

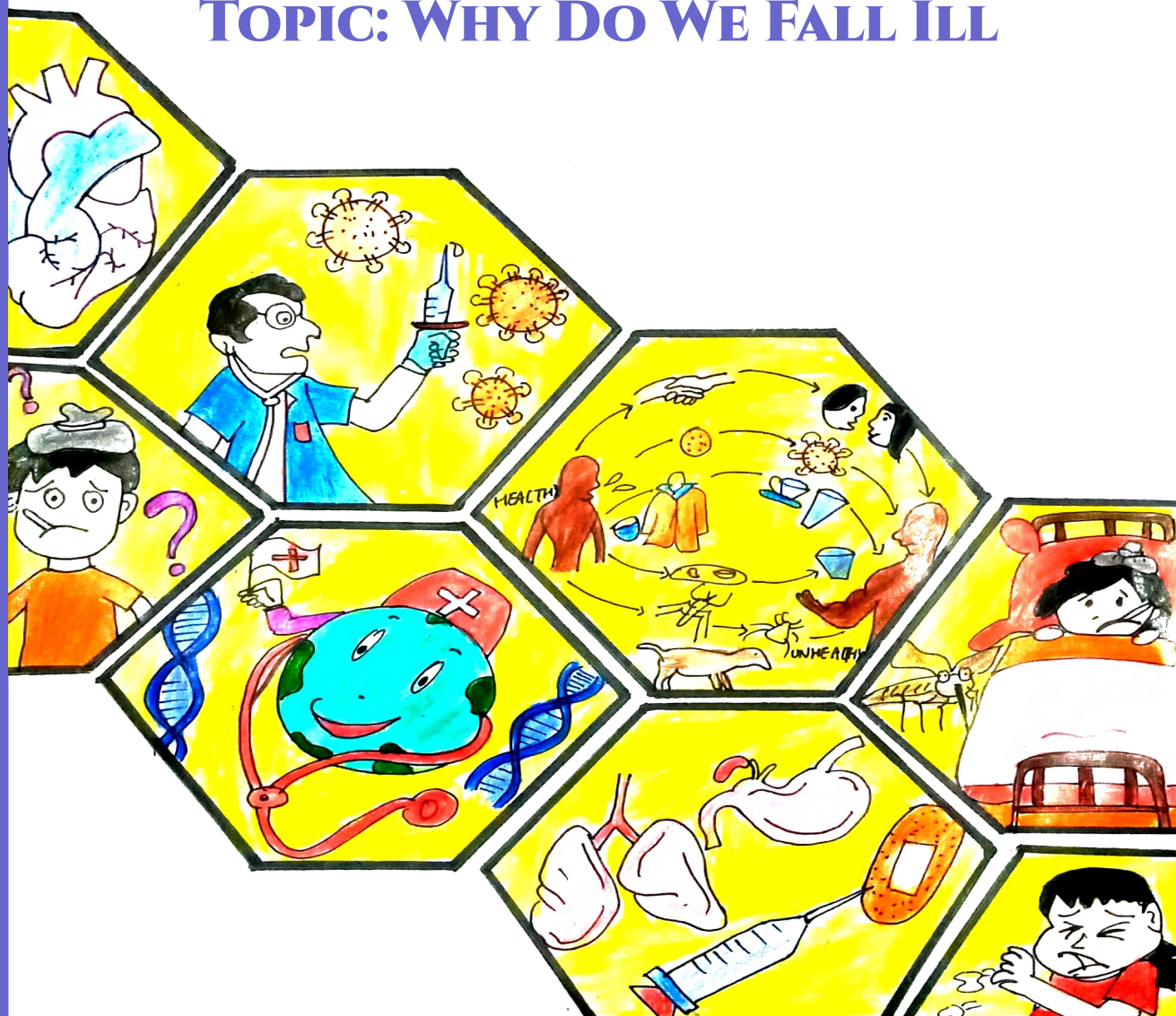


(Affiliated to C.B.S.E)

SUBJECT: SCIENCE

GRADE: IX

TOPIC: WHY DO WE FALL ILL



ACKNOWLEDGEMENT

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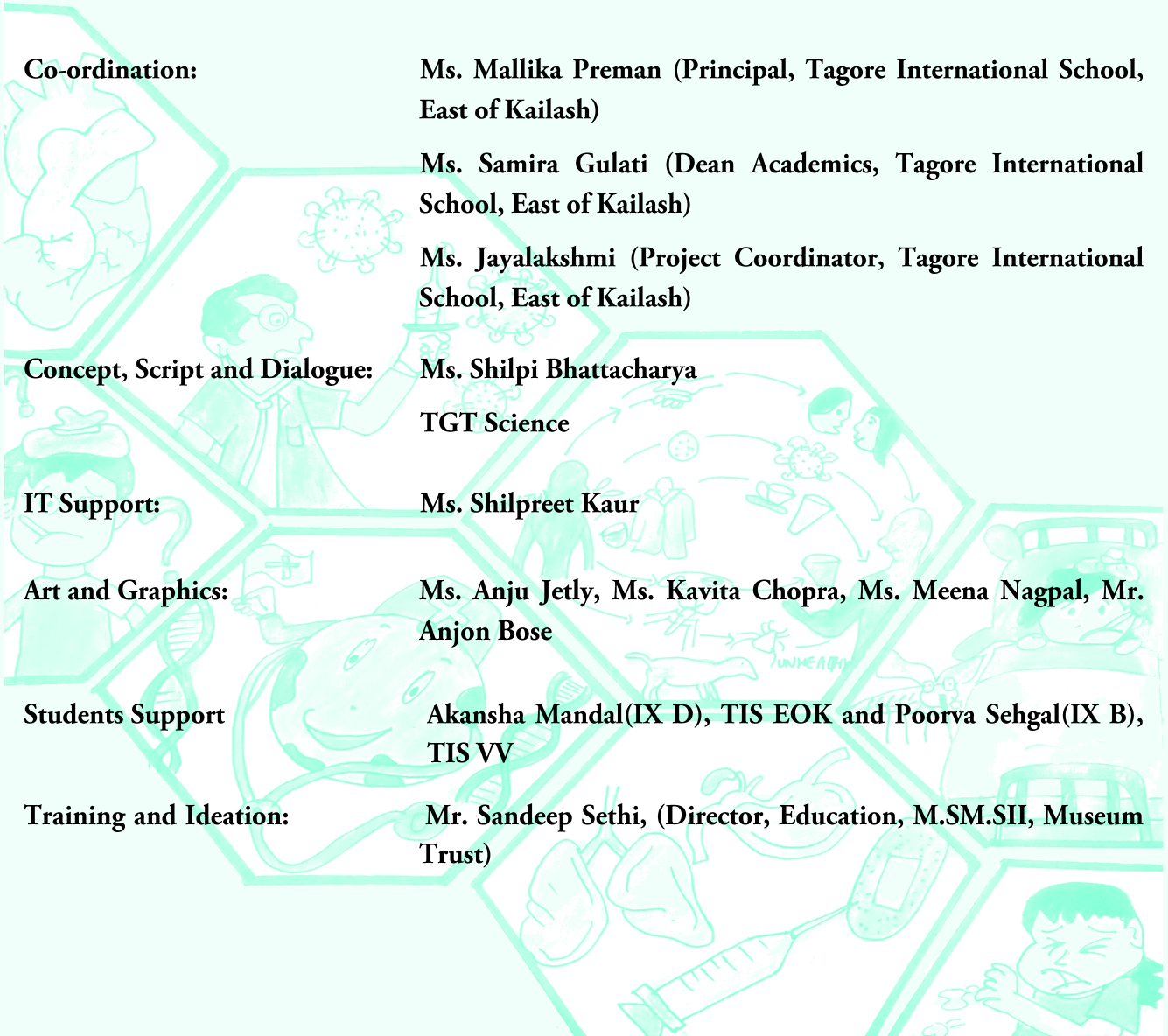
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PREFACE

This graphic novel is written with the aim to make learning a joyful experience for the learners. Students will easily identify with the characters and the settings mentioned in this graphic novel. Students will enjoy learning about the concepts of health and diseases in a fun way.

The story in the novel revolves around twins, Amit and Sumit who study in class nine. The story explores their day to day life at home and at school and how their parents and teacher facilitate learning.

This work of fiction aims to make our dear students independent learners.

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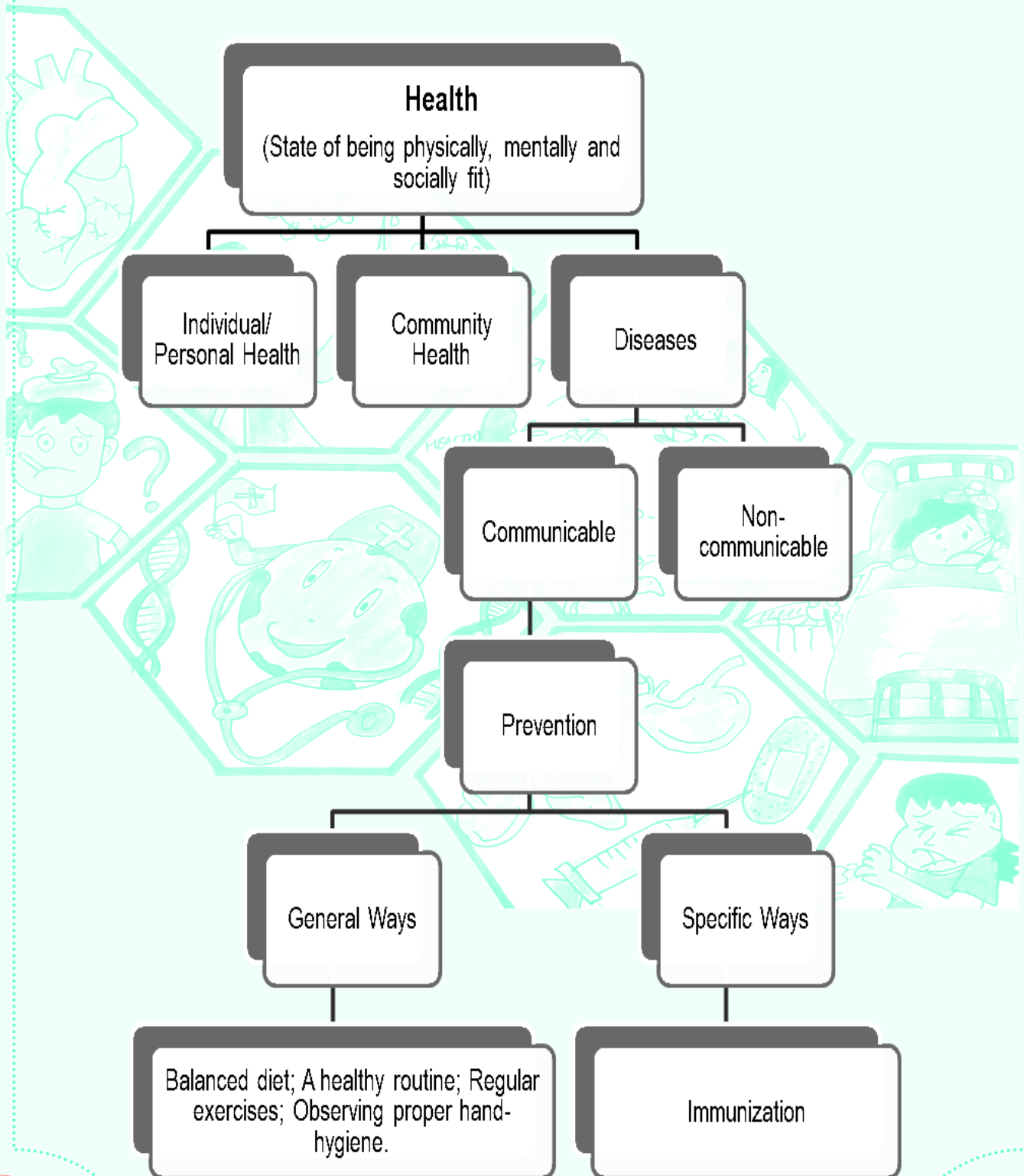


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STORYBOARD



LEARNING OUTCOMES

The reader will be able to:

- ⇒ **name different types of diseases**
- ⇒ **appreciate the role of healthy diet for a healthy body.**
- ⇒ **compare communicable and non-communicable diseases.**
- ⇒ **explain the importance of both individual and community health.**
- ⇒ **describe the role of immunization in prevention of diseases.**

The reader

- ⇒ **relates processes and phenomena with causes and effects, such as, symptoms with diseases and causal agents**
- ⇒ **explains processes and phenomena, such as, spread of diseases and their prevention**
- ⇒ **applies scientific concepts in daily life and solving problems, such as, takes preventive measures to control disease causing agents, etc.**

INTRODUCING THE CHARACTERS



Amit Mehra (One of the twins)

He is a 13 year old boy who studies in class 9. He is a voracious reader and is always found with a book in his hands.



Sumit Mehra (Other twin)

He is Amit's identical twin who studies in the same school with him. He loves to play football. He is always up to some prank or the other.



Deepti Mehra

She is Amit's and Sumit's elder sister who studies in class 12. She is also preparing for medical entrance exams.



Mr. Mehra

A 48 year old corporate employee. He is a loving father along with being a strict disciplinarian.



Mrs. Mehra

A 45 year old homemaker. She is the mother of three kids. She is an educated woman who makes sure that her kids cultivate a right attitude towards life and grow into healthy and responsible citizens of the country.

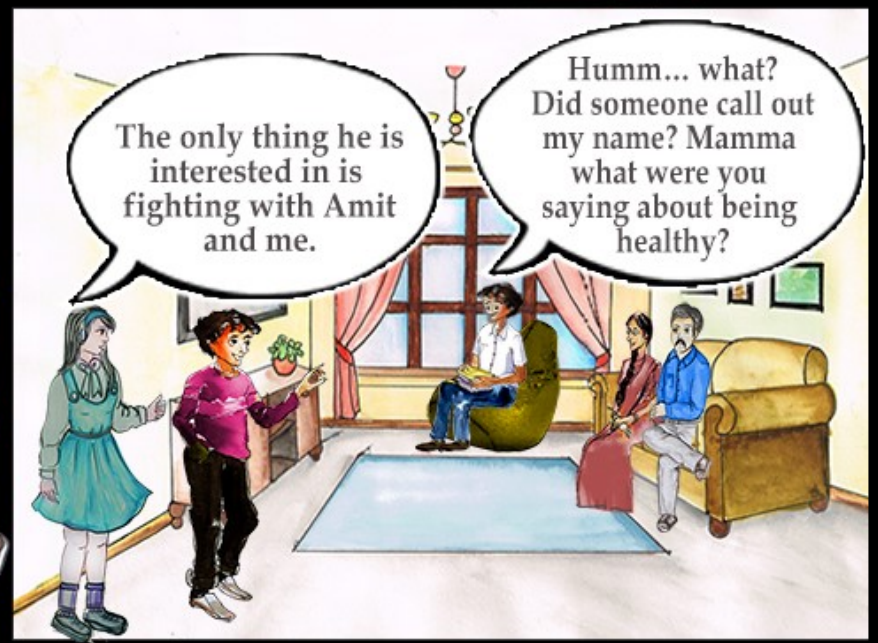
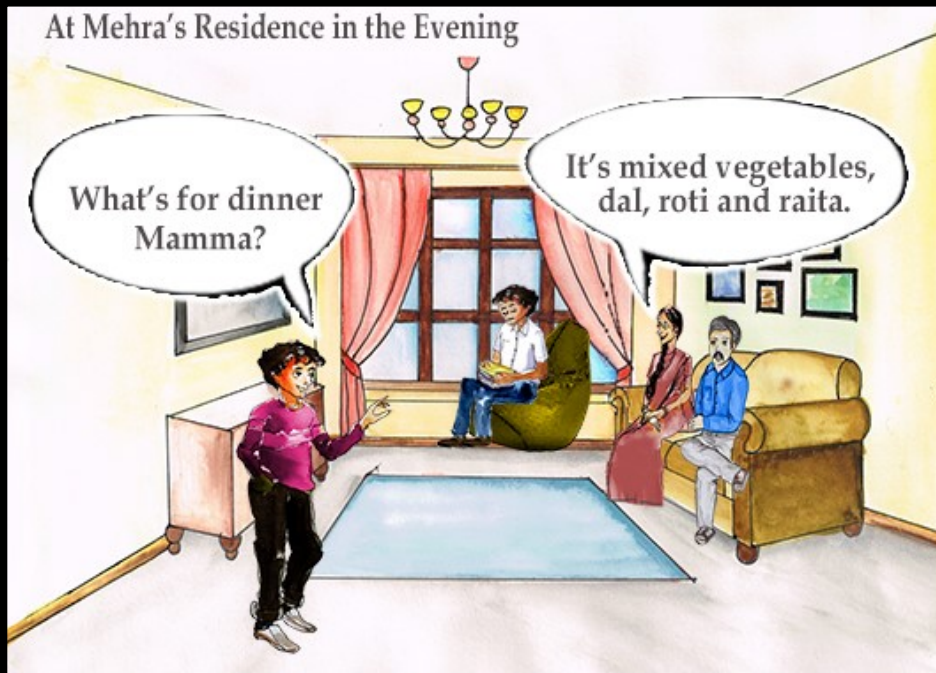


Rupa ma'am

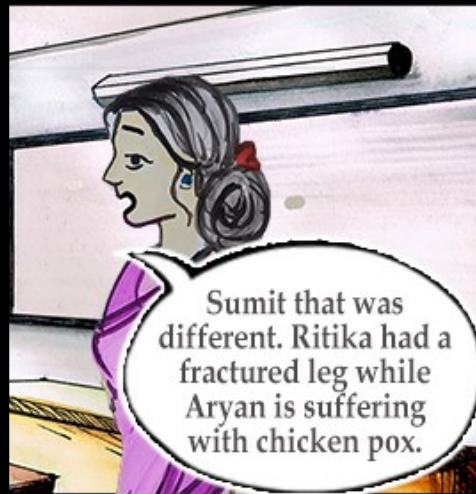
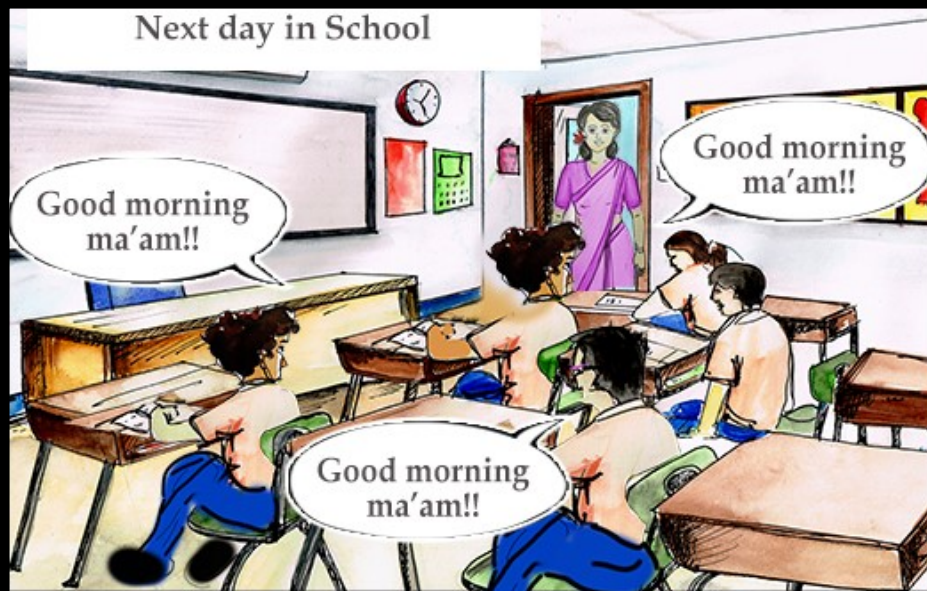
A 45 year old Science teacher in the school in which the twins study in. She is a compassionate teacher who loves her job and wants her students to be independent learners.

WHY DO WE FALL ILL

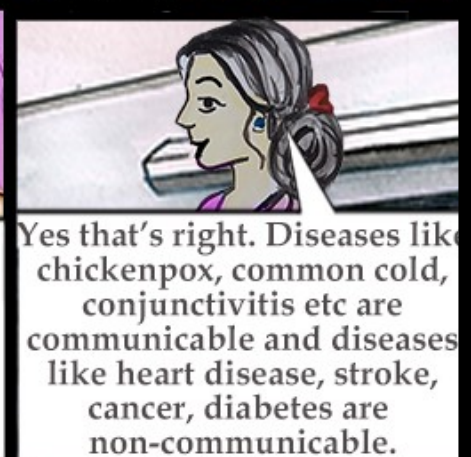
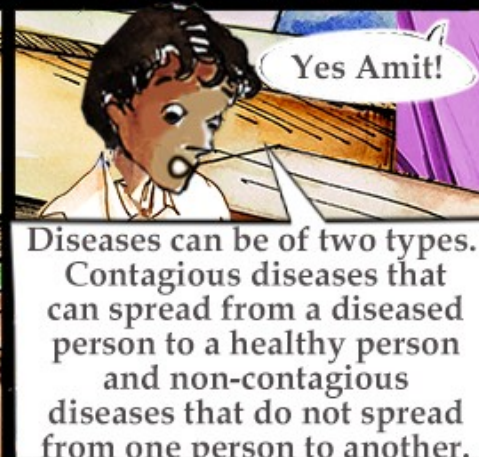
At Mehra's Residence in the Evening



Next day in School



Yes I agree that both Aryan and Ritika's cases are of medical leave, but Aryan has got chicken pox which is highly contagious.





TRING!
TRING!!



Students don't forget to wash your hands properly before you eat your tiffins. Always remember with proper hand-hygiene you can protect yourself from many ailments.



Also don't forget to fill your almanac pages, specially the vaccine record.





Mamma where have you kept my immunization chart?



All of a sudden, why do you need that?



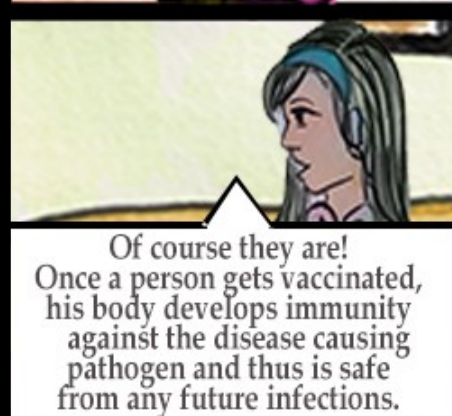
Mamma, Mr. Good boy wants to complete the task given by Rupa ma'am.



Mamma, I want to fill my almanac pages.



I really wonder whether all those shots we got as infants are still effective or not?



Of course they are! Once a person gets vaccinated, his body develops immunity against the disease causing pathogen and thus is safe from any future infections.



So basically once we get vaccinated, we develop immunity to fight off diseases.



Along with vaccination you also need a strong immune system to fight infections.



How do we make our immune system strong?



Maintain a healthy diet. Exercise regularly. Keep yourself well hydrated. Keep stress at bay and follow a regular sleep cycle.



Sleep-cycle! Hummm... I can work on that.



Ha ha ha
Ha ha ha
Ha ha ha

CHECK YOUR UNDERSTANDING—I

(1) Being healthy requires a person to be:

- (a) Physically fit
- (b) Mentally fit
- (c) Socially fit
- (d) All of these.

(2) Which of the following can make you ill if you come in contact with an infected person?

- (a) High blood pressure
- (b) Sneezing
- (c) Blood cancer
- (d) Genetic Abnormalities

(3) Which one of the following is not important for individual health?

- (a) Living in clean space
- (b) Good economic condition
- (c) Social equality and harmony
- (d) Living in a large and well-furnished house

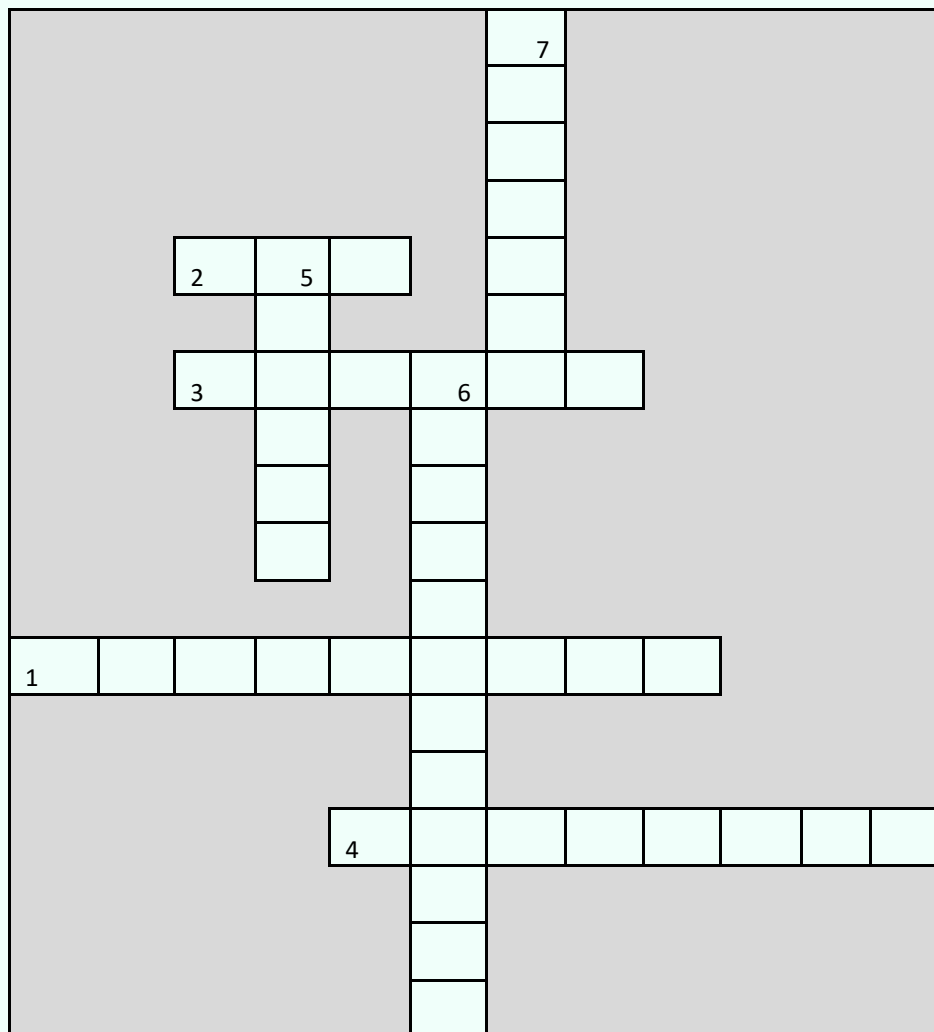
(4) We should not allow mosquitoes to breed in our surroundings because they

- (a) multiply very fast and cause pollution
- (b) are vectors for many diseases
- (c) bite and cause skin diseases
- (d) are not important insects

(5) You are aware of Polio Eradication Programme in your city. Children are vaccinated because

- (a) vaccination kills the polio causing microorganisms
- (b) prevents the entry of polio causing organism
- (c) it creates immunity in the body
- (d) all the above

CROSSWORD



ACROSS

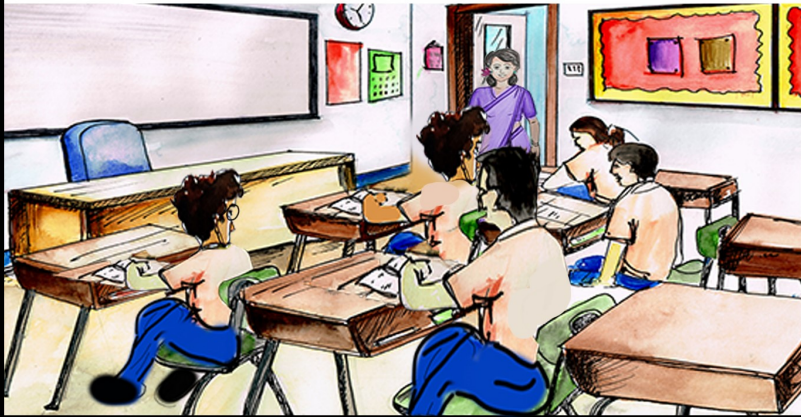
- (1) For being healthy both individual and _____ health are important.
- (2) The World Health Organization
- (3) A non-communicable disease.
- (4) A diet that contains all nutrients in proper quantity.

DOWN

- (5) A state of physical, mental and social well-being.
- (6) Such diseases can pass from a sick person to a healthy person.
- (7) A biological preparation that provides active acquired immunity to a particular

WHY DO WE FALL ILL (CONTD.)

Next day in school during Rupa ma'am's class



Ma'am may I please go to the medical room? I'm not feeling too well.

Why? What happened Amit?

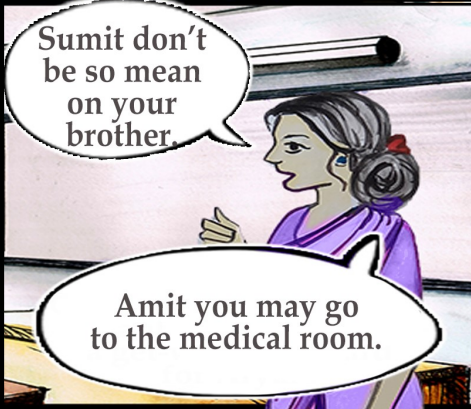


Ma'am I have a terrible headache and my stomach is also paining.

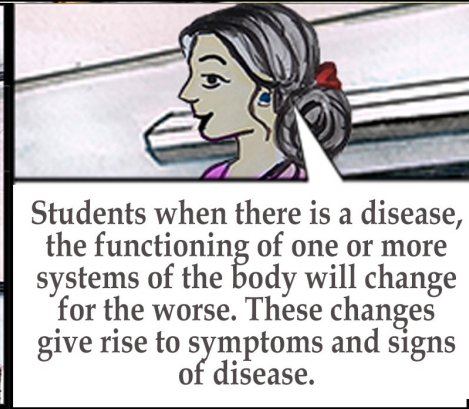


Ma'am I think Amit is getting down with some serious disease like meningitis. You see too much reading could be injurious to your health.

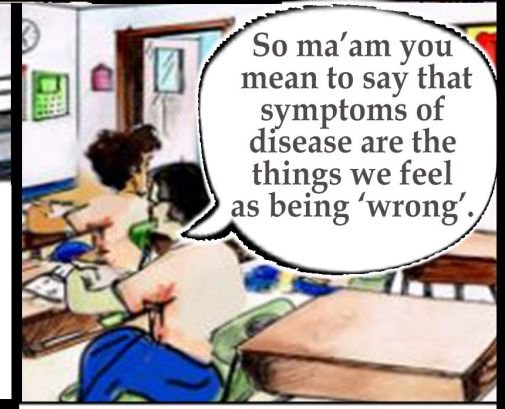
Sumit don't be so mean on your brother.



Amit you may go to the medical room.



Students when there is a disease, the functioning of one or more systems of the body will change for the worse. These changes give rise to symptoms and signs of disease.



So ma'am you mean to say that symptoms of disease are the things we feel as being 'wrong'.

Yes these indicate that there may be a disease, but they don't indicate what the disease is.



So we have a headache, we have cough, we have loose motions, we have a wound with pus; these are all symptoms.

Yes that's right Sumit.



A headache may mean just examination stress or, very rarely, it may mean meningitis, or any one of a dozen different diseases.



Ma'am you said symptoms and signs of disease, aren't the two one and the same things?



No they are not same. Symptom is a change in the normal structure or functioning of the body system or body part.



Then what are signs of a disease?



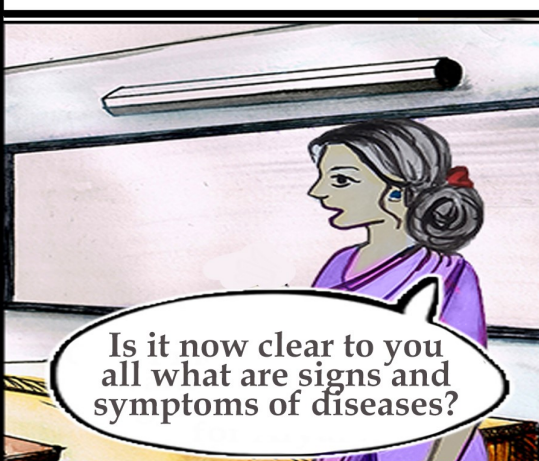
Signs of disease are what physicians will look for on the basis of the symptoms. Signs will give a little more definite indication of the presence of a particular disease.



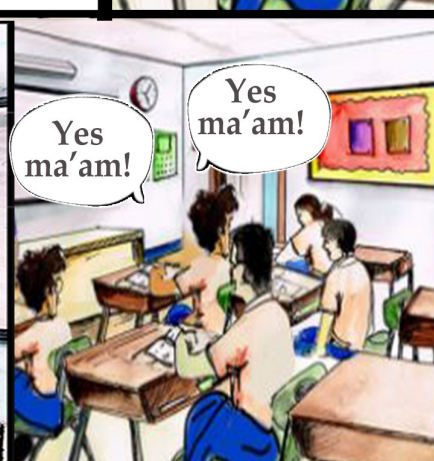
Ma'am then what are those tests that the doctors ask their patients to get done?



Physicians will also get laboratory tests done to pinpoint the disease further.



Is it now clear to you all what are signs and symptoms of diseases?



Yes ma'am!

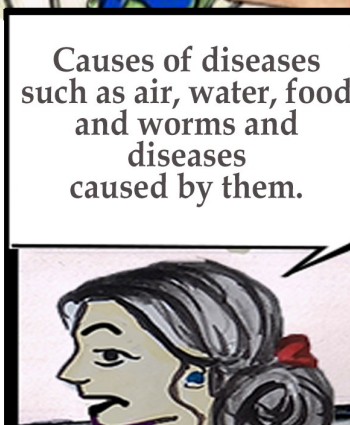
Yes ma'am!



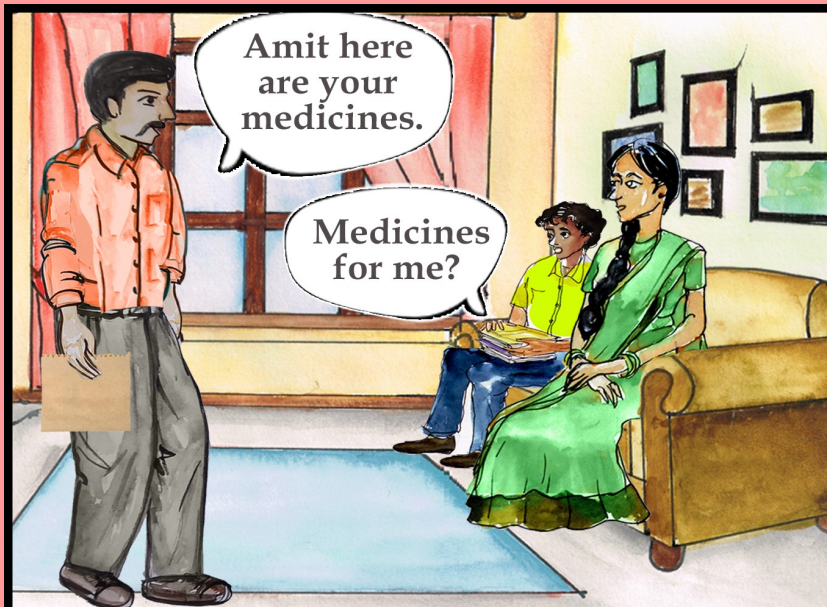
Students this weekend please do complete your projects.



Which project ma'am?



Causes of diseases such as air, water, food and worms and diseases caused by them.



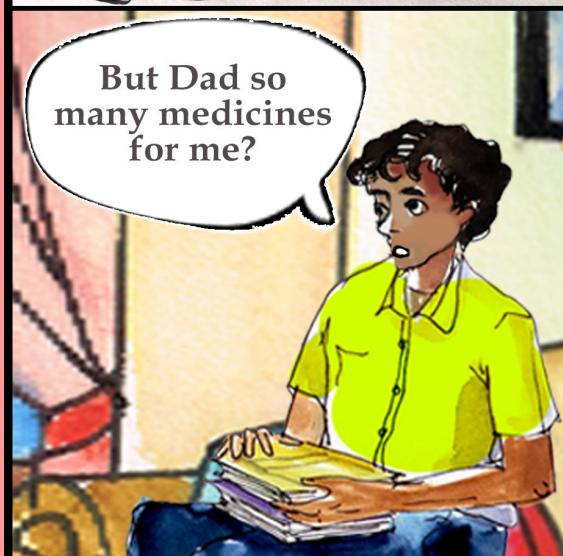
Amit here
are your
medicines.

Medicines
for me?



Yes I got a call
from your school
nurse today.
She asked me to
get an antacid
for you.

As I had to see my doctor for my
regular check-up , I asked him
to prescribe some medicines for
your indigestion too.



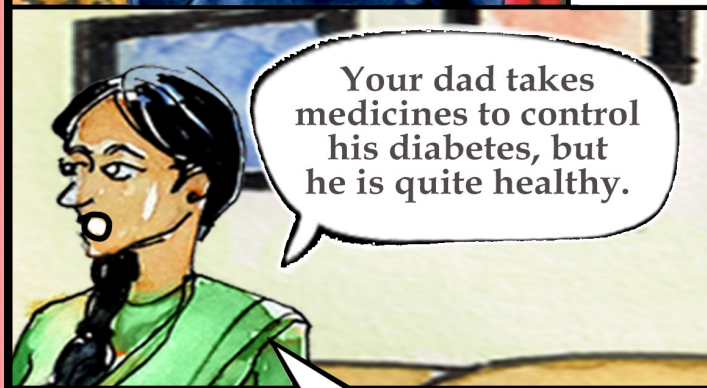
But Dad so
many medicines
for me?



No no only this antacid is
for you. Rest of the
medicines are for me.



But Dad you are quiet
healthy. Why do you
need medicines? Do you
have any disease?



Your dad takes
medicines to control
his diabetes, but
he is quite healthy.

Being healthy and being
disease-free are two different things.



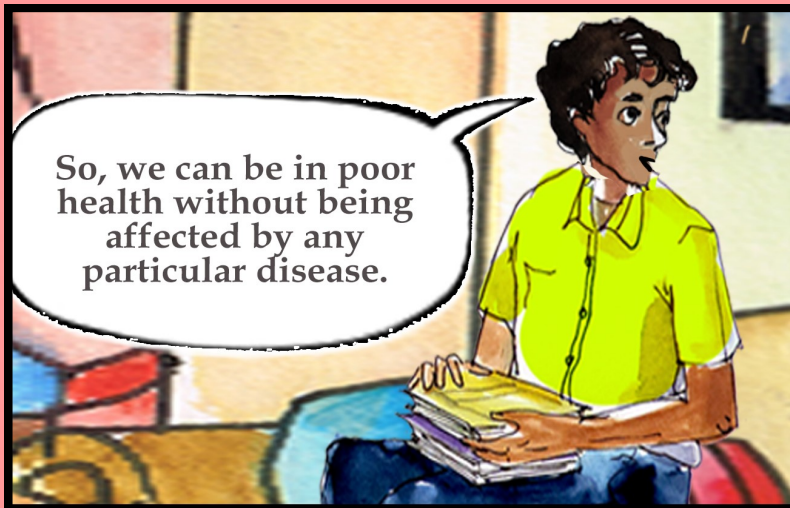
How Mamma? I'm
so confused. You
mean simply not being
diseased is not the
same as being healthy.



'Good health' for a dancer may mean
being able to stretch his body into
difficult but graceful positions.



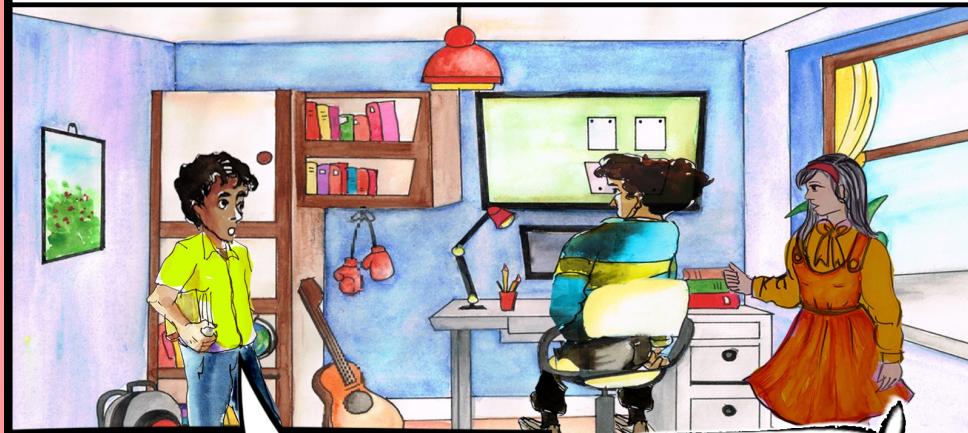
On the other hand, good health for a
musician may mean having enough
breathing capacity in his/her lungs
to control the notes from his/her flute.



So, we can be in poor health without being affected by any particular disease.

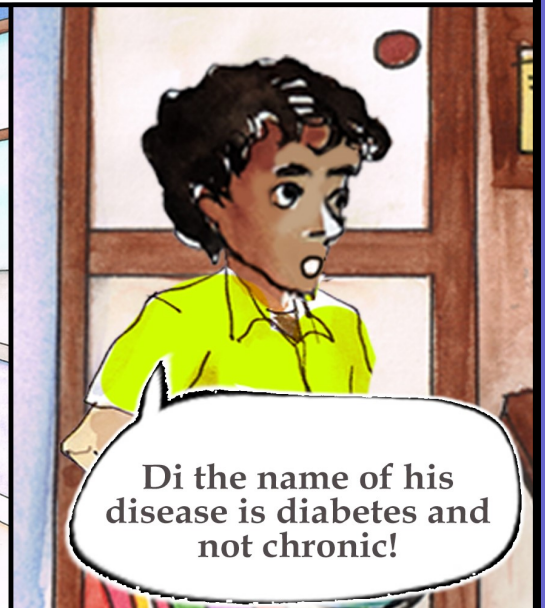


Yes that's why, when we think about health, we think about societies and communities. While, when we think about disease, we think about individual sufferers.



Hey did you both know that Dad is a diabetic. He went to see his doctor today and got medicine for me as well.

Yes I know about Dad's chronic disease.



Di the name of his disease is diabetes and not chronic!



Diabetes is a chronic disease. A chronic disease is a disease that is long-lasting in its effects. It can last for more than three months or even a life-time.



So now Amit will suffer with indigestion all his life?



Oh no! Indigestion is an acute disease. An acute disease is over very soon and will not have time to cause major effects on general health, while a chronic disease will do so.



Di can you give some examples of acute and chronic diseases?



Yeah sure. Common cold, typhoid, jaundice, cholera are some of the acute diseases. Chronic diseases include AIDS, elephantiasis, cancer, tuberculosis etc.



Okay you two now let's get started with the homework.



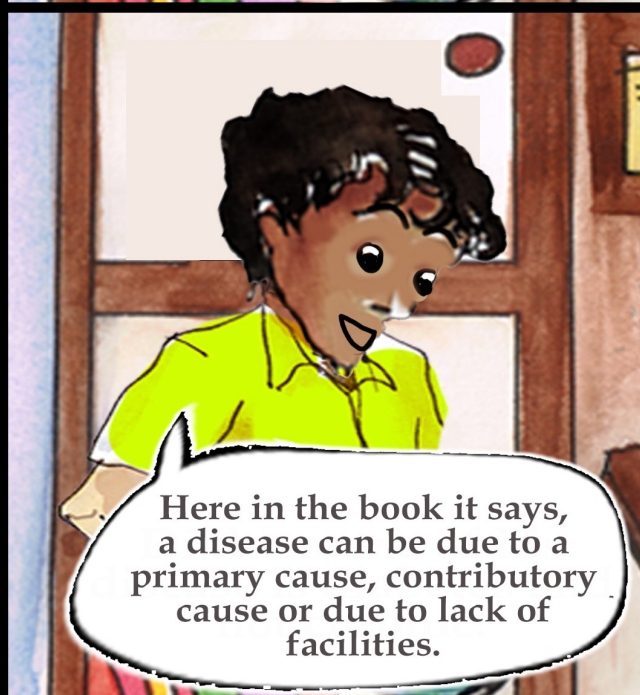
Yes let's do. Di please help us with our project on "Causes of diseases such as air, water, food and worms and diseases caused by them."



Oh sure. Health and diseases is my favourite topic. So from where do you boys want to start?



Let's start with the causes of disease.



Here in the book it says, a disease can be due to a primary cause, contributory cause or due to lack of facilities.



Amit you are making this complicated.



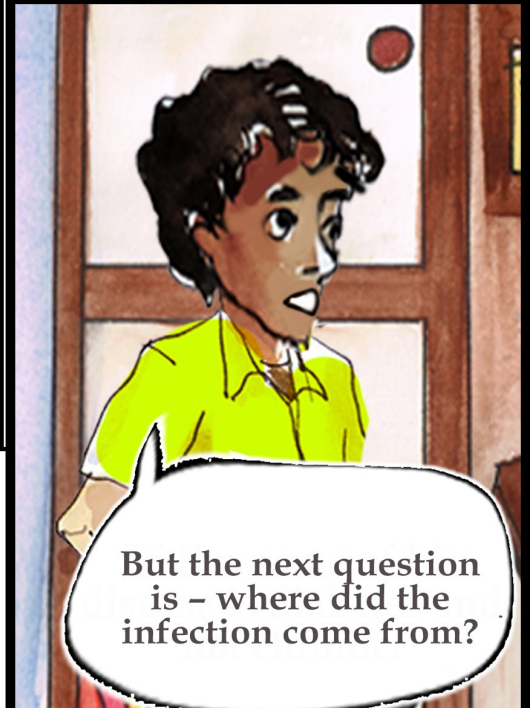
Ok wait let me explain what Amit just said with the help of an example.



Yes Di that would be great.



Let's say there is a baby suffering from loose motions, we can say that the cause of the loose motions is probably an infection.



But the next question is - where did the infection come from?



Suppose we find that the infection came through unclean drinking water. But many babies must have had this unclean drinking water. So, why is it that one baby developed loose motions when the other babies did not?



One reason might be that this baby is not healthy. As a result, he/she might be more likely to have disease when exposed to risk, whereas healthier babies would not.



Yes correct thinking. But why is the baby not healthy?



Maybe because he/she is not well nourished and does not get enough food.



Right! So, lack of good nourishment becomes a second cause of the disease. Further, why is the baby not well nourished?



Because he/she is from a household which is poor.



So you see without the pathogen, the genetic difference or the poor nourishment alone would not lead to loose motions.



But they do become contributory causes of the disease.



Right again. Good you have understood the primary and secondary causes of a disease.



Is there a tertiary cause as well.



Sure there is. Now tell me - Why was there no clean drinking water for the baby?



Perhaps because the public services are poor where the baby's family lives.



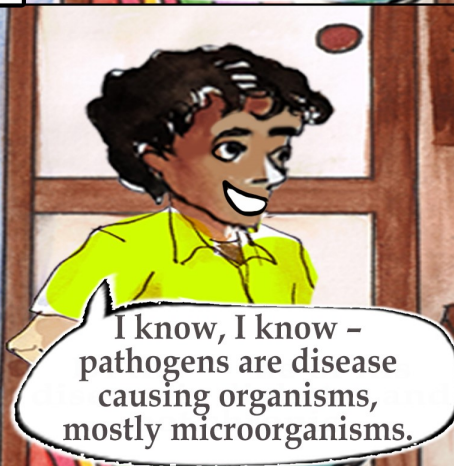
So, poverty or lack of public services becomes third cause of the baby's disease.



Absolutely right bro! I hope it's now clear to you both that all diseases will have immediate causes and contributory causes. Also, most diseases will have many causes, rather than one single cause.



Di you used the word pathogen earlier. What does it mean?



I know, I know - pathogens are disease causing organisms, mostly microorganisms.



We studied about microorganisms in class eight. They are bacteria, viruses, fungi, protozoa.



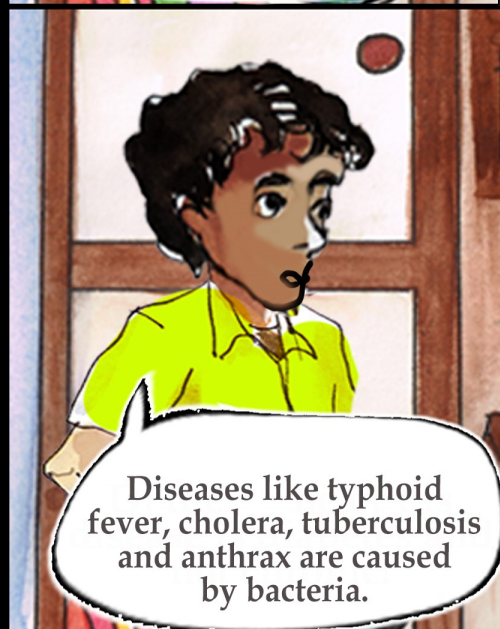
I'm surprised that you remember what you studied last year.



Yes wise-guy I do.



Some examples of diseases caused by viruses are the common cold, influenza, dengue fever and AIDS.



Diseases like typhoid fever, cholera, tuberculosis and anthrax are caused by bacteria.



Many common skin infections are caused by different kinds of fungi while protozoan microbes cause diseases, such as malaria and kalaazar.



Di do worms also cause diseases?



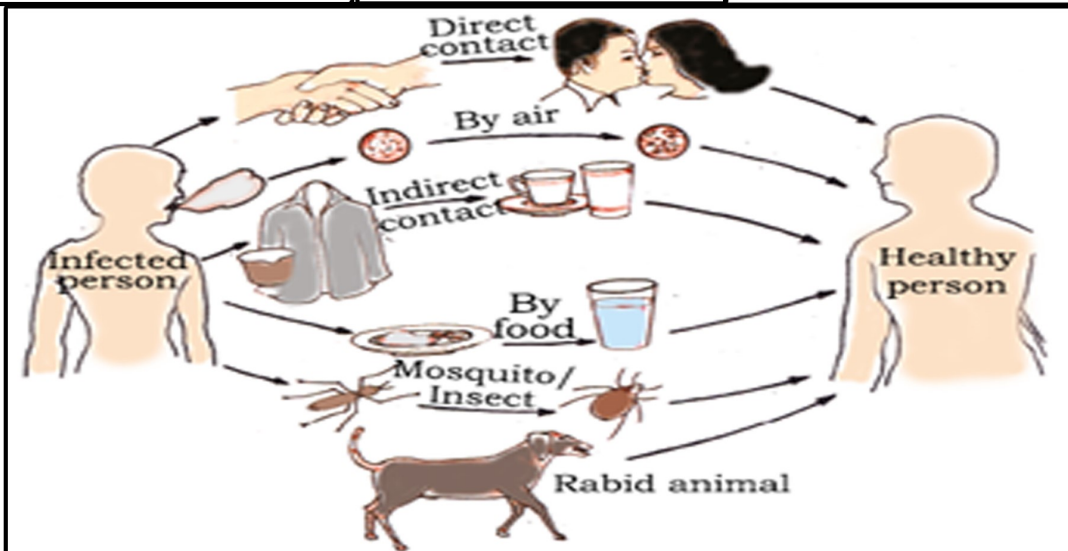
Intestinal worm infections and diseases like elephantiasis are caused by different species of worms.



Di how do these pathogens get into our bodies and cause diseases?



Here you can use this chart, I made for my class presentation, to explain common methods of transmission of diseases



So disease-causing microbes can spread through the air.



Yes this occurs through the little droplets thrown out by an infected person who sneezes or coughs. Someone standing close by can breathe in these droplets, and the microbes get a chance to start a new infection.



That's why we should always cover our mouth with a handkerchief or tissue paper while coughing or sneezing.



Not only air, diseases can also be spread through water. This occurs if the excreta from someone suffering from an infectious gut disease, such as cholera, get mixed with the drinking water used by people living nearby.



Mosquitoes and house flies also transmit diseases. Isn't it Di?



Yes they do and they are called vectors.



CHECK YOUR UNDERSTANDING—II

Fill in the blanks

- (a) _____ disease continues for many days and causes _____ on body.
- (b) _____ disease continues for a few days and causes no long term effect on body.
- (c) _____ is defined as physical, mental and social well-being and comfort.
- (d) Common cold is _____ disease.
- (e) Many skin diseases are caused by _____.

Classify the following diseases as infectious or non-infectious:

- (a) AIDS
- (b) Tuberculosis
- (c) Cholera
- (d) High blood pressure
- (e) Heart disease
- (f) Pneumonia
- (g) Cancer

Match the following:

Disease	Pathogen
Bacteria	Elephantiasis
Fungi	Malaria
Virus	Typhoid
Protozoa	AIDS
Worm	Skin infections

GLOSSARY

Balanced diet: A diet that contains all kinds of nutrients in the right proportion.

Communicable diseases: Diseases that can transfer from a sick person to a healthy person.

Disease: A particular abnormal condition that negatively affects the structure or function of all or part of an organism, and that is not due to any immediate external injury.

Health: A state of physical, mental and social well-being.

Immunization: The act of administering a vaccine.

Microbes: Living organisms that are too small to be seen through the naked eyes, also known as microorganisms.

Non-Communicable diseases: Diseases that cannot be transferred from a sick person to a healthy person.

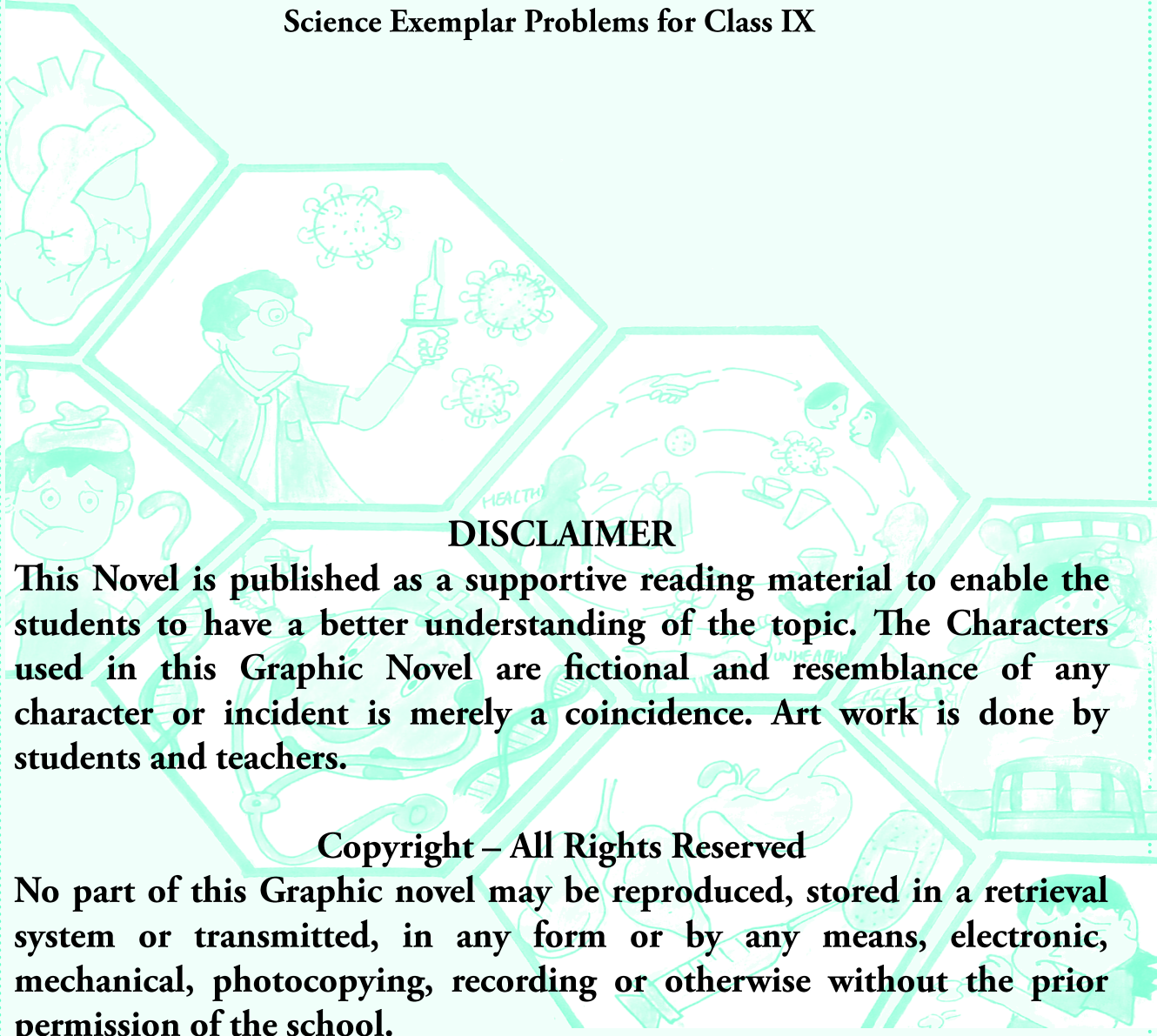
Pathogen: A disease causing organism.

Vaccine: A biological preparation that provides active acquired immunity to a particular infectious disease.

Vector: An organism that does not cause disease itself but which spreads infection by conveying pathogens from one host to another.

BIBLIOGRAPHY

NCERT Science Textbook for Class IX
Science Exemplar Problems for Class IX



DISCLAIMER

This Novel is published as a supportive reading material to enable the students to have a better understanding of the topic. The Characters used in this Graphic Novel are fictional and resemblance of any character or incident is merely a coincidence. Art work is done by students and teachers.

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FROM THE PRINCIPAL'S DESK

Dear readers,

‘Change is the only constant’, so said a wise man from the past. And so true indeed! With the coming of the National Education Policy 2020, the focus of education is shifting to more student centric education, and thus the need to produce the content in a way which can be easily understood by the students.

The Central Board of Secondary Education has also brought in alterations in the way education was being imparted in the classrooms of the nation. Art Integration with the curriculum, competency based education, stress on Physical Fitness are all endeavours to prepare the students for the necessities of the future. One such endeavour is also changing the curriculum to graphic novels.

Conceived and directed by Mr. Sandeep Sethi, his passion rubbed on to the teachers as well. He lent support through constant guidance.

I am also grateful to Ms. Anita Karwal, Secretary, Department of School Education, Ministry of Human Resource and Development, whose valuable inputs and constant motivation has encouraged teachers to curate the concepts in the form of interesting graphics. I am very sure that this will change the way topics are taught in the classrooms. Using comic strip as a tool, concepts will be explained in a simple way, more relatable to the students.

Our sincere thanks to the worthy team of Ms. Anita Karwal, Secretary, Department of School Education, Ministry of Human Resource and Development, Mr. Manoj Ahuja, Chairman, Central Board of Secondary Education and Mr. Sandeep Sethi, the pilot of the project.

My sincere thanks are also due to the team of gifted teachers and students who in a time-bound frame produced creatively endowed content which will be a visual extravaganza for the students.

Enjoy reading!

Mallika Preman

Principal

SUMMARY

- Good health is a prerequisite for a good life. It is therefore imperative that children are sensitized about healthy habits from a very young age. Health is not something that can be attained overnight but requires a long term investment in terms of food, physical exercises, healthy routine, social interactions and mental stimulations.
- Health is a state of physical, mental and social well-being.
- The health of an individual is dependent on his/her physical surroundings and his/her economic status.
- Diseases are classified as acute or chronic, depending on their duration.
- Disease may be due to infectious or non-infectious causes.
- Infectious agents belong to different categories of organisms and may be unicellular and microscopic or multicellular.
- The category to which a disease-causing organism belongs decides the type of treatment.
- Infectious agents are spread through air, water, physical contact or vectors.
- Prevention of disease is more desirable than its successful treatment.
- Infectious diseases can be prevented by public health hygiene measures that reduce exposure to infectious agents.
- Infectious diseases can also be prevented by using immunisation.
- Effective prevention of infectious diseases in the community requires that everyone should have access to public hygiene and immunisation.

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