, without teasing or avoiding them in a rude way.
- Offer help later, such as sharing notes, once the classmate is at home.

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c (iii) Protecting yourself and others

- Wash hands often with soap and water; cover the mouth and nose when coughing or sneezing; wear a mask in crowded places.
- Do not share personal items; keep your surroundings clean; stay at home if you feel unwell.

Therefore, isolation, hygiene and masks along with kind and responsible behaviour help to stop the spread of flu.

QUESTION 4 *Keep the curiosity alive*

Your family is planning to travel to another city where malaria is prevalent.
(i) What precautions should you take before, during, and after the trip?
(ii) How can you explain the importance of mosquito nets or repellents to your sibling?
(iii) What could happen if travellers ignore health advisories in such areas?

ANSWER

Malaria is caused by protozoa, which are spread by mosquitoes (vectors), so the aim is to avoid mosquito bites.

Time	Precautions
Before the trip	Read the health advisories for the area; consult a doctor; carry mosquito nets and repellents; pack clothes with long sleeves
During the trip	Sleep under a mosquito net; use repellents; wear long-sleeved clothes; avoid areas with still water and keep surroundings free from mosquito breeding
After the trip	Watch for fever, chills and sweating; if they appear, see a doctor at once and tell the doctor about the travel

a (ii) Explaining to a sibling

Say that malaria spreads through the bite of an infected mosquito. The net and repellent keep mosquitoes away so that the germs cannot enter our body, just as a door keeps strangers out.

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b (iii) If advisories are ignored

Travellers may get malaria, with high fever, profuse sweating and chills, and the illness may become serious. They may also carry the infection back and spread it to others through mosquitoes.

Therefore, avoiding mosquito bites and following advisories protects travellers from malaria.

QUESTION 5 *Keep the curiosity alive*

Your uncle has started smoking just to fit in with his friends, even though it is well known that smoking can seriously harm health and even cause death.
(i) What would you say to him to make him stop, without being rude?
(ii) What would you do if your friend offers you a cigarette at a party?
(iii) How can schools help prevent students from indulging in such harmful habits?

ANSWER

Tobacco is a harmful substance. Tobacco, diet and pollution can raise the risk of cancer.

a (i) To the uncle

Talk politely and with care, for example: “Uncle, we love you and want you to stay healthy. Smoking can cause cancer and heart problems. Real friends will respect your decision to stay away from it. Let us do something together, like walking or yoga.” Suggest meeting a doctor for help to quit.

b (ii) If a friend offers a cigarette

Say “No” firmly but politely, give a reason (it harms health), leave the situation if needed, and tell a trusted elder. Real friends do not force us to do harmful things.

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c (iii) Role of schools

- Teach students about the harm of tobacco, alcohol and drugs, and train them to say “No”.
- Keep the school and the area around it free from tobacco; engage students in sports, yoga and clubs; provide counselling.

Therefore, saying “No” to tobacco, with awareness and support from family and school, protects health.

QUESTION 6 *Keep the curiosity alive*

Saniya claims to her friend Vinita that “Antibiotics can cure any infection, so we don’t need to worry about diseases.” What question(s) can Vinita ask her to help Saniya understand that her statement is incorrect?

ANSWER

Antibiotics work only against bacterial infections. Vinita can ask questions that lead Saniya to see this.

a Questions Vinita can ask

- Do antibiotics work against viral infections like cold, flu, chickenpox and measles?
- What about diseases caused by protozoa (malaria) or non-communicable diseases such as diabetes and asthma?
- What is antibiotic resistance, and what happens if we use antibiotics when they are not needed?
- Would it not be better to prevent disease with hygiene and vaccines, since prevention is better than cure?

Therefore, antibiotics do not cure every infection, and using them wrongly makes bacteria resistant, so we must still prevent diseases.

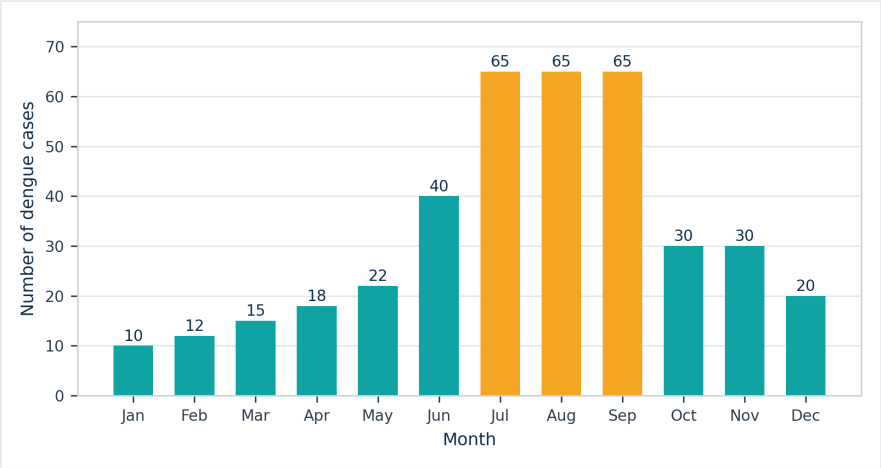
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QUESTION 7 *Keep the curiosity alive*

The following table contains information about the number of dengue cases reported in a hospital over a period of one year (January 10, February 12, March 15, April 18, May 22, June 40, July 65, August 65, September 65, October 30, November 30, December 20). Make a bar graph of the number of cases on the Y-axis and the month on the X-axis. Critically analyse your findings and answer the following:
(i) In which three months were the dengue cases highest?
(ii) In which month(s) were the cases lowest?
(iii) What natural or environmental factors during the peak months might contribute to the increase in dengue cases?
(iv) Suggest a few preventive steps that the community or government can take before the peak season to reduce the spread of dengue.

ANSWER

The bar graph is drawn with months on the X-axis and the number of dengue cases on the Y-axis. The peak months are shown in a different colour.



Bar graph: dengue cases reported in a hospital in one year

a Analysis of the graph

- The cases rise steadily from January (10) to June (40), reach the peak in July, August and September (65 each), and then fall to 30 in October and November and 20 in December.
- Total cases in the year = 10 + 12 + 15 + 18 + 22 + 40 + 65 + 65 + 65 + 30 + 30 + 20 = 392. The three peak months have 195 cases, which is about half (about 50%) of all cases.

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b **(i) and (ii)**

(i) The dengue cases were highest in **July, August and September** (65 each). (ii) The cases were lowest in **January** (10 cases).

c **(iii) Factors in the peak months**

The peak months are the monsoon months. Rain collects in pots, tyres, coolers and puddles, and still water allows mosquitoes (vectors of dengue) to breed. Warm and humid weather also helps them to multiply. The chapter also notes that the arrival of the monsoon leads to more malaria and dengue cases.

d **(iv) Preventive steps before the peak season**

- Remove or cover places where water collects (coolers, tyres, pots, drains) and keep surroundings clean.
- Spray or fog in time, and make people aware of using nets, repellents and long-sleeved clothes.
- Arrange health facilities and testing in advance, and run community cleanliness drives.

Therefore, dengue peaks in July to September, and removing stagnant water and preventing mosquito bites before the monsoon reduces cases.

QUESTION 8 *Keep the curiosity alive*

Imagine you are in charge of a school health campaign. What key messages would you use to reduce communicable and non-communicable diseases?

ANSWER

The messages should be short, clear and easy to follow.

For	Key messages
Communicable diseases	Wash hands with soap and water. Cover your mouth and nose when you cough or sneeze. Drink clean (boiled) water. Do not let water stand and breed mosquitoes. Get vaccinated. Stay at home when unwell.
Non-communicable diseases	Eat a balanced diet; reduce oil and sugar. Exercise daily. Limit screen time. Sleep well and practise yoga. Say NO to tobacco, alcohol and drugs. Get regular health check-ups.

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For	Key messages
Mind and society	Talk about your feelings, spend time with family and friends, and help lonely friends.

The campaign can use posters, slogans (for example “Prevention is better than cure”), skits and a pledge.

Therefore, hygiene, vaccination, a healthy lifestyle and care for mental health are the key messages.

QUESTION 9 *Keep the curiosity alive*

It is recommended that we should not take an antibiotic for a viral infection like a cold, a cough, or flu. Can you provide the possible reason for this recommendation?

ANSWER

Antibiotics do not work against viruses.

a Reasons

- Antibiotics target parts of bacterial cells that are different from human or animal cells. Viruses do not have these parts, so antibiotics cannot kill them.
- Unnecessary use kills the useful bacteria of the body and helps bacteria to become resistant, so antibiotics may not work when really needed.
- A cold or flu is fought by the body’s immune system, with rest and care.

Therefore, antibiotics should not be taken for viral infections because they cannot kill viruses and misuse causes antibiotic resistance.

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QUESTION 10 *Keep the curiosity alive*

Which disease(s) among the following may spread if drinking water gets contaminated by the excreta from an infected person? Hepatitis A, Tuberculosis, Poliomyelitis, Cholera, Chickenpox.

ANSWER

Diseases whose pathogens leave the body in the excreta can spread when drinking water is contaminated.

Disease	May spread through contaminated water?	Reason
Hepatitis A	**Yes**	Spread through contaminated water and food (Table 3.1)
Tuberculosis	No	Spreads through the air (lungs)
Poliomyelitis	**Yes**	The polio virus passes in the excreta and spreads through contaminated water or food
Cholera	**Yes**	Spread through contaminated water and food (Table 3.1)
Chickenpox	No	Spreads through the air

Therefore, hepatitis A, poliomyelitis and cholera may spread through water contaminated by excreta.

NCERT ARCHIVE

QUESTION 11 *Keep the curiosity alive*

When our body encounters a pathogen for the first time, the immune response is generally low but on exposure to the same pathogen again, the immune response by the body is much more compared to the first exposure. Why is it so?

ANSWER

The immune system remembers a pathogen that it has already met.

a **Explanation**

- At the first exposure, the immune system has to recognise the new pathogen and learn how to fight it, so the response is slow and small.
- After that, the body keeps a memory of the pathogen (acquired immunity). On the next exposure, it recognises the pathogen quickly and responds faster and much more strongly.
- Vaccines work in this way: they train the immune system with a weakened, dead or harmless part of the germ, so that the body is ready when the real pathogen comes.

Therefore, the second response is stronger because the immune system remembers the pathogen from the first exposure.

NCERT ARCHIVE

3.3

CLASS 8 SCIENCE · CHAPTER 3

Discover, design, and debate

Solutions · 9 activities

Directions (Questions 1–9): These are the activities of “Discover, design, and debate” and the open questions at the end of the chapter (page 44 and 45). Model answers are given; add your own observations.

QUESTION 1 *Discover, design, and debate*

Students maintain a health diary for at least a month to track food, hygiene, exercise, sleep, screen time, and emotional state.

ANSWER

This is a personal activity. A model diary format is given.

Date	Food	Hygiene	Exercise	Sleep	Screen time	Mood
Day 1	Roti, dal, vegetables, fruit	Bath, handwashing	30 min walk	8 hours	1 hour	Happy
Day 2						

a **At the end of the month**

- Look for patterns: days with less sleep or more screen time, and how you felt.
- Mark the habits to improve and set a goal for the next month; discuss with your teacher.

Therefore, a health diary helps in noticing and improving the habits that affect health.

NCERT ARCHIVE

QUESTION 2 *Discover, design, and debate*

Read about Indian scientists like Suniti Solomon, Asima Chatterjee, Yellapragada Subbarao, Mary Poonen Lukose for their contributions in the field of health and diseases.

ANSWER

A short note on each scientist is given. Read more from books and trusted websites.

Scientist	Contribution
Suniti Solomon	A physician who identified the first cases of HIV infection in India (Chennai, 1986) and worked for the care and awareness of HIV/AIDS patients.
Asima Chatterjee	A chemist who worked on medicines from plants; her research on plant chemicals led to anti-epileptic and anti-malarial medicines and cancer-related drugs.
Yellapragada Subbarow	A biochemist who worked on the energy chemicals of the body (ATP) and on medicines; he helped in the development of drugs against cancer, anaemia and infections.
Mary Poonen Lukose	A doctor who was the first woman Surgeon General of India, and worked for the health of mothers and children.

Therefore, Indian scientists and doctors have made important contributions to health and the treatment of diseases.

NCERT ARCHIVE

QUESTION 3 *Discover, design, and debate*

The deadly disease smallpox was eradicated by vaccination. Discover how this was done and why it worked. Debate whether everyone should be required to get vaccinated to protect others.

ANSWER

Smallpox is the only human disease eradicated so far.

a How it was done and why it worked

- Edward Jenner showed that cowpox protected people from smallpox, which led to the first vaccine.
- A worldwide mass vaccination campaign (the graph shows the campaign from 1965) vaccinated people, and cases were found and the contacts of patients were vaccinated to stop the spread.
- It worked because smallpox spread only from person to person, and the vaccine gave long protection, so the virus could not find new people to infect. Smallpox was declared eradicated in 1979–80.

b Debate: should everyone be required to get vaccinated?

In favour	Against
Vaccines protect both the person and the people around, including infants and sick people who cannot be vaccinated. When most people are vaccinated, diseases cannot spread easily.	People should have freedom to decide about their own body. Some people may have fear or medical reasons. Awareness and trust may work better than compulsion.

Scientists and doctors carefully test vaccines for safety, and vaccination protects the person and the community.

Therefore, vaccination eradicated smallpox, and the debate should use facts and respect for each other's views.

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QUESTION 4 *Discover, design, and debate*

According to current guidelines, learn the correct sequence of steps for performing cardiopulmonary resuscitation (CPR) on an adult in case of sudden stoppage of breathing. School may invite a doctor or a professional to demonstrate a mock drill.

ANSWER

CPR must be learnt through a demonstration by a trained person. The general steps for an adult are given below, as in common guidelines.

a Sequence of steps

- Check that the place is safe and check whether the person responds (tap the shoulders and shout).
- Call for help and the emergency number (112 in India), and ask someone to bring an AED if available.
- Check for breathing for up to 10 seconds. If there is no breathing, start CPR.
- Give **chest compressions**: place the heel of the hand on the centre of the chest, press hard and fast, about 5–6 cm deep at 100–120 per minute, and let the chest rise fully.
- If trained, give 2 rescue breaths after every 30 compressions. Continue until help arrives or the person starts breathing.

Guidelines can change, so the school should arrange a mock drill with a doctor or a trained professional.

Therefore, call for help, check breathing and give chest compressions; learn the exact method from a trained professional.

QUESTION 5 *Discover, design, and debate*

Invite a doctor to the school. Students may be encouraged to interact with the doctor on the issues of malnutrition, under-nutrition, and over-nutrition.

ANSWER

This is an interaction activity. Some terms and model questions are given.

Term	Meaning
Malnutrition	A condition caused by a diet that is not balanced, either too little, too much or lacking certain nutrients
Under-nutrition	Too little food or nutrients, leading to weakness, poor growth and deficiency diseases (such as anaemia, scurvy, goitre)
Over-nutrition	Eating more than the body needs, leading to obesity, diabetes and heart problems

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a Model questions for the doctor

- How can we know whether a child is under-nourished or over-nourished?
- Which foods give a balanced diet?
- How much exercise and sleep do children of our age need?
- How can junk food and screen time be reduced?

Therefore, a balanced diet is needed to avoid both under-nutrition and over-nutrition.

QUESTION 6 *Discover, design, and debate*

If you are given an opportunity to create a health card, what all would you like to include in it. Create your own health card and have discussion about it.

ANSWER

A health card keeps important health information in one place.

a What to include

Section	Details
Personal	Name, age, class, blood group, emergency contact
Body measurements	Height, weight and weight status, eyesight, dental check-up
Medical	Vaccinations taken, allergies, past illnesses, medicines
Habits	Diet, exercise, sleep, screen time
Well-being	Mood, stress, friends and family support

Make the card and discuss in class what the card shows about your health and which habits can be improved.

Therefore, a health card helps to track and improve physical, mental and social health.

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QUESTION 7 *Discover, design, and debate*

Have a debate on ‘Are there ill-effects of fast food on companion animals?’

ANSWER

Companion animals (pets) such as dogs and cats can also be harmed by unhealthy human food.

Points for (ill-effects exist)	Points against
Fast food is rich in oil, salt and sugar. It can cause obesity and digestive problems in pets. Some foods such as chocolate and onion are harmful to dogs. A diet that is not balanced can cause deficiency.	Small amounts of safe food may not harm. Pets can be given a balanced diet with some variety. The harm depends on the type and quantity of food.

Therefore, fast food can harm pets, so they should be given food made for them and advised by a vet.

QUESTION 8 *Discover, design, and debate*

Prepare some questions based on your learnings so far …

ANSWER

This is an open activity. Model questions are given.

- Why are some diseases communicable and some not?
- How does a vaccine train the immune system?
- Why do we get fever when infected?
- How can we reduce antibiotic resistance?
- Why is mental health a part of health?

Therefore, framing questions helps in learning and in finding answers.

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QUESTION 9 *Discover, design, and debate*

Reflect on the questions framed by your friends and try to answer …

ANSWER

Answer the questions of your friends using the chapter. Model answers for the questions above are given.

Question	Answer
How does a vaccine train the immune system?	It gives a dead, weakened or harmless part of a germ, so the immune system learns to recognise and attack it without causing disease.
Why do we get fever when infected?	Fever is a sign that the body is fighting the infection.
How can we reduce antibiotic resistance?	Use antibiotics only when prescribed, in the correct dose and for the right duration.

Therefore, discussing the questions with friends helps to clear doubts.

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