
UNIT 7 READING COMPREHENSION

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7.0 OBJECTIVES

After you read this unit you should be able to:

- comprehend the process of Reading Comprehension (RC) and understand how reading is critical to learning and academic success of students across different disciplines,

- understand the importance of using texts across the curriculum to develop reading skills and incorporate appropriate reading instruction into every class,
- learn and use a range of strategies to develop reading comprehension skills of learners in the classroom and challenge them with complex texts,
- learn and use strategies for previewing texts, monitor their understanding, determine the most important ideas and the relationships among them, remember what has been read, and make connections and inferences.
- enable students to become independent readers in any context.

7.2 INTRODUCTION

Let us understand what do we mean by the term. A simple definition of reading is that it is a process whereby one looks at and understands what has been written. The key word is ‘*understands*’ — merely reading aloud does not count as reading. This definition does not mean that the learner needs to understand everything in a text. Understanding is not an ‘all or nothing’ process, and therefore reading too is not an ‘all or nothing process either’. It means that every reader will comprehend something and perhaps some readers may not understand every word and nor is this necessary.

Again, although reading has been defined as a process whereby one looks at and understands what has been written, the reader does not necessarily need to look at everything in a given piece of writing. The reader actively works on the text and is able to arrive at understanding it without looking at every letter and word.

“Why should I bother about reading? I am not an English Teacher?”

“You don’t read in Math...”

“Science is not taught by reading.”

Many teachers respond in this manner when it is mentioned that they need to teach reading skills while teaching subject specific content. As teachers we must understand that when we talk about reading, we are talking about the ability to construct meaning from the text. In school students access information primarily through reading in all subjects, Mathematics, Science and Social Studies. Research studies show that reading across the curriculum is essential to learning; there is a strong correlation between reading and academic performance. Students who have problems reading texts are likely to experience difficulty obtaining information from texts and consequently encounter difficulties in learning. Reading in Science is not the same as reading in Social Studies topic or in Mathematics.. Thus, to maximize learning by students, teachers need to focus on helping their students develop strategies for reading and writing within their respective content areas. It is important for teachers to blend and scaffold content and literacy learning in different subjects so that students begin to view texts as interesting, informative and engaging.

The reading process

As a first step, it might be useful to find out what you think about reading. Here are some statements about reading. Which of these statements do you think are true? Which of them are false? Can you explain why you think so?

Activity 1: True or False

- *Reading involves looking at a text and saying the words to yourself*
- *Reading involves putting the words in print on the page into sentences and making sense of them*
- *To understand a word, you have to read all the letters in it, to understand a sentence you have to read all the words in it*
- *To understand a text, you need to know the meaning of all the words in the text*
- *When we read for meaning, we do not need to read every letter of every word, nor every word in each sentence*
- *There are no major differences in how one reads in one's mother tongue and how one reads in a second or foreign language*

What is actually involved in the process of reading? It is important to learn this if we want to help our students to acquire reading skills .

7.2 READING COMPREHENSION

As teachers you may sometimes have come across students who, when asked to 'read aloud' a text, could do so fairly fluently, but when asked the meaning of what they had read, would be totally at a loss. In considering the reading process, we have to distinguish between two quite separate activities: *reading for meaning and reading aloud*. It is important to clarify the difference between the ability to read a text as in being able to enunciate its syllables, and the ability to comprehend the text. It goes without saying, that Reading Comprehension (RC) should be our aim, for what use is it to 'read' a string of words/ sentences if one does not comprehend their meaning?

This table below shows the differences between the traditional view and the new understanding of reading with regard to the goals of reading, the process of reading and the role of the learner/reader.

Difference between Traditional and New Definition of Reading

Research Base	Traditional Views Behaviorism	New Definition of Reading Cognitive Sciences
Goals of Reading	Mastery of isolated facts and skills	Constructing meaning and self-regulated learning
Reading as Process	Mechanically decoding words; memorizing by rote	An interaction among the \reader, the text, and the context
Learner Role	Passive; vessel receiving knowledge from external sources	Active; strategic reader, effective strategy user, cognitive apprentice

Activity 2: What do you think?

What are the differences between the traditional and new understandings of reading? Which approach is likely to promote reading comprehension and why?

Reading to Comprehension involves interaction between 1) the reader's existing knowledge, 2) the information suggested by the text, and 3) the context. RC is not simply the passive receiving of information; rather, it is an ongoing activity that engages the reader in the act of interpretation. Further, the meaning is not something given or inherent in the text only—the reader also constructs it.

7.2.1 The Reader

Good readers interact with the texts that they read. They have personal expectations about what they want to get out of a text, and they bring those expectations to bear on what they read. They actually create meaning by constructing, or generating relationships between what they read and what they already know. In generating these meanings, they draw on their prior knowledge of and beliefs about the subject—their 'World Knowledge', so to speak that relates to the subject.

Readers have a network of prior understanding about a topic, what theorists call **schemata**. Every reader organizes his /her world knowledge into categories and a network of connections or *schema* that function as information-retrieval systems. This schema is activated when a related concept or key-word is encountered in a text, for example, in the title, or in the passage, paving the way for comprehension by enabling further connections to be built. Researchers have pointed out that the reader's comprehension of a particular text is directly proportional to the background knowledge that the reader has about the subject content of the text (Schallert and Martin, 2003). It follows therefore, that for developing the skill of reading, the learner would benefit from exposure to a range of texts in various content areas, thus broadening his/ her schema and providing practice in meaning-making.

Readers also differ from each other in their general cognitive development as well as higher level thinking skills, their purpose for reading and socio-cultural background. These factors also contribute to the readers engaging with and evaluating texts in different ways; for example, in identifying with situations or characters, or in making moral judgements.

7.2.2 The Text

Like readers, every text, every piece of writing, is unique in terms of its genre, vocabulary, language, style, difficulty level, and thematic content. The author's intent is also a key feature of a text, and the manner and extent to which it is made explicit also affects meaning-making. Some researchers opine that even 'surface features' of a text such as its font type and length can influence the process of RC (Tracey and Morrow, 2002). The text is also located in a particular time and space; thus its socio-cultural moorings impinge upon the reading transaction.

7.2.3 The Socio-cultural Context

Reading does not occur in a vacuum; rather, as stated above, every reading activity involves an interaction between the reader and text, both of which belong to specific cultural contexts. Thus, sociocultural influence permeates any reading

activity (Kucer, 2001; Schallert & Martin, 2003). Contexts are also created by the specific nature of the activity associated with the reading task, for example, the purpose assigned to the reading, by the reader himself/ herself or by the teacher. Research has shown that environments that place a premium on reading and writing a wide range of texts, with the opportunities to draw inferences, predict outcomes, possibilities, etc., help to enhance the RC skills of learners.

Activity 3

1. *Out of the following text types, which do you find easy to comprehend, and why?*

General news report, newspaper editorial, blog, research paper, an article in a science magazine, a recipe, knitting pattern instructions (consider some of the features mentioned in the paragraph above)

2. *Think and write about some articles, stories, with which you encountered difficulties in understanding because their socio-cultural context was very different from yours.*

7.2.4 Reading as an Interactive Process

The terms 'top down' and 'bottom up' are used in this context to explain the interactive process of reading. 'Top down' processing refers to the use of predictions based on one's prior knowledge, while 'bottom-up' processing refers to the role of the text in providing input through decoding, or letter and word recognition. Reading is thus an interactive process; there is a simultaneous interaction of the reader's prior knowledge and his/her sampling of the text; to put it in more technical language, the meaning of a text is reconstructed through a constant interaction between the information obtained through *bottom-up* decoding and that obtained through *top down* analysis, engagement with the text. Strategies such as summarizing, organizing, clarifying, questioning, visualizing, predicting and evaluating are employed by the reader to build up a complete picture of the meaning that emerges.

From this discussion we can conclude that

When we read for meaning, we do not need to read every letter of every word, nor every word in each sentence because we can guess much of what is said as we read it, provided the text makes sense.

Reading is an active process. when we read, we do not merely sit as passive receivers of the text. We also draw on our own knowledge of the world and of the language to help us guess what the text will say next.

Characteristics of reading

- Reading is purposeful
- Reading is selective
- Reading speed varies

- Reading is silent
- Reading is text-based
- Reading involves complex cognitive skills
- Effective reading involves *chunking of information* that the well developed schema makes possible
- Reading is based on comprehension

7.3 FEATURES THAT MAKE TEXTS COMPLEX

The complexity of a text depends on its inclusion of quantitative, qualitative features and the connections that can be made between the text material and the reader of the text.

7.3.1 Quantitative Features

These are features such as unfamiliar words, number of syllables and length of sentences. If lexical content is largely unfamiliar to the learner, the text will be difficult to understand and too much mental energy will be expended in trying to figure out the meanings of the unknown words, resulting in frustration and lack of interest. Depending on the 'lexile score' we can determine what text is suitable for a level or class.

7.3.2 Qualitative Features

Qualitative features refer to the levels of meaning and purpose of the text, organising framework or structures that provide content such as chronological order, cause-effect, compare and contrast, description and problem -solution, language, visual supports such as ,graphs, pictures and maps and finally, the readership or the audience for whom the text is written and how the author addresses the knowledge demands with their expectations of reader's knowledge.

7.3.3 The Reader and the Text

The connection between the reader and the text is important in determining the complexity of a text. The reader's motivation to read, her prior learning and the knowledge about the subject, aptitude and readiness to learn must be considered.

Activity 4: What are the difficulties you encounter/have encountered in the context of reading a book? Write your experiences in the light of the discussion above.

BEYOND TEXTBOOKS: SELECTING A TEXT FOR READING

While content and topic are important criteria for selecting a text, as teachers, it is important to select texts, other than textbooks, that can be used for specific reading strategies or building academic skills. How will you select a text?

<i>Questions to consider while choosing a text:</i>	<i>Questions to consider about how you will use a text:</i>
<ul style="list-style-type: none"> • Does the text allow students to develop or extend their knowledge of course concepts? 	<ul style="list-style-type: none"> • Which critical reading strategy might I teach with this text that will support students in acquiring course content?
<ul style="list-style-type: none"> • Does the text allow students to use a variety of critical reading components? 	<ul style="list-style-type: none"> • What will I have students do before, during, and after reading the text?
<ul style="list-style-type: none"> • Does the text present varied evidence and support for its overall message? 	<ul style="list-style-type: none"> • How will students demonstrate their use of reading the text?
<ul style="list-style-type: none"> • Does the text provide students with cognitive challenges? 	<ul style="list-style-type: none"> • How will students demonstrate their use of critical reading strategies and content acquisition?

Activity 5: On the basis of the criteria listed for choosing and using a text, make a list of a few texts you might use for teaching reading in your subject. Give the reasons for selecting these texts.

7.4 TEACHING STUDENTS TO READ ACROSS THE CURRICULUM

1. Go through the Table given below and reflect on your own reading style.
2. Identify your style of reading. What type of a reader are you?
3. What strategies will you use for making your students active readers.

Comparison of the Traits of Active and Passive Readers

An active reader (self-monitors, adjusts, and reflects)	A passive reader (simply receives information without understanding)
<p>Pre-Reading</p> <ul style="list-style-type: none"> • Builds up background knowledge before beginning to read. • Knows the purpose for reading • Asks what the text will be about • Previews the pictures, title, heading, boldface quotes, etc. • Makes predictions. <p>6. Breaks text into manageable chunks.</p>	<p>Pre-Reading</p> <ul style="list-style-type: none"> • Starts reading without thinking about the subject. • Does not know why he/she is reading • Is not curious about the text. • Does not preview text materials • Does not make predictions. • Is overwhelmed by amount of text to be read.

<p>During Reading</p> <ul style="list-style-type: none"> ● Gives complete attention to the reading task. ● Keeps the purpose in mind. ● Self-monitors comprehension. ● Stops to use a fix-up strategy when comprehension is low. ● Rereads for understanding. ● Connects with text-compares learning with what he/she already knows. Has opinions about the reading. ● Asks what author is trying to say. ● Continues predicting. ● Generates questions and seeks answers. 	<p>During Reading</p> <ul style="list-style-type: none"> ● Is easily distracted. ● Does not know why he/she is reading ● Does not monitor comprehension. ● Does not reread the material. ● Does not, or cannot, make connections and does not have an opinion about what was read. ● Doesn't care what author is saying. ● Does not make predictions. ● Does not ask questions.
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Source: Croner, Patrick, E. *Strategies for Reading Science Content Reading, The Science Education Review, 2(4), 2003, p 106*

7.7.1 Understanding Text Features

Text features and reading comprehension are closely linked. Text features enable the readers to determine what is in the text and what is important to them.

Imagine a textbook without title page, table of content, a caption, graphics, pictures, glossary or labels.. Text features contain the title, page, table of content, index, glossary, heading, sub-heading, keywords, illustrations. diagrams, etc. Infact, everything except the main body of the text.

Activity 6: *Fill the purpose of the text features (listed in the left column) in the right column*

<i>Text Feature</i>	<i>Purpose of Feature</i>
<i>Title</i>	<i>A good title gives us a clue about</i>
<i>Table of contents</i>	<i>the main topic of the text</i>
<i>Chapters</i>	<i>able of contents tells us where to</i>
<i>Glossary</i>	<i>find specific information</i>
<i>Graphics</i>
<i>Illustrations</i>
<i>Labels</i>	

Activity 7

Identify a text for discussion in the class. Ask students to preview the text by reading the title, the abstract, the headings and subheading, and skim-reading the introduction and conclusion. While they are doing this, encourage them to make notes in the margins or in a notebook about what they think the reading is about. Get them to share their impressions in a group and then ask the whole class for feedback.

7.4.2 Functions of a Text

Being aware of the function of a passage is important to comprehend it. Students need to be trained to find out whether the text aims at **convincing** the reader, **giving information** or **asking for something**. The reason or goal for writing or speaking could be to

- *persuade*: by using arguments to influence the reader to accept his/her point of view on an issue.
- *inform*: to give instructions, compare/contrast, share cause and effects, give new information
- *entertain*: using narrative, anecdotes, description, or humour, to amuse, delight, and appeal to imagination

Using Graphic Organisers to find out the author's purpose in a text

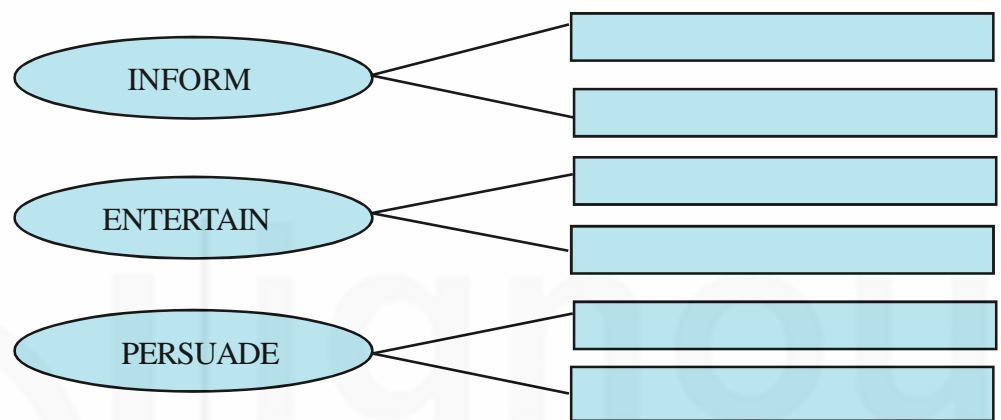


Figure . Author's purpose

The teacher can invite the students to read and think what the author expects or wants as a result of others reading the text, or why the author might be sharing this information.

Activity 8: Collect five or six different types of text (Weather bulletin, recipe, Newspaper article on an angry mob setting fire to a bus, Police notification regarding curbs on Holi, etc). Match the texts with their function. There could be more than one text for a function.

Function	Text
Giving information	
Warning	
Giving advice	
Giving instructions	
Entertaining	

7.4.3 Scanning and Skimming

Scanning and skimming are two types of reading techniques used to assimilate information from different sources quickly. **Scanning** enables a person to look up specific information from a text from any source (documents, maps, books, poems, newspaper, pamphlets, posters, etc.) while **skimming** allows the person to quickly read through something to get the basic idea.

Activity 9: Consider the following types of texts and write for each of them the reason for reading it and the style of reading used.

<i>Text</i>	<i>Reason for reading</i>	<i>Style of reading used</i>
<ol style="list-style-type: none"> 1. <i>Railway time-table</i> 2. <i>Instruction for using a machine</i> 3. <i>Newspaper article</i> 4. <i>An extract from a novel</i> 5. <i>Telephone directory</i> 6. <i>A letter to the editor</i> 7. <i>A poem</i> 8. <i>Rules for playing a game</i> 	<p><i>Looking for a particular piece of information</i></p>	<p><i>Scanning</i></p>

7.7.4 Organisation of the Text

This refers to the method of presentation of information in any passage, which is mostly in the form of

- Main idea and supporting details
- Sequence
- Comparisons
- Logical sequence

Keene and Zimmerman point out that such decision –making during reading is done at three levels: *whole-text level*, *sentence-level* and *word –level*. That is, readers form a clear idea about the key themes of a text, are able to pick out, underline and even paraphrase sentences that contain the core ideas, and at the word-level are able to identify the key words /phrases that are essential to the core themes/ideas. Teachers can guide students to look for clues to the key themes from the title and subheadings (if any) in a text. Key words pertaining to the main theme are often repeated in a text, teachers can ask students to look for content words /phrases that are repeated, and get them to ask questions pertaining to these.

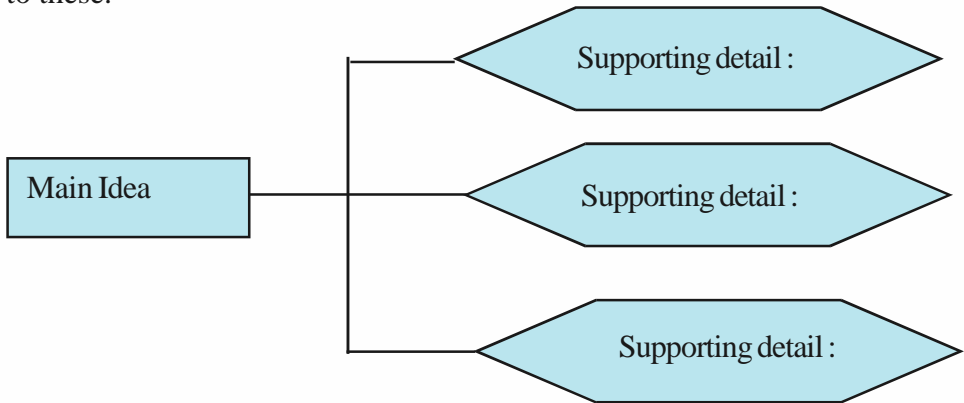


Figure : Main Idea & Supporting Details

Activity 10: Read the following passage and answer the following questions:

French physicist Charles Fabry found ozone gas in the atmosphere in 1913. At room temperature, ozone is a colorless gas; it condenses to a dark blue liquid at -170 F. At temperatures above the boiling point of water, 212 F, it decomposes. Ozone is all around us. After a thunderstorm, or around electrical equipment, ozone is often detected as a sharp odor. Ozone is used as a strong oxidizing agent, a bleaching agent, and to sterilize drinking water. This gas is also highly reactive. For example, rubber insulation around a cars spark plug wires will need to be replaced eventually, due to the small amounts of ozone produced when electricity flows from the engine to the plug.

What is the main idea of the text?

- A) Ozone is the result of pollution.
- B) High ozone levels in the atmosphere will cause large numbers of people to buy new car batteries.
- C) Ozone has no practical uses.
- D) Ozone is a natural part of the Earths atmosphere.

Write down the supporting ideas with the following main ideas

1. Ozone is all around us

.....
.....

2. Properties of Ozone

.....
.....

3. Uses of Ozone

.....
.....

Write

- the key ideas and the supporting ideas in the text
- the sequence and ordering of sequence of sections
- how each section is connected to the others
- how knowing this information will help readers understand the text better.

Source: <http://www.massbay.edu/uploadedFiles>

In these sections, we will forms on some more strategies which can be used for teaching comprehension.

7.4.4 Prediction

'Prediction', also referred to as 'hypothesis testing' or informally as 'guessing', is an activity that is essential for reading, at all stages of the reading process. Making predictions is a strategy used by readers to anticipate what they are about to read. This strategy works for all types of texts and subject areas. Prediction is also a process-skill used in Science. Teachers can help students develop proficiency in this skill by encouraging students to make predictions while reading the textbook and predicting in Science. For example, in Biology, students might predict that a seed will sprout and become a sapling under certain conditions.

Think Aloud Strategies

Teachers can use "Think -aloud" strategies to model prediction so that students can learn the skill of prediction. This strategy can be used till students become independent readers.

1. **Pre-reading** "think-aloud": "By the cover of the book, I can predict that the story is about...."
2. **While-reading** "think-aloud": "My prediction that the war was fought between the peasants and the army was wrong... but I do think that the colonisers had a major role to play in creating the divide."
3. **After -reading** "think-aloud": "My first prediction was incorrect...and now that we have come to the end, my predictions were correct/incorrect".

7.4.5 Teaching Text Structures

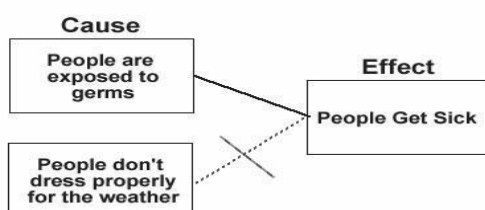
The term "text structure" refers to how information is organized in a passage. Within different disciplines, texts mostly conform to certain set structure types. For example, in fictional Literature, there are a range of narrative genres and expository texts. Scientific texts have expository structures, often containing description, comparison, cause and effect. A recognition of text structure types aids learners in forming text-to-text connections for a particular story genre, which will help them make meaning more easily. Some common types of text structures are explained below:

i) Cause and Effect:

When a text gives reasons (cause) why something happened (effect), or when the results (effects) of an action are explained (cause). Here is an example from the website, www.ereadingworksheets.com

Many people think that they can get sick by going into cold weather improperly dressed; however, illnesses are not caused by temperature- they are caused by germs. So while shivering outside in the cold probably won't strengthen your immune system, you're more likely to contract an illness indoors because you will have a greater exposure to germs.

Cause and Effect



ii) Chronological:

In some texts, the information in the passage is organized in order of time. Simple fables and stories for young readers are often organized chronologically, where a sequence of events is described in a linear manner. More complex narratives, especially novels, move forwards and backwards in time, but even if an author uses flashbacks or flash-forwards, the events still occur along a timeline. Non-fiction texts, especially in subjects such as History, present information chronologically, along with dates.

iii) Compare and Contrast:

In this pattern of organization, the similarities (compare) and differences (contrast) between two or more objects, characters, ideas, etc. are explored. Graphic organisers are useful in graphically depicting the information in such texts.

iv) Order of Importance:

Here the information is expressed as a hierarchy or in priority. For example:

Example: The most important mantra of success is to be persistent and focused on one's goal. Next comes maintaining a high level of self-confidence and refusing to be bogged down by negativity or failure.

v) Problem and Solution:

In such texts, a problem is described and a response or solution is proposed or explained.

Example: Every day, and practically every hour in our country, hundreds of people die in traffic accidents. Many lives could be saved if more stringent policing and challaning of traffic violations were to be done, especially of over speeding and drunken driving.

vi) Sequence / Process Writing:

In such text types, the information is organized in steps or a process is explained in the order in which it occurs. Most scientific experiments, descriptions of phenomena, recipes, and do-it-yourself articles fall in this category.

7.4.6 Developing Critical Reading Skills

What is Critical Reading?

Reading critically does not, necessarily, mean being critical of what you read. Critical reading means engaging in what you read by asking yourself questions such as, 'what is the author trying to say?' or 'what is the main argument being presented?'

Difference between non-critical and critical reading

What is the difference between critical reading and non-critical reading. The difference between critical reading and non-critical reading can be understood with the help of the following table.

Non-Critical Reading	Critical Reading
Passive reading of text.	Active, analytic reading of text.
Recognizing what a text says about a topic.	Re-reading to identify patterns and analyze <i>how</i> the text is written.
Goal is to make sense out of text, understand information, ideas and opinions.	Goal is to interpret information, assumptions, and language; dig into the underlying meaning of the text.

Source: WSSU Critical Reading Manual

7.4.7 Questioning and Challenging your Beliefs and Values

It is likely that the text you are reading might challenge your attitudes, your unconsciously held beliefs, or your positions on current issues. Thinking critically, in the academic sense, involves being open-minded - using judgement and discipline to process what you are learning about without letting your personal bias or opinion detract from the arguments. Critical thinking involves being rational and aware of your own feelings on the subject – being able to reorganise your thoughts, prior knowledge and understanding to accommodate new ideas or viewpoints.

7.4.8 Detecting the Author’s Possible Bias and Prejudices

is an important skill of critical reading. While reading the text the reader can ask the following questions:

1. Is the author making claims to elevate (or demean) one social, ethnic, national, religious, or gender group as compared to another, or all others?
2. Does the author consciously present evidence that serves to tell only one side of an issue withholding shedding light on the opposing view ?

7.4.9 Outlining What is Important and Summarizing

Outlining and summarizing are especially helpful strategies for understanding the content and structure of a reading selection, whereas outlining reveals the basic structure of the text, summarizing synopsis a selection’s main argument in brief. Outlining may be part of the annotating making notes process, or it may be done separately. The key to both outlining and summarizing is being able to distinguish between the main ideas and the supporting ideas and examples. The main ideas form the backbone, the strand that holds the various parts and pieces of the text together

7.4.10 Evaluating an Argument

All writers make assertions that they want the reader to accept as true. As a critical reader, you should not accept anything on face value but to recognize

every assertion as an argument that must be carefully evaluated. An argument has two essential parts: a claim and support. The claim asserts a conclusion — an idea, an opinion, a judgment, or a point of view — that the writer wants you to accept. The support includes reasons (shared beliefs, assumptions, and values) and evidence (facts, examples, statistics, and authorities) that give readers the basis for accepting the conclusion. When you assess an argument, you are concerned with the process of reasoning as well as its truthfulness. At the most basic level, in order for an argument to be acceptable, the support must be appropriate to the claim and the statements must be consistent with one another.

Activity 11: *Read the passage below and choose the best answer to the question.*

The Earth's past climate—including temperature and elements in the atmosphere—has recently been studied by analyzing ice samples from Greenland and Antarctica. The air bubbles in the ice have shown that, over the past 160,000 years, there has been a close correlation between temperature changes and level of natural greenhouse gases carbon dioxide and methane. One recent analysis from Greenland showed that at the end of the last glacial period (when the great ice sheets began to retreat to their present position), temperatures in southern Greenland rose from 5 to 7 degrees in about 100 years. Air bubbles are not the only method of determining characteristics of the Earth's ancient climate history. Analysis of dust layers from ancient volcanic activity is another such method; as is the study of ice cores, which interpret past solar activity that may have affected our climate.

Answer the following questions while reading the text and answer

- *What is the issue the writer is focusing on?*
- *Is the writer taking a clear stand on the issue?*
- *Why is the writer writing the text? (purpose for writing)?*
- *Who are the readers or the audience for this writing?*
- *Does the writer use enough evidence to support the central argument?*
- *Do you agree with the points the writer makes? Why/why not?*

<http://www.massbay.edu/uploadedFiles/>

7.4.11 Drawing Inferences

Being able to draw inferences is an important sub-skill of reading comprehension and crucial to higher-order thinking. Learners need to be able to combine their background knowledge and the information culled from the text, to form conclusions and interpret facts accordingly. As with predictions, interpretations and inferences need to be dynamic, i.e. change as the reading continues and new information is added. In inferencing, learners are required to do two things: a) answer questions where the solutions can only be provided by making logical inferences, and b) give the rationale /reasoning for their answers. Making students explain their answers causes them to slow down, to review the given facts carefully, and to collate these with the background information they have.

Activity 12

Take up a text that you would be required to teach in class, and formulate questions that would require

- prediction,
- locating specific information from the text,
- inferring
- evaluating
- opinion -forming.

7.5 TEACHING VOCABULARY*

(FOR DETAIL DISCUSSION, CONSULT BES-144 BLOCK 3)

Though guessing from contextual clues is a key strategy in reading comprehension, yet if the lexical content is largely unfamiliar to the learner, the text will be difficult to understand and too much mental energy will be expended in trying to figure out the meanings of the unknown words, resulting in frustration and lack of interest. So it is a good idea for teachers to familiarize learners with key vocabulary – that which is necessary for meaning making in the text—prior to reading difficult or unfamiliar texts.

Teachers can pre-select a small list of words and get students to actively engage with them and form connections with what they already know, through tasks such as creating graphic organisers that illustrate relationships (synonymy, antonym, similar / contrasting semantic fields, etc.) among new and known words, and maximizing opportunities to use the new words in speech and writing. Asking students to look up long lists of unknown, unrelated words is counter-productive.

Consider the following example.

Science learning involves lots of new vocabulary words.

Let us use morpheme as an example to build vocabulary. A morpheme is a meaningful part or unit of a word that can't be divided into smaller parts.

Common Science words and morphemes

Science word	Morpheme (meaning)	Related words
Photosynthesis	<i>Photo (light)</i>	Photography, photograph
Thermometer	<i>Therm (heat)</i>	Thermos
Microscope	<i>Micro (small), scope (see)</i>	Microwave, Stethoscope
Geology	<i>Geo (earth)</i>	Geode, Geometry
Graph	<i>Graph (write)</i>	Autograph, bar graph

How do I use this information?

Using morphemes helps you teach your students more about word meanings and families of related words. If they learn for example, that micro means small and scope means see, they can figure out that a microscope is an instrument scientists use that helps individuals to see small objects. Once a learner recognizes the meaning of a morpheme, she can use that information to learn other new words.

*(For a detailed discussion, consult bes-144 Block 3)

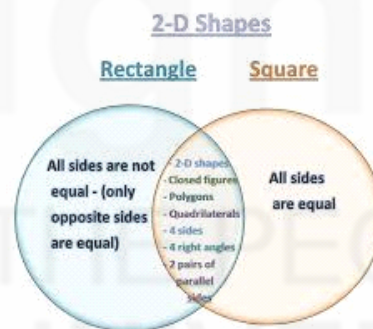
Word Wall is a collection of words which are displayed in large visible letters on any display surface like a board wall etc.

All courses have subject-specific terminology which can be used for a word-wall such as:

- Geography - terms and concepts associated with geographical regions.
- Science - terminology to describe major concepts.
- Mathematics - vocabulary for math concepts and terms e.g. integer, polynomials, equations, analytic, geometry, measurement, coefficient.
- English Literary terms, graphic text features, prefixes, suffixes, roots, easily confused words accept, except etc.

Venn Diagram

A Venn diagram consists of interlocking circles or ellipses. The area common to both circles shows similarity between two items, while the differences between the items are indicated visually by those parts of the circles that are not common to each other. This is especially useful when showing comparison/contrast, for e.g. between two species of animal creatures in a Science lesson, or characters in a story. Teachers can model the use of Venn Diagram and after students have read the contrasting ideas in the text or have read two or more texts, ask students to complete the Venn Diagram.



7.6 KWL CHART

The KWL chart is a staple in most reading-focused classrooms, from Kindergarten through high school, especially for content-based subjects such as Science, History, Geography, etc. This simple, three-column chart is a way to (1) bring students' prior knowledge about a topic to the forefront of their minds, (2) identify questions that they will look to answer while reading the text, thereby establishing a purpose for reading and building motivation to read, and (3) organize the information learned while reading.

K: What the student knows about the topic.

W: What the student wants to know

L: What the student has learned after reading the lesson/ topic

The strategy requires students to build on past knowledge and is useful in making connections, setting a purpose for reading, and evaluating one's own learning.

Consider the following examples of a KWL Plus chart from a Geography, History and Biology class in which the topic of study was Minerals, World War II and Evolution respectively.

Know	Want to know	Learned
<ul style="list-style-type: none"> ● Metallic and non-metallic minerals ● Names of some metals: gold, silver, copper ● Some are found in ore form ● Some minerals are expensive 	<p>How to identify differences between metallic and non-metallic minerals</p> <p>Properties of metallic minerals</p> <p>Properties of Non-metallic minerals</p> <p>How many minerals are there?</p> <p>Where are they found?</p> <p>Uses of both</p>	<ul style="list-style-type: none"> ● Metallic minerals contain metal in raw form and Non-metallic minerals do not contain metals ● Metallic minerals are generally associated with igneous rocks and non metallic minerals are generally associated with sedimentary rocks ● Metallic minerals are usually hard and have shine of their own, non metallic minerals do not have a shine of their own; ● Examples of metallic minerals are iron, copper, bauxite and tin; ● Examples of non-metallic minerals are salt, coal and mica ● Mining activity is called a 'killer industry' because of the health risks involved esp. in coal mines

Topic : World War II

K What we already know	W What we want to find out	W What we want to find out
<p>What we have learnt</p> <ul style="list-style-type: none"> ● Adolph Hitler Commanded the German Army ● The British fought in the World War II ● Adolph Hitler designed the Nuclear Bomb ● World War II started in 1939 ● World War II ended in 1945 	<ul style="list-style-type: none"> ● Which country started World War II and why? ● What was the Nazi's Motivation? ● Why did the British fight in World war II? ● Which countries did they fight in? ● Which country was the peacemaker in World War II? ● What made Britain a big threat? 	<ul style="list-style-type: none"> ● Germany was the reason why World War II started .Germany invaded Poland in an unprovoked attack. ● German nationalism that began to develop before WW 11 was the main reason for the War.Nationalism rose in the wake of severe economic recession and the Jews were made the scapegoat. ● Britain and France declared war on Germany after Germany invaded Poland. ● World War II was not fought in a country it was more of a war of the continent.

Activity 9: Consider any topic that you are interested in, for example, *Classical Music*. Read an article about it, draw up a KWL chart and complete the chart.

READING VISUALS (Pictures, Maps, Cartons, etc.)

Today, there is so much information being spread visually that the need for visual literacy is being felt in all disciplines. It is more important than ever that our students learn what it means to be visually literate. Visual literacy is about analyzing and creating messages. Images can be used to influence and persuade, so it is incumbent upon educators to learn how to teach with and about images and to help our students understand the language of visuals.



Picture: After the defeat of Tipu Sultan, most of South India was now either under the company's direct rule, or under its indirect political control.

Source: https://en.wikipedia.org/wiki/Indian_independence_movement

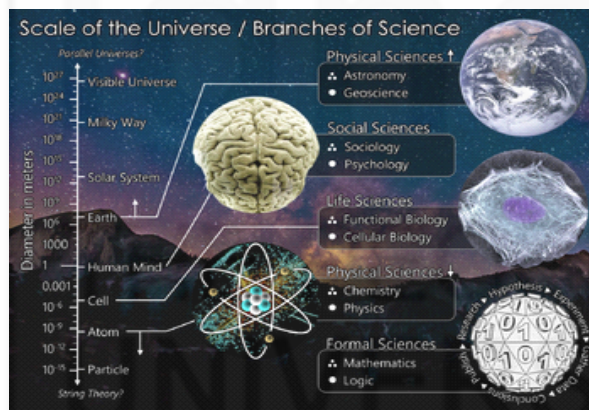
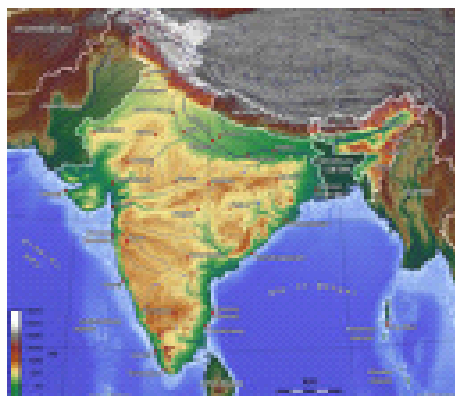


Diagram: The scale of the universe mapped to the branches of science, with formal sciences as the foundation.

Source: <https://en.wikipedia.org/wiki/Science>



Map : topography map-India

Source: https://en.wikipedia.org/wiki/Geography_of_India



Rainwater Harvesting, RK Laxman
<https://www.google.co.in/>

Students should be asked to scan the picture/map/diagram/graph/cartoon. The teacher can ask them to answer these questions :What do you notice first? What is the title or caption? Observe its parts. Are there labels, descriptions, thoughts, or dialogue? List the people, objects, and places in the cartoon. List the actions or activities. Which words or phrases are the most significant? Which of the visuals are symbols? What do they stand for? When is it from? What was happening at the time in history it was created? What is the message? Students need to learn to read the visuals in conjunction with the printed text.

7.7 READING DISCIPLINE-BASED TEXTS

From our discussion in the previous section, we know that meanings of written texts are pieced together by reading and that readers also draw on their prior knowledge to form these meanings. Such prior sources of knowledge include, words; sentence structure or syntax; text structures or genres and topics. But prior knowledge is not restricted to these.

Reading in content areas requires an understanding of academic language, knowledge of the protocols and style of discipline-based writing. It also requires development of critical thinking skills for examining ideas and evidence, making connections, problem solving and synthesizing complex idea in a logical manner.

Think and Reflect

- *What should be the overall aim of a reading programme? Give examples in the context of the discipline you teach.*
- *What factors will you keep in mind while constructing exercises for teaching reading comprehension?*
- *Why should the reading materials be interesting to students?*
- *From the discussion above choice any topic and the appropriate reading strategy from the subject you teach.*

7.7.1 Reading in Science

Teaching Science involve engaging students with texts and supporting them with understandings of the textual information. Encouraging students to become independent learners and engaging them in discussions with their peers on text

content, language, organisation and structure of the text can promote scientific reading comprehension.

Comprehension of scientific texts has been found to be challenging to inexperienced readers as scientific texts are unique. Science texts normally include figures, drawings, maps, tables, etc. Scientific registers use technical vocabulary and syntax.

The technical vocabulary in science has Latin or Greek roots *poly*, *plasm*, *phyt*, *therm*, *troph*, *logy*. *Taxonomic* or categorical terminology in science requires an understanding of multiple relationships embedded in the terms.

Reading science texts requires the critical thinking and analysis which is similar to performing hands-on science activities. Process skills involved in doing Science and reading are common.. “The same skills that make good scientists also make good readers: engaging prior knowledge, forming hypotheses, establishing plans, evaluating understanding, determining the relative importance of information, describing patterns, comparing and contrasting, making inferences, drawing conclusions, generalizing, evaluating sources, and so on” (Armbruster (1993)p. 347).

Science readers need to focus on understanding vocabulary and technical phrases specific to science, interpreting scientific symbols and diagrams, making sense of the organizational patterns commonly used in science texts, (exposition, description, instruction and argumentation) and inferring main ideas using inductive and deductive reasoning skills.

Difficulties in reading Science Textbooks

- Most science textbooks are written in an impersonal, objective tone, offering no scope to the reader to access her prior knowledge about a topic.
- Difficulty of making connections between ideas within the text. Use of technical words and absence of linking words like “because,” or “therefore,” adds to the problem of making connections between key ideas in the text.

Teacher’s role: *Shahnaaz, a school teacher, has come across this phrase in the text,” If there are seven electrons in the outer level of the atom, then the atom could bond with another atom that has one electron in its outer energy level.” She notices that situation is commonly signalled by the text structure **if-then**. Shahnaaz explains that ,in Science ,one event is often dependent on another. Here students observe how Shahnaaz is thinking critically about the text and negotiating meaning in a reflective and explicit manner (Grant, et. al.2015,p.75).*

The teacher can use signal words to clue the students into the text. If a chronology or sequence of information is being shared, the teacher can use signal words such as first, next, then and finally.

Textbooks in Science have diagrams, charts, graphs and tables. An efficient science reader will first read the text that relates with the diagram and then study the diagram for key labels, data values, etc. She/he will then go back to the text to continue reading. This back and forth, science-style reading can be demonstrated by the teacher to the students for deeper engagement with the text.

Excerpt from a Biology textbook

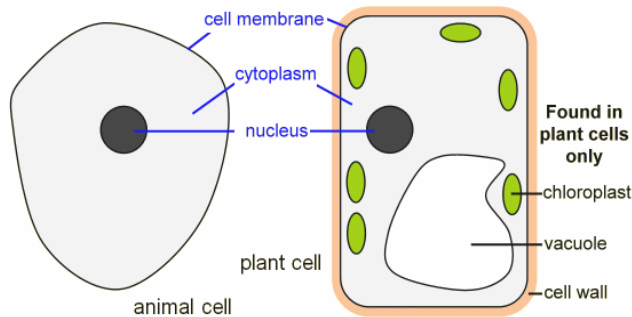


Figure: Generalised animal and plant cell

All living things are made up of cells. The structures of different types of cells are related to their functions.

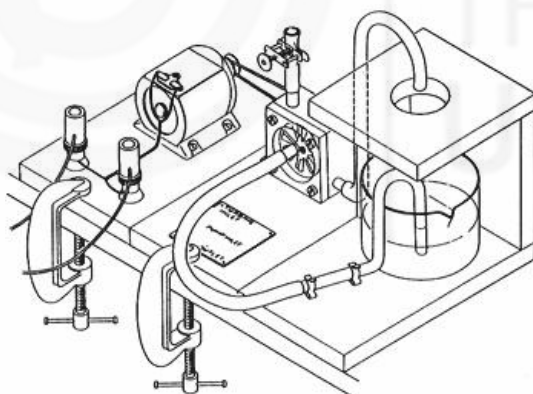
*Animal cells and plant cells have features in common, such as a **nucleus**, **cytoplasm**, **cell membrane**, **mitochondria** and **ribosomes**. Plant and algal cells also have a **cell wall**, and often have **chloroplasts** and a **permanent vacuole**. Bacterial and yeast cells have different structures to animal and plant cells.*

*Dissolved substances pass into and out of cells by **diffusion**.*

Source : http://www.bbc.co.uk/schools/gcsebitesize/science/add_aqa/cells/cellsrev1.html

Excerpt from a Physics textbook

Using a pump to raise water



Clamp the motor/dynamo unit next to the turbine/pump unit, which in turn is clamped next to the head of water unit. Connect the pulleys on the motor and pump units with a rubber band or driving belt. Apply 4-6 volts d.c. to the motor. This will drive the pump unit which takes water from the lower level to the higher one. (It is necessary to prime the pump by filling with water before use: this is achieved by sucking on the third connection to the pump unit with a finger over the output and the input underwater.)

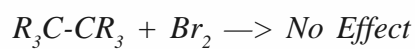
Source: <http://practicalphysics.org/moving-energy-one-thing-another-1.html>

In this text, the author is giving instructions for conducting an experiment and describing the outcome with the help of a diagram. It is important to assess how purpose shapes the content and style of a text. The teacher can discuss in the class why texts tend to be similar or different, depending on the purpose of the author.

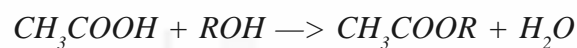
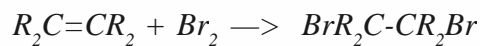
Excerpt from a Chemistry textbook

<i>Experiment</i>	<i>Observation</i>	<i>Inference</i>
<i>Warmed with acetic acid and a few drops of concentrated sulphuric</i>	<i>Fruity smell is formed.</i>	<i>Alcohol confirmed.</i>

Chemical Equations:-



OR



In this text from Chemistry, we find that the reader is expected to conduct the experiment, observe and draw inferences. The text draws on the use of symbols in the chemical equation, the sentences are arranged logically, the reader is expected to make inferences.

7.7.2 Reading in History

Unlike Science, History is constructed mainly through texts and cannot be experienced 'hands-on' as in case of conducting experiments in Science. Reading a history book is like having a conversation with the author who wants to tell the reader something that he or she thinks is important and true. The author is not only conveying information, but also trying to *convince* you of his or her interpretation of the past. In other words, the author tries to *persuade* the reader that *these* facts are important and that they are connected in a particular way. Historical inquiry revolves around a historical question and a set of primary and secondary documents. All works of history contain arguments, a reader has to identify what the argument of the book or article is.

Historians read and examine the documents and in doing so ask questions like What kind of document it is? For whom it was meant? Who is the audience? What are the words and phrases used and what could be the author's bias? What is the overall text structure of the document?

Comprehending the sources in History is difficult, textbooks in history can also make comprehension challenging. As research suggests, readers come across many **difficulties** while reading the texts:

- failure to make cause and effect connections explicit (Black & Bern, 1981)

- use of indirect, ambiguous or irrelevant references (Fredericksen, 1981)
- lack of sufficient detail to understand concepts and inclusion of irrelevant information to the main ideas (Trabasso et al., 1984)
- individual sentences containing very dense ideas.

Excerpt from a History textbook

The Debate on the ‘Industrial Revolution’

Until the 1970s, historians used the term ‘industrial revolution’ for the changes that occurred in Britain from the 1780s to the 1820s. From then, it was challenged, on various grounds. Industrialisation had actually been too gradual to be considered a ‘revolution’. It carried processes that already existed towards new levels. Thus, there was a relatively greater concentration of workers in factories, and a wider use of money. Until well into the nineteenth century, large regions of England remained untouched by factories or mines and therefore the term ‘industrial revolution’ was regarded as inaccurate: England had changed in a regional manner, prominently around the cities of London, Manchester, Birmingham or Newcastle, rather than throughout the country. Could the growth in the cotton or iron industries or in foreign trade from the 1780s to the 1820s be called revolutionary?

Teacher’s role: The text is an expository text, presenting a sequence of events with the help of words like ‘from then’, ‘until,’. The central idea, that is, the debate on the nature of ‘Industrial Revolution’ The author is using persuasion and evidence to support a viewpoint. We also notice the dense language and sentences are long. Gursharan, a History teacher first analysis the text herself and identifies the key ideas and meanings. She engages the students in recalling their prior knowledge and asks them to highlight the key idea. She then asks the class to break the sentences with important information into their meaningful parts to help them navigate the text. Next, she asks the students to identify the cause-effect sentences and persuasive arguments.

Activity 12: *Collect three/four different types of texts in Science and History (Newspaper article, textbook excerpts, articles from popular magazines and academic journals. Read all the texts carefully and underline the parts where one event depends on the other. Identify the signal words that depict the cause-effect relationship, like if-the, because, therefore, hence, etc. Write down how the messages are being communicated in different texts.*

7.7.3 Reading in Literature

Reading complex literary works poses a challenge to learners who need to understand how the author shapes an imaginary world in novel, poetry and drama. Students also need to recognise genres such as fable, allegory, science fiction, sonnet, ballad etc. Readers should understand the rhetorical tools such as analogy, irony, pun, metaphors etc. and be able to fill in the gaps left by the author. The

reader needs to have the ability to make intertextual links, have knowledge about the author, her background, other authors and related texts within the same genres.

Sample of different genres (poetry and prose) in Literature

<p><i>My Heart Leaps Up</i></p> <p><i>My heart leaps up when I behold A rainbow in the sky: So was it when my life began; So is it now I am a man; So be it when I shall grow old, Or let me die! The Child is father of the Man; And I could wish my days to be Bound each to each by natural piety.</i></p> <p style="text-align: center;">– William Wordsworth</p>	<p><i>The Piano Teacher</i></p> <p><i>The piano teacher, Erika Kohut, bursts like a whirlwind into the apartment she shares with her mother. Mama likes calling Erika her little whirlwind, for the child can be an absolute speed demon. She is trying to escape her mother. Erika is in her late thirties. Her mother is old enough to be her grandmother. The baby was born after long and difficult years of marriage. Her father promptly left, passing the torch to his daughter. Erika entered, her father exited. Eventually, Erika learned how to move swiftly. She had to. Now she bursts into the apartment like a swarm of autumn leaves, hoping to get to her room without being seen. But her mother looms before her, confronts her. She puts Erika against the wall, under interrogation – inquisitor and executioner in one, unanimously recognized as Mother by the State and by the Family. She investigates: Why has Erika come home so late?</i></p> <p>-Elfriede Jelinek, Nobel Prize winner for Literature, 2004</p>
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In the texts here, we find the difference in the genres of prose and poetry. The language of prose is straightforward and ideas are arranged into paragraphs which look like big blocks of words. Poetry on the other hand is an expression with rhyme and rhythm. Ideas are expressed in lines and arranged in sentences.

7.7.4 Reading in Mathematics

Even though, on the face of it, Mathematics hardly lends itself to reading, students face reading comprehension difficulties in Mathematics which includes understanding word problems and graphic illustrations. Mathematics language is constructed from everyday uses of language but it is different from other school subjects (Schleppegrell, 2007), and this subject-specific nature of language in mathematics has important implications for mathematics learning. Language in Mathematics involves multiple modes of representation which are ways to symbolize, describe and refer to the same entity. For example, fractions can be represented through graphs, symbols, words, diagrams, pictures, models, manipulatives, oral or word problems. O'Halloran (2005, p 80) explains the nature of mathematical discourse as "multi-semiotic", based on three semiotic systems performing three different functions, natural language (if you multiply 8 times 8, the answer is 64), symbolism ($y-0=2(x-1)-y=2x-2$) and visual images (graphs, diagrams, etc.)

Some special features of Mathematical text that can lead to student **difficulties** as indicated by Barton and Heidama (2002) and Shuard and Rothery (1988) include:

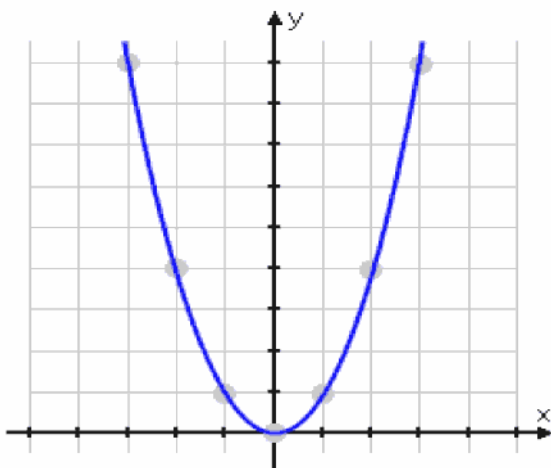
1. Reading mathematics often requires reading from right to left, top to bottom, bottom to top or diagonally.
2. The text in mathematics textbooks has more concepts per sentence per word and per paragraph than ordinary textbooks.
3. Mathematical concepts are often abstract and require effort to visualize.
4. The text in mathematics textbook is terse and compact - that is, there is little redundancy to help readers uncover the meaning.
5. Words have precise meanings which often are not fully understood.
6. Formal logic connects sentences so the ability to understand implications and make inferences across sentences is essential.
7. In addition to words mathematics textbooks contains numeric and non-numeric symbols.
8. Mathematics textbooks often contain complex sentences which can be difficult to understand.

Excerpt from a Mathematics textbook

The most basic quadratic is $y = x^2$. When you graphed straight lines, you only needed two points to graph your line, though you generally plotted three or more points just to be on the safe side. However, three points will almost certainly not be enough points for graphing a quadratic, at least not until you are very experienced. For example, suppose a student computes these three points:

x	$y = x^2$
0	$0^2 = 0$
1	$1^2 = 1$
2	$2^2 = 4$

Then, based only on his experience with linear graphs, he tries to put a straight line through the points.



Source: <http://www.purplemath.com/modules/grphquad.html>

Teacher’s role: Mathematics has a reading protocol all its own, and just as we learn to read literature, we should learn to read mathematics. You will notice in the beginning that the paragraph includes lots of information in a short amount of text. Sentences and words have precise meaning and connect logically to surrounding sentences and graphic images (table, graphs, and pictures). Mathematics also requires students to be proficient at decoding not only words but also numeric and nonnumeric symbols. Teaching reading in a math classroom is more about teaching students how to use reading as a tool for thinking, reasoning, and learning.

Gopa, a school teacher, uses the Frayer Model, a graphic organiser, to assist her students with vocabulary development. She realises that Mathematics vocabulary is one feature of mathematics text that can be challenging. This graphic organizer was designed by Dorothy Frayer and her colleagues at the University of Wisconsin to provide for a thorough understanding of new words. Students are asked to provide a Definition of the word, Facts or Characteristics of the word, Examples, and Nonexamples.

FRAYER MODEL

Definition in your own words A quadrilateral is a shape with 4 sides	Facts/Characteristics <ul style="list-style-type: none"> ● 4 sides, ● May or may not be equal in length ● Sides may or may not be parallel
QUADRILATERAL	
Examples <ul style="list-style-type: none"> ● Square ● Rectangle ● Trapezoid ● rhombus 	Non-examples <ul style="list-style-type: none"> ● Circle ● Triangle ● pentagon

Activity 13 : *How do the following facilitate reading of Science and History texts:*

- *Identifying key ideas*
- *Understanding the text features*
- *Underlining difficult words/phrases*

7.8 LET US SUM UP

In this unit, our focus has been on Reading Comprehension, and on developing reading skills across the curriculum. Comprehending a text is a multi-pronged process, involving the text, the reader and the socio-cultural context. From defining reading and understanding the process of reading, we have proceeded to understand the importance of reading across the curriculum. Research has shown that there is a strong correlation between RC and academic performance. Different

reading strategies are required for reading course material in diverse subjects, for example, reading strategies required for Literature are very different from the strategies required for Social Science or Mathematics.

Readers must develop the ability to go beyond main ideas and learn to analyse, synthesize and evaluate information pertaining to different subjects. They must develop the ability to sift, filter out and collate information from the spectrum of content areas. The Unit discusses the importance of reading as a tool for learning in different disciplines. This has been followed by a detailed discussion of the various strategies to develop reading skills, accompanied by clear examples. At every stage, activities have been suggested for the teacher to try and to gain a more application –based understanding of the process of Reading and how to teach it. By modelling, encouraging prediction-making, asking probing questions, and focusing on higher-order cognitive skills across the subjects in their curriculum, learners can be trained to develop their reading skills, which will impact positively on their overall performance and learning.

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