

Diseases, Prevention & Control

Reference book on Malaria for children

Project 3
Visual Communication

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Certificate

Project topic : Disease Prevention & Control

Reference book on Malaria for children

Visual Communication | Project 3

Guide: Prof. Mandar Rane

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Declaration

I declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/ source in my submission.

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To my Guide, Prof. Mandar Rane. A remarkably sensitive and meticulous individual who has been an inspiration for very long and a persistent support.

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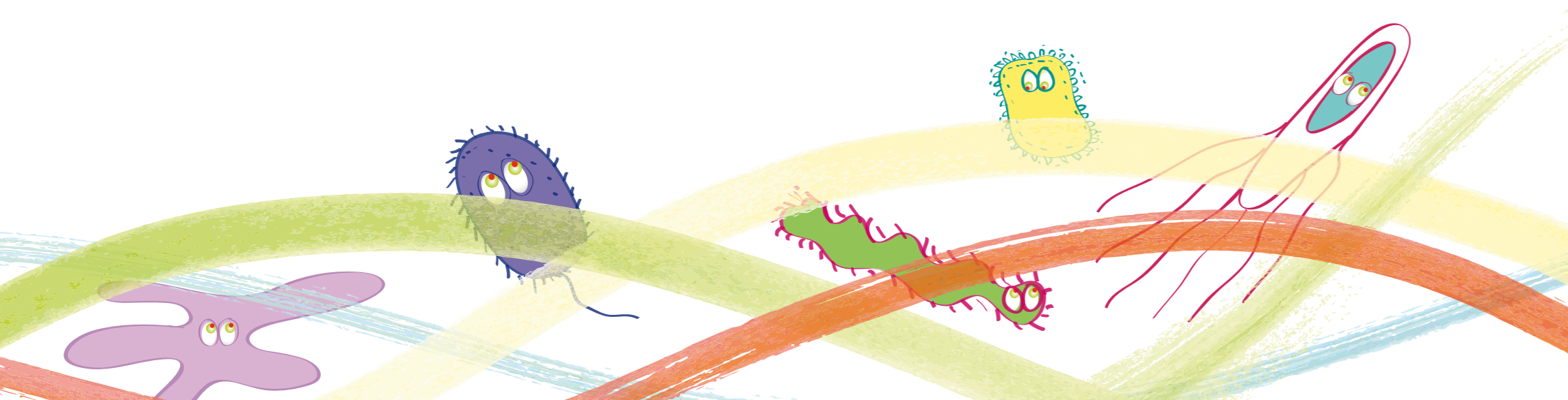
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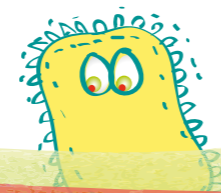


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Why?

My project has taken shape through a tiresome process of exasperating confusions and euphoric moments of clarity. At every turn I forced myself to pose seemingly simple questions in the form of why's? how? who? & what? to keep constant base with the possible and achievable. Although for days I have taken the liberty to wander and think about the directly unrelated. The document presented is a compilation of these seemingly simple questions disguised in the form of interventions, answers to which I found either within myself or from dutiful friends and my remarkably gifted guide.



Prologue

If you go out in the sun and have cold water after that you will get fever.
 You should eat spinach like Popeye you will be strong.
 If you burp after you finish eating it means you are full.
 If you eat fruits you will not fall sick.
 If you get hiccups it means that maybe someone is remembering you.
 You should not eat vada pav from the street.
 Always wash your hands before you eat.

The list of things we were suppose to follow as children is endless. Although now there is some logic we see behind some of these strange notions that our parents have engrained into us, little did we know what is it in spinach that makes us strong or what is fever? Why fruits are good for your skin? Or what germs are?

But then again one cant help but wonder,
 Does a child really need to know so much at that age? Would she/he understand what fever is or how it happens?

Having grown up in a family of nurses and doctors my bed time stories have mostly been my aunts narrating incidences from hospitals during their shifts. For a very strange reason it used to excite me, an alien

environment. With a brigade of people, who are there to fix you and take care of you. Of people coming in sick and not knowing what is happening to them. Heart attacks, diarrhoea, coma, cancer were words I would hear and only understand that it is something very serious. That, there is a possibility of loosing your life if nothing is done. Since then this has been my constant wonder as to why is it that people even get in a situation like this where so much is at stake. What is it that they do to get a heart attack or what happens to the brain in a coma.

Only I know the kind of frustration I would feel when I would fall sick and have to lay in bed all day. Miss school and feel so miserable with things happening inside my body I don't understand. Only knowing one thing that I am not well. What is well?

Although there is lot which is not in our control but whatever bit is, I think I would any day want to know what exactly is happening. Doesn't everyone have a right to know? Take informed and conscious decisions for the better.

Why this subject?

I believe in design for a purpose or function. My interest in public health & medicine has been active for a while now. It arises from basic concern for people and believing that everyone must take informed decisions in life and living a healthy life can only help one do so.

Hence, it only made sense to pick a subject that is of interest to me, which I see myself pursuing even in the future. Design can facilitate, motivate and bring clarity through unconventional methods and means.

Public Health Communication is a term I came across as I began my initial understanding of the role design

can play in helping people make a positive change. It also implies the development of communication methods or strategies to promote public health. From here I began looking into more closely at the coined term and looking at the scope of what can be achieved.

From a more broader understanding of Public Health Communication, I narrowed the subject to focus on disease and awareness. Further study only helped me realise that designing for children under the particular subject would be most fruitful for their learning and advance beneficial change.

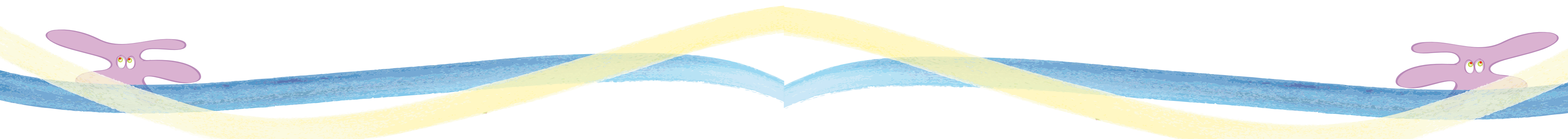


Abstract

A book on Malaria for children from 7 yrs and above. It is placed in the young reference book category as it provides factual content in an engaging, creative & coherent form. The stem of the book is a story based on the disease which takes forth the content explaining the all key components involved in understanding & learning about a disease, control & prevention. The story is only to help children make associations, relate with characters & follow a time line, while the essential facts and information to give deeper in-depth understanding of the science behind it.

Chapter 1

1. Introduction



Where did I start from?

My learning started from a very broad understanding of the Indian health care system. This was important to understand the kind of services and information available to people from all age groups. Also, to understand at what level the need for design intervention would be most useful.

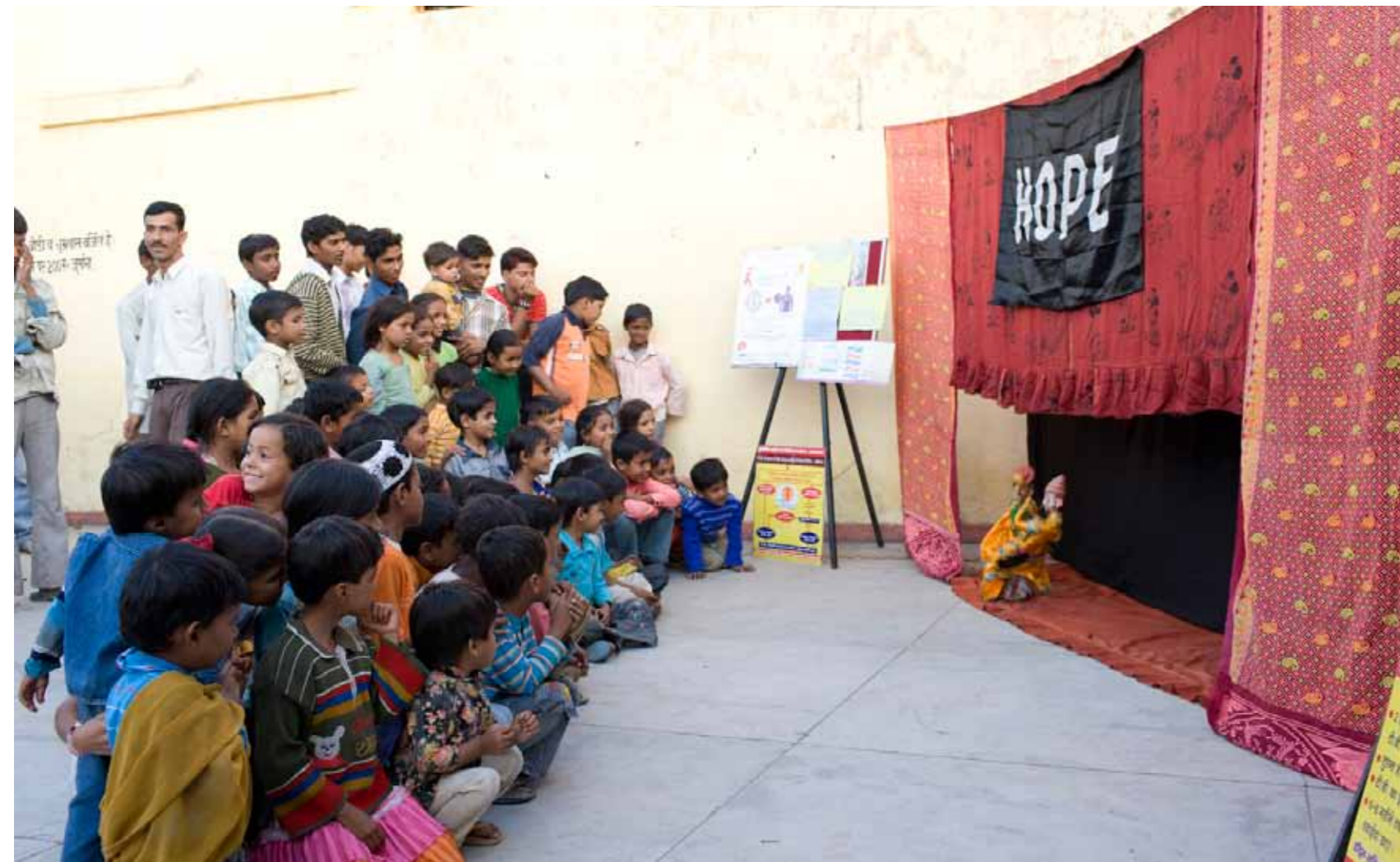


Introduction

With more than one billion people, India is the second most populous country in the world accounting for 17% of the world's population. The country has recently become one of the world's fastest growing economies with an average growth rate of eight percent over the past three years. It has emerged as a global player in several areas, including information technology, business process outsourcing, telecommunications, and pharmaceuticals. The demographic profile of India is changing with an ageing population. The subcontinent is characterized by large diversities in geographical regions, socio cultural groups, and health needs.

*While India is being propelled to a position of international eminence, it faces three main groups of health challenges: first, dealing effectively with unfinished agendas of communicable diseases, maternal and child health, and health systems strengthening; second, dealing with new emerging challenges such as the premature burden of noncommunicable diseases (NCDs); and third, dealing with globalization related issues while contributing to the management and shaping of the global policy environment.**
 (* WHO, Country Cooperation Strategy at a glance)





Children in a poor community in North West India watch a puppet show organised by the AKS Hope project. Health education initiatives such as these are an integral part of TB control efforts in vulnerable communities where awareness of the disease is low.

Amongst the many challenges identified in our country few key point have been noted below :

- Inequitable access to quality care
- Limited expenditure of government on Health (0.9% of GDP)
- Relevance of Public Health practice and education
- Inadequate and delayed information available for informed decisions and outbreak response management.

Communicable diseases account for about 38% of the disease burden with large variations across states. Adolescents constitute 22 percent of the total population, and about 70% of adolescent girls are anaemic. NCDs (Non communicable diseases) have evolved as major public health problems and accounted for 53 percent of all deaths in the age group 30-59 years in 2005 (a). It is projected that by 2015, 59 percent of the total deaths in India would be due to NCDs. Tobacco is widely consumed and remains as the single most important preventable risk factor with 47% of men and 15 percent of women being regular consumers of tobacco (b). Road traffic injuries result in the death of more than 100 000 people every year (c). While NCDs are usually expected to occur in old age, their peak occurrence in India is a decade earlier than western countries. India is striving to achieve the

millennium development goals set forth by the UN and the expectations to attain various targets are variable. The policies (d) set by the government although seem all inclusive and idealistic the ground realities are more than evident as we witness in our daily lives.

The presented data is only to bring to light and set the base to understand the dire need for people to take their health and life as a serious matter of concern. The government and policies set can only provide help in either controlling emerging problems or giving medical support. Conscious change can occur only at a more personal level.

Education can help inform people and make them aware of the repercussions of ignoring emerging concerns of health related issues. Young population must be the principle target to help them grow up to make informed choices. The impact when directed from general education is limited hence most of the needed information must be integrated into the educational system and during the earlier years of growth. (by way of books, class room material etc.) for them to understand the basic concepts of health and preventing the onset of a disease. Knowledge will only empower them to become active members of their family and community, thereby bringing about a positive social change in the long run.

What is the state of Health care in India?

This was a dilemma lurking over my head for quite some time since the inception of the project. Primarily to gauge the main problem areas. Every country has a system of deploying services to the masses based on priority. Both short term and long term. The following chapter shares the initial research done on the particular subject thereby providing the basis for identifying a suitable problem statement.



Chapter 2

Research

1. Concept of health
2. Determinants of health
3. Indian health care delivery system
4. Health Education
5. Approach to health education
6. Scope of health education

7. Secondary research
8. Observation and Findings
9. School Curriculum
10. Textbooks as learning aids
11. Alternative materials

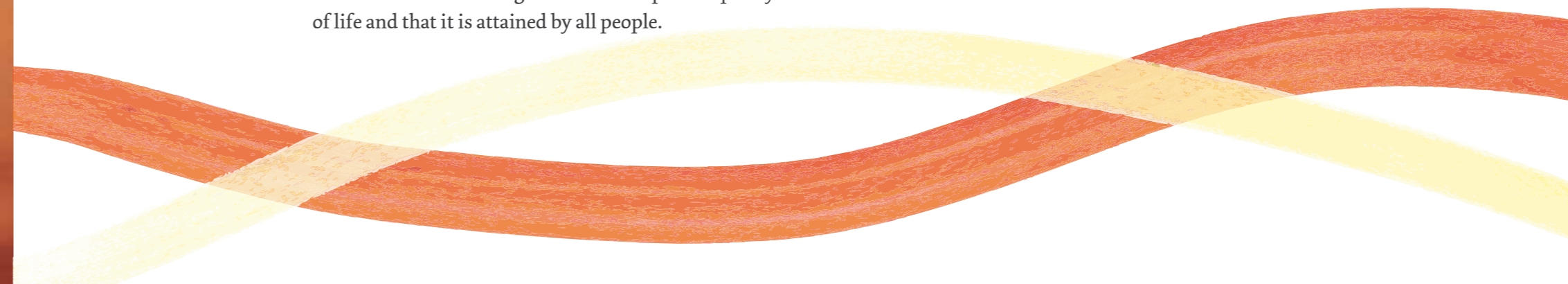


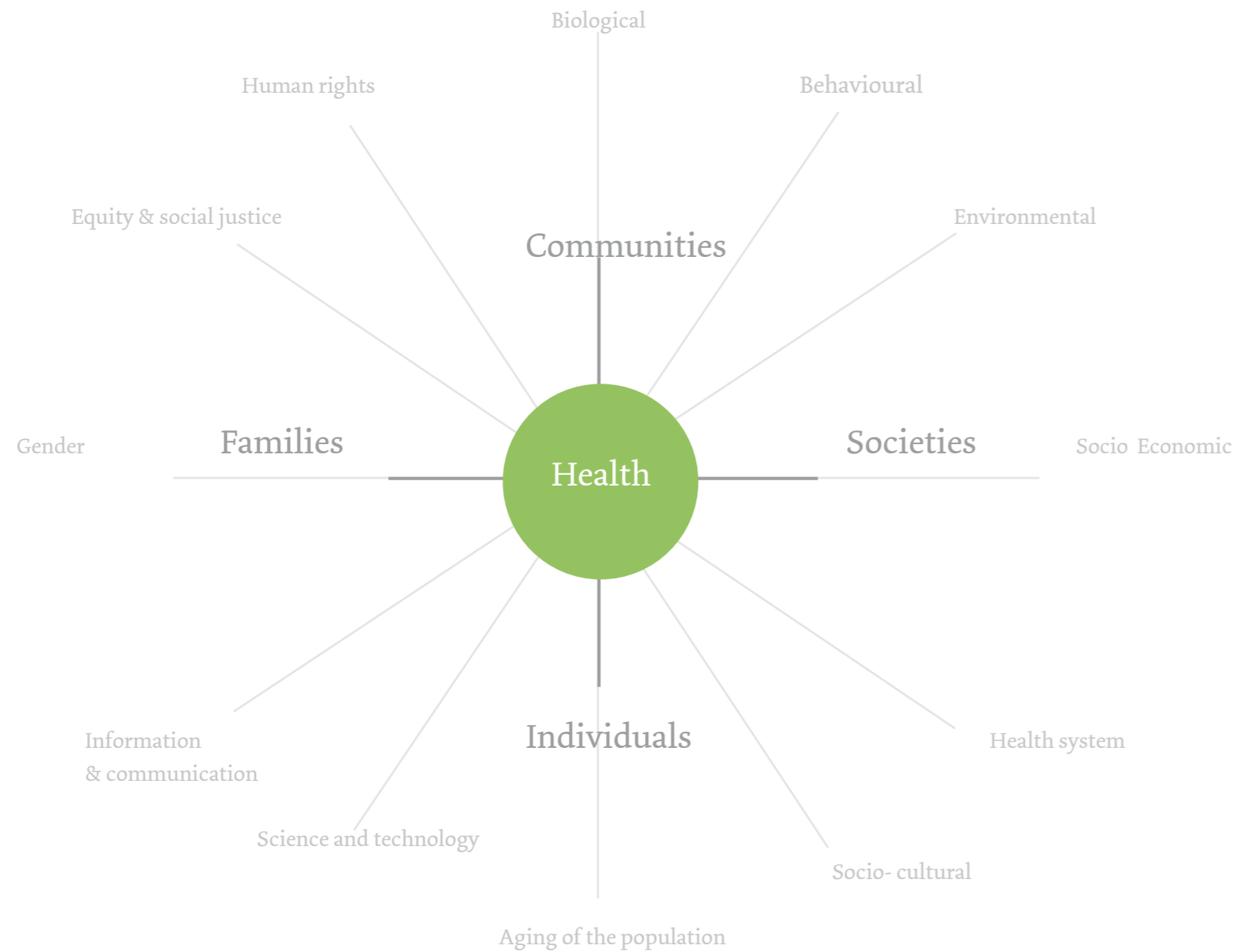
Concept of health

Health is a common theme in most cultures. In fact, all communities have their concepts of health, as part of their culture. Among definitions still used, probably the oldest is that health is the “absence of disease”. In some cultures, health and harmony are considered equivalent, harmony being defined as “being at peace with the self, the community, god and cosmos”. The ancient Indians and Greeks shared this concept and attributed disease to disturbances to bodily equilibrium.

All said health continues to be neglected on a more individual level. It has taken seat when compared to more important needs for example wealth, power, prestige, knowledge and security. It is completely taken for granted and its importance not realized until lost.

However, during the past few decades, there has been a reawakening that health is a fundamental human right and a world wide social goal. To have improved quality of life and that it is attained by all people.





Determinants of Health

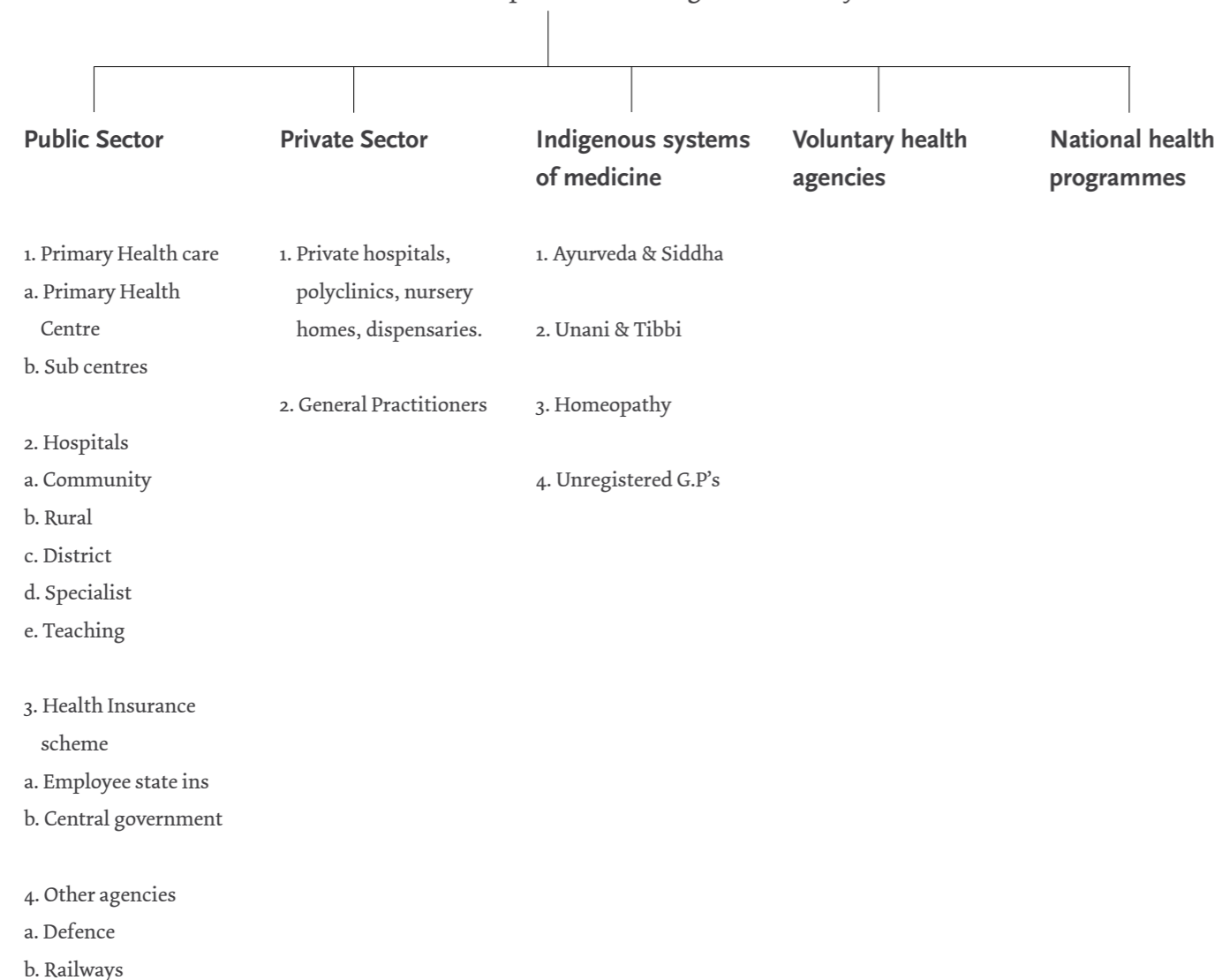
Health is multifactorial. The factors, which influence health, lie both within the individual and externally in the society in which he or she lives. It is a truism to say that what man is and to what diseases he may fall victim depends on a combination of two sets of factors – his genetic factors and the environmental factors to which he is exposed. These factors interact and these interactions maybe health promoting or deleterious.

Thus, conceptually, the health of individuals and whole communities maybe be considered to be the result of many interactions.



Indian health care delivery system

The services at multiple levels existing in India today.



Health education

Health education is the part of health care that is concerned with promoting healthy behaviour.
 -WHO (1988), Education for Health. A manual on health education in primary health care.

The foundation of a preventive health care system is health education. The basis of all education is communication. It is often assumed that knowledge determines attitudes and attitudes determine behaviour

Health education can bring about changes in lifestyles and risk factors of disease. Most of the worlds major health problems and premature deaths are preventable through changes in human behaviour at low cost. * But education alone is insufficient to achieve optimum health. The target population must have access to proven preventive measure or procedures.

*UNICEF state of worlds children 1989



Approach to Health Education

4 approaches followed by most countries

1. Regulatory approach – Government intervention, direct or indirect, designed to alter human behaviour.
2. Service approach – providing the masses with all the basic health facilities for them to improve their own health. Although this approach failed because it was not based on the felt needs of the people.
3. Health education approach – there are many problems that can be solved only through health education. Through a systematic approach people can be told about the right choices to make.
4. Primary health care approach – full participation and involvement of the people in the planning and delivery of health services.

Scope of Health Education

The scope of health education extends beyond the conventional health sector. It covers every aspect of family and community health.

Since attitudes and behaviour patterns are formed early in life. We must move back in time and start health education with young population. The assumption is that behaviour is more easily controlled or developed in young population than adults. Hence, most of the needed information must be integrated into the early learning stages.

Contents of health education *

1. Human Biology
2. Nutrition
3. Hygiene
4. Family health
5. Disease prevention and control
6. Mental health
7. Prevention of accidents
8. Use of health services

* K. Park, "Preventive and Social Medicine", M/s Banarasidas Bhanot, 2005



Why children?

Having an overall idea of the current system of public health care in India, what I could infer was that the government had services in place but mostly to counter the immediate problems that were the need of the hour. Hence, a lot of short term counter treatments are available to growing epidemics and diseases.

But what is needed is a more sustained long term goals of educating and helping the masses become more aware of the importance of health and the hazards of diseases.

The process is taking place at the school level where along with the regular curriculum health and hygiene is included in textbooks and taught to children. But how effective are they in conveying the message? Do children really know what a disease is? Once they understand the importance of healthy living at a young age, many future complications can be avoided. Keeping these questions in mind, the next level of research was carried out.



Secondary research

Having broadly identified the young population as the desired age group to work with, a small study was conducted with them. Few questions were posed to children (15 in number) between 7-12 years of age, to get insight into their understanding of what a disease is and to what extent they have been exposed to information about health and hygiene.

School going children were the prime focus to understand the systemic curriculum of learning. How much do they really imbibe from the school environment and from home. What methods they enjoy more and what there alternative sources of information and knowledge are.

I also spoke to a few teachers to understand their methodology of teaching and how children respond to new concepts.



7 yrs, 3rd std



8 yrs, 3rd std



9 yrs, 4th std



7 yrs, 3rd std



8 yrs, 4th std



9 yrs, 4th std

Children

“When I was in 6th std I got allergy boils, **Allergy is when you don’t like something and you go close to it.**” - Afreen, 12 yrs

“I got chicken pox, don’t know how it happens. **My whole body was full of things that were coming out and it did not go for two to three months.**”
“Cancer is something that can enter any part of the body, then you get skin cancer, stomach cancer and breast cancer” – Devangi, 7 yrs

“I get frustrated. I can’t get up or go to watch TV. I get head ache. Body becomes too weak. Cold happens because of bacteria which is a microorganism. **Feel as if surrounding temperature is going up and down.**”
 – Gene Shaji, 12 yrs

“ Swine flu happens because of **goat**, people told me this. I didn’t know.” – Dinesh, 12 yrs

“ Cold happens because of **bacteria** that goes into your nose”
“ Swine flu happens because you eat **pig skin**”
 – Divya, 9 yrs

Teachers

“Well the new syllabus lessons are different, **They don’t straight away learn a concept like science. They learn through stories now, about everything Houses, Bridges, diseases, water etc..** They know of severe diseases like typhoid or malaria only through **personal experiences** or if anyone is family is not well.”

“Children know if their family members are sick but don’t know in detail.”

“Children **identify** themselves with the **characters** in each story, similar situations are explained form **real life**, like going for picnics and adventure. This excited them.” - Jyothi Mam, EVS teacher, 4th std.

“ In the 3rd std they only understand different senses, the new textbooks are better because they are in story forms. It hold their attention for long.” - Suprabha Mam, EVS teacher, 3rd std.

Observations and Findings

Awareness

- Only 5 out of 15 children knew how fever happens.
- They are aware of changes in their body when they fall sick, head ache, high temperature, shivering, body ache, running nose etc.
- They understand the word disease as a sickness, when one is unwell
- Understand meaning of neat and clean
- They know allergy is when body reacts to something
- Can identify body parts & senses
- From personal experience they know of certain diseases like Malaria, Chicken pox, Jaundice, Typhoid and Swine Flu through exposure to different media. Cancer, Heart attack and Diabetes (heard off through family)

Influences

- Parents
- Teachers
- Friends and Siblings
- Family
- Books/ comics
- Television
- Video games

Relations

- They can understand Cause and Effect
- How Fever happens (If you eat green leafy vegetable you wont get fever, playing in the sun, eating outside food etc) as told by parents
- Cold and Cough (Eating ice cream, drinking cold water etc.)
- Cancer leads to death
- Disease occurs due to bacteria
- Water and Air pollution how it happens.
- Stories in textbooks which illustrate city life

How do I define an age group?

From the time they are born till they turn 13, they are children. To decide where exactly I want to work in terms of a specific age group became a confusion. Hence, a bit of background study helped understand the process of learning and change both physically and psychologically in defining an age group.

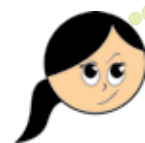
I referred to Piaget and Rudolf Steiners theories which more or less propose similar patterns in a child's development. Piaget's theory identifies four developmental stages and the processes by which children progress through them. The four stages are:

1. **Sensorimotor stage (birth – 2 years old)**
2. **Preoperational stage (ages 2-7)**
3. **Concrete operations (ages 7-11)**
4. **Formal operations (beginning at ages 11-15)**

From which the **Concrete operations stage** in where the child starts to conceptualize, creating logical structures that explain his or her physical experiences. Abstract problem solving is also possible at this stage. For example, arithmetic equations can be solved with numbers, not just with objects.

Rudolf Steiner's developmental theory states. Early childhood learning is largely experiential, imitative and sensory-based. The education emphasizes learning through practical activities. **Elementary school years (age 7-14)**, learning is regarded as artistic and imaginative. In these years, the approach emphasizes developing children's emotional life and artistic expression across a wide variety of performing and visual arts. During adolescence, to meet the developing capacity for abstract thought and conceptual judgment the emphasis is on developing intellectual understanding and ethical ideals such as social responsibility. (Waldorf School of thought as proposed by Rudolf Steiner)

Hence, with the above theories as my base and also understanding that children begin to read at an average age of 6-7, considering early learners and late bloomers, I considered the age group from 7-12. As I realised even from interaction with children, at this age they are beginning to explore new concepts and make relations with the world they associate with. Even in schools this is time where initial seeds to complex concepts are sown. Their main medium of learning is the text books that they are made to follow, where through a set curriculum they learn stage by stage.

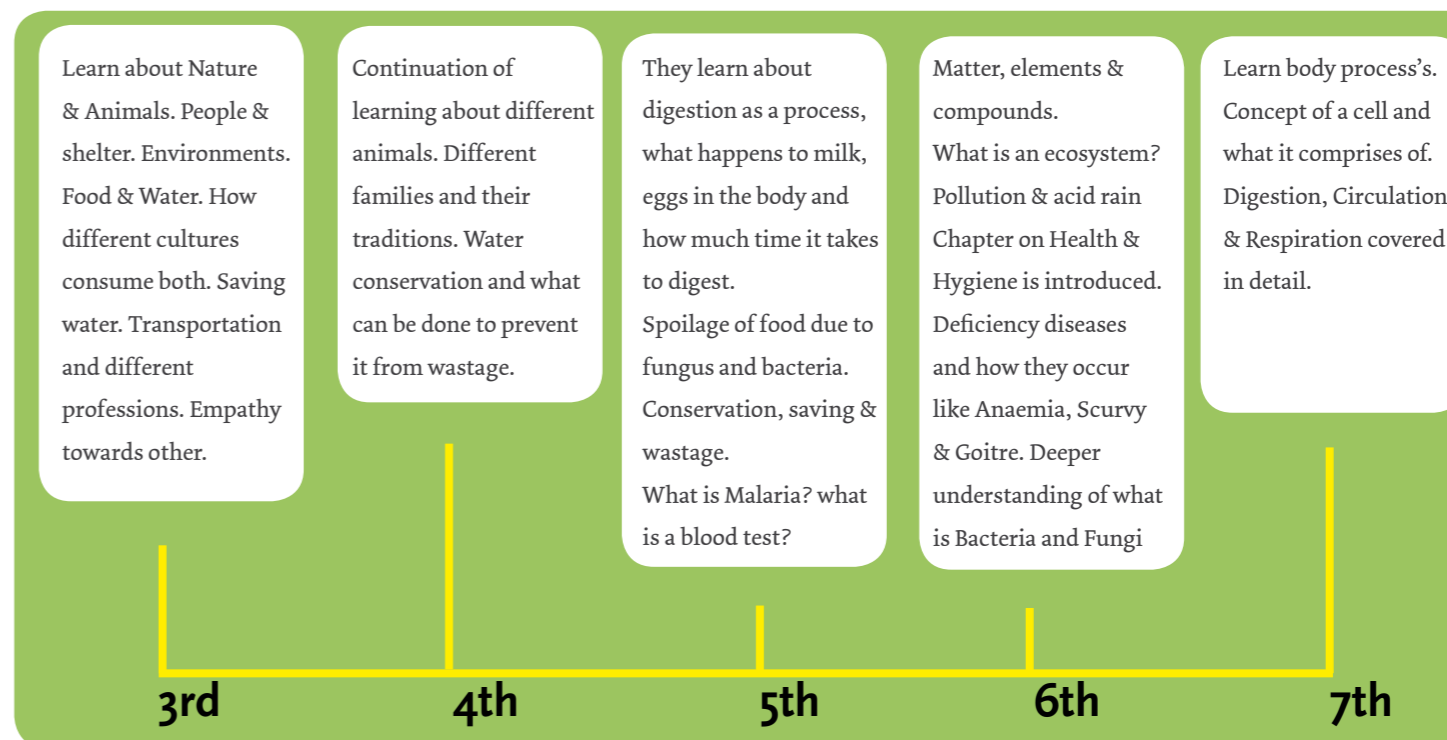


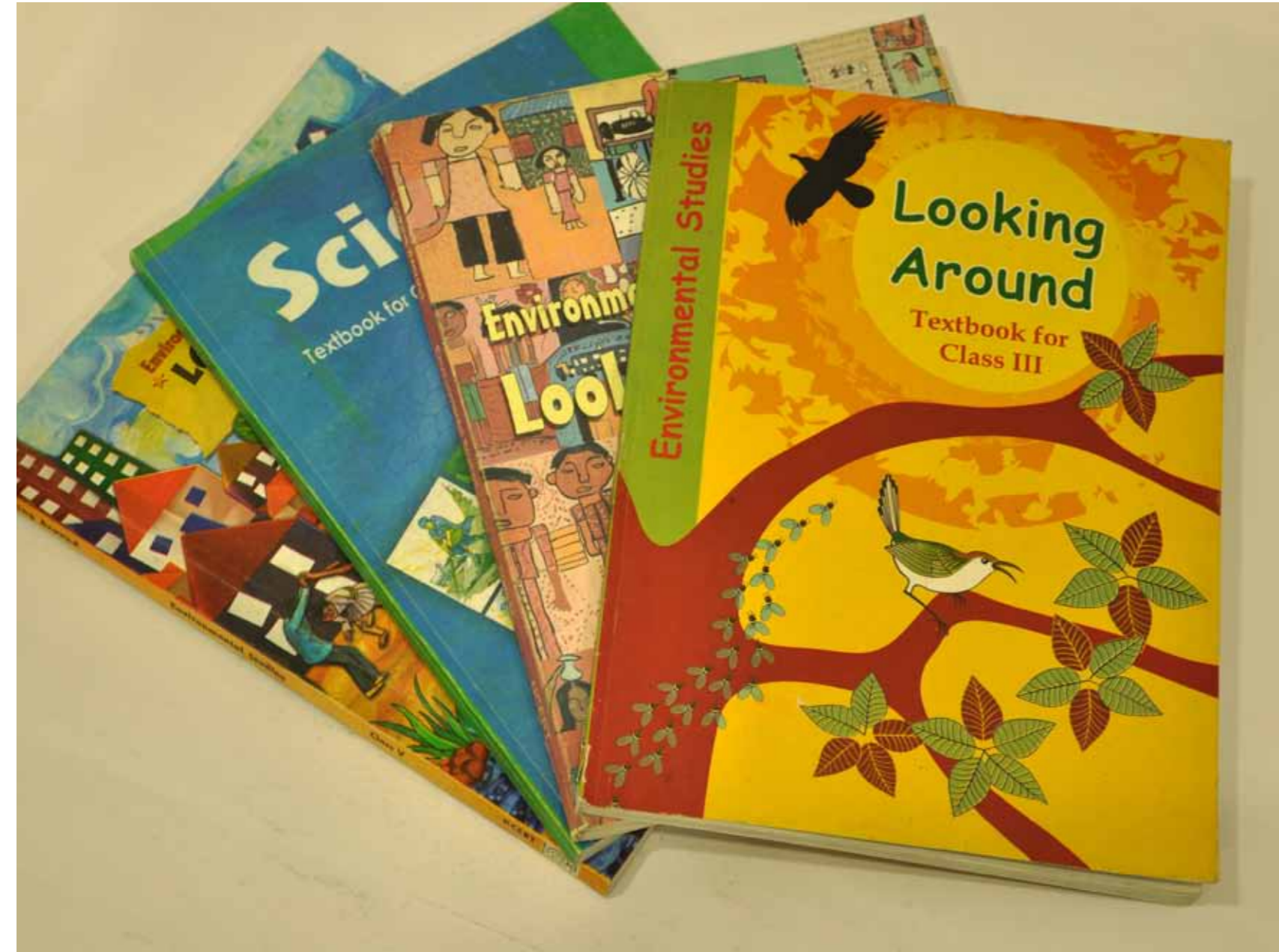
School Curriculum from 3rd to 7th std (7- 12 yrs)

Boards : ICSE, CBSE & SSE

Subject : Environmental science & Science

This activity was to map what children are made to study in schools within the age group especially in Environmental science & science as we progress to higher classes. As, Health & Diseases is usually covered under these subjects. To understand at what level certain concepts are introduced.

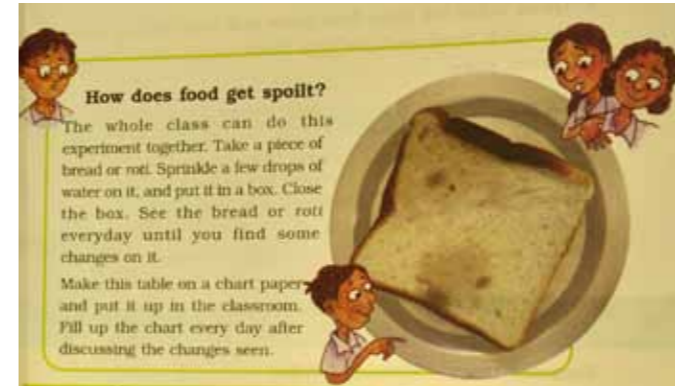




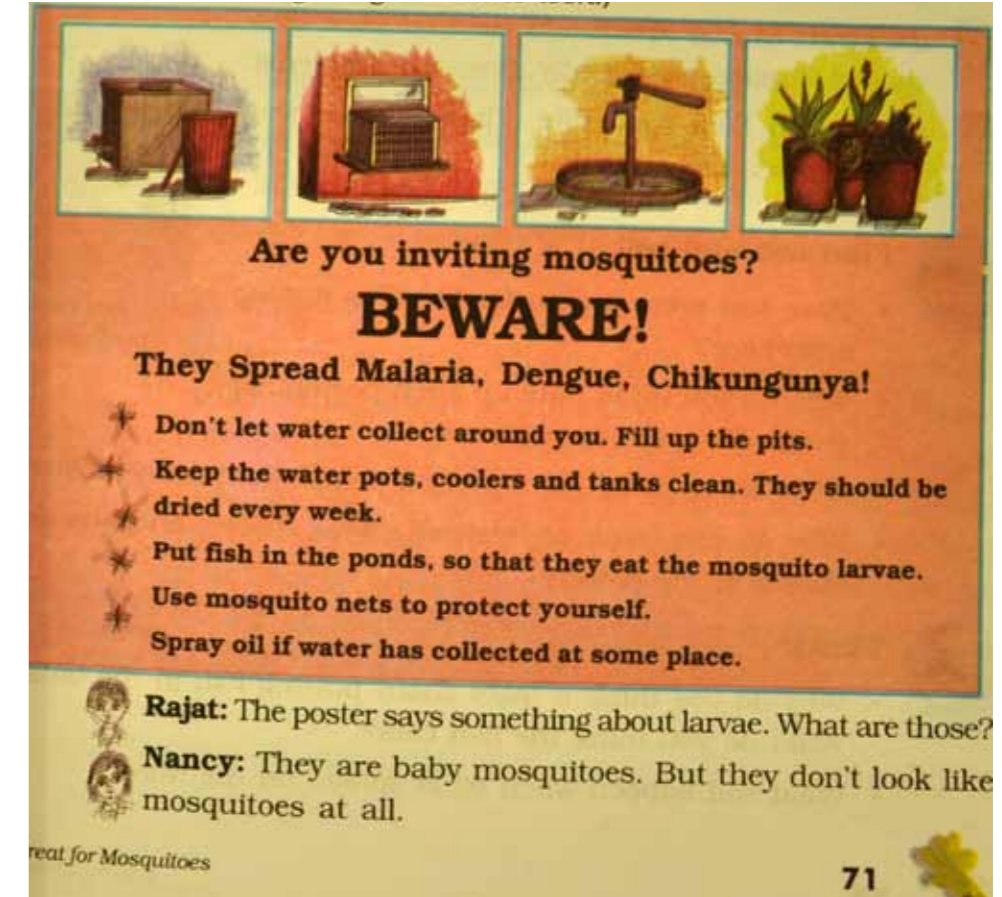
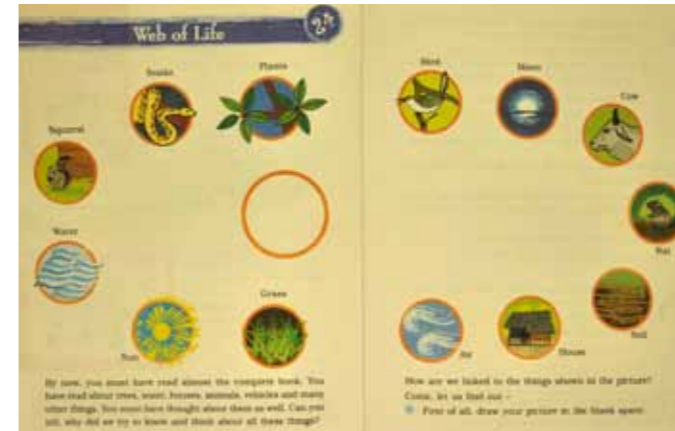
Science textbooks used in schools as prescribed by the curriculum



Science textbooks



Activities to do and observe



Illustrated drawings & posters

Food item with plant as the major source	Ingredients/source	Plant part which gives us the ingredient
1. Brinjal curry	Brinjal	Fruit
	Chilli as spice (any other)	Fruit
	Oil from groundnut, mustard, soybean, any other plant	Seed
2.		

Tables and charts

Why children need to be told about diseases?

- Children at this age are learning multiple new concepts which are isolated from each other due to the methods used in school.
- Due to the pressure of keeping curriculum simple and precise yet covering major subjects, a lot is discussed only briefly.
- Disease, prevention and control is introduced during the latter years of schooling.
- They are very much capable of understanding complex ideas of global warming and the web of life.
- Children have half baked information about a lot ailments that even they themselves have experienced leading to inaccurate information which they sometimes even share with friends.
- They are curious and are willing to learn more if interest is generated in certain subjects.
- Lastly they have a right to know and learn about their bodies. If someone in their family is sick they are curious and are concerned. Hence, they can be told about diseases through more creative methods using mediums they are already exposed to or are familiar with.



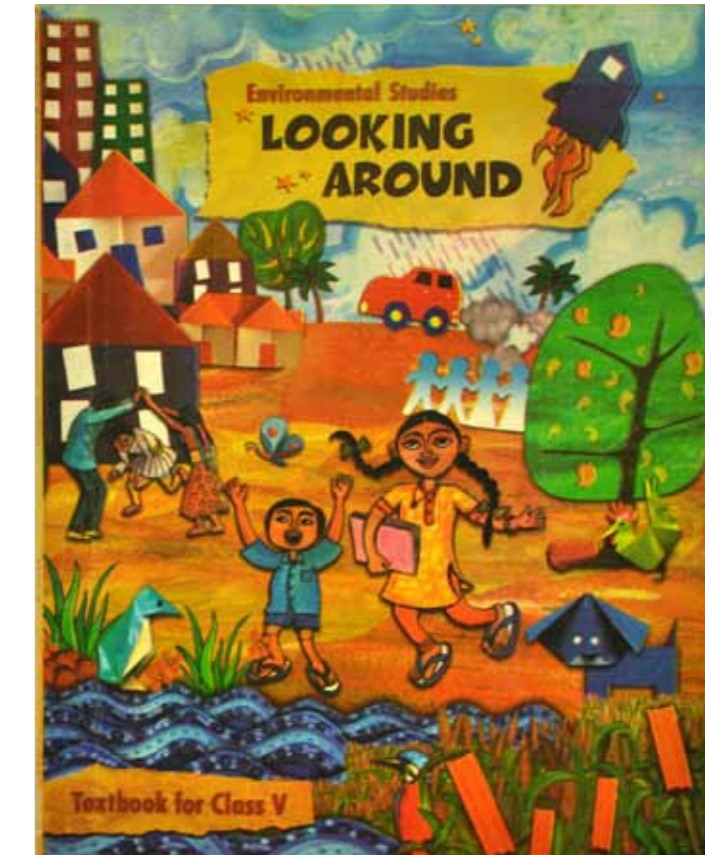
Table 8.2 Movements in our body

Body Part	Movement				
	Rotates completely	Rotates partly/turns	Bends	Lifts	Does not move at all
Neck		Yes			
Wrist					
Finger					
Knee					
Ankle					
Toe					
Back					
Head					
Elbow					
Arm	Yes				

Tables and charts

Water Games
Bazaar Gaon, Maharashtra

There was a big water park near Bazaar Gaon. One day Rohan and Reena went with their parents to the water park. There were many water-fountains. Reena said, "Look Rohan, there are so many rides in the water." "And look at all these big ponds," Rohan said. Splash! Splash! Splash! Both turned around. They saw a long thick water hose going zoom, zoom, zoom.



Animals live in different places. Some animals live in the trees, some in water. Some live on land, some live under the ground and some fly in the sky. Some animals even live in our houses.

Children love to look at the colours, shapes and movement of animals and listen to their sounds. They enjoy imitating them too. Looking at the diversity in the animal world and putting them under different groups is the beginning of classification.

3

Notes for teachers

Are there other mediums of learning about diseases?

Having a clear idea of now what area I want to work with the next obvious question that occurred to me is this, Is their material already out their for children to learn about diseases and if yes, What are they? Books, Cd, roms, Educational shows? Is it accessible to all? What is the content of such material and How deep are they really going into the subject?



Materials available for children on diseases

Children's Books

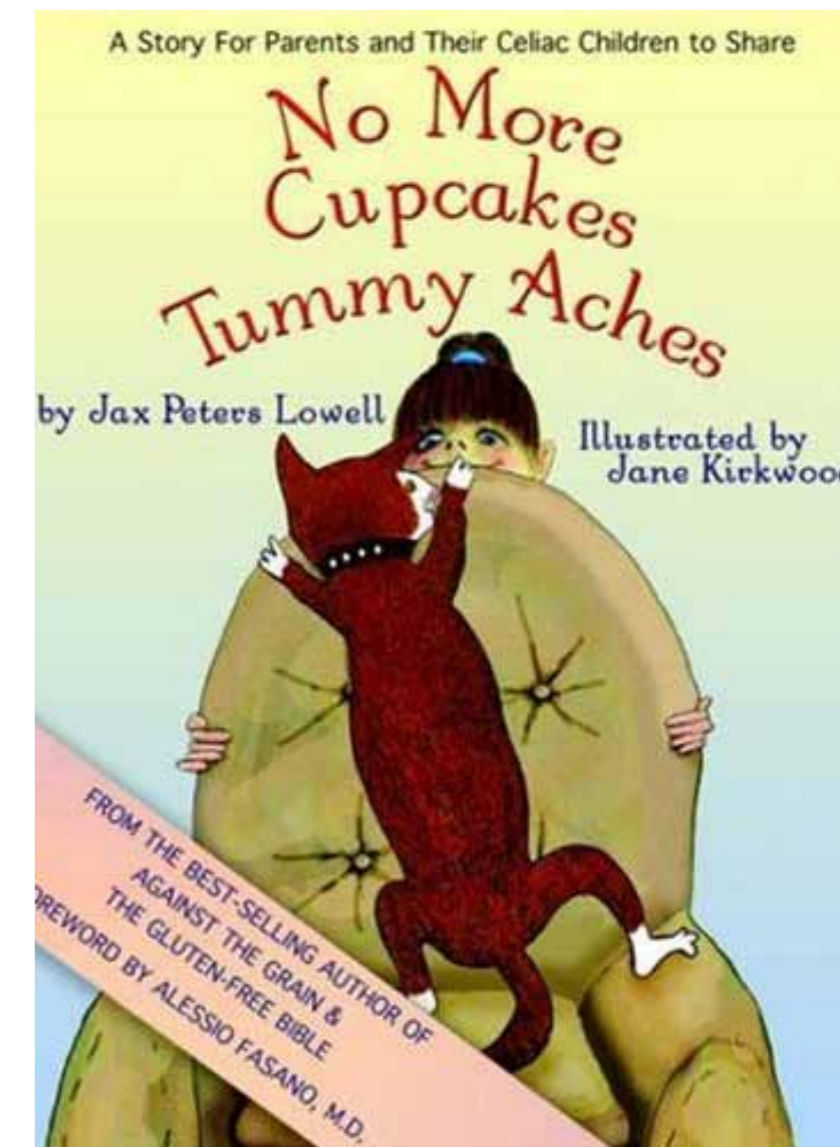
The children's books category can be briefly divided into the following sub categories :

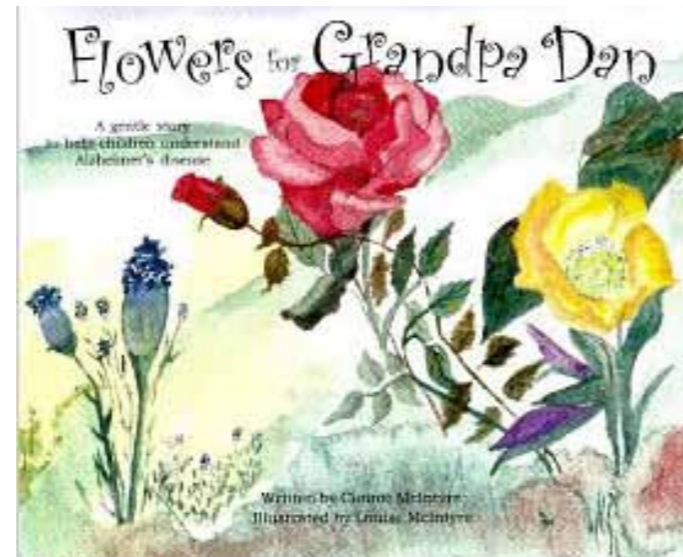
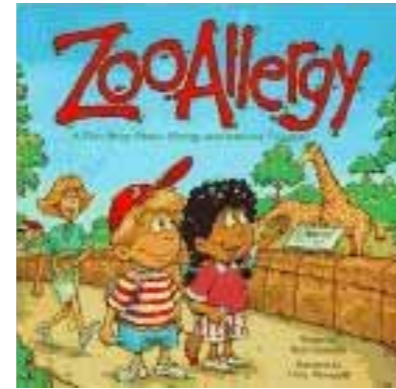
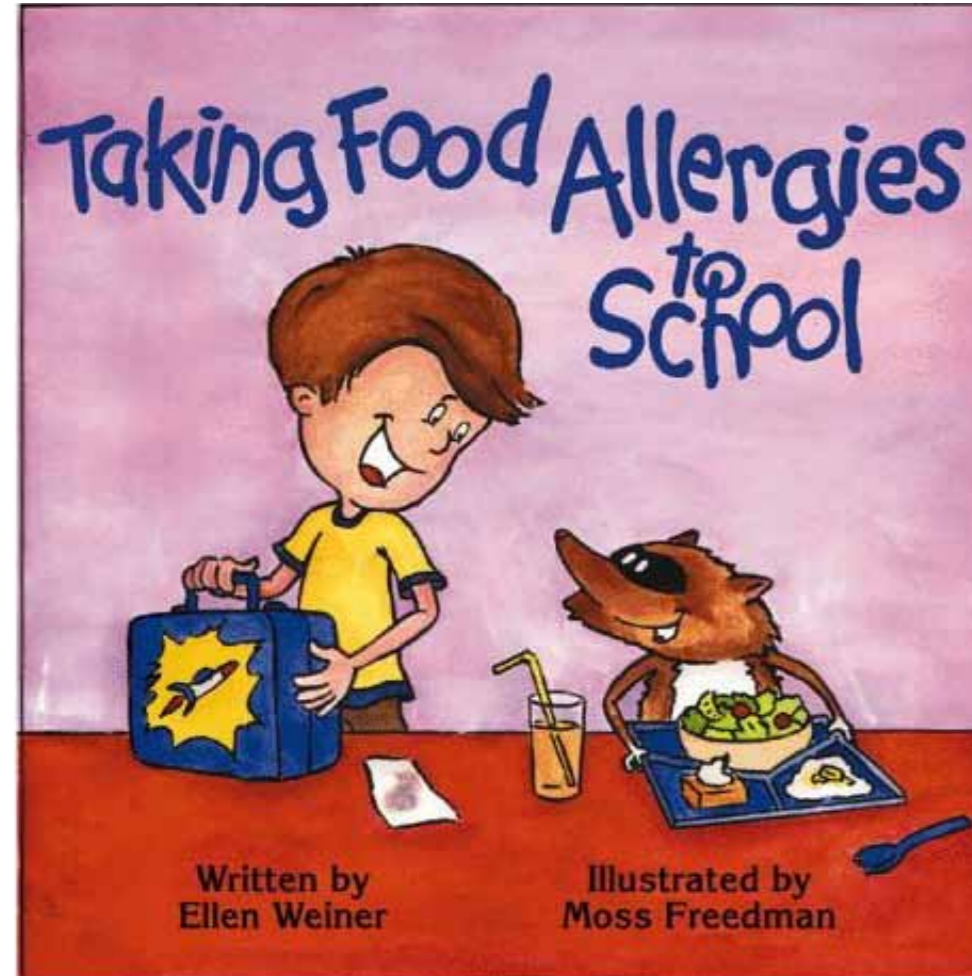
- Fairy Tales
- Picture Books
- Activity Books
- Work Books
- Young Reference
- Young Fiction
- Pre School & Toddler

Hence books related to diseases range within the above categories. Although most are picture books for children above 4 yrs of age, the content varies.

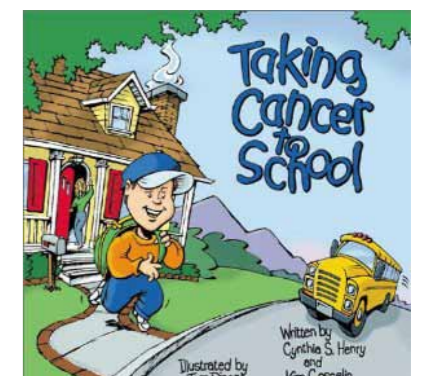
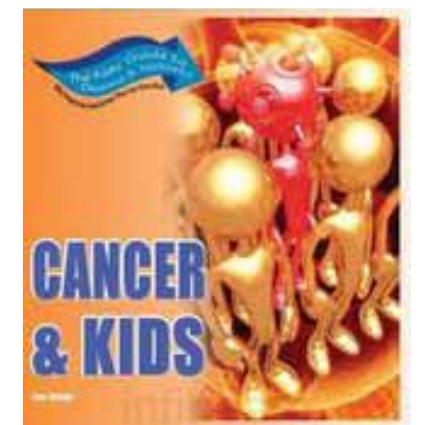
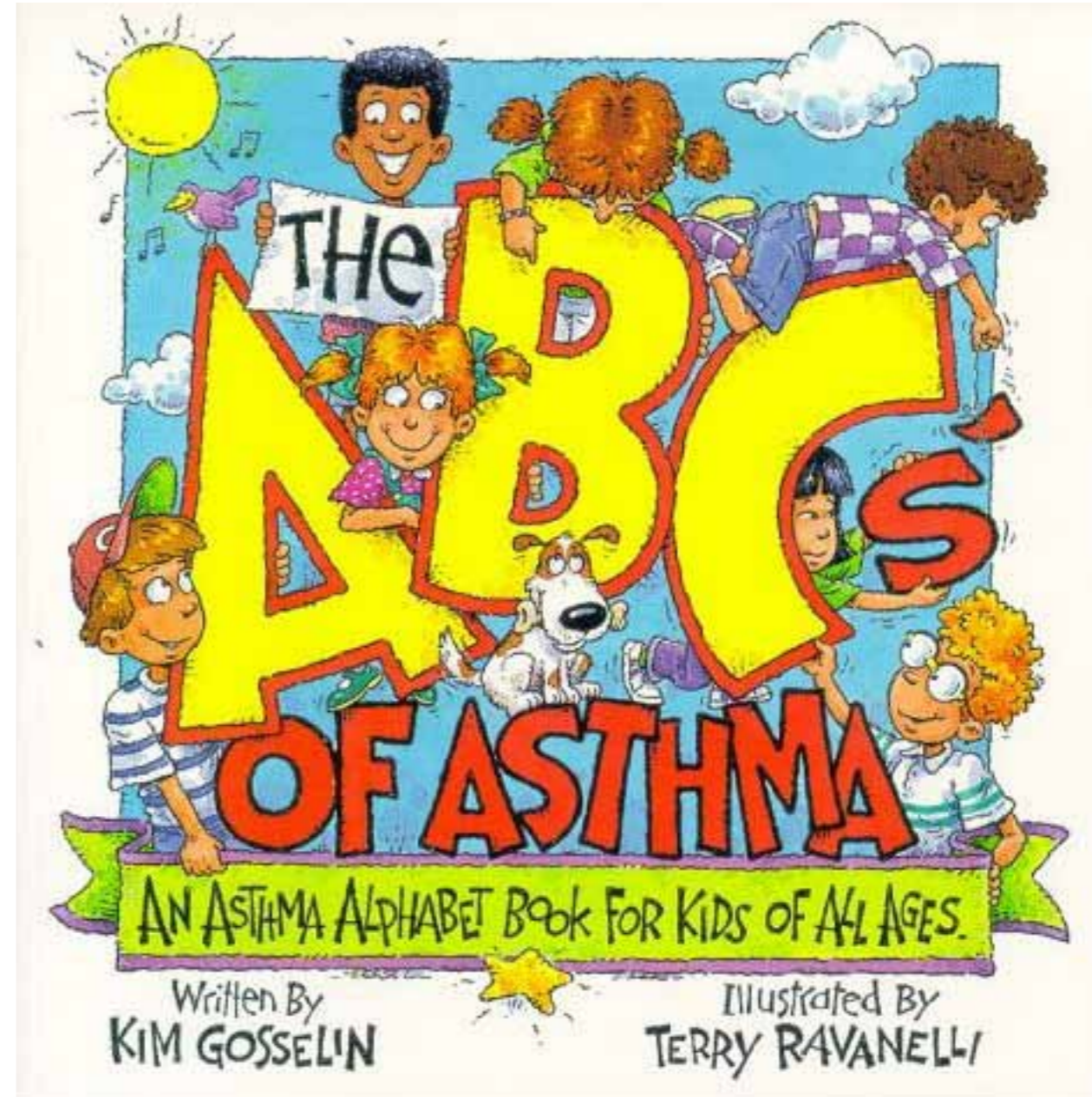
Most of the books are in the form of stories and only talk about introducing the idea of a certain ailments to young readers who fall under the age group of 6 years. Hence they don't go into much detail.

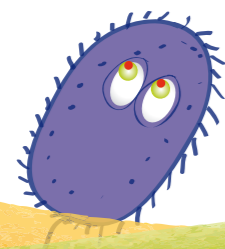
In the young reference category there many books which available in the form of series which are for children for 7 yrs and above. It is at this age where they begin to decide what they like reading and what kind





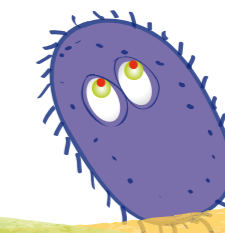
Kind of books they prefer. Children more or less learn to read by the age of 7. Some are considered early readers while some take time. It is said that till the age they learn to read and from 7 yrs on they read to learn.





Chapter 3

1. Design brief
2. Design scope



What do I want to do?

At this crucial point it was important to give form to my ideas that I wanted to take forward. On discussion with my guide and considering my personal interest. I decided to work on a book for children. I was keen on illustrating, writing content, looking for a structure and giving shape to an entire idea as a part of my project and this would give me an opportunity to do so. The model as proposed if works could be applied to others (diseases) and then can form an entire series of books.

Working on children's book sparked my excitement and from here on began the real work of creating.



Design Brief

To design a reference book for children on a disease. The need identified is in the young reference category of books, where there is a gap to be filled with a comprehensive compilation of information specifically designed for children, their learning and understanding on the specific subject.

It should excite children and make them want to read and learn more about the subject. Not compromising on the ratio of content with variable that make books exciting it should by the end of the day be fun to read and not bare any resemblance with textbooks and other material which they are already exposed to.

Key words : Engaging, Informative, Factual, Fun, Colorful & Child Centric.

Design Scope

The project scope is to take shape in the form of a book. Reference book based on a disease, content for which is specifically thought out and designed to engage them into understanding the five basic components involved in understanding any disease, which are mode of transfer, agent causing the disease, environment, incubation period and host. Prevention and control will also be key areas which would be defined and clearly explained.

The age group specified would be 7 yrs and above. Considering this as the average reading age. This is purely based on the developmental theories stated earlier. Hence, the content developed for ages above can be more detailed and extensively explain processes. But the challenge is to constantly create interest through a medium which they are already familiar with and already have exposure to.

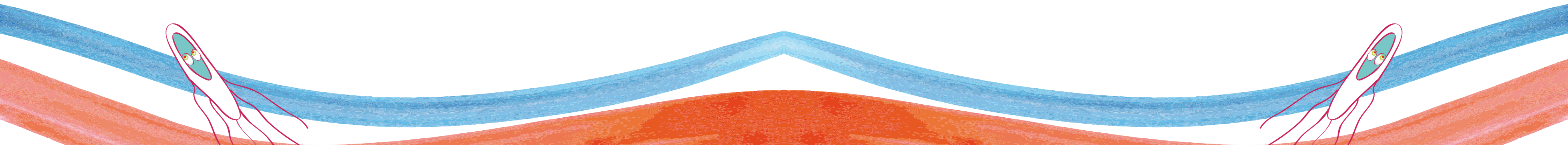
A structure would be developed for the book such that it can be replicated for all diseases. Hence, in future take the form of a series of diseases. On testing and evaluation changes would be made to suit the best way in which children retain information and learn. The prime focus of the project is the development

of content specific for the particular subject and the structures that can take shape through a book to facilitate learning. The way the content is designed and portrayed will help children imbibe maximum and give them incentive to come back to the book again. The information must have a long lasting impact and on multiple reading it will only help re in force certain values of health which is the desired outcome in the long run.

For now the possible application of the book is identified as a reference book which can be made available to children personally at book stores, or schools could have such a set in their libraries for supplementary reading. For better understanding beyond textbook knowledge and alternative process of learning. Once the structure of content is tried and tested it can be made available to a wider mass of children from all backgrounds.

Chapter 4

1. Design Process
2. Malaria
3. Understanding Malaria
4. Design Idea
5. Developing the story
6. Design decisions
7. Information structure of the book
8. Illustration Style
9. Grid & Layout
10. Towards final Design



How do I go about it?

I decided to go back to the study with children. Looked at the kind of answers they gave to the questions. Most of them were not even aware of fever and common cold but had heard of more complex diseases like Malaria, Chicken pox and even cancer.

On further study I learnt that Fever and Common cold are only symptoms of a disease. It is sign that something is wrong with the body. Malaria causes fever, Jaundice causes fever and even with Typhoid its the same. Hence, to explain fever in isolation would not make sense. Fever can be explained through each disease and that will clear their concepts with much more coherence.

A disease which mostly they have experienced and have a vague idea about needed to be decided upon.



Design Process

A list of 10 diseases was identified which was short listed. They were on the basis of what children at a certain have already experienced or have heard of. Also to cover the spectrum of communicable and non communicable diseases.

Fever

Common Cold

Malaria/ Dengue

Typhoid/ Jaundice

Polio

Anaemia

Chicken Pox

TB

Cancer

Heart Attack

Diabetes

Swine Flu

From which one was selected to detail out the structure and analyse how the information would flow and book would take shape. Based on which the same model would be then applied to the rest of the diseases.

How much do they know about Malaria?



8 yrs, 3rd std

Few children were again contacted to ask them specific questions only on Malaria. If they had heard of it? How it happens? Have they ever had Malaria? What happens after you get it? If they knew how to prevent it...

“ Malaria happens because of Mosquito, I got Malaria once I could not go to school. I had high fever and body pain. Doctor did blood test. Spray hit to stop them from coming.” Devangi, 7 yrs



7 yrs, 3rd std

“ When you eat outside food, you get fever. I have not got but my friend got. She told me.” Rukmini, 8 yrs

“I don't know, you get fever and get sick.” Dinesh, 9 yrs



9 yrs, 4th std

“ Malaria is caused by Mosquito bite, and it spreads. My mother got. She was in hospital for 3 days.” Divya, 9 yrs



Malaria

Taking Malaria as the example the content was detailed out. There are five important aspects that need to be covered while talking of any disease.

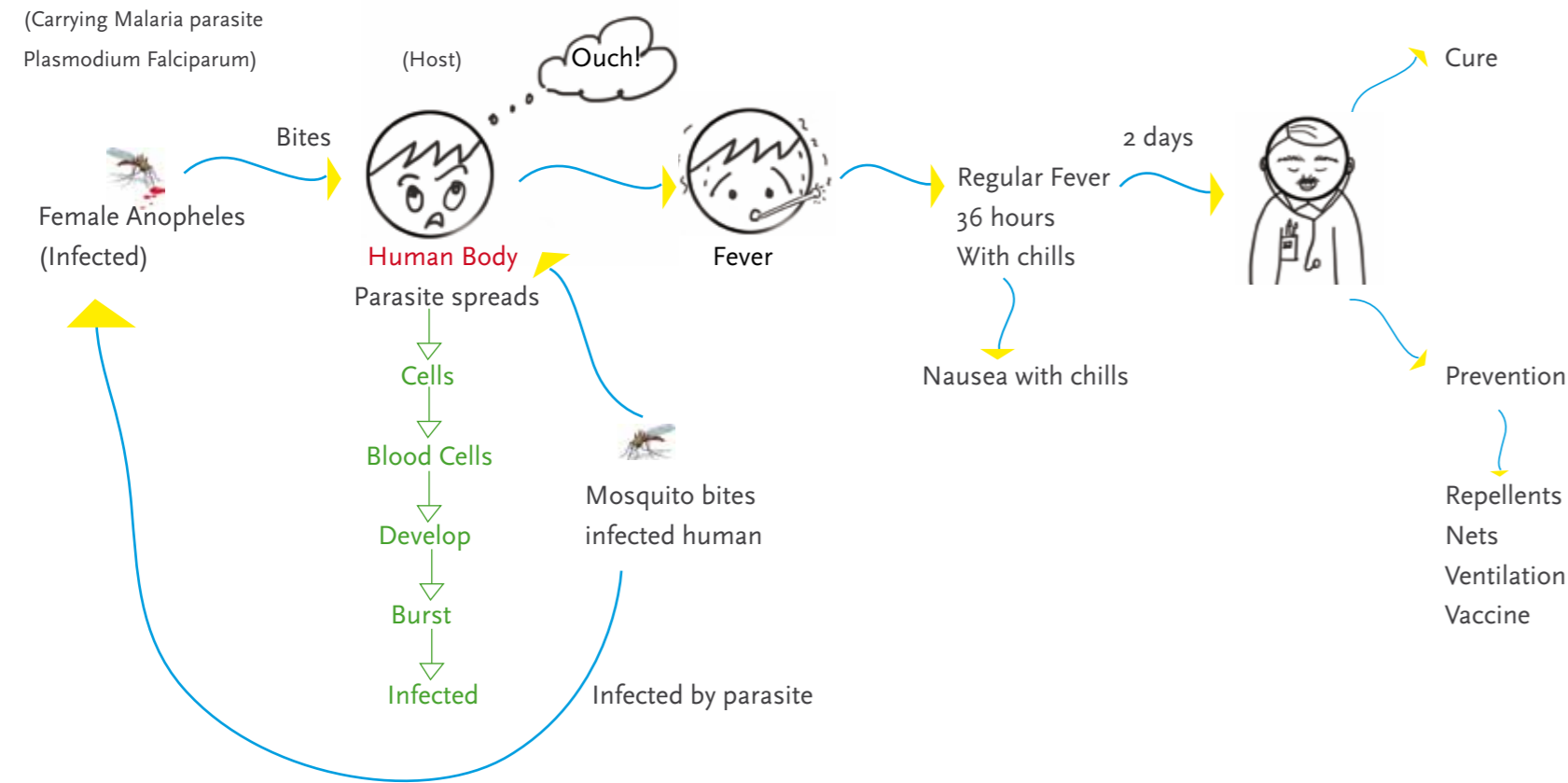
1. Agent
2. Host
3. Mode
4. Incubation Period
5. Environment

Based on this information any diseases can be easily identified. Prevention and Cure is also necessary in learning about each disease. Hence a short abstract about the disease was written to identify the above mentioned criteria.

“Malaria is a serious and in severe cases a fatal disease who's affects can be seen **in humans**. It is caused by a **parasite called Plasmodium Falciparum**. People who get Malaria are typically very sick with high fevers, shaking chills and flu- like illness. Malaria can usually be treated but if cases get severe people may even loose their lives. Malaria is spread through the **bite of a female anopheles mosquito**. Only the Anopheles mosquito can transmit the virus. **Symptoms begin 10 days to 4 weeks** after infection, although a person may feel ill as early as 7 days or as late as 1 year. Malaria is typically **found in warmer regions of the world- in tropical and sub tropical countries**. Higher temperatures allow the anopheles mosquito to thrive.”

Understanding Malaria

Malaria is usually a monsoon disease and occurs in areas of high humidity. Common in tropical regions, cities like Bombay.



Design Idea

Keeping in mind the initial study about the kinds of books available and the content that is found in them a few pointers were kept in mind for the design idea.

- Children learn best through examples, instead of directly citing a phenomenon. A build up its cause, effect and influence helps them put pieces of information together and make sense of it in the real world.
- Although stories are engaging and facilitate in the learning process through characters and imagination, the ratio of necessary information that needs to be told and the story in itself (characters & plot) has to maintain a balance.
- Since the outcome falls in the category of reference books its prime focus should not waver from giving comprehensive information on diseases. Use of terminologies, facts and definitions are equally important part of the books. How it can be transformed from dull boring information to exciting fun reading material is the real design challenge.
- The use of humour or drama must not override the main focus of the book but must only facilitate in the reading process and turning to a new page. There are alternatives to such books available but

there main focus is leisure and entertainment not imparting important facts about health and living. Falling in a different category of books.

- Lastly, The content for each disease will take shape from the core essentials of the disease. Although a structure will bind all the books together each disease will have information designed special to its nature, to help children remember and retain its individual nature.

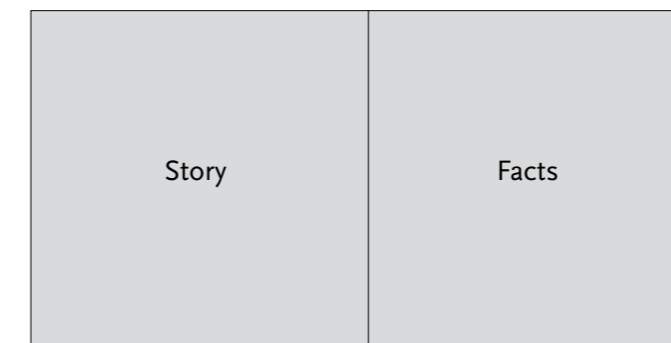
How can my book be different?

After having a look at the kinds of books available for children, this was the first question that occurred to me. Most books were either for extremely young kids or for much older children entering their teens considering the amount of detailing.

There was a wide range of subjects covered but none on diseases specifically. How can a balance be achieved between giving precise information and making the book equally fun to read? What do children enjoy reading most? How can they be made to remember important facts without much effort?



Hence, the book would be a hybrid of a story and facts. The story is only to help children make associations and follow a time line, while the essential facts and information to give deeper in-depth understanding of the science behind it.



The structure would be such that the left hand side of the book would have a story which is based on the disease and would briefly cover all the 5 important points as mentioned earlier to describe the disease. There would characters and a plot taking its form from each disease. The right hand side will have co inciding facts based on the story about the disease. The story would follow an illustrative style while photographs and images from real would be used to show facts.

How to write to story on a disease?

A disease is a kind of condition where in mostly the eventual outcome is known. Different diseases might have different symptoms and cures but once detected you more or less know what is going to happen then how does one write an interesting story about one?

Since each disease would be different, in the case of malaria what is most important to remember the chief causative agent ie. Mosquito. There are many other factors that need to be included in the story to build the characters persona, background etc. Such that even small details a child would remember because it is so well woven into the plot. Other details such as creating gripping suspense and introducing supporting characters are simple methods of holding it together.



Developing the story

Multiple drafts of the story was written to inculcate the right amount of fun and facts. Malaria has been used as an example for further design development.

Draft 1

Sui and Mui are best friends. If you look closely you will realize that they look a lot like fly, but are actually not. They are “Mosquitoes”. They love playing hide and seek in the dark, but during the day they often rest in cool and shady places to avoid the sun. Like, under the table or behind the sofa. Sui and Mui come from different families. Sui is a female mosquito from the anopheles family and Mui from a male mosquito family.

One day they were playing till very late in the evening. “Hey, Sui, its getting late, I better rush to my home now for dinner.” Said Mui. “Oh yes”. “I am starving too.” Said Sui. While Mui loved his nectar and sugar and got instantly energized, Sui liked human blood. The sight of a nice juicy toe or tender fingers would make her mouth water and she couldn’t resist taking a small bite at it. After her lip smashing meal, she would get back to playing until she was hungry again. “Shoo” “Shoo” “Ouch”. This was the problem, everytime it was Sui’s mealtime. “Nobody ever let me eat in peace” she whined.

“It is because you are hurting them Sui”, said Mui one day.

“ Don’t you feel bad poking and constantly biting someone, this is not right”

“Bad? Why?” “Why should I feel bad, its so tasty and I have always had blood for dinner” “What is so bad?” “Ah, Well Sui, I leave it upto you to realize.”

Sui paid no attention to her friend and went back to her old ways. She would always find one right spot to bite them and later on gloat with joy because she was so quick.

No one had ever asked Sui this and this got her thinking one day.

After few minutes of thinking, she became hungry again and ventured out for a snack.

But this time she couldn’t find her usual juicy toe. “Hmm” “This is strange”, she wondered.

She peeped out to see where everyone was. Only to her astonishment to find that her juicy toe belonged

to Raju and he was lying in bed looking rather ale and sick. His mother and father surrounded him and they looked deeply concerned.

Sui was very confused and did not understand.

“We need to call the doctor, he has high temperature and he is shivering”, his father said.

Soon a strange looking man came to their home, he had a funny looking device around his neck. He kept placing it on his chest and held his had and then nodded.

“We need to send his blood for testing”, Doctor said.

The doctor took out an injection and took some of Raju’s blood.

“Hey how did he do that”. Sui wondered,

“ I want some”.

That night Sui slept hungry, tired and feeling very confused. The next day, Sui was ready to hear about what the doctor had to say.

“He has Malaria”, “We need to start medicines”

“It is happening because of Mosquitoes”. “We need to disinfect the home soon, before it spreads”.

“ MALARIA!!” Sui exclaimed

“ DISINFECT!!”

Sui became sad.

She realized that Mui was right and knew her fate was

decided. They were going to spray the whole home with DDT and kill them all.

She tried to explain to her friends about what she felt and told them to stop doing bad. But they did not listen to her. She decided to pack her bags and let Raju recover and live happily.

(Feed back - Story very linear. No interesting points. Less uncertainty and predictable.)

Draft 2

Once upon a time there was a group of wandering mosquitoes. They were looking for a place to live for the upcoming Monsoons. They were from the Anopheles family and were driven away from their previous home. Sui had recently joined their group and was beginning to learn their traits. After a long search they finally found a small muddy pond in a garden. It was quite, damp and dark, just what they were looking for.

“I am starving” said one of the female mosquitoes.

“Where do we go looking for food!”

“Why would you go anywhere? There is so much to feast on, here!” Exclaimed one of the male mosquitoes.

“We can’t feast on this, human blood is what we need. How else will we lay eggs and survive?” All the female mosquitoes were infuriated.

“ Well, we are going to be here around the pond and look for a place to rest, you may venture out and do as you please.” All the male mosquitoes reclined in peace while the females left the pond in fury.

“This is not fare, every time we have to go looking for food ” The group of female mosquito’s set out looking for the closest colony of humans.

“You two head to left, you to the right and sui follow

me” Sui and her partner landed on a dimly lit balcony packed with creepers and potted plants. “ This looks like the perfect place to start sui, we can hide behind the rose bush” She said.

As soon as they were about to spring over they heard a rustling sound closing in on them from the back. When they turned there back to their pure shock was a raging dragon fly about to get them.

“ Fly for your life, Sui !!!!! as fast as you can”

Traumatized Sui leapt across the balcony and landed straight into what appeared as a bed room. She peeped out to look at her friend dodge the dragon fly and soon come trembling right next to her. She was panting incessantly “ Ha, we made it, we were almost served as dinner tonight.” She smirked at the terrified Sui “ Lets get to what we came for. ”

They peered into the room and examined the number of people. They were two of them, a man and a women fast asleep.

Since sui was new to the group she only observed and followed instructions silently.

“Alright sui this is how its done, look for exposed parts

of the body. Don't go close to the face because they can see you and then you're in danger. Fingers and toes are the best bet. Avoid light, keep low and make precise incision. Be as quick as possible and finally your secret weapon, don't forget to release your saliva before you bite. It will numb there skin and they wont feel a thing”

“ok?”

“ok!! Got it”

“ Now off you go, while I look for someone else”

Sui followed instructions carefully and finally was about to make the bite. She placed her proboscis right above the skin and pushed it straight right in, released her saliva and sucked on blood. She was delirious with joy and could not stop. Soon she was so full that she was about to burst and wake the man up. He was moving his toes.

“ Enough sui. He is about to wake up. Before he switches on the light lets go.”

Sui had to be pulled away and taken back to the pond, because she was so full.

“Ahhh, I think I am going to burst. I drank too much.”

Sui sighed

“The trick is to have little from each and bite as many as you can”

Sui soon learnt the tricks and could find multiple people to bite in one night.

After a few weeks she went back to the same man she had first bitten. She at once recognized him. But this time he looked rather pale and sick. He was clearly shivering and had a blanket on him. There were few people around him. One of who was a Doctor. She went closer to get a clearer view and listen to what was happening.

“The blood test results show he has Malaria” he said.

“We need to treat him immediately with medicines.

As a precaution you must also spray your home with mosquito repellents. They must be thriving close by.”

A few others from the same colony had also fallen ill and they were spraying their homes with pungent repellents to avoid mosquito's.

Sui could no longer enter their homes because of the smell of the repellents. It would choke her.

She went back to pond all confused and wondered.

“ What is Malaria?” she asked

“Well, Malaria is a disease. It is a kind of sickness which the humans get affected by. We are said to carry the disease causing parasite in our saliva. Hence every time we bite them to suck blood the parasite gets

transferred to them. Or if we bite a human who might already have the parasite then we also get it with the blood.

But somehow we are only the vectors of this disease. The parasite does not affect us. Only the female anopheles mosquito spreads Malaria in humans.” She was told. Sui learnt more from her group mates not just about herself but also about other mosquito families and their whereabouts.

Generations of the wandering mosquitoes have evolved. They are becoming stronger and more resistant to the insecticides and treatments used by the humans. Natural predators are also their biggest threats. Hence they are constantly looking for new places to settle and thrive.

The time came for the wandering mosquitoes to again look for a new home. Sui and her new family left the pond. Soon after they left the pond, that they previously occupied was also sprayed with repellents, while they continued their journey towards new colonies. (Feed back : Predictable beginning and the story needs to become short and precise)

Draft 3

“Ahek” “Ahek” “Harummm”

“Fly” “Fly”

“We must evacuate immediately”

The wandering mosquitoes, once again set out looking for a new home.

A new Adventure!

There search ended by a small muddy pond in a garden. It was damp and dark, just what they were looking for. Sui had recently joined their group and was beginning to learn the traits of the family they belonged to, Anopheles.

“I am starving” grumbled one of the female mosquitoes. “Where do we go looking for food!” “Why would you go anywhere? There is so much to feast on, here!” the male mosquito’s exclaimed. “We can’t feast on this, human blood is what we need. How else will we lay eggs and survive?” All the female mosquitoes were infuriated.

They then set out looking for the closest colony of humans. “Lets split up, you two head to left, you to the right and sui follow me” Sui and her partner landed on

a dimly lit balcony packed with creepers and potted plants. “ This looks like the perfect place to start sui, we can hide behind the rose bush”.

As soon as they were about to spring over they heard a rustling sound closing in on them from the back. When they turned there back to their pure shock was a raging dragon fly about to get them. “ Fly for your life, Sui !!!!! as fast as you can”

Traumatized Sui leapt across the balcony and landed straight into what appeared as a closed dark room. She peeped out to look at her friend dodge the dragon fly. “ Ha, we made it, we were almost served as dinner tonight.” She smirked at the terrified Sui “ Lets get to what we came for. You didn’t think this was a piece of cake did you? ”

“Alright then this is how its done, look for exposed parts of the body. Don’t go close to the face because they can see you. Fingers and toes are the best bet. Avoid light, keep low and make precise incision. Be as quick as possible and finally your secret weapon, don’t forget to release your saliva before you bite. It will numb there skin and they wont feel a thing” “ok?”

“ok!! Got it”

“ Now off you go, while I look for some more people” Sui followed instructions carefully and finally was about to make the bite. She placed her proboscis right above the skin and pushed it straight right in, released her saliva and sucked on blood. She was delirious with joy and could not stop. Soon she was so full that she was about to burst and wake the man up. He was moving his toes.

“ Enough sui. He is about to wake up. Before he switches on the light lets go.” Sui had to be pulled away and taken back to the pond, because she was so full and could not move. “Ahhh, I think I am going to burst. I drank too much.” Sui sighed “The trick is to have little from each and bite as many as you can” Sui soon learnt the tricks and could find multiple people to bite in one night.

After a few weeks she went back to the same man she had first bitten. She at once recognized him. But this time he looked rather pale and sick. He was clearly shivering and had a blanket on him. There were few people around him. One of who was a Doctor. She went closer to get a clearer view and listen to what

was happening. “The blood test results show he has Malaria” he said. “We need to treat him immediately with medicines. As a precaution you must also spray your home with mosquito repellents. They must be thriving close by. ”

A few others from the same colony had also fallen ill and they were spraying their homes with pungent repellents to avoid mosquitos. Sui could no longer enter their homes because of the smell of the repellents. It would choke her. She went back to pond all confused and wondered. “ What is Malaria?” she asked

“Well, Malaria is a disease. It is a kind of sickness, which the humans get affected by. We are said to carry the disease, causing virus in our saliva. Hence every time we bite them to suck blood the virus gets transferred to them. Or if we bite a human who might already have the virus then we get it with the blood. But the virus does not affect us. We only carry it. Only the female anopheles mosquito spreads Malaria in humans.” She was told.

Sui learnt more from her group mates not just about herself but also about other mosquito families and

their whereabouts. Generations of the wandering mosquitoes have evolved. They are becoming stronger and more resistant to the insecticides and treatments used by the humans.

Natural predators are also their biggest threats. Hence they are constantly looking for new places to settle and thrive. The time came for the wandering mosquitoes to again look for a new home. Sui and her new family left the pond. Soon after they left the pond, that they previously occupied was also sprayed with repellents, while they continued their journey towards new colonies. (The third draft is used as working model to develop the book, based on inputs from the previous drafts changes are made to make it more precise and story a little more tight)

Design Decisions

Naming the character Sui, was a thought out decision to help children remember the feeling of a mosquito bite. The mosquito bite is like a light prick and the sound “Sui” is to replicate that feeling. It is important to give children such markers to remember details of the story as well as important facts about Malaria.

Mosquito's point of view, The main cause of Malaria is the mosquito. Hence, this was the most important piece of information which had to be conveyed. Using the mosquito as the main character also helped in building a context, explaining other factors like the environment, prevention and control. What the children hopefully will take back is also a new perspective to observing their environment and mosquito's in particular than isolating themselves from a particular disease or condition.

Information structure of the book

The information structure for the entire book was mapped to get a glimpse of how it would flow.

Following the same format of the story flowing on the Left hand side and the fact on the right hand side.

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

“Ahek” “Ahek” “Harummm”
“Fly” “Fly”
“We must evacuate immediately”

The wandering mosquitoes, once again looking for a new home.....

What is a mosquito? Different from a fly? Origin. Evolution

There search ended by a small muddy pond in a garden. It was damp and dark, just what they were looking for.....

Anopheles? Species? Weather? Parts of the world.

7	8	9	10	11	12
---	---	---	----	----	----

“I am starving” grumbled one of the female mosquitoes. “Where do we go looking for food!”

Difference between male & Female? What do they feed on? Body Parts?

They then set out looking for the closest colony of humans. “Lets split up, you two head to left, you to the right and sui follow ...me”

Dusk and Dark they move out Lay eggs, How do they breed?

Sui and her partner landed on a dimly lit balcony packed with creepers and potted plants. “

Places where they are ideally found in a home environment

13	14	15	16	17	18
----	----	----	----	----	----

As soon as they were about to spring over they heard a rustling sound closing in on them from the back.....

Natural Predators of the mosquitoes, Dragon Fly. Guppy Fish. Flight of the mosquito. Speed at which they fly

Traumatized Sui leapt across the balcony and landed straight into what appeared as a closed dark room. me”....

Nature's balance continuation. Compound eyes

“Alright then this is how its done, look for exposed parts of the body. Don't go close to the face because they can see you...”

How do they bite? The saliva...

19	20	21	22	23	24
----	----	----	----	----	----

“ Now off you go, while I look for some more people”
Sui followed instructions carefully and finally was about to make the

Where do they mostly bite? Co2 released ares they are attracted to. to certain smells.

“ Enough sui. He is about to wake up. Before he switches on the light lets go.”

How does the bite look? Do they bite other organisms?

Sui soon learnt the tricks and could find multiple people to bite in one night.....

Nuisance? Why? Itch. Irritation

25	26	27	28	29	30
----	----	----	----	----	----

After a few weeks she went back to the same man she had first bitten. She at once recognized him.....

What is a disease? How do you know when someone is sick or has a disease? What do you do?

“The blood test results show he has Malaria” he said. “We need to treat him immediately with medicines.....

Doctor Hospitals Some diseases cannot be discovered hence blood test.

“ What is Malaria?” she asked.....

What is Malaria? Different from other diseases

What is a virus?

31	32	33	34	35	36
----	----	----	----	----	----

Sui learnt more from her group mates not just about herself but also about other mosquito families and their whereabouts.

Prevention methods

The time came for the wandering mosquitoes to again look for a new home. Sui and her new family left the pond.....

The time came for the wandering mosquitoes to again look for a new home. Sui and her new family left the pond.

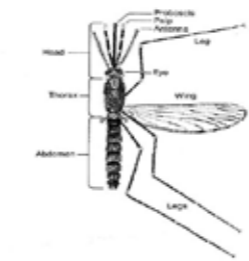
Places affected around the world
Cycle of malaria

Illustration style

The style of illustration is what sets the mood of any story. It enhances the impact of the words use to tell a story. There are various styles that exist to give desired impact, examples being : children’s, 3D, Technical/ Scientific, Digital, Pen and Ink, Mixed Media etc. They mostly vary between the spectrum of realistic and abstract. For the particular subject I chose water colors and photo inks. The illustration style was towards the realistic as they could not look very different from the facts and scientific information or the children would get confused with abstract drawings.



Comic



Scientific

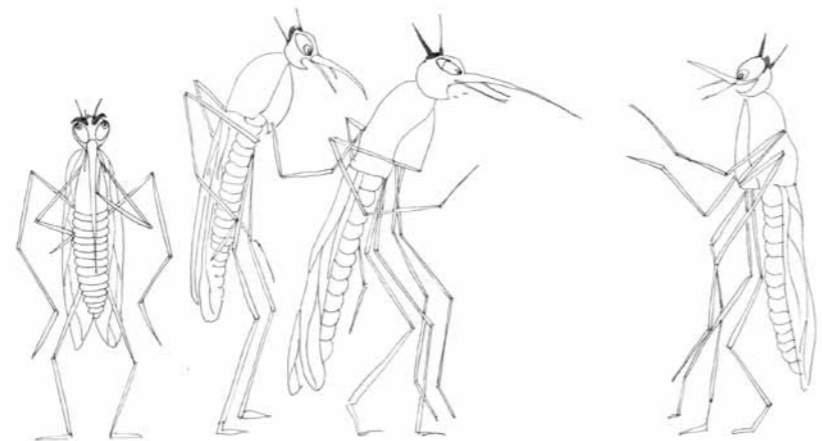
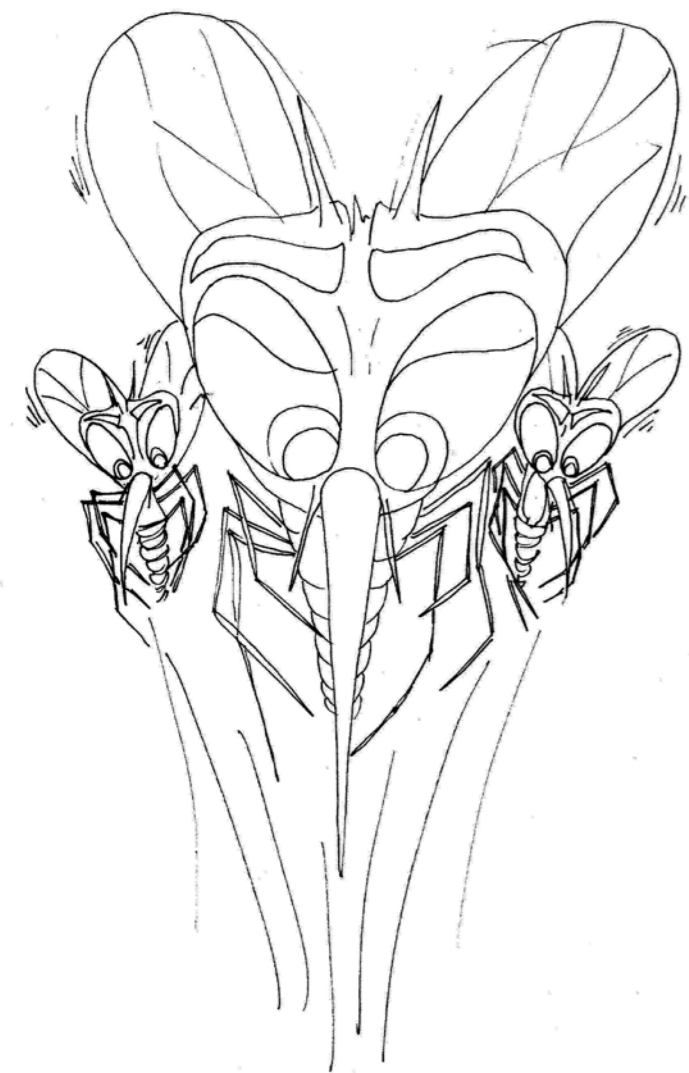


Abstract

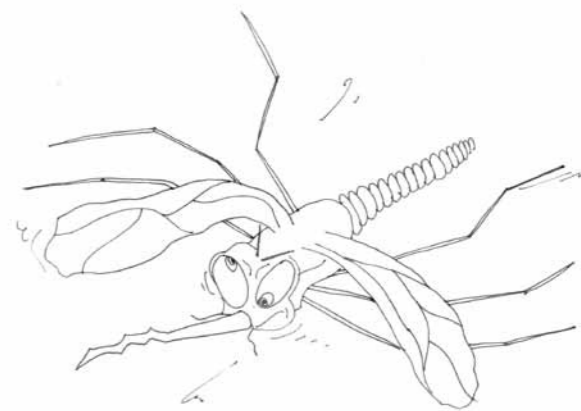
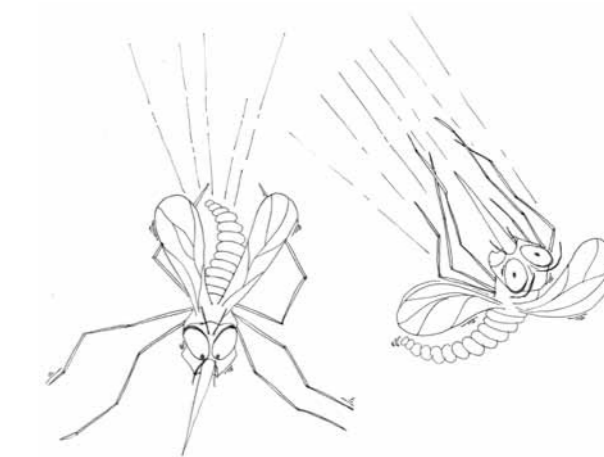


Children’s Style (Water colors)

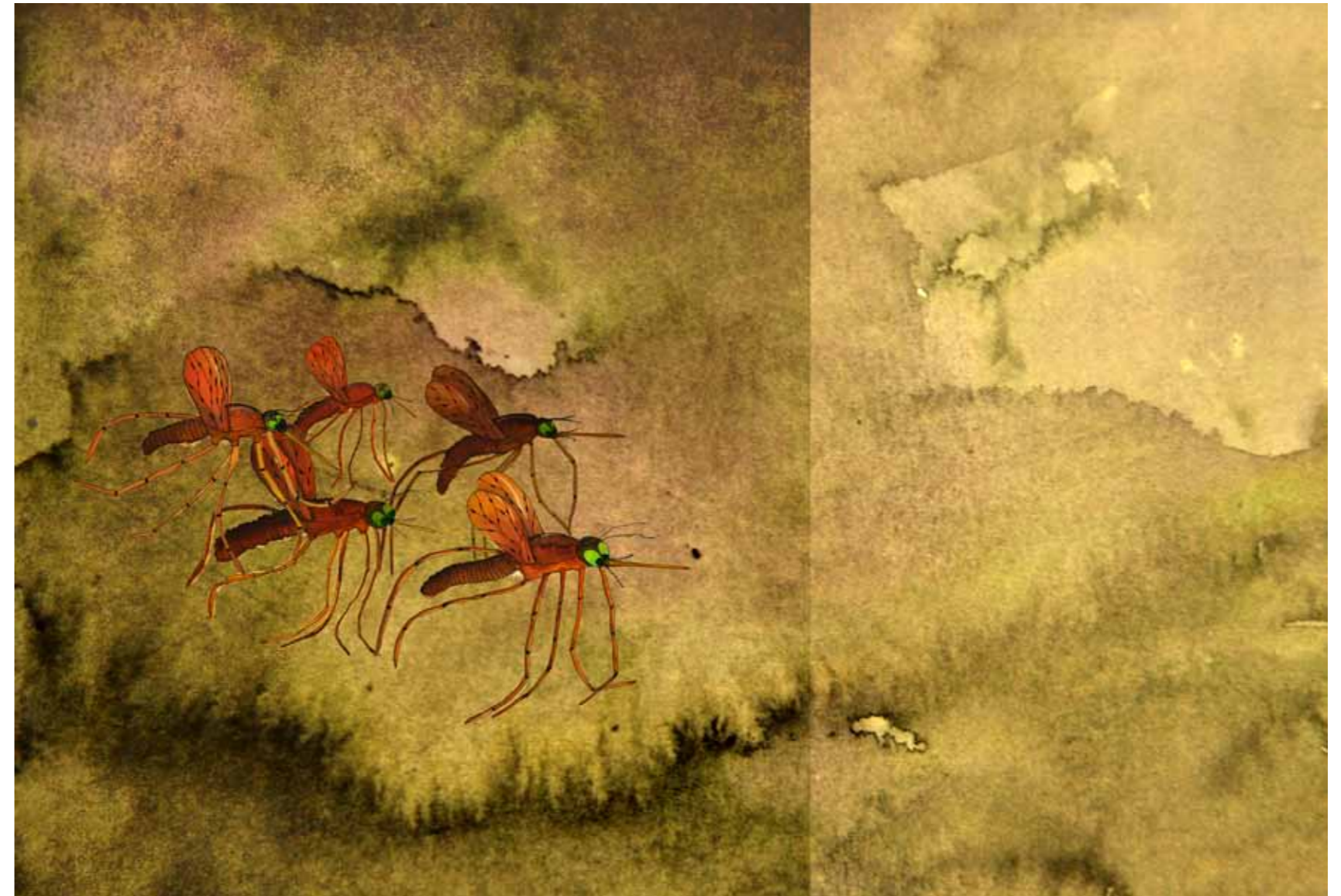
Initial Explorations



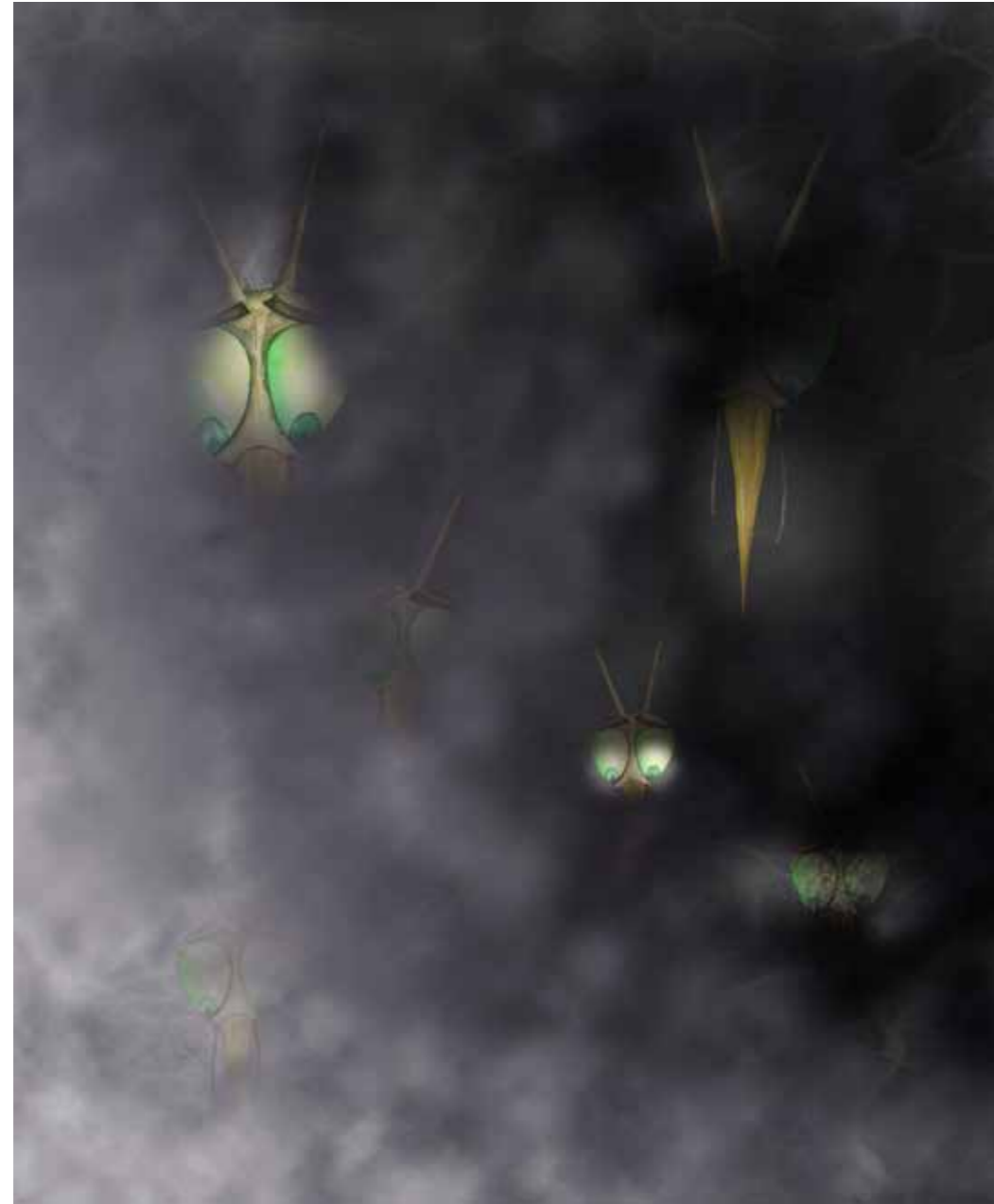
Pencil sketches of characters of the story.



Color options



“The wandering mosquitoes, once again set out looking for a new home. A new Adventure! “



“Ahek” “Ahek” “Harummm”
“Fly” “Fly”
“We must evacuate
immediately”

Grid & Layout

Book Size: 20.5 cm/ 25.5 cm

Font : Perpetua Bold

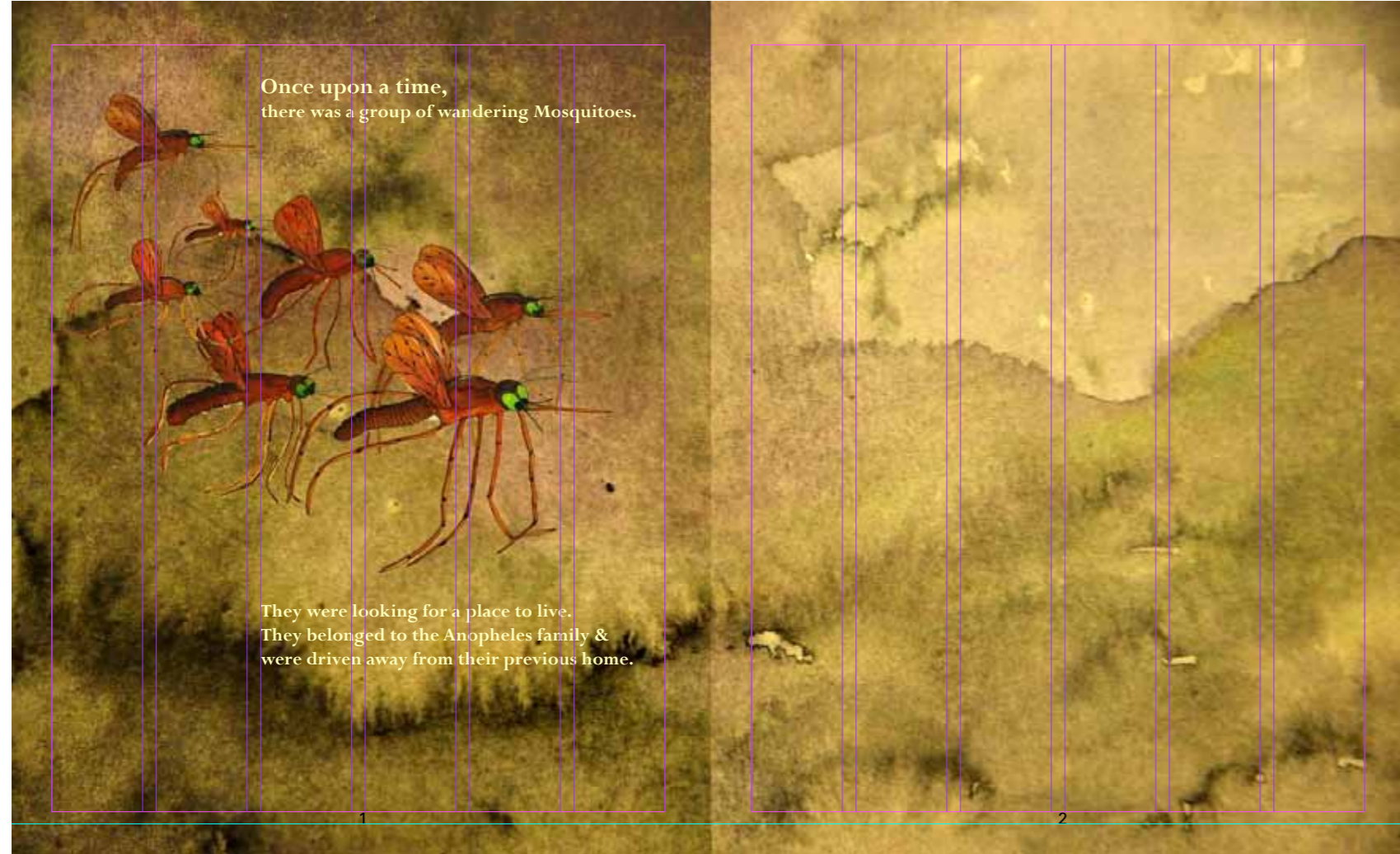
20 pt (Subject to change)

Whitney Medium

12 pt

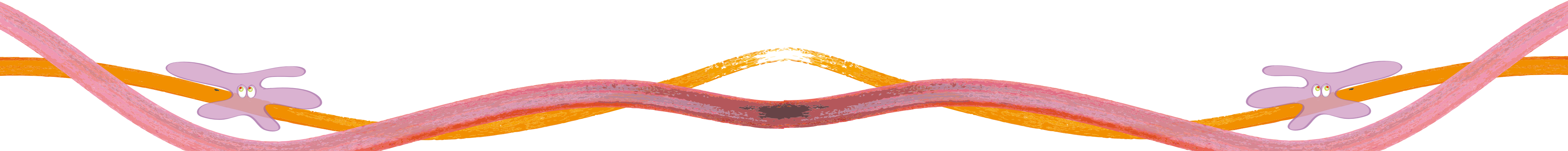
Whitney Bold

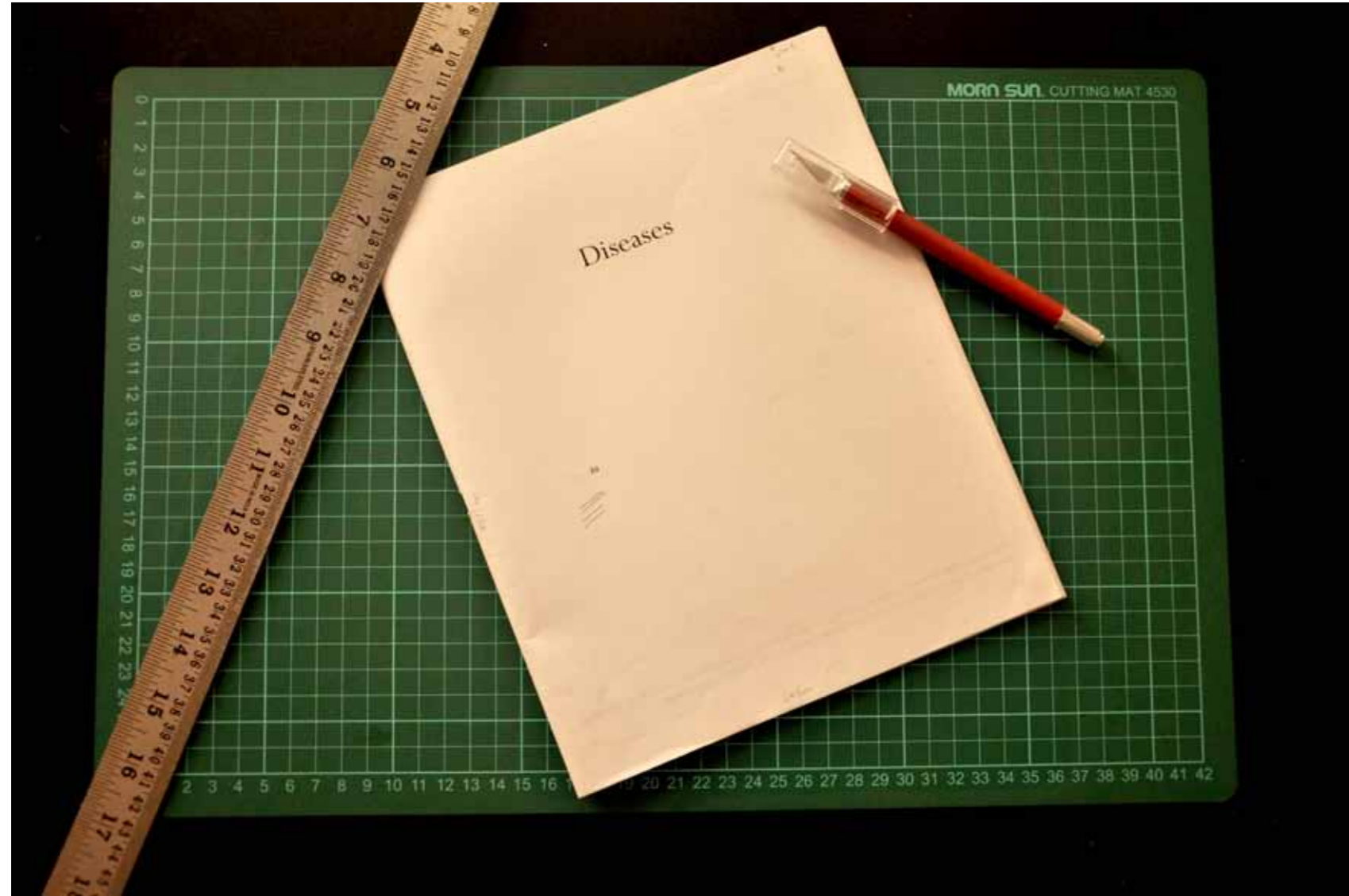
20 pt (Subject to change)



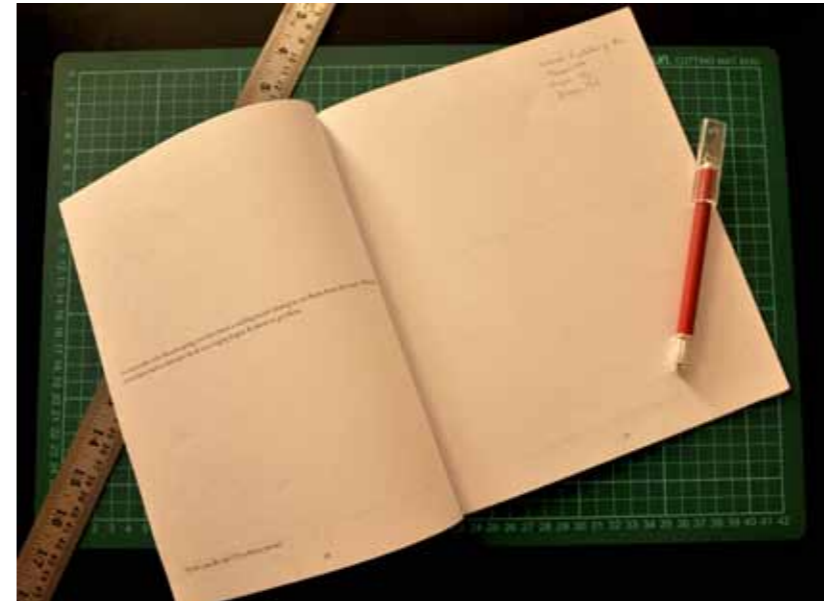
Chapter 5

1. Final Design Idea
2. Evaluation
3. Iteration
4. Application





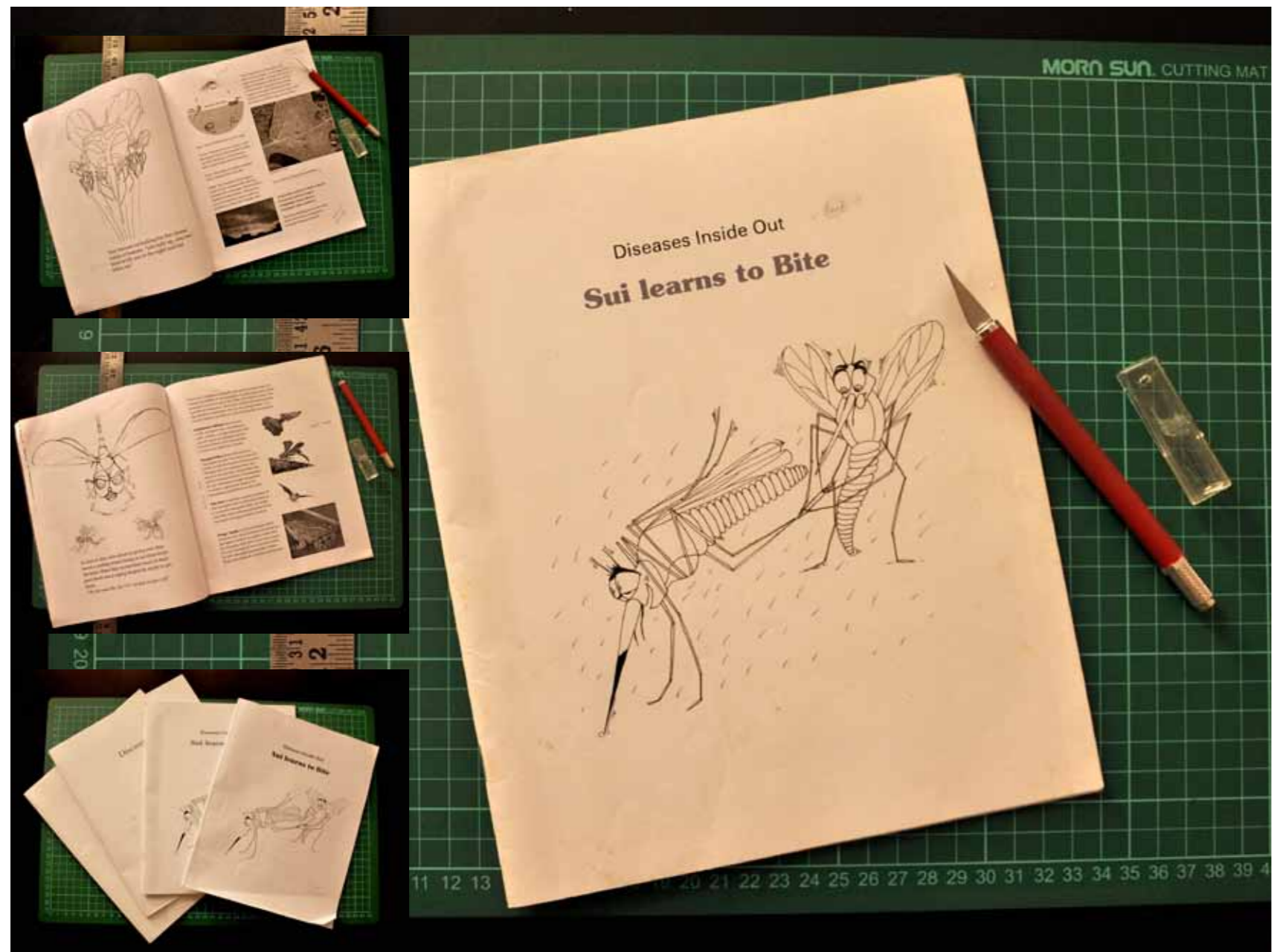
Dummy



Towards final design

For any book to take shape, it starts with a dummy. After the initial explorations were done to get a sense of how the characters would look and the color palette that can be used a dummy is the next step to start with. It starts like a bare skeleton and bit by bit content flesh in the form of content is placed to give the book its final form.

Following the same process a number of dummies were created to understand information flow and the placement of text. The type face and grid was appropriately changed to suit the content of the book.



Book Size: 20.5 cm/ 25.5 cm

Font : Body Text

Stone serif informal

pt size 11

Body Text 2

Stone Sans Normal

pt size 11

Title Text

Stone Sans Bold

pt size 18

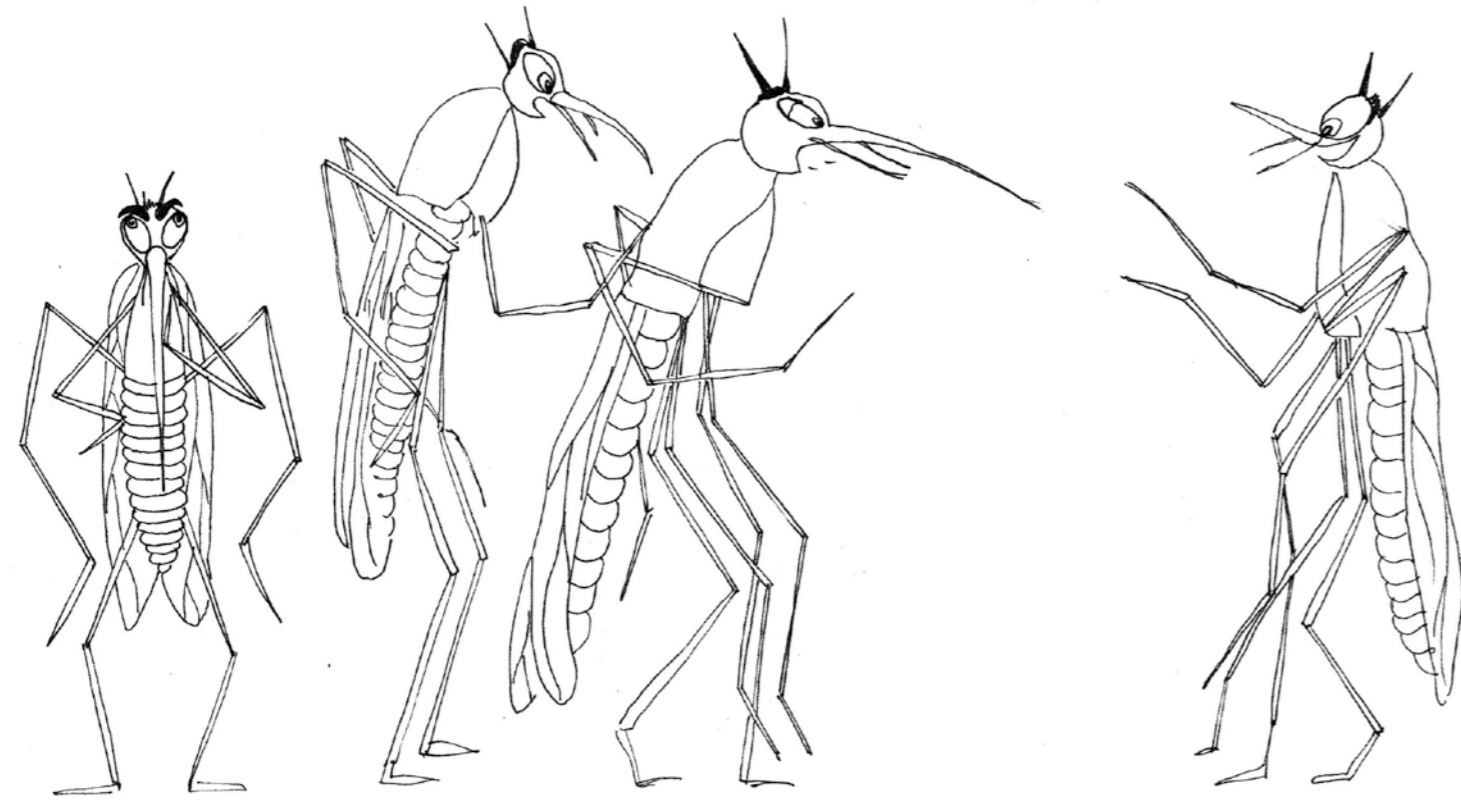
Title: "Diseases Inside Out, Sui Learns to Bite"

Pages: 40

Category: Young Reference Book

Final Illustrations

The final illustrations were made on the computer using the initial sketches as reference. They were rendered in Photoshop to get uniform colors.



These mosquitoes are a small group that live in a garden. It was dark and dark, just what they were looking for. But had recently visited their group and was beginning to hear the noise of the honey they belonged to, Anopheles.

Anopheles also living in different places. They are found in all parts of the world, but are most common in the tropical regions of the world.

Anopheles, the most common, are used to bite humans. They are also used to bite animals. They are found in all parts of the world, but are most common in the tropical regions of the world.

The most dangerous to people, the one that causes malaria, is the Anopheles mosquito. It is found in all parts of the world, but is most common in the tropical regions of the world.



Layout

Left hand side,
The story unfolds.

Right hand side,
Factual data

They then set out looking for the closest colony of humans. “ Lets split up, you two head to left, you to the right and sui follow me”

If you must have noticed, most of the times we get bitten by mosquito's at night or late evening. Reason being, the peak feeding hours are from dusk until dawn, mosquitoes actually being nocturnal.

*They can be classified as :
 Crepuscular (active at dusk or dawn) Nocturnal (active at night), Endophagic (feed indoors) & Exophagic (feed outdoors)*

Life Cycle

All mosquitoes go through a life cycle of four stages, to wit egg, larva, pupa and adult. To begin the cycle a female mosquito first has to obtain a blood meal. Just one blood meal supplies enough nutrients for the mother mosquito to produce up to two hundred and fifty eggs at one time.

Adult: The duration from egg to adult varies considerably among species and is strongly influenced by ambient temperature. Mosquitoes can develop from egg to adult in as little as 5 days but usually take 10-14 days in tropical areas

Pupa: The pupa is comma-shaped when viewed from the side

Larva: Mosquito larvae have a well-developed head with mouth brushes used for feeding, a large

Egg: Adult females lay 50-200 eggs

Life Cycle of Anopheles Mosquito



Mosquito's
 Mosquito's are insects that have been around for more than 30 million years. They constitute the most important single family of insects from the standpoint of human health. They are found all over the world. A mosquito is a type of fly.

Mosquito's are like flies; they have two wings, but unlike flies, their wings have scales, their legs are long and the females have a long mouth part (proboscis) for piercing skin.

Mosquito Horse Fly

The word "mosquito" is Spanish for "little fly," and its use dates back to about 1583 in North America (Europeans referred to mosquito's as "gnats").

The oldest known mosquito with an anatomy similar to modern species was found in 79-million-year-old Canadian amber from the Cretaceous period. An older sister species with more primitive features was found in amber that is 90 to 100 million years old.

A mosquito can fly an estimated 1 to 1.5 miles per hour.

A mosquito can detect a moving target at 18 ft. away.

Mosquito's can dash between raindrops and even fly backward.

Mosquito's fly a huge 150 miles in their lifetime.

The average mosquito weighs in at a tiny 2 to 2.5 milligrams.

A mosquito can smell a crowd from 20 metres away.

The wandering mosquito's, once again set out looking for a new home. A new Adventure!

Anopheles Mosquito
 Mosquito's also belong to different families. There are more than 2,700 species of mosquito's in the world, the most commonly found in India are *Anopheles*, *Culex*, *Aedes* and *Mansonia*. Anopheles mosquito's mostly thrive in the tropical regions of the world. Although some even survive cold weather conditions.

Regions of the world where Anopheles Mosquito's thrive

The word Anopheles in Greek, "an" stands for not and "opheles" for profit literally means useless.

Mosquito's, like most insects, are cold blooded creatures. As a result, they are incapable of regulating body heat and their temperature is essentially the same as their surroundings. In tropical areas, mosquito's are active year round. In temperate climates, adult mosquito's become inactive with the onset of cool weather and enter hibernation to live through the winter.

Male Anopheles Female Anopheles

There search ended by a small muddy pond in a garden. It was damp and dark, just what they were looking for. Sui had recently joined their group and was beginning to learn the traits of the Anopheles family which they belonged to.

Life Cycle
 One of the major misconceptions about mosquito's is that they all suck blood. This fact is not always true. Mosquito's are a special insect and contrary to popular belief, only the adult females bite for a blood meal. Surprisingly enough the average adult mosquito actually survives on a diet consisting of plant material, such as nectar and juices.

Every adult mosquito's body can be divided into three distinct parts, The Head, Thorax and Abdomen. Whether male or female the basic body parts remain same.

"I am starving" grumbled one of the female mosquito's. "Where do we go looking for food!"

Why would you go anywhere? There is so much to feast on, here!" The male mosquito's exclaimed. "We can't feast on this, human blood is what we need. How else will we lay eggs and survive?" All the female mosquito's were infuriated.

Life Cycle
All mosquito's go through a life cycle of four stages: egg, larva, pupa and adult. To begin the cycle, a female mosquito first has to obtain blood. Just one blood meal supplies enough nutrients for the mother mosquito to produce up to two hundred and fifty eggs at one time.

The duration from egg to adult varies among species and is influenced by temperature. Mosquito's can develop from egg to adult in as little as 5 days but usually take 10 – 14 days in tropical areas.

Female Anopheles Mosquito

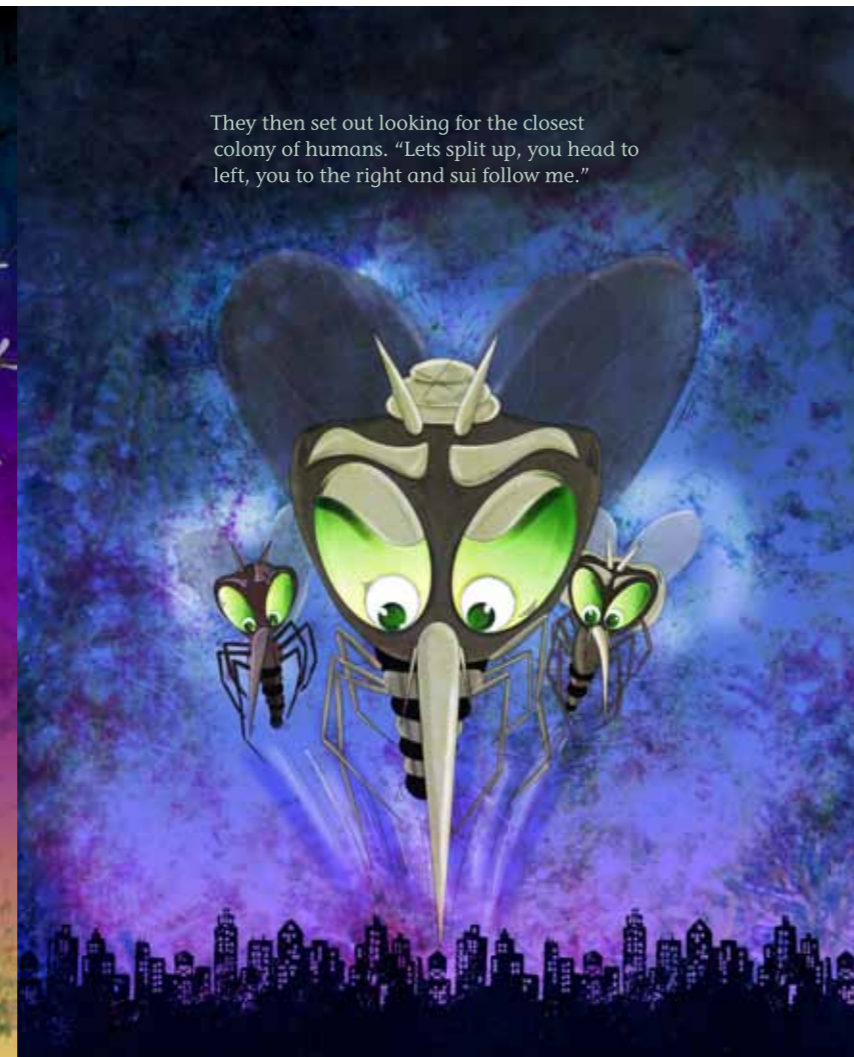
Adult females lay 50-200 eggs.

The pupa is comma-shaped when viewed from the side.

Mosquito larvae have a well-developed head with mouth brushes used for feeding, a large thorax and nine segmented abdomen.

If you have noticed, we get bitten by mosquito's at night or late evening. Reason being, the peak feeding hours are from dusk to dawn, mosquitos are nocturnal creatures.

They can be classified as:
Crepuscular (active at dusk or dawn),
Nocturnal (active at night) and Endophagic (feed indoors) Exophagic (feed outdoors)



Mosquito Problems start at Home
Mosquito's need water to breed and grow. It doesn't take much water and much time. Almost anything that can hold water for more than one week can produce these pests. By destroying water-bodies, the mosquito's don't get a chance to breed.

Clean overgrown ponds and keep fish in them.

Throw away old bottles and cans

Clean Leaf clogged gutters

Empty water from flower pot dishes

Repair leaking faucets

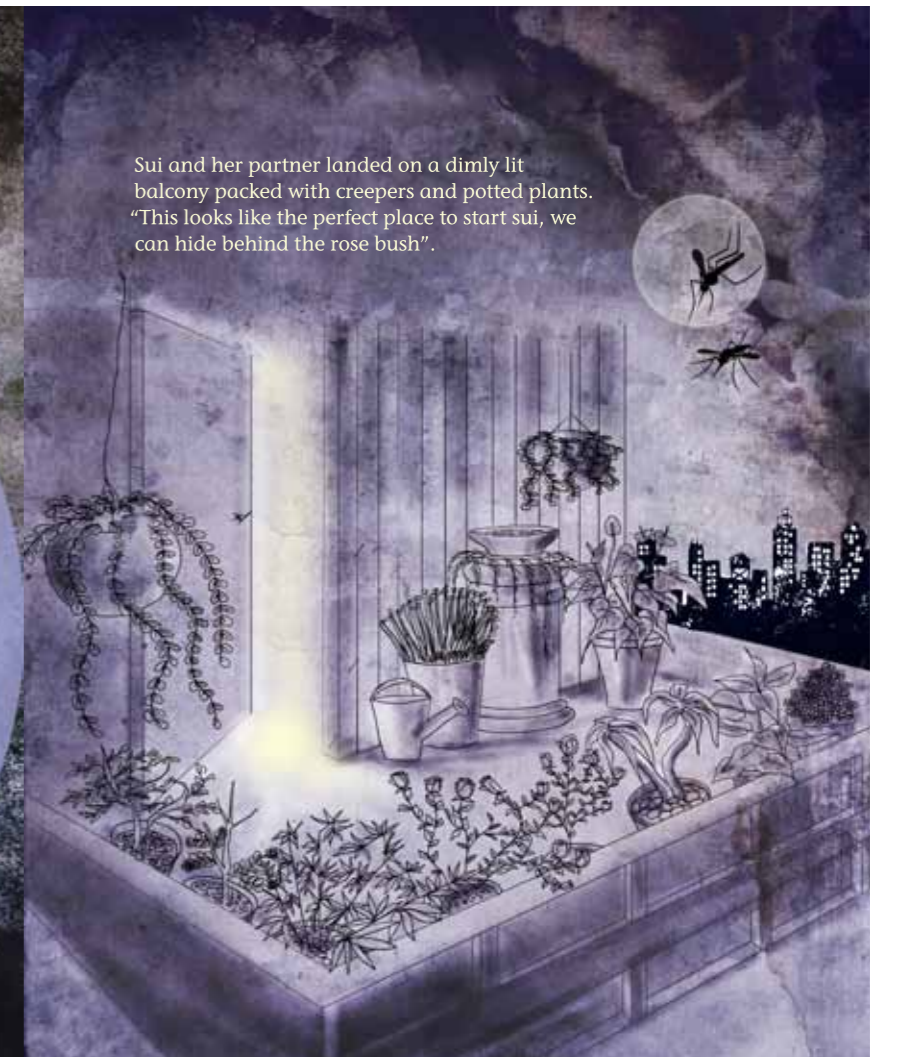
Screen or cover barrels

Change water in bird baths weekly


Fill tree holes

Throw away used litre


It takes about one week for a mosquito to grow from an egg to adult




Natural Enemies of Mosquito's
 There are a number of insects and small animals that are natural predators of the Mosquito. They help in reducing the mosquito population in our environment. Hence, we can encourage these creatures to a certain degree in order to control the pesky mosquito's.




Dragon Fly
 Dragon Flies are often referred to as "mosquito hawks" for their ability to kill thousands of mosquito's. Though they do consume their fair share of mosquito's, but like most natural predators of mosquito's they do not consume enough to cause a significant impact on populations in the wild.




Gambusia Fish
 A single mosquito fish can eat up to 50 mosquito larvae in 30 minutes.




Frog
 Frogs and their young ones consume mosquito's, but in small quantities.



Bat
 Bats also eat mosquito's voraciously. They are called opportunistic feeders.






As soon as they were about to spring over they heard a rustling sound closing in on them from the back.

When they turned there back to their pure shock was a raging dragon fly about to get them. "Fly for your life, Sui !!!!! as fast as you can."

Mosquito Sensors
 Mosquito's are insects that have been around for more than 30 million years. During those millions of years, mosquito's have been honing their skills to find animals and bite. They have multiple sensors which enable them to track their prey from long distances. These sensors are all placed in their heads.




Heat Sensors
 Mosquito's can detect heat, they can find warm-blooded mammals and birds very easily once they get close enough.

Chemical Sensors
 Mosquito's can sense carbon dioxide and lactic acid up to 100 feet away. Mammals and birds gives off these gases as part of their breathing. Chemicals in sweat also seem to attract mosquito's hence people who don't sweat much don't get nearly as many mosquito bites.

Visual Sensors
 If you are wearing clothes that contrasts with the background, and if you move while wearing those clothes, mosquito's can see you. It's a good bet that anything moving is "alive", and therefore full of blood, so this is a good strategy.

13



Traumatized, Sui leapt across the balcony and landed straight into what appeared as a closed dark room. She peeped out to look at her friend dodge the dragon fly.

"Ha!, we made it, we were almost served as dinner tonight." She smirked at the terrified Sui " Lets get to what we came for. You didn't think this was a piece of cake did you?"

Mosquito Bite
 When a mosquito comes to bites it casts its proboscis back and forth under the skin sawing through tissue and probing through tissue until it strikes a small blood vessel. Saliva from the mosquito contains an anti-coagulating agent to stop the blood from clotting so the mosquito can feed easily.






TARGET




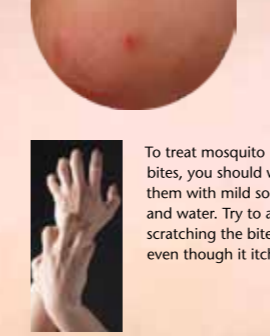
“Alright then this is how its done, look for exposed parts of the body. Don't go close to the face because they can see you. Fingers and toes are the best bet. Avoid light, keep low and make precise incision. Be as quick as possible and finally your secret weapon, don't forget to release your saliva before you bite. It will numb there skin and they wont feel a thing. “ok?”. “ok!! Got it”


Mosquito Bite
 Only the female mosquito bites humans. After she has bitten you, some saliva which was released before biting remains in the wound. The saliva of the female mosquito contains proteins which evoke a reaction from the human body. Due to which the area swells and you itch, a response provoked by the saliva. Eventually, the swelling goes away, but the itch remains until your immune cells break down the saliva proteins.



The inflamed portion which is left on the skin after the mosquito bite is called a *wheel*.



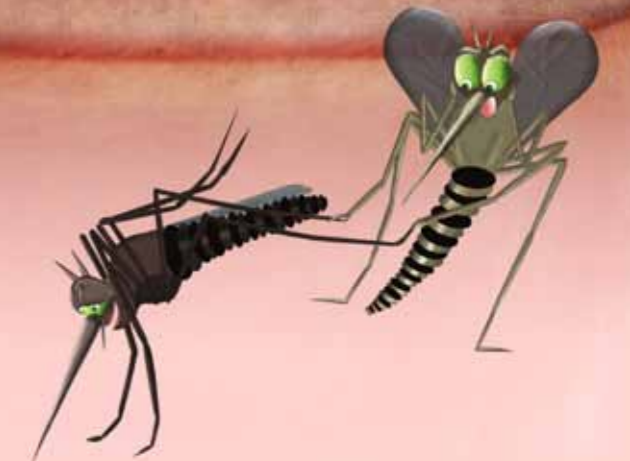




Female mosquito's don't just bite humans. Dogs, cats, and even horses and cattle are also prone to mosquito bites.

“Enough sui. He is about to wake up. Before he switches on the light lets go.” Sui had to be pulled away and taken back to the pond, because she was so full and could not move.

“Ahhh, I think I am going to burst. I drank too much.” Sui sighed. “The trick is to have little from each and bite as many as you can.”



Mosquito's Prey
 Scientists are still investigating the complexities involved with mosquito host acceptance and rejection. Some people are highly attractive to mosquito's and others are not. Mosquito's have specific requirements to satisfy, and process many different factors before they feed. Female mosquito's use the CO₂ we exhale as their primary cue to our location.

Mosquitos posses receptors located on the antennae which allow them to zero in on a blood source. They find this by detecting CO₂.

A host seeking mosquito is guided to our skin by following the slip stream of CO₂ that exudes from our breath. Once they have landed, they rely on a number of short-range attractants to determine if we are an acceptable host. Folic acid is one chemical that appears to be particularly important

Mosquito's are attracted to strong odours. Flowery or fruity fragrances like those found in bath or body lotions have a tendency to bring on mosquito's.

Dark Clothes Detergents Perfumes Soaps

Sui soon learnt the tricks and could find multiple people to bite in one night.

Mosquito's spread Diseases
 Mosquito's are called pesky insects not just because of their annoying biting abilities but also because they can be very dangerous. Through their bite they transfer disease carrying microorganisms into our bodies leading to sickness and ill health. In very severe cases people also loose their lives.

A disease is the absence of good health. It is a disturbance in normal functioning of the body.

Symptoms of a Disease
 Fever, Cough and Cold are mere symptoms of the onset of a disease or a sickness. It is a way through which our body gives us a sign that something is not right and we need to take care of it.

Some of the most common symptoms of the onset of a sickness is *Fever, Common Cold, Shivering with High Fever, Body ache and Head ache.*

Bacteria

Fungi

Virus

Parasite

There are a few agents that cause illness. Some of them include the microorganisms, such as parasites, bacteria, fungi and viruses.

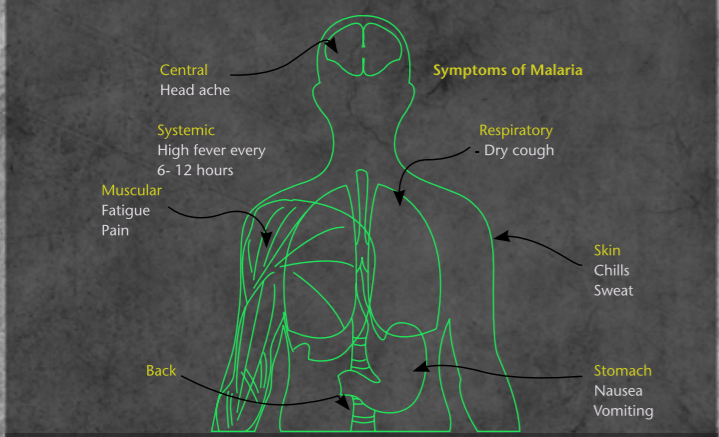
Microorganisms are living organisms, most of them unicellular creatures. Microbes include viruses, bacteria, fungi and parasites, which can cause diseases when our immune system can't fight them off.

After a few weeks Sui went back to the same boy she had first bitten. She at once recognized him. But this time he looked pale and sick. He was shivering and had a blanket on him.

There was a Doctor also in the room. She peered in closer to get a clear view.

Malaria symptoms
Infection with malaria parasites may result in a wide variety of symptoms, ranging from absent or very mild symptoms to severe disease and even death. Malaria can be categorized as mild or severe. In general, malaria is a curable disease if diagnosed and treated promptly and correctly.

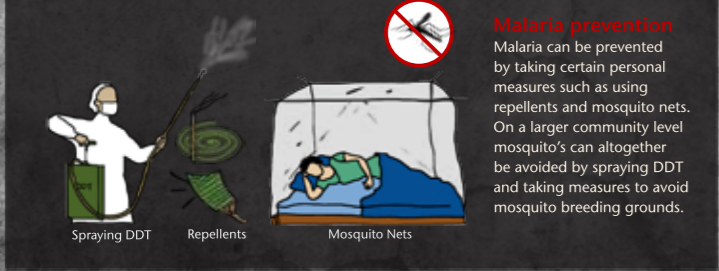
Following the infective bite by the Anopheles mosquito, a period of time (the "incubation period") goes by before the first symptoms appear. The incubation period in most cases varies from 7 to 30 days. The shorter periods are observed most frequently with Plasmodium falciparum.



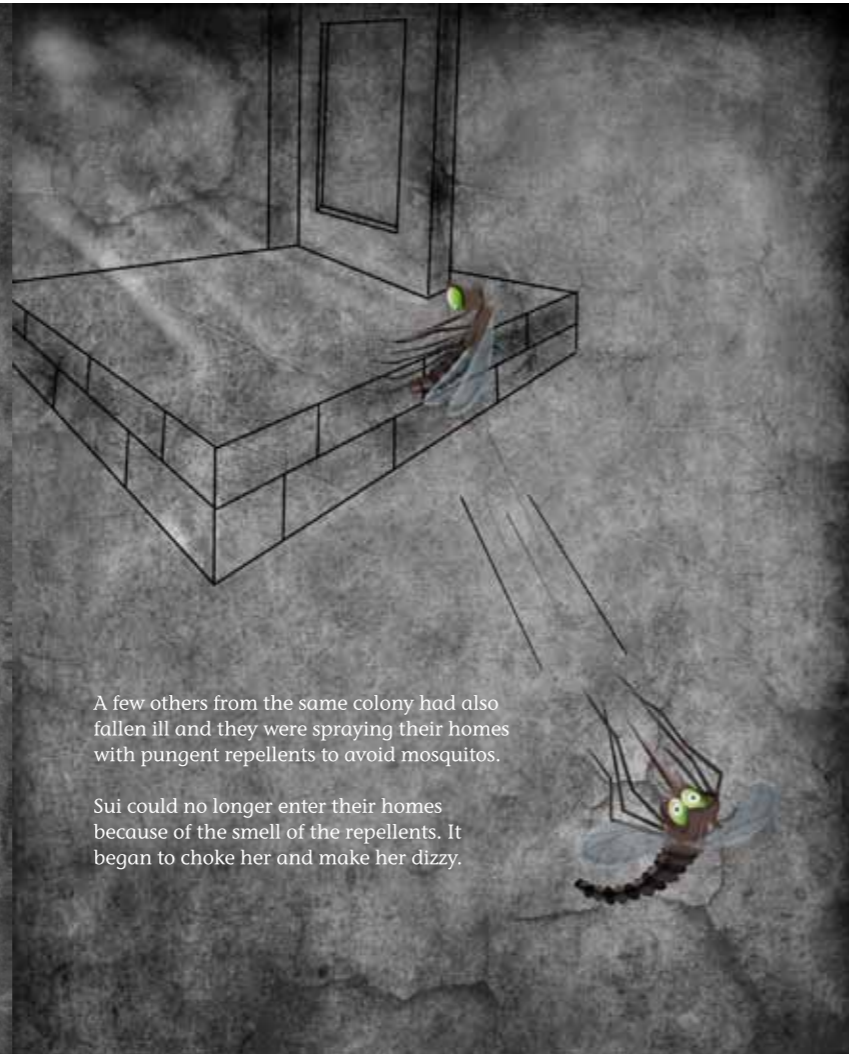
Symptoms of Malaria

- Central: Head ache
- Systemic: High fever every 6-12 hours
- Muscular: Fatigue, Pain
- Back
- Respiratory: Dry cough
- Skin: Chills, Sweat
- Stomach: Nausea, Vomiting

Malaria prevention
Malaria can be prevented by taking certain personal measures such as using repellents and mosquito nets. On a larger community level mosquito's can altogether be avoided by spraying DDT and taking measures to avoid mosquito breeding grounds.



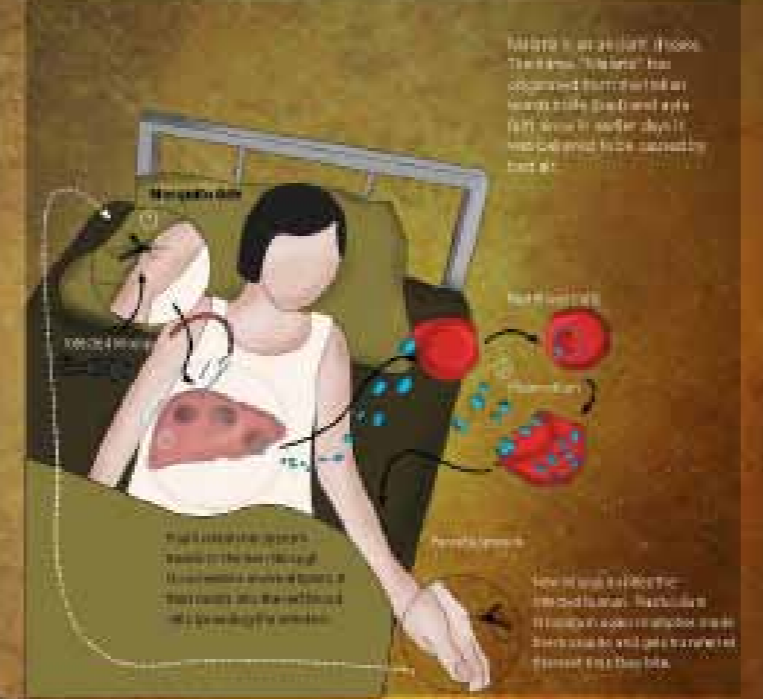
Spraying DDT Repellents Mosquito Nets



A few others from the same colony had also fallen ill and they were spraying their homes with pungent repellents to avoid mosquitos.

Sui could no longer enter their homes because of the smell of the repellents. It began to choke her and make her dizzy.

Malaria Cycle
There's a common misconception: Mosquitos don't cause malaria — they only spread the disease. Malaria is caused by microscopic parasites that are passed to humans when a mosquito bites a person who has malaria. If people don't receive the right care, the parasites can cause serious complications. The mosquitoes that transmit malaria come with a special life cycle. When the mosquito bites a human, the parasites enter the bloodstream and travel through the body until they reach a liver cell to make more.



Malaria is an illness that causes fever, chills, and fatigue. It is caused by a parasite that is spread by a mosquito. The parasite enters the bloodstream and travels through the body until it reaches a liver cell to make more.

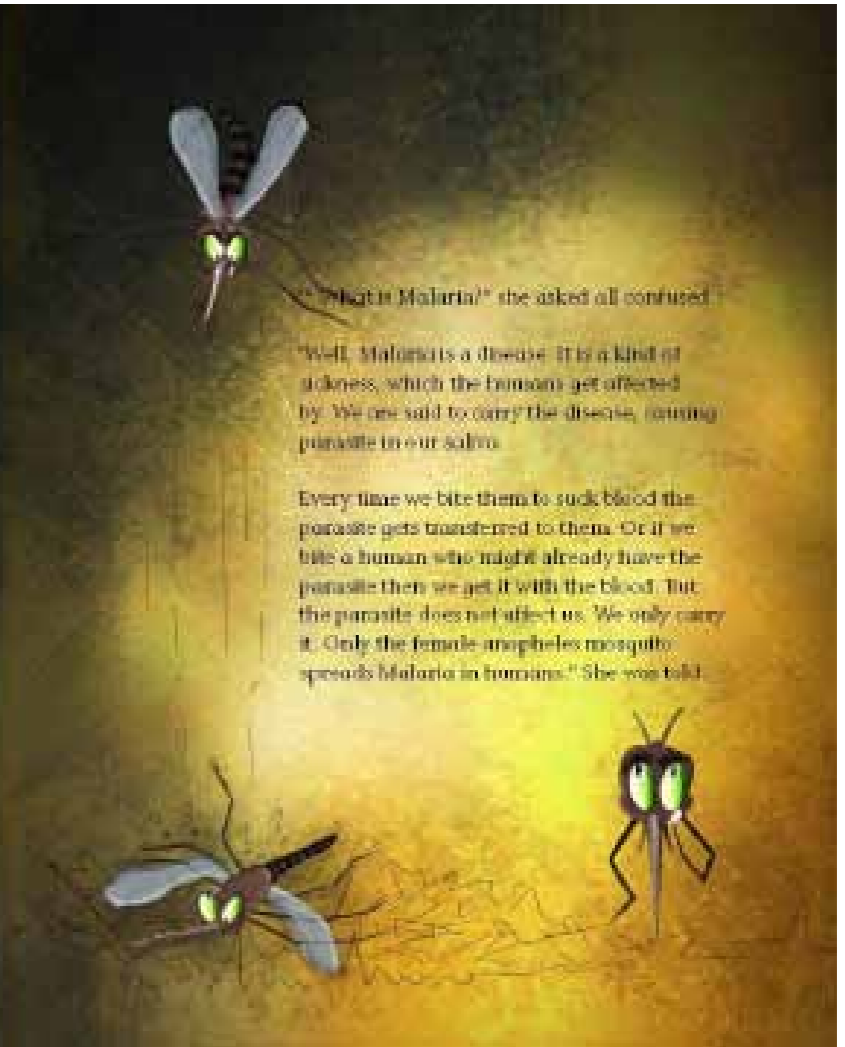
When a mosquito bites a person who has malaria, the parasite enters the bloodstream and travels through the body until it reaches a liver cell to make more.

When a mosquito bites a person who has malaria, the parasite enters the bloodstream and travels through the body until it reaches a liver cell to make more.

"What is Malaria?" she asked all confused.

"Well, Malaria is a disease. It is a kind of sickness, which the humans get affected by. We are said to carry the disease, causing parasite in our saliva.

Every time we bite them to suck blood the parasite gets transferred to them. Or if we bite a human who might already have the parasite then we get it with the blood. But the parasite does not affect us. We only carry it. Only the female anopheles mosquito spreads Malaria in humans." She was told.



Mosquito Families
 It's not that only the Anopheles mosquito's spread disease, there are other species that which transfer disease to various parts of the world. Aedes Aegypti and Culex are most common around the world.

Regions affected by Culex
Aedes Aegypti
Culex

Japan is heavily infested by the Aedes Aegypti mosquito. It is very common in India and it is fatal in Malawi.
 Aedes Aegypti is a disease spreader by the Culex mosquito. It is very common in India and it is fatal in Malawi.

Regions affected by Malaria
 Most tropical regions of the world are at high risk due to the weather being conducive to the development of the Anopheles Mosquito. In India alone every year thousands of people lose their life due to the fatal disease. Every year more than 1 million people die of Malaria around the world. The highest transmission rates are in Africa north of the Sahara.

And several more from her group, treats not just about herself but also about other mosquito families and their whereabouts.

Generations of the wandering mosquito's have evolved. They are becoming stronger and more resistant to the insecticides and treatments used by the humans.

the time came for the wandering mosquito's to again look for a new home. Sul and her new family left the pond. Soon after they left the pond, that they previously occupied was also sprayed with insecticides, while they continued their journey towards new colonies.

Natural Enemies of Mosquito's
 There are a number of insects and small animals that are natural predators of the Mosquito's. They help in reducing the mosquito population in our environment. Hence, we can encourage these creatures to a certain degree in order to control the pesky mosquito's.

As soon as they were about to spring over they heard a rustling sound closing in on them from the back.

When they turned their back to their prey shock was a raging dragon fly about to get them. "Fly for your life, Suu!!!!!! as fast as you can."

Dragonfly
 Dragonfly has been around since the early Cambrian period. It is one of the most ancient and successful groups of insects. It has a long history of predating mosquitoes.

Frog
 Frogs will eat mosquito larvae and pupae. They are also good at eating adult mosquitoes.

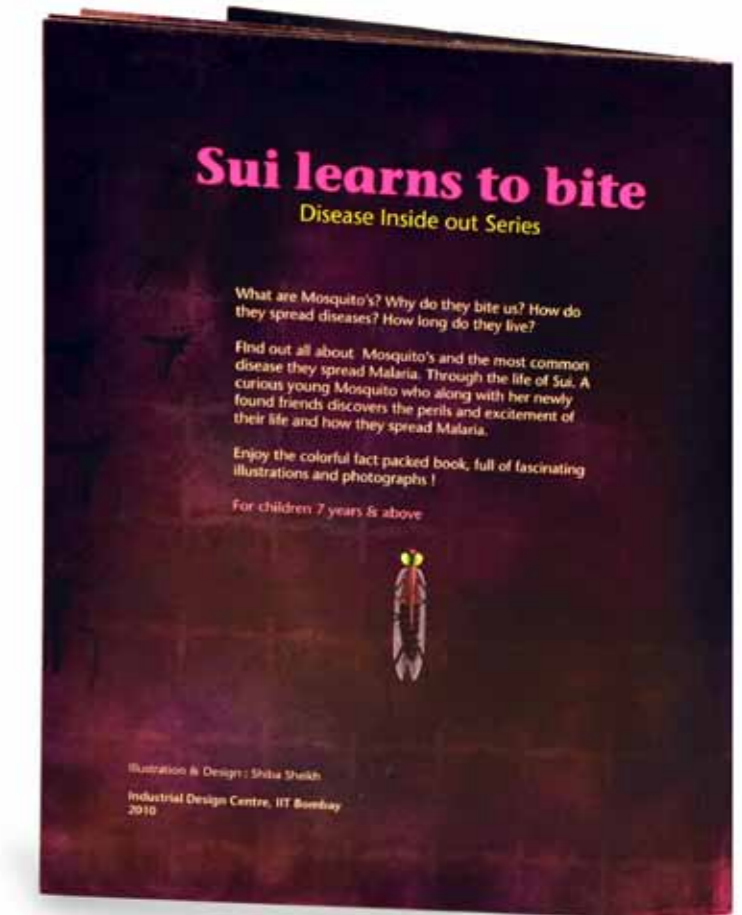
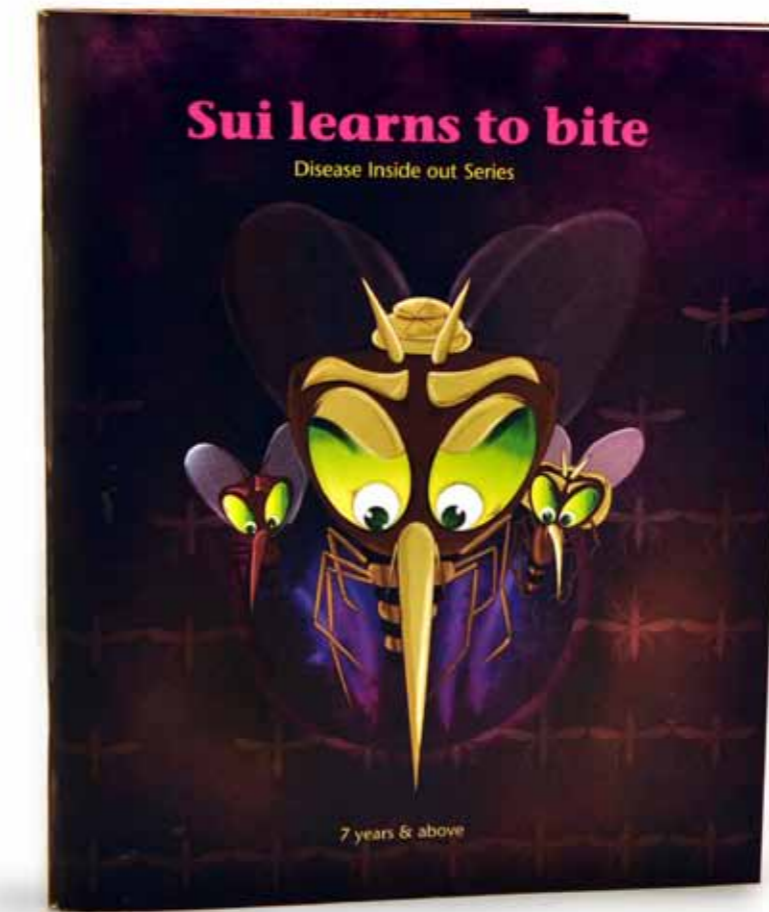
Wasp
 Some wasps will eat mosquito larvae and pupae. They are also good at eating adult mosquitoes.



What did the children think?

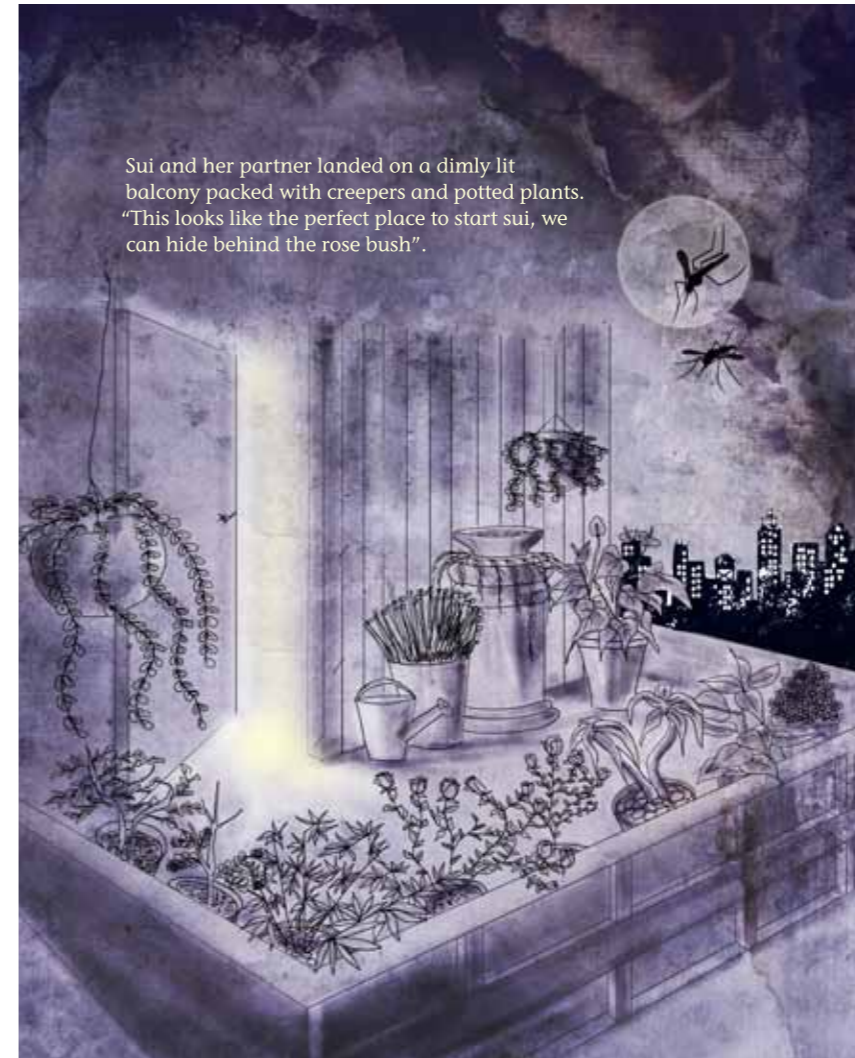
After having shown children the book, the feedback which was received was the following :

- They were able to understand what Malaria is and how it happens by just browsing through the book.
- The illustration style was well received and kept them interested in reading the entire book.
- They had be prompted about the structure of the book ie. story on the right side and facts on the left.
- They felt a break in continuity while reading with the proposed structure.
- They were able to understand the content even better once they had help from parents, teacher and friends.
- Keeping the following in mind further changes were made considering the same story.



Iteration

Since, the structure of the story and facts and the way it was divided was a bit confusing for the children to follow. The next best option was to make one only with the story. The book would be have the continuous story with the same illustrations but no facts on the adjacent pages in order to maintain a more simple structure.





With the new changes made although simpler without facts, at least there was continuity. Although the language of the story was for younger children, they were able to gauge from story about Malaria as a disease. Hence, the exploration of the book only being a story book for children was also a possibility which was looked at for easier reading for younger children.



Epilogue

Working on a project for children is a challenge. Only having the end product in your hand and having gotten response from children themselves can one know of how successful the eventual output is.

The learning mostly has been in understanding the journey of giving shape to a concept and seeing it come to an end and working. In the case of book design multiple changes are possible along the way and one has to be willing to constantly evolve it with respect to the end user ie. Children. They should be able to enjoy and understand it at the same time.

In the near future the project will take the shape of a series of books which can be published and be available in book stores and libraries, and will help children learn about health and diseases.

References

K. Park, “*Preventive and Social Medicine*”, M/s Banarasidas Bhanot, 2005.

Wood David, “*How Children think and learn*”, Basil Blackwell inc, 1988.

Bedi, Yash Pal, “*Handbook of Hygiene and Public Health*”, Anand Publishing co., 1966.

D. McCannon, Northwale school of art at Glyndwr University, “*Character based learning through allegories of information*”.

De Parker, Indrani, IILM School of Design, “*Complete Education – Addressing social issues using the visual language as medium*”

http://www.tastudio.com/www_renderings/bridge_in_europe_pen_ink_illustration.jpg

http://www.toonpool.com/user/17/files/flora_202265.jpg

http://www.craftydeer.com/content/julie/WJ_3sm.jpg

http://www.rivercenter.uga.edu/education/altamaha/images/shiner_700.jpg

