HEM *harmonize*

Integration of Values

Maths

Grade X

Teacher's Manual

Teacher Manual for Integration of Values in Teaching Academic subjects

By

HEMA Foundation, Mumbai

Teacher Manual for Integration of Values in Academic subjects

Maths

Grade X

IDEA conceived and executed by

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Preface

It gives immense pleasure to all of us at HEMA Foundation in presenting the "Teacher Manual for Value Integration" from Grade I to Grade X to our beloved teaching fraternity in school education. Teachers are the corner stones in building the huge edifice for the student community and they are the driving force and guiding spirit to the society. Little will change in the society, if the teachers do not make any efforts. We are all living in a scenario where value systems need to be integrated and enhanced through essential school subjects so that the students assimilate values into their regular habits effortlessly. There may have been innumerable reasons why values from the society are disappearing, but there cannot be two opinions about the significance of educational institutions in restoring the culture and values of the society. When they say, 'values are to be caught', it is leaving a high degree of moral responsibility on the part of our teachers and this manual is our humble effort to lessen that burden for them. This manual is not a substitute to the academic teaching lesson plan, but is a supplementary assistance to the academic text. Nevertheless, the teachers are at perfect liberty to choose and aptly use the learning materials/activities wherever they find it relevant. This manual would be of great use to the teachers as they are written by practicing teachers in the school system and after thorough research and therefore, the general difficulties of teachers such as completion of portions in the given time to teach the subjects etc are taken care of. In fact, some of the lessons have been written after seeing their practical applications in actual classrooms.

We all have a responsibility of creating a society that is driven by values and our younger generation is the key change makers in the society. They all must be inspired by our educational institutions and their teachers so that their intellectual development is supported and augmented by the value systems and culture. HEMA Foundation takes it as a commitment to the society in participating in this huge endeavor. Inviting all the stake holders to this venture of spreading and integrating values into the learning environment of schools, with all humility, we remain always your well wishers

Thank You,

Mahendra

Mahendra Kabra
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Anita

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Acknowledgement

Welcome to HEMA Foundation's "Teacher Manual for Value Integration'. I take this opportunity to thank each one of those who participated in it. At the outset I thank the Management of HEMA Foundation, its Managing Trustee Shri Mahendra Kabra and the Trustee and Creative Director, Smt. Anita Maheswari, for their unstinted support and cooperation in making this happen. Our humble pranams to the Senior most Member of HEMA Foundation Padmashree Shri Rameshwarlal ji Kabra, for his abundant blessings. The Associate Director Hetal Desai, the IT department Head, Shri Arvind Pandey, Shri Akash Shah and all other team mates from HEMA Foundation have contributed immensely toward realizing this manual.

There are several people outside the system who have supported this cause by giving their valuable comments and suggestions and my thanks are due to them as well. My sincere appreciations to the authors of this book who have been esteemed Principals, Section heads and Department heads and educators from reputed institutes of the country and they deserve the highest appreciation in envisaging the concept so well. My sincere appreciation to Dr. Shobana Nandakumar Nair, Mrs. Shobha Rajkumar, Mrs. Priya Cibi, Mrs. Sopna T. R and Rashmi Menon, for authoring the manual for Math, EVS, English and Science respectively. It was their untiring work and willingness to modify the documents as and when changes were required or further researches were needed, that this book was made possible.

As the Academic Director of HEMA Foundation and the person who has conceived this idea of value integration, I have gone through this document several times before presenting it to you and am fully aware of the significance of each word used in this document. I am sure the faculty who uses this manual would strictly adhere to the norms of the school Boards and the suggestions given over here. The Central staff of HEMA Foundation is more than willing to take your valuable suggestions and I promise that we shall be able to incorporate them if found suitable in our next publications.

I thank you for all your incredible commitment. All the credits if you find this document useful, would go invariably to all those who wrote the book and those who helped in the realization of the book and all those demerits if any, are purely due to my oversight. Believing that you would find it very useful in reaching out to the students and become inspiring teachers for our younger generations

I remain your sincere

Vijayam Ravi, PhD

Introduction
(must read before the teacher proceeds)

Its 'a Friday evening'. Everyone looks forward to a joyful weekend with family. After a weeklong work, it is a much-needed break. The school campus that was brimming with noises and screams of children, is silent and calm- The evening twilight has set in on the tall buildings, creating beautiful silhouettes. All have shut their tables; cupboards and the office of the school is closed. Principal and staff were slowly proceeding to the gate. They all wished each other a happy weekend. The peon is stepping out. Suddenly it happened. None expected the normal events that take place every day would take a turn so unexpectedly. School watchman came rushing to them to announce that there has been a riot in the city and he said he could see few students along with some other miscreants sabotaging public and private properties and hurting people on streets, hooting and howling. He added that it is not safe now to walk out. That the rioting group included their students as well. The miscreants included some of their old students too. And they were all those 'good' students when they were inside the school campus.

That left the teaching staff and the leaders stunned for a while. For a moment many of them looked at the school building just like that, which is their Almamater, and it stood so tall and elevated with a pride of creating thousands of glorious citizens in the past. Each one had a question mark in their eyes. None spoke. There was a dumb silence. Each one silently started replaying what they have been doing in the classrooms all along. There was an unbelief, inexplicable feeling reflected in their eyes. Did we make any difference to our students today? Did we teach our children to live or did we teach only Math, Science and language?

This is a serious question that all teaching faculty must ask themselves-

Did we teach subjects? Or did we teach children?

Professional standards for teaching academic subjects and transferring the right knowledge to the students have been the main objective of teaching all along, across the universe. All the latest teaching and learning revolutions that are happening in the classrooms and the students are evaluated for their skill development. Education is the vehicle for development of human being. Situations turned out to be grim when the pandemic engulfed the world with its outstretched arms. Every nook and corner of the world reeled under pressure with the pain and uncertainty that was caused by this pandemic. The ambiguity around, the uncertainty, complexity and insecurity around the schools was huge that none could fathom a way to come out of it. Teachers started looking toward blended learning in a hybrid classroom situation as a solution to reach students. All the more a reason for us, to do introspection about what we were doing till yesterday in the classrooms.

Yes, we taught our students Math, English, Languages, Social sciences, Sports, Music, Art and Craft and everything else-but values. We boasted ourselves as the top schools

with more students falling into the distinction list in terms of marks. Every year we sent out to the world, thousands of students with less skills and values but more of academics and marks. We were happy. Schools were happy. But we realize today that only some of those schools have been teaching students and not teaching subjects alone. Teaching subjects has a goal post and that is the academic credentials in terms of marks, but teaching students per say has another purpose altogether and that is -Touching their lives. We were confused and placing our balls in the wrong goal' posts. Result? The riots on the street, misbehavior, calamities, destruction, suicide and a valueless society in the making! Yes, certainly we imparted knowledge of academic subjects, however while this intellectual development is transmitted, there was room for us -the teachers for integration of values into these subjects. Few schools include moral science or value education in the curriculum and the teachers do teach the kids values like an academic subject and most of the schools assess the moral science in a written examination. It is very doubtful whether the students have really gained anything out of this process. Chances are bright that they end up considering the value education as just another subject. Teaching values through books was not a mistake, but assessing the children on marks was the issue. So, students when they completed their moral science examination, and received their 'pass marks', they quietly 'passed on' the values to the dustbins.

They say that the society's growth and degradation depend to a large extent the way the students are produced by the schools. The economic prosperity of a Nation depends to a large extent on living style and value systems of the society and there is every reason to believe that when the crime rate in a country goes high, the economic prosperity has declined in the society. The thinking, the culture of coexistence, working as teams and maintaining the art of tolerance, if these are removed from the society, it is very difficult to revive the Nation. India has been such a rich country with its values and it is a very painful scenario to watch how our younger generation is missing out on values. To a large extent the responsibilities can be passed on to the Macaulay's education system, parents and schools. If the schools make deliberate attempts to impart academic subjects and create excellence in that, the student's generation that gets molded out of the schools would certainly prove to be an asset in creating wealth and prosperity for the nation. However, if the schools do not impart values to the students, the nation will end up in a huge disaster after some time in terms of its moral fibre.. Wealth and success alone do not bring happiness to the society or an individual. Yes, it may bring some kind of satisfaction and one can always get a pleasure out of it. But very soon, this feeling becomes very transient and the mind would look for something else. This is human nature and it happens because the purpose of human life is not imparted to the students in schools. And when the assessment is done, that subject is also done.

Is this the purpose of education? Swami Vivekananda conceives education as the process where the innate potential of the human being is revealed. The innate nature of a human being is peace and joy. The riots on the street shows totally opposite virtues. Then where did the schools go wrong?

The riot on the street by students is not the debate here. It may be right or it may be wrong. The question is of larger dimension. It is of citizenry, safety, security and morality of a Nation, of the Globe! But why does such a behavior happen? Why do our students or our citizens behave in such an unruly manner that is a pain to others? When did our children or our citizens who passed out of the portals of our school, become so very intolerant? What is the fundamental cause for such an unrest in the minds of students, or generally speaking mankind as a whole? The intellectual quotient is very much in place. But when the spiritual quotient and emotional quotient are misplaced, the human beings sometimes behave weirdly. They lose cool, the power to think and act. Most often human beings react.

Did we, at schools, teach our stduents to act, or react?

Did we, at schools, teach the students values? Or imbue values in them?

Did we teach the students only subjects? Or did we touch their lives?

The Context to Value integration with subjects:

It is in this context of these questions, that the thought of integrating values with academic subject teaching dawned. Education and values are no two different subjects. They are mutually interwoven. As a teacher, the biggest role is to prepare their students behave like human beings with all values intact. All academic subjects may give them an opportunity to excel in life, but the values learnt help them to live as human being. Since the teacher is an integral part of education and the inspiration in the life of the children, they have to turn toward integrating values while they teach subjects. Value integration does not mean quoting a value and discussing it, rather it is an effort to lead the students to see a personal meaning in whatever the teacher teaches in all subjects. It depends to a large extent on the creativity of the teacher to highlight the value that is hidden in all subjects, including the languages. Value means a person's personal principles or standards of behavior the judgement of how important that value is to him in his life. In nut shell we can say, "Value is a preferential behavior" . What the teacher needs to do in class is to help the kids choose 'his/her preferential behaviour'

The fundamental shift that needs to happen here is this.

At the centre, is the value and all subjects are contributing to the stabilization of the value. Therefore, the teaching has to be intertwined with those values from the subjects and the teachers reach to the students in a very subtle way. Each Subject-be it Science, Math Or languages, or social science, or Non-academic subjects, have got something very fundamental to convey to the people who spend time to learn those subjects. And if we look at those subjects from a very objective perspective, we can clearly see what they are all dying to convey to the children. Math talks about precision, value of time, sharing caring, multiplying happiness and joy and several likes. Science talks about hard work and resilience and the will power to fail and still work hard to achieve. Languages give the

feelings of expression, love, compassion and what not. So, when a student goes out of the school portals, he would have assimilated within him values like precision, punctuality, rationality, truth, compassion, love, caring, sharing, determination, courage to fail, spirit of enquiry et etc. Along with similar such values, the content gets learnt by the kids.

What benefits do Value integration bring to the students?

1. The students acquire several time honoured personal and collective values for life
2. Along with the cognitive development assured by modern education, integrating values in academic subjects prepares the children to develop their social and emotional lives
3. The approach of integration of values in teaching subjects, help the students enrich students' intellectually, physically, socially, morally, spiritually and artistically.
4. Schools can witness more of academic diligence with students showing increased attentiveness in the classroom and show capacity to do independent work
5. The school ambience also will see less of conflicting situations as the students start demonstrating greater empathy and responsibility
6. The student teacher relationships drastically improve and it becomes more trusting
7. Students feel a sense connectivity with others and belongingness

The argument

Teachers are the crucial ingredients in getting the values incorporated into the system and there is no two way about it. At present teachers are focused on completing their lessons on time amid all challenges and they do not have the extra time for doing any research for incorporating the lessons with values. Education and imparting values are no two different subjects. They are one. Additionally, thrusting a subject of value addition always attracts criticisms, primarily from the teaching community since they believe that it is an additional work and have to prepare more.

This argument is in place and cannot be ruled out and that is why HEMA foundation pitches in for help.

What does HEMA foundation offer to teachers?

This particular attempt from HEMA Foundation is to address this conflicting issue in education. HF is striving to reach out to teachers with ways and means to incorporate or integrate values while they teach academic subjects so that additional burden is not on them, while they address a major concern of education.

Values can never be taught, values can only be caught

Every subject has material knowledge that is needed for existence. What goes unnoticed more often is the subtle knowledge that the subjects try to convey. Any subject-Language, Math or science-all stand there for spreading virtues and values alongside the material knowledge. It is an integral part of learning the subject.

How and why are the values integrated by HF?

There is a very sound reason for HF to adopt the project of value integration into academic subjects and it is justified when any one reads the deliberations made in the NEP-2020 -NEP talks passionately about the integration of values, skills, and essential subjects to make the learning holistic. Let us refer to the clause 4.28, and it reads as follows: "Students will be taught at a young age the importance of "doing what's right" and will be given a logical framework for making ethical decisions. In later years, this would then be expanded along themes of cheating, violence, plagiarism, littering, tolerance, equality, empathy, etc., with a view to enabling children to embrace moral/ethical values in conducting one's life, formulate a position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work. As consequences of such basic ethical reasoning, traditional Indian values and all basic human and Constitutional values (such as seva, ahimsa, swachchhata, satya, nishkam karma, shanti, sacrifice, tolerance, diversity, pluralism, righteous conduct, gender sensitivity, respect for elders, respect for all people and their inherent capabilities regardless of background, respect for environment, helpfulness, courtesy, patience, forgiveness, empathy, compassion, patriotism, democratic outlook, integrity, responsibility, justice, liberty, equality, and fraternity) will be developed in all students."

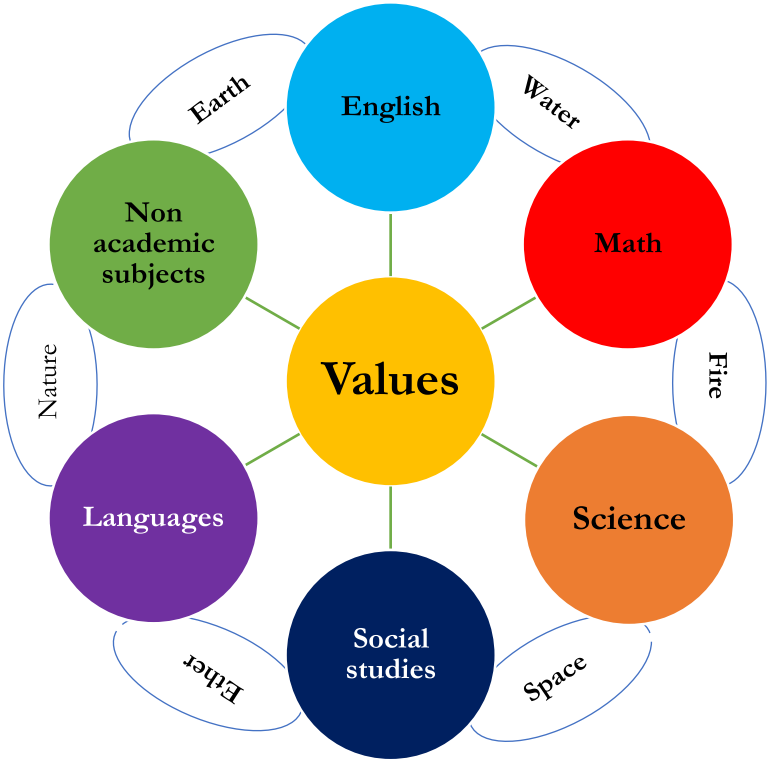
The new NEP and therein the NCERT insist on integration of values with essential subjects. Nature is the mother of all knowledge- Every learning that takes place with human beings is connected through the mind and intellect. While giving food for thought at the intellectual level, teachers have to supplement the emotional aspect through developing the mind. Mind develops by seeing, observations and hearing from sources that make sense to it. Human brain and human mind need to go hand in hand to make rational decisions and emotional attachments. If there are no emotions to any material knowledge learnt, it will remain a subject only. The love for the subject comes, when one extrapolates it to the application of it both at the material and emotional level. The emotional intelligence that gets originated while an academic subject is being taught is as powerful as the academic learning. Because it signals imagination and creativity and these are faculties associated with the mind. The rational brain which is provided with intellectual information about the academic subjects processes the knowledge with the help of the emotional brain-which is the mind. When no food is given to the emotional brain, it gets impoverished. Therefore, a balancing act needs to be done by teachers while imparting knowledge on academic subjects to incorporate the value or virtue that the subject is trying to convey to the reader or learner.

While the teacher teaches a topic 'Patterns' in Math, remember that the teacher has to touch the value of precision, discipline and punctuality. The whole universe gives us innumerable patterns and they all follow a certain order. That order brings discipline and it helps you see things in the right perspective. Similarly, the teacher, while discussing about geography, and earth in particular, what can be brought out is the virtue of evolution and the stability given by the earth. Earth is an evolved planet. The innate stability, the order, the growth and silence involved in this process are all virtues that can

be imparted to the students. On similar lines, the ecosystem, the biology, atmosphere, the plants, animals, air, water, aesthetics, and beauty-all talk about values and virtues of truth, tolerance and love, coexistence, interdependence, compassion and honesty.

Integration of values with academic subject teaching is an effort of HEMA Foundation to reach to the teachers with the varied ways of dealing with academic subjects and making it very interesting for the students to learn.

Whom does this manual serve?



The next thing that HF is trying to incorporate is Skills along with values. Skills are also considered to be an integral part of learning and hence while a value is highlighted the skills are also touched upon.

The additional advantage that teachers who use this manual of HF is that, the chart of the flow of lessons can be as such adopted in real teaching sessions without the need for doing a lesson plan again. The pattern of a school lesson plan used for imparting academic session is given incorporating the values integrated in it.

The perfect way of starting an academic lesson in a normal classroom situation so that the students get glued to the teacher's skills of teaching, is assured in the manual

through a context text-either by way of a story or an activity or discussion that rouses the interest of children

The description of the lesson ends with assignments for doing individually, at home or in class and this comes as a huge relief for the teachers

There is also a descriptive summary in the beginning of the text manual where in the topic, the core values, the skills and the activities that can be done and also the materials required for the same are all given so that the teacher gets a quick idea about how to go about the same.

HF, thus, is trying to travel that path of imbibing values to children along with the teachers!

Organization of the manual-How to read the manual?

The teacher will have to read and understand the manual as follows:

This teacher manual follows a certain structure that is not replacing the academic journal of the teacher. On the contrary, serves as an additional support as to how the teacher can link those values that are very relevant for a human life with the teaching of the subjects.

It has two parts:

A descriptive summary: this is a sheet in the beginning of each manual, showing what are the core values, sub values and skills that are linked with the topics and describes what activities can be undertaken to teach the values through subject integration and also shows what all education materials are required. Teacher has to glance through this to get a fair idea about how many values are integrated in total and understand this part first

The second part is the actual manual where the method of integration is dealt with the main academic concept.

The structure of the manual goes as follows: Start reading from introduction

1. **Introduction:** This gives what the lesson is about and what values, skills can be integrated here and the significance of it
2. **Learning objectives:** This plan talks about what are the academic and value driven objectives of learning the lesson
3. **Process and Action:** Here the way how the lesson has to be undertaken and it is shown in the form of a flow chart for quick understanding mentioning the activities at each stage. It starts with the context which actually serves as the introduction of the class to the new topic.
4. **Activities and related discussion:** Here the activities are dealt with in detail with discussion questions that lead to both academic and value driven integration. It is through these the teacher is able to deliver the total lesson effortlessly.
5. **Assignments:** Gives assignments that can be done individually, at home, or as group in the class.

The activities given can be chosen by the teacher as and when needed or as per the time available. It is not mandatory that the teacher does all activities.

Conclusion:

It is a proven fact that any particular value learnt becomes a habit when one practices it consistently. The purpose of integration of values with academic subjects is to learn the values along with the academic concepts and so whenever the academic concepts are tested, the value learnt is reiterated. The creativity and imagination of teacher make the lessons interesting to the students and HEMA Foundation presents this Value Integration Teacher Manual for the benefit of the teaching and student community.

Jai Hind

Conceived and presented by

Vijayam Ravi, PhD

Academic Director

HEMA Foundation

"वसुधैव कुटुंबकम्"

Vasudhaiva Kutumbakam (“vasudha”, the earth; “iva”, is ; and “kutumbakam”, family). This Sanskrit phrase literally translates to mean that the whole world is one single family. The Sages have said that the entire world is truly just one family connected with thoughts, emotions, humanity and humility.

सर्वे भवन्तु सुखिनः सर्वे सन्तु निरामया ।
सर्वे भद्राणि पश्यन्तु मा कश्चित् दुःखभाग् भवेत् ।।

May all be prosperous and happy. May all be free from illness.
May all see what is spiritually uplifting. May no one suffer in anyway.
Om peace, peace, peace.

Vision

We aim to cultivate a conscious understanding of human values in individuals in order to help them coexist peacefully and harmoniously.

Mission

Our mission is to awaken the spirit of value based living in all individuals at school, organizational and community levels through well researched and structured programs resulting in a responsible, effective and harmonious existence for all

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Unit 1

Topic	Values / Life skills integrated & imbibed	Activities
Number System	**Core Values considered :** Inclusivity, Harmony diversity **Other Sub-Values:** unity, kindness, confidence, helping nature **Life skills:** problem solving, logical reasoning and abstract thinking.	**Value integration Activities:-** 1. Discussion & Crossword puzzle worksheets to revise the previous knowledge of students. 2. Discussion and Explanation to inculcate in students the importance of inclusivity, Harmony & diversity 3 Diversity& inclusion wheel to guide students for group discussion & debate 4. Assignment Prepare Poster on Harmony, Diversity& inclusivity quotes group wise for school bulletin board.

Materials / Resources needed

Value Integration:-

1. Work Sheets of crossword puzzle to conduct context activity
2. Facilities and Equipment to show videos
3. BB, Pen, Duster
4. Ncert Text Book, Reference books,(R.D Sharma , R.S.Aggarwal)

Description (of the points of discussion)

Value Integration:-

In this chapter the activities and games are incorporated in such a manner that children learn Number system consists of different types of numbers, diversity of numbers, harmony of numbers. Therefore, inclusivity of irrational numbers makes number system complete, this inclusion of diversity brings with it a certain harmony and opens several avenues for application and problem solving. Through this lesson the teacher shall inculcate the value of inclusivity harmony & diversity to students and explain that by internalizing these values in one's personality will help in creating a productive and harmonious social environment allowing everybody to feel comfortable and safe. By doing so one can contribute to creating a conducive environment for stimulating ideas, thoughts and actions.

The key discussions are:

1.By discussion & Crossword puzzle worksheets teacher shall revise the previous knowledge of students.

2..By discussion and Explanation teacher shall inculcate in students the importance of inclusivity,Harmony & diversity among students

3..By using Diversity& inclusion wheel teacher guide students for group discussion & debate so that students learn from each other which brings inclusivity ,diversity & harmony and togetherness in the classroom.

4. Assignment

Prepare Poster on Harmony, Diversity& inclusivity quotes group wise for school bulletin board.

Grade X No: of Periods – 15Hrs

Unit-1

Real Numbers

Discipline, Persistence & Dedication

I. Introduction

The union of rational numbers and irrational numbers together called as real numbers. It aims to generalise properties of numbers and relations among them to evolve results, such as, Euclid's division algorithm, Fundamental theorem of arithmetic to apply them to solve problems related to real life contexts.

Just like all integers have factors similarly, students need to understand that to achieve any goal that they set their mind to, they must first identify the steps that need to be taken. Breaking down a goal or a vision to small actionable steps is the first and the most important stage to achieve success. When one works on your goals with the utmost dedication, discipline and persistence in the face of failure, it is only then that one can achieve the most difficult goals. Through this lesson students learn the importance of discipline and persistence and how these are important traits required in the search for true meaning

The core values focused upon are *Discipline, Persistence & Dedication along with* sub values such as *unity, togetherness, confidence, and teamwork.*

II. Learning Objectives / Outcomes

Through this unit, the students will achieve the following grade appropriate academic and value based goals:

- Apply Euclid Division Algorithm and obtain HCF of two positive integers in the context of the given problem.
- Apply Euclid Division Algorithm and prove results of positive integers in the form of ax+b where a and b are constants
- Use the Fundamental Theorem of Arithmetic and calculate HCF and LCM of the given numbers in the context of the given problem.
- Recall the properties of irrational number and prove that whether the sum /difference /product /quotient of two numbers is irrational or not.
- Apply theorems of irrational number and prove whether a given number is irrational or not

- Apply theorems of rational numbers and find out about the nature of their decimal representation and their factor
- Learn to aim high and identify steps that are required to achieve the target. Inculcate the value of persistence, dedication and discipline.

III. Process & Action Plan

Real numbers are the numbers which include both rational and irrational numbers. In this section, Students learn one more application of Euclid's division lemma known as Euclid's Division Algorithm. An algorithm means a series of well-defined steps which provide a procedure of calculation repeated successively on the results of earlier steps till the desired result is obtained. This teacher shall relate with discipline, persistence& dedication will reach you success. Your role as a teacher is significant, as you have the power and the means to shape the lives under your guidance. One of the most important goals you may have as a teacher, is the character education of the students using the academic content at hand.

The values and life skills integration within this unit may follow the following process and action plan, as depicted in the flow chart on next page:

A.
Introduce the **context** activity:
Discussion & Work sheets. Ref-A1

B. Carry out the varied **activities** in class (given below) in the sequence specified.

Discipline, Dedication and Persistence.
Explanation, Discussion & debate on the assigned topic
Ref-B1& B2

C. Aid generalization of the concepts learnt, through **assignments** (given below).

Plan a goal for their future, make a systematic plan to reach the goal, identify obstacles and work on it to overcome the same.
Ref-C1

While it would be ideal to expose the students to all the activities as given, and the discussion that would ensue, you may choose as per your convenience and availability of time, the activities that would be relevant to the content being taught and/or suited to the cognitive and emotional maturity of the students.

This topic incorporates the *core approach* – Knowing, Understanding, Valuing and Acting the values embedded in the topic.

The *core values* being considered are *Discipline, Dedication and Persistence* along with other sub-values like *unity, togetherness, confidence, and teamwork.*

The unit also provides the scope to develop the following life skills in the students: *observation, thinking, problem solving, and critical thinking, drawing*

IV. Activities & Related Discussion

A: The context Activity for the teacher to Start

Teacher shall discuss with students and revise the values they have learned in Std IX through number system. In std X the number system is extended the study of division lemma, algorithm & fundamental theorem. Through this lesson, students are encouraged to develop a systematic and disciplined approach/planning towards solving problems. Through persistence and dedication one can overcome any challenge that lies in their path towards achieving their goals.

"A goal without a plan is just a wish" - Antoine de Saint-Exupery.

B. Value Based Activity:

B1:

The lesson can proceed with an interesting debate activity. Teacher shall divide students into groups and give the following topics for discussion/debate.

In this lesson the study of lemma, logarithm or fundamental theorems teaches one need to follow systematic well defined steps which gives a procedure for solving any type of problem. This is true in real life.

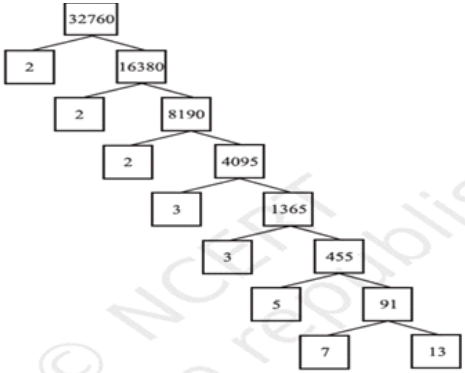
Through the below debate topics, the teacher should aim to inculcate the values of goal setting and achieving goals in a righteous and ethical manner. Furthermore, this will stimulate students to come up with creative ideas in response to the topics.

- Get it done, by hook or crook! is it okay to achieve your goals in this manner?
- What is more important in your path to success? The journey or end result?
- Would you rather do what you love or do something that pays?

The skills students learn from debating are not limited to public speaking or eloquence in expressing their ideas. Preparing for a debate helps them to improve their critical thinking capability and essay writing skills.

Such activities will encourage students to conduct research to support their point of view. This will improve a student's abilities to assess references and analyze data. Indeed, debate activities can be an effective way to develop the skills needed to become a modern citizen in the 21st century, including collaboration, communication, and creativity.

B2: Discussion Activity: Here teacher can elaborate that like factor tree leads us to conclude that every composite number can be written as the product of powers of primes. This is called Fundamental Theorem of Arithmetic. . Children can be made to draw factor tree for different numbers to understand how factorization takes place uniquely.



In this context teacher can encourage students to use a similar approach when tackling challenging tasks. One should break the activity down to its smallest tasks and set realistic targets for completion. This will boost confidence among students to face any difficult situation in life.

Picture Courtesy: NCERT Class X Mathematics Textbook.

V. C: Assignments

C1: Ask students to set a goal for their future , make a systematic plan to reach the goal, find out the true obstacles and work on it to overcome.

Resources

References:

1. NCERT Textbook, Reference books,(R.D Sharma , R.S.Aggarwal)

Unit 2

Topic	Values / Life skills integrated & imbibed	Activities
Polynomials	**Core Values considered :** Interconnectedness & Collaboration **Other Sub-Values:** Collaboration, Interdependence, Collaboration& Cooperation,team work,caring& sharing **Life skills:** communication and critical thinking, analysis, creativity, problem solving skills, and strategizing skills	**Value integration Activities:-** 1. Worksheets to revise the previous knowledge of students. 2.Story Narration & discussion with students relate to real life situations 3.conduction of game of balloons 4.Assignment: Make drawings of global interconnectedness with apt quote to display in school bulletin board

Materials / Resources needed

Value Integration:-

1. Work sheets to conduct context activity
2. BB, Pen, scissor, colour pencils. balloons
3. Facilities and Equipment to show videos.
4. NCERT Text books, reference books (R.D. Sharma, R.S Agarwal) pen, board, Duster.

Description (of the points of discussion)

Value Integration:-

In this chapter the activities incorporated in such a way that while learning polynomials students learn the importance of inter-connectedness and inter-dependence as when we connect two or more terms with addition, subtraction, multiplication, together it becomes a polynomial. Similarly when we connect or depend with other people or the community which give us a feel of unity & togetherness. Factoring a polynomial means writing the polynomial as a product of factors. Factoring is a mathematical process by which you break up a math phrase into simplified parts. This concept can be extended to one's daily life as well, when we face any complicated or complex problems, we need to break it small bite-size blocks and solve one block at a time until the whole problem is resolved.

The key discussions are:

1.By Discussion & using worksheets teacher revise the previous knowledge of students.

2.By narrating a story & discussion with students teacher relate to interdependence/interdependence& collaborative /cooperative learning

3.By taking balloon game teacher instil the value of collaboration and interdependence among students

3.Assignment:

1:Make drawings of global interconnectedness with apt quote to display in school bulletin board.

Grade X No: of Periods – 7Hrs

Unit 2

Polynomials

Interconnectedness & Interdependence

I. Introduction

In mathematics, a polynomial is an expression consisting of variables and coefficients that involves only the operations of addition, subtraction, multiplication, and non-negative integer exponents of variables. Students studied polynomials in one variable and their degrees in previous classes. It is extended to quadratic polynomial and cubic polynomials of degree 2 and 3 respectively. This chapter also discusses zeroes of the polynomials and their graphical representations.

Students learn the relationship between zeros and coefficient for quadratic, cubic and bi–quadratic polynomials. Through this lesson students realize the connection between quadratic polynomial, sum, product of zeroes and interdependence of division algorithm of polynomials. Just like how polynomials create a connection and dependency between coefficients and variables to derive values, similarly students must realize that to derive happiness in one's life it is important to nurture healthy relationships among families, friends and society, furthermore students realize that happiness can be sustained only when there is a feeling of belonging and/or a sense of community, this highlights the inter-dependent nature of all our relationships on one's well-being.

II. Learning Objectives / Outcomes

Through this unit, the students will achieve the following grade appropriate academic and value based goals:

- Recall degree of polynomial and find the number of zeroes of polynomial
- Analyze the graph of the polynomials and find the number of zeroes of polynomial
- Compute zeroes of the polynomials and verify the relationship between zeroes and the coefficients.
- Compute the sum and product of zeroes of the polynomial and find the quadratic polynomial
- Divide the two given polynomials and verify the division algorithm

- Divide the given polynomial with its known zero and find all the other zeroes of that polynomial.
- Realize the significance of inter relation,inter connectedness& inter dependence for happy and peaceful life.

III. Process & Action Plan

Teacher highlights the interconnectedness & interdependence while teaching polynomials. An algebraic expression can have exponents that are rational numbers. Teacher shall relate life values of interdependendence & interrelationship in a polynomial which is an algebraic expression where exponent on any variable is a whole number, where the variables and exponents are interdepended and connected with each other to make a polynomial.

This lesson makes them realize the value of interdependence, which not only gives them happiness but enables them to learn from each other, importance of relationships and lead a successful & happy life. One of the most important goals you may have as a teacher is the character education of the students using the academic content at hand.

The values and life skills integration within this unit may follow the following process and action plan, as depicted in the flow chart on next page:

A.
Introduce the **context** activity:
Discussion & solving worksheets. Ref-A1

B. Carry out the varied **activities** in class (given below) in the sequence specified.

1.
Interconnected ness & Co-operation
Narration of Wolves life story- Family Bond. Group Discussion.
Ref-B1

2.
Interdependence
Narration of Wolves life story-Sharing Knowledge. Group Discussion.
Ref-B2

C. Aid generalization of the concepts learnt, through **assignments** (given below).

1.
Research study on interdependence in school community & its positive impact.
Ref-C1

While it would be ideal to expose the students to all the activities as given, and the discussion that would ensue, you may choose as per your convenience and availability of time, the activities that would be relevant to the content being taught and/or suited to the cognitive and emotional maturity of the students.

This topic incorporates the *core approach* – Knowing, Understanding, Valuing and Acting the values embedded in the topic.

The *core values* being considered are *Interconnectedness & Interdependence* along with other sub-values like *curiosity, collaboration, inter-relations collaboration& cooperation*.

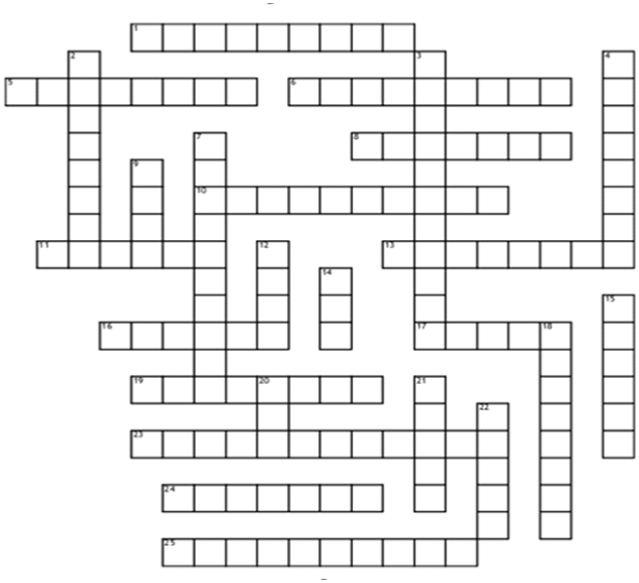
The unit also provides the scope to develop the following life skills in the students: *communication and critical thinking, analysis, creativity, problem solving skills and strategizing skills.*

IV. Activities & Related Discussion

A. The Context activity for the teacher to start:

Teacher shall highlight the various applications of polynomials in different fields, by emphasizing on the way polynomials are related and connected to innumerable fields that affect our daily life, the teacher can teach students that by maintaining good relationships with everyone, one can earn an abundance of success, peace and happiness.

A1: Teacher shall start the lesson by giving work sheet to solve in the class group wise and ask them to discuss with each other what they have studied in the previous class. This will help them to interact and recollect their knowledge by depending on each other and learn from each other.



Across

1. 4x-2y+3 has three terms, also known as a _____

5. When looking at a polynomial, re-ordering the terms from highest to lowest degree is known as _____ form

6. When you're multiplying numbers together, it's known as _____

8. (2x(3))/2=3x, x=_____

10. A _____ is an algebraic expression that consists of adding or subtracting terms

11. The _____ of 3xy is two

13. 12x-3 has two terms, also known as a _____

16. 7x-3y are known as _____ terms

17. 3x+4=5x-2, x=_____

19. This has no variables

23. 2x-11=x+62, x=_____

24. (3x-8)/4=x-6, x=_____

25. 5x/10+x=(4x-90)+5, x=_____

Down

2. When given 6x-2, x is referred to as the _____

3. When looking at 2y, 2 is known as the _____

4. 3x is one term, known as a _____

7. A phrase that has variables and numbers, then is connected by operators is known as an _____

9. 3x/4=2x-5, x=_____

12. 2y+4y are known as _____ terms

14. 11x/2=10x-9, x=_____

15. 4x/2=3x-11, x=_____

18. 3x+4=5x-2, this is known as an _____

20. 3x-7=4x-17, x=_____

21. A number, variable or even the product of an equation are known as _____

22. 4x-6=2x+8, x=_____

https://wordmint.com/puzzles/3335954

B: Value based activities: Inter-dependence & Inter connectedness

B1:https://www.livingwithwolves.org/about-wolves/social-wolf/

Teacher shall explain inter-connectedness of terms of polynomial, inter-relationship of coefficients & zeros and inter-dependence of division algorithms in polynomials.

Similarly it is very important for students to understand that one needs to develop relationships and connections with others, nurture it and always treat it with respect. If the trust built in a relationship falters or is broken, then it becomes very difficult to re-build the same connection again.

The teacher should reiterate the story of wolves which is discussed in std IX along with its discussion. Teacher shall ask students to read the findings of living with wolves. This gives them insights on interdependence, collaboration coordination, sharing, caring and team work.

1. Family Groups (Or Packs) & The Bond

A wolf pack is an exceedingly complex social unit—an extended family of parents, offspring, siblings, aunts, uncles, and sometimes dispersers from other packs. There are old wolves that need to be cared for, pups that need to be educated, and young adults that are beginning to assert themselves – all altering the dynamics of the pack. The job of maintaining order and cohesion falls largely to the alphas, also known as the breeding pair. Typically, there is only one breeding pair in a pack. They, especially the alpha female (the mother of the pack), are the glue keeping the pack together. The loss of a parent can have a devastating impact on social group cohesion. In small packs, human-caused mortality of the alpha female or of both breeders can cause the entire pack to dissolve.

After the alphas, wolves second in command are called the betas, followed by mid-ranking wolves, and finally the omegas. Both mid- and low-ranking positions are somewhat fluid. Although an omega may hold that position for many years, it is not unheard of for the pack to pick a new omega and let the other retire.

Living in a pack not only facilitates the raising and feeding of pups, coordinated and collaborative hunting, and the defense of territory, it also allows for the formation of many unique emotional bonds between pack members, the foundation for cooperative living. Wolves care for each other as individuals. They form friendships and nurture their own sick and injured. Pack structure enables communication, the education of the young and the transfer of knowledge across generations. Wolves and other highly social animals have and pass on what can be best described as culture. A family group can persevere for several generations, even decades, carrying knowledge and information through the years, from generation to generation. Wolves play together into old age, they raise their young as a group, and they care for injured companions. When they lose a pack mate, there is evidence that they suffer and mourn that loss. When we look at wolves, we are looking at tribes—extended families, each with its own homeland, history, knowledge, and indeed, culture.

Discussion:

Narrate or allow students to read the above excerpt, ask the following questions:-

1. Have you ever noticed who in your family/school is trying to keep everyone connected?
2. If someone falls sick or is not able to take care of themselves, what will be the solution?
3. Is it necessary to have order and cohesion in a family or a group? If not what happens?

B2: Sharing Knowledge:

Teacher can organize a discussion session to highlight the qualities

Wolves communicate, collaborate and share knowledge across generations. The older wolves, as more experienced hunters, share hunting strategies and techniques with younger wolves, passing down knowledge from one generation to the next, maintaining a culture unique to that pack. The late biologist Gordon Haber observed wolves changing their hunting strategy based on weather, terrain, and prey behavior. Both wolves and humans brought unique, complementary talents to a relationship that was based on mutual respect. Several scholars agree that humans learned to hunt from wolves.

Group Discussion:

After narrating this life of wolves' teacher divide students into groups and give different values which exist in wolves' life and how it is important in our life for group discussion. A member of each group will be given the opportunity to share the group's study and the findings with the rest of the class. The teacher will take note of it and guide them wherever necessary.

- Sharing of knowledge & culture
- Caring of elders & weaker people

Ask students what they understand from interdependence & Inter connectedness. Remind them that interdependence provides support to individuals allowing them the strength to support others and to focus on their own personal growth. Individuals who are interdependent will reap the rewards immediately. You will achieve more success and happiness when you are connected to those around you.

V.C: Assignments

C1: Research and find interdependence in school community and positive impact in students life

Resources

References:

1.NCERT textbook for Mathematics, Reference books,(R.D Sharma , R.S.Aggarwal)

2.Links given under the respective activities

Unit 3

Topic	Values / Life skills integrated & imbibed	Activities
Coordinate Geometry	**Core Values considered :** Interdependence & Compassion **Other Sub-Values:** integrity, kindness, helping, honesty, inter-relationship. **Life skills:** problem solving, logical reasoning and abstract thinking, interpersonal ,communication, observation.	**Value integration Activities:-** 1. Solving worksheets in the class room& discussion teacher to revise their previous knowledge of students. 2.Interaction& discussion of real life example to instill Interdependence 3. Story narration & Group discussion with students to instil Compassion 4.Assignments Do one kindness activity in discussion with your friends& teacher and write a report about the activity about your feelings post the activity.(Visiting an old age home, teaching less privileged, giving food to someone in need,…)

Materials / Resources needed

Value Integration:-

1. Work sheet to conduct context activity&
2. Facilities and Equipment to show videos
3. Pen, Board, Duster
4. NCERT Text Book, Reference books, (R.D Sharma , R.S. Aggarwal)

Description (of the points of discussion)

Value Integration:-

In this chapter the activities are incorporated in such a manner that children learn Co-ordinate geometry helps to find solutions in many areas and in different applications which we normally see in our everyday life. Anyone with a cell phone will make use of coordinates via Google Maps in order to get directions to a location. Astronomers use a coordinate system that is relative to the earth's geographic poles defining the celestial equator, and, use a much larger coordinate system with the sun at the 0,0,0 location. Coordinate geometry is a tool, which fixes our position in this wide big world. It helps us to perceive our own position and the relative position of other entities.

Through the above examples we understand the importance of Co-ordinate geometry in defining relationships and providing guidance. This topic also teaches students the value of being helpful to others and developing interpersonal skills to communicate and understand others needs in a better manner.

The key discussions are:

1.By solving worksheets in the class room& discussion teacher shall revise their previous knowledge of students.

2.By interaction& discussion of real life examples teacher instill interdependence ,sharing and helping each other to lead a succesful and peaceful life

2.By Story narration & Group discussion with students teacher instil what ever kindness you share with others has a way of coming back to you in a delightful manner. Therefore, it is important for each one of us to be compassionate, kind and to treat everyone with the same respect that one would expect for themselves

3.Assignments

Do one kindness activity in discussion with your friends& teacher and write a report about the activity about your feelings post the activity.(Visiting an old age home, teaching less privileged, giving food to someone in need,…)

Grade X No: of Periods – 15Hrs

Unit-3

Pair of Linear Equations in Two Variables

Equality & Relationship

I. Introduction

An equation which can be put in the form ax+by+c=0, where a, b and c are real numbers, and a and b are not both zero, is called a linear equation in two variables x and y.

In this lesson we discuss the relation between variables, coefficients and how they equate to a value that satisfies the equation. Similarly in life, one must maintain a healthy balanced relationship with their loved ones where there is equality, respect and love, by nurturing such a relationship, one can always find support, love and a feeling of comfort, that will remain constant in good times and in those unforeseen bad times when one needs care.

Through this lesson, students learn the significance of equality, respect and nurturing healthy relationships in one's life.

II. Learning Objectives / Outcomes

Through this unit, the students will achieve the following grade appropriate academic and value based goals:

- State the properties of linear equation and classify the given equations as linear or nonlinear
- Interpret the concepts of linear equations and represent any given situation algebraically and graphically
- Plot the lines corresponding to the given two linear equations and comment on the nature /behaviour of the lines representing the linear equations.
- Use different algebraic methods and solve a pair of line equations. (Substitution, Elimination & Cross multiplication)
- Use the concepts of pair of linear equations in two variables and represent any given situation algebraically and find its solution.
- Calculate the ratio of coefficients of linear equations and discuss the nature of pair of linear equations

- Rewrite the given equations (using substitution method) which are reducible to a pair of linear equations and find the solution of those equations.
- Learn the significance of equality, respect and nurturing healthy relationships in one's life.

III. Process & Action Plan

Two qualities play very crucial role in our life .One is equality and the other one is keeping good relations with everyone. At the same time keeping a balance of our mind whenever we face any situations in our life. Through Linear equations teacher shall imbibe these qualities among students. Your role as a teacher is significant, as you have the power and the means to shape the lives under your guidance. One of the most important goals you may have as a teacher, is the character education of the students using the academic content at hand.

The values and life skills integration within this unit may follow the following process and action plan, as depicted in the flow chart on next page:

A.
Introduce the **context** activity:
Discussion & Work sheets. Ref-A1, A2 & A3

B. Carry out the varied **activities** in class (given below) in the sequence specified.

1.
Equality, Relationship Balance
Revision of Equality, Relationship & balance which they have studied in std IX.
Ref-B1.

2.
Relationship/ Friendship
Discussion Debate on the given Topic.
Ref-B2 & B3

C. Aid generalization of the concepts learnt, through **assignments** (given below).

1.
Research study on the relationship of academic performance and friendship.
Ref-C1

While it would be ideal to expose the students to all the activities as given, and the discussion that would ensue, you may choose as per your convenience and availability of time, the activities that would be relevant to the content being taught and/or suited to the cognitive and emotional maturity of the students.

This topic incorporates the *core approach* – Knowing, Understanding, Valuing and Acting the values embedded in the topic.

The *core values* being considered are *Equality & Relationship* along with other sub-values like *stability, confidence, and teamwork,balance*

The unit also provides the scope to develop the following life skills in the students: *observation, thinking, problem solving, and critical thinking, drawing*

IV. Activities & Related Discussion

A: The context Activity for the teacher to Start

An equation which can be put in the form ax+by+c=0, where a, b and c are real numbers, and a and b are not both zero, is called a linear equation in two variables x and y. Through this lesson, students learn the significance of equality, respect and nurturing healthy relationships in one's life.

A1: Teacher shall revise the important concepts learned in std IX by giving work sheet group wise to teach them to work in team and improve their teamwork and cooperation.

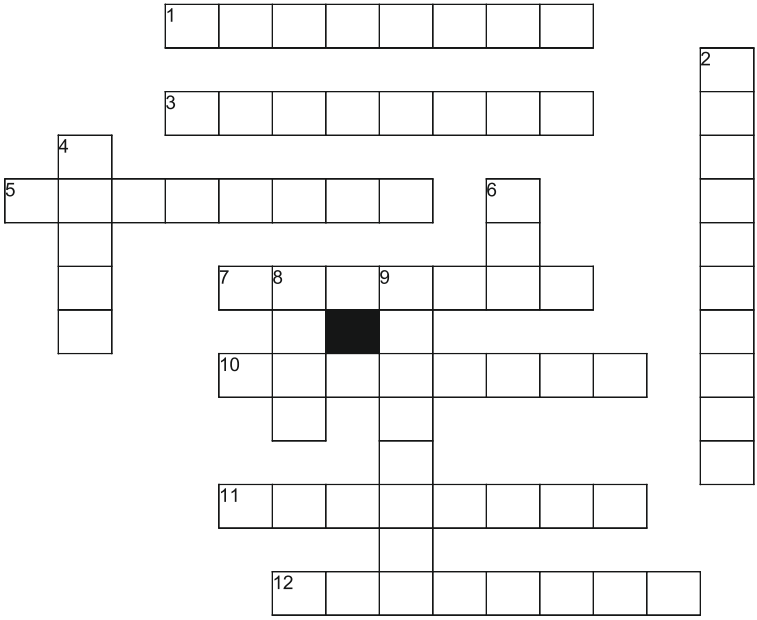
A3: Solve the crossword Puzzle

Across

1. The graph of a linear equation in two variable is a _____ line.
3. Graph of the equation of the type x=a is a line parallel to y-axis
5. answer of an equation is also called its _____
7. An _____ pair of numbers used to represent solution of an equation in two variables
10. Every point on the graph of a linear equation in two variables is a _____ of the equation
11. A term whose values keep changing is called a_____.
12. A term whose values do not keep changing is called a_____.

Down

2. A linear equation in two variables has _____ many solutions
4. Every solution of the linear equation in two variables represents a _____on the graph of the equation
6. Number of solution an equation of the type ax + b=0
8. Answer of an equation is also callesda
9. A statement of equality is called an _____.



Ref: https://wordmint.com/public_puzzles/105073

In this activity we discuss the relation between variables, coefficients and how they equate to a value that satisfies the equation. Similarly in life, one must maintain a healthy balanced relationship with their loved ones that will sustain in both the good times and in those unforeseen bad times when one needs care.

B. Value Based Activity:

B1: Equality Wheel-The essential ingredients for a healthy equitable balanced relationship.

In this lesson we discuss the relation between variables, coefficients and how they equate to a value that satisfies the equation. Similarly in life, one must maintain a healthy balanced relationship with their loved ones.

Teacher shall revise regarding relationship, equality and balance they have studied in std IX while learning linear equations with two variables through the equality wheel.

Picture Courtesy:

https://mobile.twitter.com/CompassCenterNC/status/1328805234790068225/photo/1

In a healthy relationship there are a number of qualities that are present. You can see those qualities in this wheel with the center being equality and the outer ring bring non-violence. This is a great tool to use to review the different qualities in a relationship that students should be seeking.

Take time to sit with your students and go through the wheel. Remind them they deserve good relations but also need to exhibit all these qualities to maintain good relations. Positive relationships encourage students, motivates them and improves engagement in learning. Help students get to know each other. The sooner you are able to help students realize that there are more similarities than differences among them, the more comfortable they will be in the class. You can do this in several ways. Teacher may customize the factors as per the need of class.

Ask students /Brainstorm with students what qualities or factors they think to keep for good relations and maintain equality in class room.

B2: Balanced Action: Discussion

Equations will have meaning and application only when it is balanced. When RHS=LHS in an equation we can say it is balanced. This is also true in our real life.

Ask students the following questions

1. Do you feel sad when you see people suffer?
2. Have wondered what your life will look like 5, 10, 20 years down the line?
3. Have you ever felt that right and wrong are fuzzy concepts?

Help students to understand what the meaning of balance action is. Life is a great adventure. We all go through many ups and downs in life. We all need to figure out how to lead a happy balanced and peaceful life.classroom.

Every action or non-action has its own consequences. Remind them all need to learn how to act and balance on the battle field of life. If we open our eyes, learn from the masters and we can all of a sudden see the beauty in the ugly, the good in the bad in life and work. Learning to balance our actions, deal effectively with the situations in our lives, stopping unnecessary suffering, which will pave way to enjoy every moment we have in life.

B3: Balanced Action &Equitable relation: Debate

Teacher can conduct a discussion on how balanced action is required for enjoying every moment of life. Divide students into groups and conduct a debate in the class on the following topic.

- Does friendship improve academic performance & personality in the classroom?
- Our forefathers enjoyed better and stronger relations with families than us?

After the debate ask students what they understand the of the value of equitable relations, balanced action. What it necessitates…

V. C: Assignments

C1: Do a small research study on academic power & friendship.

Resources

References:

1. Ncert Textbook, Reference books,(R.D Sharma , R.S.Aggarwal)
2. Links given under the respective activities

Unit 4

Topic	Values / Life skills integrated & imbibed	Activities
Linear Equations with Two Variable	**Core Values considered :** Equality, Balance **Other Sub-**responsibility, trust, honesty & Fairness **Life skills:** Problem solving, logical reasoning and critical thinking, communication.	**Value integration Activities:-** 1.Discussion& solving worksheets, to revise the previous knowledge of students 2. Discussion & preparation of balance behaviour chart 3.Use equality wheel to demonstrate/explain the secrets & benefits to lead & maintain a successful healthy equitable & balanced life 4. Assignment: 1.Prepare poster by using equality, relations & balancing life quotes for the class to display-GroupWise

Materials / Resources needed

Value Integration:-

1.Worksheet for context activity ,chart paper for balance behaviour activity
2.Facilities and Equipment to show videos and space for conducting activities
3.BB, Pen, Duster
4.Ncert Text Book, Reference books,(R.D Sharma , R.S.Aggarwal)

Description (of the points of discussion)

Value Integration:-

In this chapter the activities, stories and games are incorporated in such a manner that students realise When you are living with balance in your life, you are living with peace and harmony every day. Balance comes in physical forms, emotional forms, and a spiritual form. Striking a balance helps you lead a happy and contented and disciplined life, it ensures your growth as an individual and secures your mental peace and wellbeing. It helps you dream bigger: By maintaining a healthy balance, one can secure future. Therefore it is each ones responsibility to maintain a healthy balance in all walks of life

The key discussions are:

1.By doing a discussion& solving worksheets, teacher shall revise the previous knowledge of students and introduce the values related to the lesson

2.By discussion activity teacher inculcate & prepare chart for balance behaviour in the classroom with the help of students

3. By using equality wheel teacher demonstrate/explain the secrets & benefits to lead & maintain a successful healthy equitable & balanced life

4. Assignment:

1.Prepare poster by using equality, relations & balancing life quotes for the class to display-GroupWise

Grade X No: of Periods – 15Hrs

Unit-4

Quadratic Equations

Balance, Equality & Optimism

I. Introduction

This chapter discusses about quadratic equations, and various ways of finding their roots Quadratic equations come up when we deal with much real-life situations. An equation is an expression that equates two expressions. It says that the value of the expression on one side of the equality sign is equal to the value of the expression on the other side. We assume that the two sides of the equation are balanced. We perform the same mathematical operations on both sides of the equation, so that the balance is not disturbed and we get solution.

Similarly, when using this lesson in life, one learns that striking a balance helps you lead a happy and contented and disciplined life, key to sustaining happiness is to nurture a healthy mindset with optimism and maintaining equality your relationships with others. Therefore, it is each one's responsibility to maintain a healthy balance in all walks of life.

We use factorisation to find the roots or solution of the equation Factoring is a mathematical process by which you break up a math phrase into simplified parts. This is true in daily life when we face any complicated or complex problems, we need to break it into different parts and solve it based on priority, doing so helps us to approach and solve problems in a more manageable manner. Furthermore, the teacher should extend the learning of this topic to life by helping students understand how factorization plays an important role in helping students overcome challenges in life and become positive in life. This requires teachers to emphasize on sharpening one's problem solving skills, critical thinking and strategizing skills so as to break down a tough task into smaller easy to do tasks.

Through this lesson students learn *Balance, Equality & Optimism* which are essential qualities one should possess to lead a happy & successful life.

II. Learning Objectives / Outcomes

Through this unit, the students will achieve the following grade appropriate academic and value based goals:

- Represent the given equation in the form of quadratic equation

- Solve quadratic equations through factorization, middle term splitting, completing square method, use of quadratic formula and find its roots.
- Substitute the value of the roots of a given quadratic equation and verify them.
- Examine the discriminant of quadratic equation and find out the nature of its roots
- Describe the nature of the roots of a quadratic equation and determine that whether a given situation is possible or not
- Learn Striking a balance helps you lead a happy and contented and disciplined life,
- Equality& Optimism which are essential qualities one should possess to lead a happy & successful life.

III. Process & Action Plan

Teacher shall correlate the importance of equality, optimism and balancing life while teaching quadratic equations. Relating life values with mathematics will help them to realize its application in everyday life and register in them deeply. Your role as a teacher is significant, as you have the power and the means to shape the lives under your guidance. One of the most important goals you may have as a teacher, is the character education of the students using the academic content at hand.

The values and life skills integration within this unit may follow the following process and action plan, as depicted in the flow chart on next page:

A.
Introduce the **context** activity:
Discussion & worksheets. Ref-A1,A2 & A3

B. Carry out the varied **activities** in class (given below) in the sequence specified.

1.
Balance, Equality & Optimism
Explanation & organise group discussion, research study and debate to inculcate values on assigned topic.
Ref-B1, B2 & B3

C. Aid generalization of the concepts learnt, through **assignments** (given below).

1.
Write your views on promoting equality in society.
Ref-C1

While it would be ideal to expose the students to all the activities as given, and the discussion that would ensue, you may choose as per your convenience and availability of time, the activities that would be relevant to the content being taught and/or suited to the cognitive and emotional maturity of the students.

This topic incorporates the *core approach* – Knowing, Understanding, Valuing and Acting the values embedded in the topic.

The *core values* being considered are *Balance, Equality & Optimism* along with other sub-values like *harmony, teamwork, relations, respect.*

The unit also provides the scope to develop the following life skills in the students: observation, problem solving. Critical thinking

IV. Activities & Related Discussion

A: The context Activity for the teacher to start:

This chapter discusses about quadratic equations, and various ways of finding their roots. Quadratic equations come up when we deal with much real-life situations. Similarly, when using this lesson in life, one learns that striking a balance helps you lead a happy and contented and disciplined life, key to sustaining happiness is to nurture a healthy mindset with optimism and maintaining equality your relationships with others.

Teacher shall recall the values learned through the lessons Polynomials, Linear Equations and Exponents and Powers and give them the following worksheet before introducing the values of quadratic equations.

A1: Factorize the following Algebraic Expressions

1. $4x2 + 16x$
2. $x2 - 14x - 40$
3. $x2 + 4x - 12$
4. $x2 - 144$
5. $81x2 - 49$

A2: Expand the following

1. $(x + 5)(x + 5)$2. $(m - 3)(m - 3)$
3. $(y + 8)^2$
4. $(x + 9)(x - 9)$
5. $(3m + 4)(3m - 4)$

Teacher asks students while factorizing/expanding an expression -what did they learn?

Give them a hint ….(simplifying complex problems)

A3

1. Express with positive exponents

(a) 3^{-5} (b) 5^{-6} (c) b^{-15}

2. In the similar manner we can also convert negative attitude into positive attitude by using

(a) Body (b) Mind (c) Intellect

Teacher asks students how in mathematics you could make any negative values into positive?

This is possible in real life too. We come across many life situations where unexpected things happens ,but in such cases taking our thoughts and actions positively and without losing control we need to face the situation. That is true success. Optimism is a quality everyone should possess

B: Value Based Activities:

Teacher shall discuss with students that while learning quadratic equation, one realizes the importance of balancing both sides of the equation, equating LHS=RHS, they could get the solutions or roots of the equations, converting negative exponents one gets positive expressions to solve a problem. Now applying these qualities in our daily life to see the changes.

The lesson can proceed with some examples

B1: Positive attitude (Optimism)

Teacher shall ask students to speak about one positive thing about their life . Students may come with many positive point. Teacher shall acknowledge, appreciate and encourage them.

Teacher shall show the video

https://youtu.be/sGq6wsPksjA 3min 35 sec The story of Wilma Rudolf

Encourage students to reflect upon the original story, connect it their own lives. Facilitate discussion on how to be always an optimist. Some examples given below. Elicit more from students.

1. Make everyone feel that you appreciate their good qualities and strengths
2. Think only for the best, work only for the best and expect only the best.
3. Forget mistakes of the past and persevere to achieve greatness for the future.

Ask students to make a list and make a buddy system to follow in the class room

B2: Equality - Debate

Ask students what they know about the term 'equality' discuss with them about different types of equality prevail in our society. And its importance and give them a topic for debate and conduct it in the class

1. When attempting to create a more harmonious society, gender is a more important factor than class or income.

Teacher may help and guide students and instill in them the value of gender equality and respect for each other. This is the only way to make our society harmonious and all of us can live peacefully.

B3: Balance in life – Discussion

Ask students

1. How many of you have both parents working? (Yes/No)
2. How are your parents managing home & office?
3. How many of you would like to become professionals or have a job?
4. How are you going to manage professional life & family?
5. Teacher shall divide the class into groups and assign topic related to Balance, for group discussion and present to the whole class.

1. Balance between Professionalism and Family / Importance of a work-life Balance.

Teacher may help and guide students and instill in them the value of balancing life. It is the ability to withstand any adversity and bounce back from difficult life situations. It helps in tapping our strengths and support system to overcome challeges and work through different situations. Balancing act will empower us to adjust with any situations

3. C: Assignments

C1: Write your views on promoting equality in society

Resources

References:

Ncert Textbook, Reference books,(R.D Sharma , R.S.Aggarwal)

Resources for Teachers:

https://www.harleytherapy.co.uk/counselling/optimism-vs-pessimism.html

https://www.jagranjosh.com/articles/group-discussion-work-and-life-balance-1406009542-1

Unit 5

Topic	Values / Life skills integrated & imbibed	Activities
Introduction to Euclid's Geometry	**Core Values considered :** Innovation, Creativity& Curiosity **Other Sub-Values:** Teamwork, passion **Life skills:** Analytical, problem solving, creative, thinking, and abstract thinking	**Value integration Activities:-** 1.Discussions & solving worksheet to revise the previous knowledge 2.Conduction of quiz and discussion to inculcate curiosity,innovation& creativity 3. Discussion and conducting debate to ensure how curiosity will lead to passion further paving the way for creativity and innovation. 4.Assignment: Research study regarding ancient mathematics advantages& disadvantages.

Materials / Resources needed

Value Integration:-

1. Worksheets to solve in the class for the context activity and set of questions for conduction of quiz.
2. Facilities and Equipment to show videos
3. NCERT Text Book, Reference books,(R.D Sharma , R.S.Aggarwal) P

Description (of the points of discussion)

Value Integration:-

In this chapter the activities are incorporated in such a manner that While learning the lesson students

realise that Geometry was being developed and applied everywhere in the world. But this was happening in an unsystematic manner. The interesting thing about these developments of geometry in the ancient world is that they were passed on from one generation to the next, either orally or through palm leaf messages, or by other ways. . Euclid, a teacher of mathematics at Alexandria in Egypt, collected all the known work and arranged it in his famous treatise, called 'Elements'. He divided the 'Elements' into thirteen chapters each called a book. These books influenced the whole world's understanding of geometry for generations to come. In this chapter; we shall discuss Euclid's approach to geometry and shall try to link it with the present day geometry Through this chapter teacher instil the values of innovation, creativity and curiosity among students.

The key discussions are:

1.By discussions and worksheets teacher revise the previous knowledge for introduction of new lesson and the values

2.By conducting quiz and discussion thereafter teacher inculcate the sense of curiosity,innovation& creativity in students

2.Through discussion and conducting debate teacher ensure how curiosity will lead to passion further paving the way for creativity and innovation.

3.Assignment:

Research study regarding ancient mathematics advantages& disadvantages.

Grade X No: of Periods – 8Hrs

Unit-5

Arithmetic Progression

Hard work & Perseverance

I. Introduction

In our daily life, we often come across many things which follow a definite pattern or sequence. Arrangement of leaves on the stem of a tree or the arrangement of grains on a cob of maize and the pattern of individual cells on a honeycomb are a few examples of patterns in nature. Arithmetic Progression is one such pattern. An arithmetic progression is a list of numbers in which each term is obtained by adding a fixed number to the preceding term except the first term. Though we never realize it, there are many instances of arithmetic sequences that we come across daily.

As the name suggests Arithmetic Progression deals with progress, each time we add a constant number to a preceding term the value of the succeeding term increases. Through this lesson one learns the importance of positivity/optimism, perseverance and discipline. By constantly improving oneself and improving the work one puts in, over a period of time with sustained hard work, one experiences a multi fold output in terms of success and results. Self-discipline, hard work and perseverance teach us to be focussed, dedicated and determined towards our goal.

II. Learning Objectives / Outcomes

Through this unit, the students will achieve the following grade appropriate academic and value based goals:

- Produce patterns and observe that succeeding terms are obtained by adding a fixed number to the preceding terms.
- Distinguish between finite and infinite AP and determine the nature and write the last term of the given AP
- Calculate the nth term of a given AP and find its terms and their nature and solve real-life word problems
- Calculate the sum of a given AP and get the solution of real-life word problems and contextual problems
- Calculate the last term of the given AP and find solution real-life word problems

- Use appropriate formula to calculate the last term of the given AP
- Learns the importance of positivity/optimism, perseverance and discipline

III. Process & Action Plan

While teaching Arithmetic Progression teacher highlights the importance of optimism, perseverance, hard work and discipline. Relating life values while solving mathematics problems will help students to register and correlate these values deeply in their minds.

The values and life skills integration within this unit may follow the following process and action plan, as depicted in the flow chart on next page:

A.
Introduce the **context** activity:
Story, Discussion & worksheets. Ref-A1, A2

B. Carry out the varied **activities** in class (given below) in the sequence specified.

1.
Hard work & Perseverance
Explanation& discussion on how to reach success.
Ref-B1

2.
Consistency & perseverance
Debates on the assigned topic to register the importance .
Ref-B2

C. Aid generalization of the concepts learnt, through **assignments** (given below).

1.
Case study on personalities who made their presence felt.
Ref-C1

While it would be ideal to expose the students to all the activities as given, and the discussion that would ensue, you may choose as per your convenience and availability of time, the activities that would be relevant to the content being taught and/or suited to the cognitive and emotional maturity of the students.

This topic incorporates the *core approach* – Knowing, Understanding, Valuing and Acting the values embedded in the topic.

The *core values* being considered are *Hard work & Perseverance* along with other sub-values like *discipline, orderliness, hope, discipline, optimism.*

The unit also provides the scope to develop the following life skills in the students*: problem solving, decision making, critical thinking, observation, computation.*

IV. Activities & Related Discussion

A: The Context Activity for The Teacher to Start

The lesson Arithmetic Progression deals with progress, each time we add a constant number to a preceding term the value of the succeeding term increases. Through this lesson one learns the importance of positivity/optimism, perseverance and discipline.

A1: Story of Ambalapuzha Payasam (Kheer)

Teacher starts the lesson with the narration of story of Ambalapuzha Payasam((Kheer) to explain the power of progression.

The King of Ambalapuzha (a kingdom was a big chess enthusiast. One day a sage challenged him (the king) to play the chess. To motivate this Sage, the King offered any reward that the sage could name. The sage modestly asked just for a few grains of rice in the following manner: the king has to put a single grain of rice on the first chess square and double it on every consequent one. So, King accepts this and the game was started. Having lost the game and being a man of his word the king ordered a bag of rice to be brought to the chess board. He started placing the grains according the reward asked by the sage.

The following picture describes growth of number of grains: learn?

From the above image, at 64th square King has to place the total numbers of grains are about 9 million trillion tons. Upon seeing the dilemma, the sage appeared to the king in his true-form, that of Lord Krishna. He told the King that he did not have to pay the debt immediately but could pay him over time. The king would serve paal-payasam (made of sweet pudding made of rice & milk) in the temple freely to the pilgrims every day until the debt was paid off. Lord Krishna's wish is honored .Even today payasam is served freely to all who visit the Ambala puzha Shree Krishna temple.

After the narration of the story teacher shall ask students identify the values, they have understood from this. Teacher may provide clues if necessary…… (Perseverance, honesty, generosity)

- Did you notice the honesty of the king?
- Explain honesty /generosity of king & Lord Krishna.
- Have you ever felt that you have exhibited perseverance while doing any activities (while studying, before exam, before games…)

https://hinduism.stackexchange.com/questions/16712/the-legend-of-chessboard-pala-payasam-story-of-ambalappuzha-sri-krishna-temple.

Teacher shall elicit some more examples from students where they observe arithmetic progression.

- Multiplication Tables are a brilliant example of Arithmetic Progression as multiplication is a form of repeated addition.
- The clock or the watch we use daily, the second's hand moves in Arithmetic Sequence, so does the minute's hand and the hour hand.
- Coming to think of it, even the weeks in a calendar follow the AP, so do the years. Each leap year can be known by adding 4 to the previous leap year.
- The seats in a theatre are also arranged by using arithmetic progression.

A2: Fill in the missing values and describe the number Pattern.

a. 0, 3, 6, 9 ----, ----

b. 0, 8, 16, 24 ----, -----

c. 0, 7, 14, 21 ----, -----

d. 0, 4, 8, 12 ----,------

e. 0, 6,12, 18 ----,------

Now students will have a proper idea regarding arithmetic progression. Explain to students that they can see a systematic, consistent steady growth in the above examples. In real life to sustain such growth, one needs to put in hard work and perseverance.

B:Value Based Activities

B1: The discussion Activity:

Teacher can select sums from text book and discuss with students (Exercise 5.3 - Sum no 20 –Potato race)

Ask and encourage students reflect upon the sums and connect it to the real life. Facilitate discussion on the key aspects like hard work, consistency & perseverance.

Teacher shall explain to students in Arithmetic Progression we can see a systematic and steady way the value changes from small to big this shows that by constantly improving oneself and improving the work one puts in, over a period of time with sustained hard work, one experiences a multi fold output in terms of success and results.

B2: Teacher explains how systematic hard work, consistent discipline and perseverance lead progress & success in one's life with right examples.

There are many factors involved in making a person successful. They're usually talented, intelligent, and sometimes a little lucky, but one thing nearly all successful people have in common is consistent hard work and discipline. Systematic hard work gives you a purpose, it helps you overcome laziness, procrastination, your doubts, fear of failure, insecurities, and your bad habits. The best measure for anything is progress. And there's nothing else that brings more results on a consistent basis than hard work.

. Working on your goal itself is the motivation one needs to keep moving forward and say no to distractions from daily life.

In the beginning of this journey, handling success and all the responsibilities that come with it will be difficult. But earning it with sweat and sacrifices prepares you for that. Here are some examples.

- No athlete truly deserves a medal before investing years of his life into training, before getting his body ready to endure it, before building the qualities necessary to become a champion and developing the mindset of a winner, the same applies to your life as well (Teacher may give examples from real life)
- Successful entrepreneurs wouldn't have been able to manage people effectively, build products people love, run a big company, organize their time well and work with big sums of money, if they hadn't started from nothing and earned the chance to get to every next step. (Teacher may give examples from real life)
- Millionaires also weren't that good at handling their money, investing wisely or networking. It took those years, trial and error, and patience to make a fortune. (Teacher may give examples from real life

So, the hard work, together with the time it takes, is a must on your journey to success. By investing energy in working hard and being disciplined, it increases one's confidence and improves overall personality. It brings out the best in us thus bringing us a step closer towards achieving success.

Hence, Self-discipline and hard work both play a vital role in success.

B3: Now teacher shall divide students into groups and conduct a debate on the following topics.

- Is it better to study last minute before the exams or study consistently?

V.C Assignments

C1: Case Study of the life journey of Sachin Tendulkar, Mahendra Dhoni, Virat Koli, PV Sindhu, Saina Nehwal… Students can choose any one personality of their choice in any field. Ask them to give a presentation as per time.

Resources

References:

1.Ncert Textbook, Reference books,(R.D Sharma , R.S.Aggarwal)

2. https://motivationgrid.com/hard-work-is-the-key-to-success/

3. Links given under the respective activities

Unit 6

Topic	Values / Life skills integrated & imbibed	Activities
Lines & Angles	**Core Values considered :** Inter-connectedness & Inter-relationship **Other Sub-Values:** inter-dependence, happiness, discipline, teamwork. **Life skills:** drawing, accuracy, observation, logical reasoning.	**Value integration Activities:-** 1. Discussion & worksheets teacher revise students previous knowledge 2. Video & discussion to show the inter connectedness between nature and human beings 3.Revision of values learned in std VIII while learning lines& angles , give some more examples of Inter-connectedness/inter-dependence. 4.Group discussion & presentation in the class on the assigned topic 3.Assignment Prepare/research an example of how things are interdependent/Interconnected, how situations in different regions/countries/ individuals have an impact on you.

Materials / Resources needed

Value Integration:-

1. Facilities and Equipment to show videos
2. BB, Pen
3. Ncert Text Book, Reference books,(R.D Sharma , R.S. Aggarwal)
4. Worksheets for conducting context activity

Description (of the points of discussion)

Value Integration:-

In this chapter the activities and games are incorporated in such a manner that children learn the relationship of figures and objects to the space around them. Lines are a series of points that continue in both directions. When two lines lie on a two dimensional or flat surface, they are either parallel or they intersect. Parallel lines never meet or intersect. They remain equal distance apart no matter how far they are extended. Intersecting lines share a common point, or vertex, where they cross, this forms angles. When two lines intersect they are many cases of formation of angles like perpendicular, complimentary, supplementary, vertically opposite etc.

Though this lesson the teacher shall explain to students the importance of inter connectedness and interrelationships and its significance in life.

The key discussions are:

1. By Discussion & worksheets teacher revise students previous knowledge

2.By showing a small video & discussion teacher show the inter connectedness between nature and human beings

3.Teacher revise the values learned in std VIII (lines& angles) regarding the inter connectedness. Then give some more examples to instil the significance of Inter-connectedness/inter-dependence.

4.Group discussion & presentation in the class on the assigned topic

5.Assignment

Prepare/research an example of how things are interdependent/Interconnected, how situations in different regions/countries/ individuals have an impact on you.

Grade IX No: of Periods – 8Hrs

Unit-6

Triangles

Harmony (Unity & Diversity) Stability & Aesthetics

I. Introduction

Triangle is one of the most recognized geometric shapes. This chapter describes study about those figures which have the same shape but not necessarily the same size are called similar figures, it is discussed in detail about the similarity of triangles, rules of similarity, application of similarity to prove theorems & properties. In the real world the principles of similarity of triangles/other shapes are used in construction when we need to reinforce structures so that they are strong and stable, and do not bend or buckle in strong winds or when under load.

While learning application of principles of similarity and triangles students realise the importance of Harmony (Unity & Diversity) Stability & Aesthetics in real life. Through the lesson of congruence of triangles, students understand the importance of how people from diverse backgrounds can come together to create value, this unity can be achieved by playing to the strengths of this cohort of diverse people and creating a harmonious community. Such a community provides its members a feeling of togetherness and belonging that promotes individual's happiness and fulfilment.

II. Learning Objectives / Outcomes

Through this unit, the students will achieve the following grade appropriate academic and value based goals:

- Distinguish between congruency and similarity and understand the concept of similar figures
- Compute the angles and ratio of sides of polygons/triangles and determine their similarity.
- Apply basic proportionality theorem and its converse and determine the ratio of sides in the given triangle(s)
- Apply various criteria of similarity and prove whether given triangles are similar or not
- Show similarity of triangles and solve real life problems. Compute the square of the ratio of the corresponding sides of triangles and find the area of similar triangles.

- Compute the area of similar triangles and find the relation between their sides, medians, mid points of the triangles
- Apply the theorem that if a perpendicular is drawn from the vertex of the right angle of a right triangle to the hypotenuse then triangles on both sides of the perpendicular are similar to the whole triangle and prove Pythagoras Theorem.
- Prove Pythagoras theorem and its converse and solve real life problems
- Apply Pythagoras theorem and its converse and determine that whether a given triangle is a right-angled triangle or not
- Application of principles of similarity& congruence teaches to sustain Harmony (Unity& Diversity) Stability & Aesthetics in real life.

III. Process & Action Plan

Triangles possess a number of key advantages that make them ideal for both architects and curious students: these shapes are incredibly common, structurally sound, and easy to apply and use in everyday life. We can find numerous examples where principle of similarity in objects is applied in daily life situations. Students should be made to understand how to maintain harmony and stability in life. Through these lesson students able to appreciate the aesthetics & beauty of different circumstances of life .One of the most important goals you may have as a teacher is the character education of the students using the academic content at hand.

The values and life skills integration within this unit may follow the following process and action plan, as depicted in the flow chart on next page:

A.
Introduce the **context** activity:
Discussion & Work sheets Ref-A1, A2

B. Carry out the varied **activities** in class (given below) in the sequence specified.

1.
Stability & Aesthetics
Explanation, Demonstration, Group Discussion & presentation.
Ref-B1

2.
Harmony (Unity& Diversity)
Explanation & Group discussion on the given Topic & presentation.
Ref-B2

C. Aid generalization of the concepts learnt, through **assignments** (given below).

1.
Planning & organising an event for the class.
Ref-C1

While it would be ideal to expose the students to all the activities as given, and the discussion that would ensue, you may choose as per your convenience and availability of time, the activities that would be relevant to the content being taught and/or suited to the cognitive and emotional maturity of the students.

This topic incorporates the *core approach* – Knowing, Understanding, Valuing and Acting the values embedded in the topic.

The *core values* being considered are *Harmony (Unity& Diversity) Stability & Aesthetics* along with other sub-values like *stability, confidence, and teamwork, precision, accuracy, discipline, strength*

The unit also provides the scope to develop the following life skills in the students: *drawing, observation, thinking, problem solving, and critical thinking, drawing & observation*

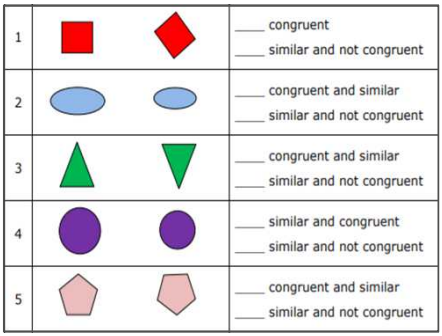
IV. Activities & Related Discussion

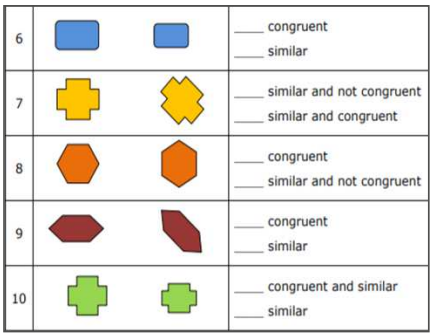
A: The context Activity for the teacher to Start

Through the lesson of congruence of triangles, students understand the importance of how people from diverse backgrounds can come together to create value, this unity can be achieved by playing to the strengths of this cohort of diverse people and creating a harmonious community.

A1: Identify the congruent figures& similar figures

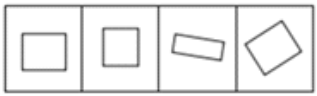
Teacher shall give some worksheets to students to solve in the class to make them understand the concept of similarity & congruence.





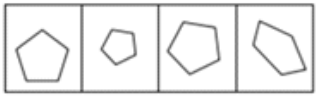
A2: Circle the figure that is congruent to the first figure in the series

1.



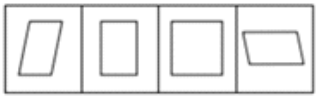
2.

3.



4.

5.



https://www.easyteacherworksheets.com/math/geometry-congruency.html

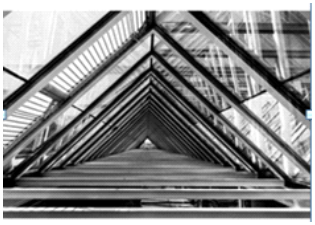
A3: Discussion Activity:

Once students understand the concept ask students regarding worksheets. Could they learn any value from this exercise? Provide them some clues so that teacher can elicit from them (beauty, precision, diversity, unity…) Guide the students to understand the beauty and importance of harmony in same shapes and different shapes.

Just like congruence and similarity bring harmony, beauty & stability in structures. Include discussion about harmony with nature too. Talk to students about harmony in relationships like accepting differences and co-existing with everyone, which give stability and beauty in life.

B. Value Based Activity:

B1: Teacher shall discuss/demonstrate about the application of similarity in real life by using the principle of similar triangles/other geometrical figures in architecture buildings are very stable strong and with aesthetics beauty. Teacher shall show few examples either by pictures or by presentation.



Picture courtesy: https://line.17qq.com/articles/glnnmlndv.html

Teacher shall divide the class into groups and ask students to do a research and find out more structures where the principle of similarity of triangle/other geometrical figures is used and do a presentation in the class with brief description of values learned and correlate them with real life values (Aesthetics, precision, stability, harmony). How these values can be applied in their life.

Discussion Activity:

Ask students:-

1. Have you experienced the importance of harmony and stability in building structures. Do you feel these qualities are important in one's life?
2. Could you find diversity & unity in similar & congruent structures? What did you learn from it?
3. Did you find those structures to be aesthetic? What would you like to comment on it?

Help students understand that by tapping into our strengths and support systems to overcome challenges and work through problems, it enables us to make our life harmonious, stable and beautiful.

B2: Study of similarity & difference teaches harmony (Unity& Diversity)

Teacher shall explain that understanding the principles of similarity helps to learn how to create opportunities for people to identify common ground, respect differences, and appreciate strengths.

Teacher shall divide the class into different groups and assigned the following study/discussion among the groups and present the report

Identify

1. Talents of each member of the group-(similar& different-Sports, cultural, academic)
2. Festivals & important celebration as per each member's culture, how it is celebrated and what is the message it conveys
3. Mother tongue/Language spoken by members at home

After each group's presentation teacher shall discuss with students and summarise that to live happily and harmoniously, we need to identify similarity, respect diversity and celebrate them amongst us. Your class itself is an example of harmony where there are many similarities at the same time diversities too. Teacher shall give examples of cricket & Football team where similar & diverse players are needed

V. C: Assignments

C1: Plan /organise an event for the class (Celebration/festival/exhibition/fun-fare) GroupWise by making use of similarities and differences of each member.

Resources

References:

1. Ncert Textbook, Reference books,(R.D Sharma , R.S.Aggarwal)
2. Links given under the respective activities

Unit 7

Topic	Values / Life skills integrated & imbibed	Activities
Triangles	**Core Values considered :** Strength, Ethicality & Aesthetic **Other Sub-**precision, accuracy, discipline. **Life skills:** problem solving, logical reasoning and abstract thinking, observation & drawing.	**Value integration Activities:-** 1.Solution of different worksheets in the class room to previous knowledge 2 Discussion , demonstration and case study to inculcate ethicality, strength and beauty in ones character. 3. Discussion& explanation and usage of right quotes to instil how congruency behaviour shapes the character of personality. 4.Assignment: 1.Prepare a collection of constructions of buildings or beautiful structures where congruence of triangle principle is applied.

Materials / Resources needed

Value Integration:-

1. Facilities and Equipment to show videos.
2. NCERT Text books, reference books (R.D.Sharma, R.S Agarwal)
3. Pen, board, Duster.
4. Work sheets to conduct Context Activity& pictures to demonstrate Value based activity.

Description (of the points of discussion)

Value Integration:-

In this chapter the activities are incorporated to encourage students to learn the Application of congruent triangles in the real world are seen in construction where we need to reinforce structures so that they are strong and stable, and do not bend or buckle under duress from strong winds or when under load.

Similarly, when we apply the same principles to one's life, we observe that one who is steadfast in his decision and actions is not affected by someone who lives with congruency does not external pressure to affect change. People who withstand such forces and stick by their actions have strong character that exhibits ethics and radiates beauty that is truly appreciated at the highest level. Through this lesson students understand the importance of strength in the face of adversity, being ethical in one's actions and the aesthetics that such a strong character radiates, inspiring people around them.

The key discussions are:

1.By solving different worksheets teacher shall revise their knowledge regarding triangle and its properties

2.By discussion, demonstration of examples and by giving case study teacher elicit the application of congruence of triangle and thereby inculcate ethicality, strength and beauty in ones character.

3.By discussion& explanation and by using right quotes teacher inculcate the significance of congruency and how it shapes the quality of one's life

4.Assignment:

1.Prepare a collection of constructions of buildings or beautiful structures where congruence of triangle principle is applied.

Grade IX No: of Periods – 8Hrs

Unit-7

Coordinate Geometry

Interdependence & Compassion

I. Introduction

Coordinate geometry is an important branch of mathematics. It is a system of geometry where the position of points on the plane is described using an ordered pair of numbers. Coordinate Geometry involves the use of algebraic processes in the study of geometric problems and the geometric interpretation of algebraic equations. It helps to find solutions in many areas and in different applications which we normal see in our everyday life.

Coordinate geometry is widely applied in various fields such as physics, engineering, navigation, seismology and art. Through this lesson we understand the importance of Co-ordinate geometry in defining relationships and providing guidance. Teacher can emphasize the importance of values such as interdependence & compassion among students. This topic also teaches students the importance of developing interpersonal skills to communicate and understand others needs in a better manner.

II. Learning Objectives / Outcomes

Through this unit, the students will achieve the following grade appropriate academic and value based goals:

- Identify x and y coordinate and plot points on the graph.
- Apply and derive distance formula and determine the distance between two coordinates on the graph and solve various mathematical and real-life problems graphically
- Apply and derive section formula and divide the line segment in a given ratio and determine the vertices /diagonals /mid points of given geometrical shapes.
- Apply and derive the formula of area of triangle geometrically and determine the area of quadrilateral /triangle
- Develop inter-dependence and compassion.

III. Process & Action Plan

Coordinates serve as the bridge between algebra and geometry. It is a bridge with two-way traffic; also by means of coordinates, geometric problems may be given its algebraic form. The coordinates x and y are dependent on each other to locate a position. Therefore teacher can relate this and make students aware of the significance of interdependence & compassion to lead successful life. This chapter gives the teacher an opportunity to explain benefits of interdependence and compassion.

Teacher reiterates to students that the application of coordinate geometry gives many benefits to humanity. Use of the interdependence of coordinates X and Y was Descartes's great contribution to mathematics, which revolutionized the study of geometry. It is used in astrophysics (say calculation of distance between two celestial bodies), geography, and architecture (how would you accurately represent relative distance between and sizes of multiple objects unless you have a frame of reference).

The values and life skills integration within this unit may follow the following process and action plan, as depicted in the flow chart on next page:

A.
Introduce the **context** activity:
Discussion & Work sheets .Ref-A1

B. Carry out the varied **activities** in class (given below) in the sequence specified.

1.
Interdependence & Compassion
Explanation, Discussion, video and assignment of activities group wise to instill values.
Ref-B1 & B2

C. Aid generalization of the concepts learnt, through **assignments** (given below).

1.
Undertaking class for less privileged children of lower classes.
Ref-C1

While it would be ideal to expose the students to all the activities as given, and the discussion that would ensue, you may choose as per your convenience and availability of time, the activities that would be relevant to the content being taught and/or suited to the cognitive and emotional maturity of the students.

This topic incorporates the *core approach* – Knowing, Understanding, Valuing and Acting the values embedded in the topic.

The *core values* being considered are *Interdependence and Compassion* along with other sub-values like *kindness, empathy, and sharing.*

The unit also provides the scope to develop the following life skills in the students: *drawing, observation, thinking, problem solving, and critical thinking, drawing*

IV. Activities & Related Discussion

Coordinate geometry is widely applied in various fields such as physics, engineering, navigation, seismology and art. Through this lesson we understand the importance of Co-ordinate geometry in defining relationships and providing guidance.

A: The context Activity for the teacher to Start

Teacher gives worksheets to solve in the class to test previous knowledge of students in academics and thereby demonstrate the interdependence of coordinates

A1: Answer the following:

1. If the coordinates of a point are (0, -4), then it lies in:

a) X-axis b) Y-axis c) At origin
d) Between x-axis and y-axis

2. If the coordinates of a point are (3, 0), then it lies in:

a) X-axis b) Y-axis c) At origin
d) Between x-axis and y-axis

3.If the coordinates of a point are (-3,-4), then it lies in:

a) First quadrant b) Second quadrant c) Third quadrant d) Fourth quadrant

4. If x coordinate of a point is zero, then the point lies on:

a) First quadrant b) Second quadrant c) X-axis d) Y-axis

5.The point whose ordinate is 8 and lies on y-axis:

a) (0, 8) b) (8, 0) c) (5, 8) d) (8, 5)

6. If the coordinates of the two points are P (–7, 5) and Q (–6, 9), then (abscissa of P) – (abscissa of Q) is

a) –3 b) 1 c) –2 d) –1

7. The coordinates of any point on the y-axis are of the form (0, k), where |k| is the distance of the point from the:

a) y-axis b) x-axis c) (0, 1) d) (1, 0)

8. Find the coordinates of the point

i. which lies on both x and y-axis.

ii. whose abscissa is 5 and lies on x-axis.

iii. whose ordinate is -4 and lies on y-axis.

9. Find the perpendicular distance of the point P (5, 7) from the y-axis

10. Write the coordinates of a point on x-axis at a distance of 6 units from the origin in the positive direction of x-axis

https://www.ncertbooks.guru/mcq-questions-for-class-9-maths-chapter-3-with-answers/

Discussion Activity:

1. While solving the worksheet could you find any relation between x coordinate and y coordinate? Are they interdependent?
2. Similarly have you ever experienced you are dependent on anybody for aything (at home, at school, while playing…)
3. Do you feel the need to help others who are not as fortunate as you?
4. What is your opinion about being dependent on each other?

Guide & explain students that helping others and accepting help from others is okay and are signs of a strong community, it teaches people what it means to be human.

B. Value Based Activity:

B1: Discussion Activity:

Teacher shall discuss with students in coordinate geometry

1. How the coordinates are interdependent/interconnected to each other. To plot or to locate a position, to find the distance between two points, and find the area of triangle
2. Is it possible without x-coordinate and y coordinate together,

Teacher explains it is applicable in real life too. If we are interconnected /interrelated and help communicate well with each other it will help us achieve fulfillment and happiness.

https://www.youtube.com/watch?v=mTsvSAItPqA

Teacher shall show this video of compassion & integrity to students and discuss with them. Ask them 1. What did they feel while seeing the video?
2. Did any thoughts come to your mind?
3. Did any instance highlighted in the video bring any memories where you could have acted differently, or people could have treated you in nicer manner?

Play the video again but pause at all important points to engage in deeper reflection and discussion.

B2: Teacher shall divide students into groups and assign the following activity.

1. Make a plan in coordination with team to keep school always clean by students for students
2. Prepare an awareness program and execute the same for lower class students to save energy
3. Organise a blood donation camp in school in coordination with faculty and team members.

This lesson encourages students "the purpose of life is not to be happy, it is to be useful, to be honourable.to be compassionate, to have it make some difference that you have lived and lived well "(Ralph Waldo Emerson).

V. C: Assignments

C1: Ask Students to identify topics (Mathematics/English) in consultation with class teacher and teach the children who are less privileged (such as peons' children or your housemaids children or adopt a school who has under privileged students) after school hrs. or every Saturday

Resources

References:

1. NCERT Textbook, Reference books,(R.D Sharma , R.S.Aggarwal)
2. Links given under the respective activities

Unit 8

Topic	Values / Life skills integrated & imbibed	Activities
Quadrilaterals	**Core Values considered :** Stability, Aesthetics and Diversity **Other Sub-Values:** like teamwork, curiosity, inter-connectedness, inter-relationship. **Life skills:** observation, thinking, problem solving.	**Value integration Activities:-** 1 Discussion and by solving work sheets to revise previous knowledge of students regarding quadrilaterals. 2. Demonstration of pictures and discussions to encourages & guides students to find the real world applications to nurture healthy relationships and build sustainable connections with people from diverse back grounds 3. Group discussion& presentation in class by assigning tasks to different groups to inculcate team work, interconnectedness, inclusivity& diversity 4. Assignment: Do a research Study where Quadrilaterals & Triangles or its applications are used in real life and submit report.

Materials / Resources needed

Value Integration:-

1. Worksheets to conduct context activity for the teacher
2. Facilities and Equipment to show videos & conducting games
3. BB, Pen
4. Ncert Text Book, Reference books,(R.D Sharma , R.S.Aggarwal)
5. Pictures for demonstration for value based activity

Description (of the points of discussion)

Value Integration:-

In this chapter the activities and games are incorporated in such a manner that children learn that each quadrilateral is unique and different in its own way; however, they are independent with their own set of properties and purposes. Comparing the same with life, we see that it is important to build relationships with diverse sets of people, because they bring a unique mind-set and perspective towards life that one can always learn from, thereby enhancing the stability of the relationship. By inculcating the value of inclusivity in one's life, one ensures to have a harmonious and stable relationship with the community.

Nurturing values such as inclusivity in one's personality helps in building an appealing and aesthetic character that is attracts others to you.

The key discussions are:

1 By discussion and by solving work sheets teacher shall revise previous knowledge of students regarding quadrilaterals.

2. By demonstration of pictures and discussions teacher encourages & guides students to find the real world applications & how it is connecting and relating with real life and teach them to nurture healthy relationships and build sustainable connections with people from diverse back grounds.

3. By conducting a group discussion& presentation in class by assigning tasks to different groups teacher inculcate team work, interconnectedness, inclusivity& diversity

5. Assignment:

Do a research Study where Quadrilaterals & Triangles or its applications are used in real life and submit report

Grade X No: of Periods – 10Hrs

Unit-8

Introduction to Trigonometry

Creativity& Innovation

I. Introduction

Trigonometry is the study of triangles. It deals with the relationships between angles and sides in triangles. It helps students to have a better understanding of the world because many of the earth's natural structures resemble triangles. This chapter deals with the study ratios of the sides of a right triangle with respect to its acute angles, called trigonometric ratios of the angle.

Through this lesson, students learn the values of creativity, innovation and entrepreneurship. Trigonometry is the tool that has allowed humans to explore their creativity and build innovative technologies to push the frontier of science. It is a core nature of humans to adapt and use the tools at hand to solve problems that they face, but to do so and build solutions for complex problems that affects the society at large requires immense creativity, innovation and the undeterred spirit of an entrepreneur. These traits once internalized can propel a human to overcome any challenge and become a leader of change. Trigonometry integrates memorisation, conceptual understanding and problem-solving ability.

II. Learning Objectives / Outcomes

Through this unit, the students will achieve the following grade appropriate academic and value based goals:

- Describe trigonometry and study the relationship between side and angle of a triangle
- Define and distinguish various trigonometric ratios and describe and verify sine, cosine, tangent, cosecant, secant, cotangent of an angle
- Use given trigonometric ratio(s) and find and verify other trigonometric ratios /angles of the triangle
- Compute the trigonometric ratio 0^0, 30^0, 45^0, 60^0 and 90^0 and use these for different angles
- Compute the trigonometric ratio of complimentary angles and apply the values in solving contextual problems

- Compute and apply trigonometric identities and simplify and solve mathematical problems.
- Learn the values of creativity & innovation

III. Process & Action Plan

Creativity & innovation are the two most important qualities children need to possess or acquire in the present scenario which will help not only them personally but to the world at large. Teacher shall make aware to students that because of the creativity, innovation& Entrepreneurship of many people we are enjoying many facilities today. The earliest known work on trigonometry was recorded in Egypt and Babylon. Early astronomers used it to find out the distances of the stars and planets from the Earth. Even today, most of the technologically advanced methods used in Engineering and Physical Sciences are based on trigonometrical concepts. These ratios are often used in calculus as well as many branches of science including physics, engineering, and astronomy.

The values and life skills integration within this unit may follow the following process and action plan, as depicted in the flow chart on next page:

A.
Introduce the **context** activity:
Discussion & worksheets. Ref A1 & A2

B. Carry out the varied **activities** in class (given below) in the sequence specified.

1.
Creativity, Innovation
Explanation and Group discussion& presentation on the assigned topic.
Ref-B1

2.
Innovation and entrepreneurship
Debate on the assigned topic.
Ref-B2

C. Aid generalization of the concepts learnt, through **assignments** (given below).

1.
Report on the application of trigonometric ratios on the topic of their choice.
Ref-C1

While it would be ideal to expose the students to all the activities as given, and the discussion that would ensue, you may choose as per your convenience and availability of time, the activities that would be relevant to the content being taught and/or suited to the cognitive and emotional maturity of the students.

This topic incorporates the *core approach* – Knowing, Understanding, Valuing and Acting the values embedded in the topic.

The *core values* being considered are *Creativity& Innovation* along with other sub-values like *imagination, curiosity*

The unit also provides the scope to develop the following life skills in the students: *memorisation, problem solving, observation, critical thinking, and logical thinking*

IV. Activities & Related Discussion

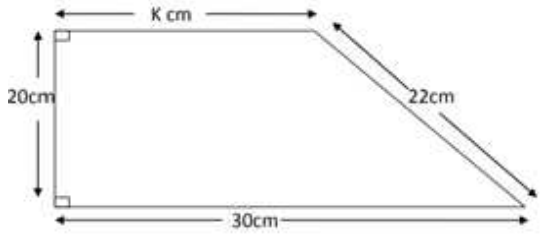
A: The context activity for the Teacher to start:

This chapter deals with the study ratios of the sides of a right triangle with respect to its acute angles, called trigonometric ratios of the angle. Through this lesson, students learn the values of creativity, innovation and entrepreneurship. Trigonometry is the tool that has allowed humans to explore their creativity and build innovative technologies to push the frontier of science.

Teacher shall revise their previous knowledge by giving worksheet which will help them to use their creativity & innovation. Teacher can introduce some creative and thought-provoking worksheet where students shall apply their innovation& creativity

A1: Student will continue to explore the use of Pythagoras to solve real life problems and they will be asked to use Pythagoras theorem to solve the following real-life scenario: You're locked out of your house and the only open window is on the second floor, 25 feet above the ground. You need to borrow a ladder from one of your neighbours. There's a bush along the edge of the house, so you'll have to place the ladder 10 feet from the house. What length of ladder do you need to reach the window?

A2: Use Pythagoras' theorem to find the value of k to one decimal place



http://mrsyostmathsyr9.weebly.com/

B: Value Based Activities:

B1:Teacher and student will discuss both group and individual activities.

Teacher discusses with students and gives an idea of some fields where application of trigonometry is used so that students can do a detailed study. A member of each group will be given the opportunity to share the group's study and the findings with the rest of the class. The teacher will take note of any error in reasoning and computation and make necessary corrections.

Trigonometry in Daily Life:

1. Mechanical structure of a building or a bridge. The blue print of its plan involves lot of trigonometric concepts where the necessary measurements are done. Trigonometry makes it possible to determine unknown angles and sides.

2. Music production: while conducting sound waves, the trigonometric identities sine and cosine come into play, where the basic laws of sine and cosine have to be applied

3. Architecture: Architects use trigonometry to describe the shapes and forms of a numerical equations. These equations are translated easily by any contractor to reproduce the exact building the architect had in mind. They use trigonometry to calculate structural load, roof slopes ground surfaces and many other aspects, including sun shading and light angles.

4. Astronomy: Trigonometry was used in astronomy since ancient time. It is used to measure the distance to nearby stars. In 240 B.C, a mathematician named Eratosthenes discovered the radius of earth using trigonometry and geometry.

5. Navigation & Oceanography: It is used in navigation to find the distance of the shore from a point in the sea and calculating the height of tides in oceans

Ref:https://www.topperlearning.com/blog/importance-of-trigonometry-and-its-applications-8919

Post group discussion, teacher can summarise that using trigonometry humans have innovated and developed some mind-boggling inventions that have allowed humanity to explore avenues that have were not considered as possible.

B2: Guide Students to have debate on the topic given below or any other topic of teacher's choice that help them to think & explore more. The aim of this debate is to encourage students to think more and apply their creativity to bring a change in the education system as per their views.

How can the education system empower students with an innovation mind-set and an entrepreneurial spirit?

Teacher summarized innovations and creativity applied by many mathematicians in trigonometry. It has brought unprecedented changes which made human life comfortable. This teaches us an important lesson. Everyone has same resources but how it is applying and using it judiciously & sensibly. Thinking out of the box is a virtue teacher shall to inculcate in students which will improve their creativity& innovation.

V. Assignments

C1: Ask students to prepare a detailed study on the application of trigonometry in the field of their choice, explain the innovation and creativity applied and how it is changed the life of human beings.

Resources

References:

1. Ncert Textbook, Reference books,(R.D Sharma , R.S.Aggarwal)

2. Links given under the respective activities

Unit 9

Topic	Values / Life skills integrated & imbibed	Activities
Areas of Parallelograms and Triangles	**Core Values considered :** Sturdiness, Aesthetics, Curiosity & Team Work **Other Sub Values:** confidence, trust, courage, aesthetics, sturdiness, stability **Life skills:** Critical thinking, observation, problem solving, logical reasoning, and abstract thinking.	**Value integration Activities:-** 1 Discussion ,crossword puzzles worksheets to revise the previous knowledge of students 2. Demonstration& explanation to show of how Parallelograms & triangles give stability, sturdiness, aesthetic value in construction of buildings/Monuments 3. Case study ,group discussion & presentation of the application of parellogram & triangles in real life. 4. Assignment: Prepare a dream house/school plan group wise by using quadrilaterals and triangles and other geometrical shapes

Materials / Resources needed

Value Integration:-

1. Work sheet for the context activity& pictures for value based activity
2. Facilities and Equipment to show videos& presentation
3. BB, Pen
4. Ncert Text Book, Reference books,(R.D Sharma , R.S.Aggarwal)

Description (of the points of discussion)

Value Integration:-

In this chapter the activities are incorporated in such a manner that helps students to realise that Parallelograms and triangles and its combination are effective tools for architecture and are used in the design of buildings and other structures as they provide necessary rigidity, strength and stability. While learning this chapter students develop curiosity, confidence, trust & teamwork, also to appreciate aesthetics & beauty in everything around them.

The key discussions are:

1.By discussion & crossword puzzles worksheets ,teacher shall revise the previous knowledge of students

2. By demonstration& explanation teacher show of how Parallelograms & triangles give stability, sturdiness, aesthetic value in construction of buildings/Monuments

3. Case study ,group discussion & presentation of the application of parellogram & triangles in real life. which will help them to develop team work, confidence & curiosity.

4. Assignment:

Prepare a dream house/school plan group wise by using quadrilaterals and triangles and other geometrical shapes

Grade X No: of Periods – 23Hrs

Unit-9

Some Applications of Trigonometry

Vision, Direction and Ambition

I. Introduction

This chapter **Applications of trigonometry** is the extension of chapter 8 **Introduction to trigonometry** where it was discussed about trigonometric ratios. Through the applications of trigonometry, students understand real world examples of how trigonometry was applied to develop solutions.

This lesson helps students understand that no matter how difficult the challenge may seem, it can always be overcome with clear vision, direction and the ambition to achieve excellence. By inculcating these values in oneself, students empower themselves with the winning mind-set and the courage to meet any obstacle head on.

II. Learning Objectives / Outcomes

Through this unit, the students will achieve the following grade appropriate academic and value based goals:

- Identify line of sight and determine angle of elevation and angle of depression
- Apply trigonometric ratios (of specific angles) and determine heights and distances of the objects in the real-life context.
- Helps to understand that no matter how difficult the challenge may seem, it can always be overcome with **clear vision, direction and the ambition** to achieve excellence. By inculcating these values in oneself, students empower themselves the winning mind-set and the courage to meet any obstacle head on.

III. Process & Action Plan

Trigonometry is a study of the relationship of angles, lengths and heights. It is a typical example where Vision, Direction and Ambition brought huge success and progress in every field of life. Now it has spread its applications into wider fields like engineering, physics, surveying, architecture, astronomy and even in the investigation of a crime scene. Apart from astronomy and geography, trigonometry is applicable in various fields like satellite navigation, developing computer music, chemistry number theory, medical imaging, electronics, electrical engineering, civil engineering, architecture, mechanical engineering, oceanography, seismology, phonetics, image compression and game development

The values and life skills integration within this unit may follow the following process and action plan, as depicted in the flow chart on next page:

A.
Introduce the **context** activity:
Discussion & worksheet. Ref- A1

B. Carry out the varied **activities** in class (given below) in the sequence specified.

1.
Vision, Direction and Ambition
Discussion & Explanation about application.
Ref-B1

2.
Vision, Direction and Ambition
Preparation of Vision Statement:
Discussion/ Report.
Ref-B2

C. Aid generalization of the concepts learnt, through **assignments** (given below).

1.
Prepare vision statement for self.
Ref-C1

While it would be ideal to expose the students to all the activities as given, and the discussion that would ensue, you may choose as per your convenience and availability of time, the activities that would be relevant to the content being taught and/or suited to the cognitive and emotional maturity of the students.

This topic incorporates the *core approach* – Knowing, Understanding, Valuing and Acting the values embedded in the topic.

The *core values* being considered are *Vision, Direction and Ambition* along with other sub-values like *courage, curiosity, creativity, innovation*

The unit also provides the scope to develop the following life skills in the students: *imagination, observation, problem solving, logical and critical thinking*

IV. Activities & Related Discussion

A: The context Activity for the teacher to start:

Through the applications of trigonometry, students understand real world examples of how trigonometry was applied to develop solutions. This lesson helps students understand that no matter how difficult the challenge may seem, it can always be overcome with clear vision, direction and the ambition to achieve excellence.

A1: Solve the following crossword puzzle

Teacher provides a worksheet to solve in the class which will give them to revise the academic concepts and at the same time give a direction & vision for the new chapter.

Across

6. the other two sides
7. trig ratio, opposite over adjacent
10. trig ratio, adjacent over hypotenuse
11. across from the theta angle
12. is a set of three integers a, b, c which form the sides of a right angled triangle
13. the side opposite the right angle is the hypotenuse
14. which says that the square of the length of the hypotenuse equals the sum of the squares of the lengths of the legs
15. is the study of the relationship of the sides and angles of a triangle

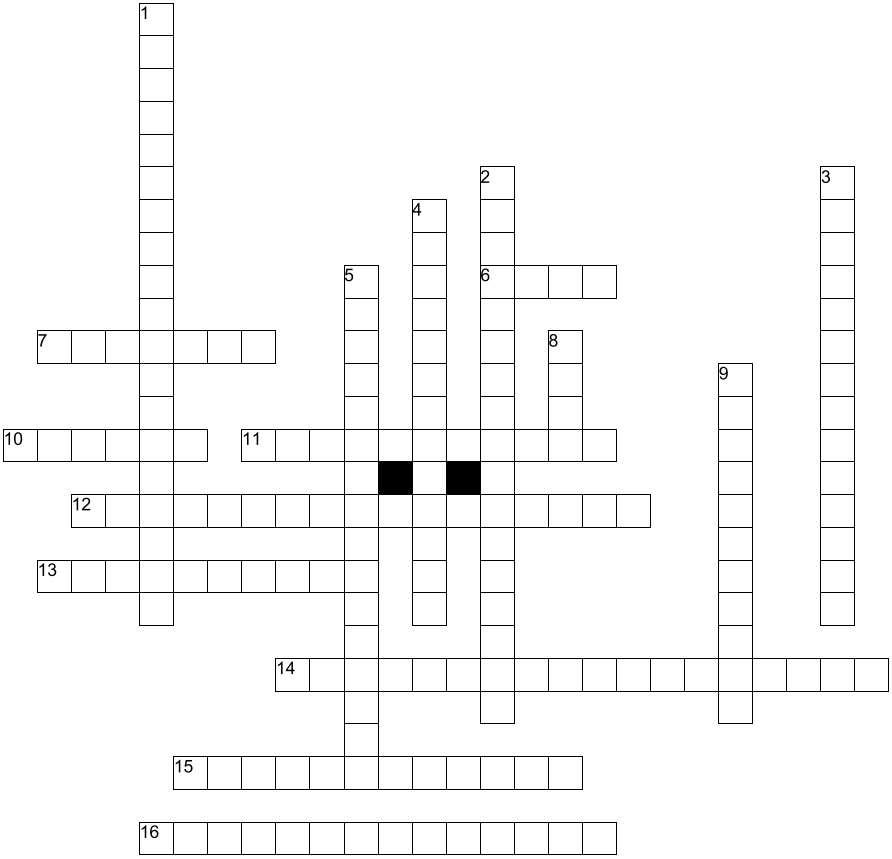
Down

1. perform the opposite operations that the sine, cosine, tangent, secant, cosecant and cotangent perform
2. angle which the plane descends
3. Special right triangle has acute angles measuring 30 and 60 degrees.
4. contains a right angle, which measures 90 degrees and two acute angles each less than 90 degrees
5. angle between a horizontal line and the line of sight to an object

16. isosceles right triangles sometimes referred as, acute angles are equal

above the horizontal line

8. trig ratios, opposite over hypotenuse
9. is adjacent next to the theta angle



Ref: https://wordmint.com/public_puzzles/1241081

Discussion:

Teacher shall discuss with students and explain that when we do anything in life, we need to have strong vision, direction & ambition in life. If you have these qualities nothing can stop you from achieving your goals.

B: Value Based Activities:

B1: Teacher shall discuss regarding the application of trigonometry in different areas paved way into many aspects of human life. This happened because of exceptional vision, suitable direction and remarkable ambition of people. The teacher can cite application of trigonometry in diverse areas and how it has brought about change in this world or teacher shall give the topic to students group wise ask them to find information about each topic, where they will focus on the force behind its vision, direction and ambition to reach the pinnacle of success.

- **Trigonometry in Aviation**

Aviation technology has evolved with many upgradations in the last few years. It has taken into account the speed, direction and distance as well as the speed and direction of the wind. The wind plays a vital role in when and how a flight will travel. This equation can be solved by using trigonometry.

For example, if an aeroplane is travelling at 250 miles per hour, 55° of the north of east and the wind blowing due to south at 19 miles per hour. This calculation will be solved using the trigonometry and find the third side of the triangle that will lead the aircraft in the right direction.

- **Trigonometry in Navigation**:

Trigonometry is used in navigating directions; it estimates in what direction to place the compass to get a straight direction. With the help of a compass and trigonometric functions in navigation, it will be easy to pinpoint a location and also to find distance as well to see the horizon.

- **Trigonometry in Criminology**

Trigonometry is even used in the investigation of a crime scene. The functions of trigonometry are helpful to calculate a trajectory of a projectile and to estimate the causes of a collision in a car accident. Further, it is used to identify how an object falls or in what angle the gun is shot

- **Trigonometry in Marine Biology**

Trigonometry is often used by marine biologists for measurements to figure out the depth of sunlight that affects algae to photosynthesis. Using the trigonometric function and mathematical models, marine biologists estimate the size of larger animals like whales and understand their behaviors.

- **Trigonometry in video games:**

Have you ever played the game, Mario? When you see him so smoothly glide over the roadblocks. He does not really jump straight along the Y axis; it is a slightly curved path or a parabolic path that he takes to tackle the obstacles on his way. Trigonometry helps Mario jump over these obstacles. As you know Gaming industry is all about IT and computers and hence Trigonometry is of equal importance for these engineers.

- **Other Uses of Trigonometry**

The calculus is based on trigonometry and algebra. The fundamental trigonometric functions like sine and cosine are used to describe the sound and light waves

- Trigonometry is used in oceanography to calculate heights of waves and tides in oceans
- It used in the creation of maps
- It is used in satellite systems

Discussion:

There are many areas in our life where application of trigonometry has taken ahead because of right vision, direction and a very strong ambition of our forefathers. The same need to be followed by students. Teacher shall discuss with students in depth. Encourage students that they all need to have great vision, right direction, strong ambition and systematic strategies to reach the vision

Ref: https://www.embibe.com/exams/real-life-applications-of-trigonometry/

B2: Vision Statement: Discussion/Report

Teacher shall instruct students to write a vision statement for themselves and define a plan of action to achieve this vision. It is to be noted that this vision should involve bringing about a change in the way the world works.

Topic: My Future: Vision and strategic plan to achieve it

Examples of vision statement

My career goal is to become a doctor working in a large hospital. I've always wanted to help people live healthy lives and cure illnesses.

I want to work with young people in the community as a social worker. My talent as an approachable person and my strong commitment to justice has inspired me to assist others who are less fortunate.

My career goal is to become the CEO of a technology company. I am driven by technology's ability to affect global communication and dedicated to providing technological solutions to empower under-represented populations.

V. C: Assignments

C1: Ask students to introspect thoroughly (strong& weak Points) and **prepare** their own vision statement and put it in their room and see every day so that it becomes their ambition and inspire them to work for achieving it.

Resources

References:

1. Ncert Textbook, Reference books,(R.D Sharma , R.S.Aggarwal)
2. Links given under the respective activities

Unit 10

Topic	Values / Life skills integrated & imbibed	Activities
Circles	**Core Values considered :** Equality **Other Sub-Values:** Harmony, unity, kindness. **Life skills:** problem solving, logical reasoning and abstract thinking.	**Value integration Activities:-** 1. Using picture of Circle teacher demonstrate its different parts, encourage students to think a life with out circles and use cross word puzzle worksheet revise the previous knowledge of students. 2. Explanation & discussion of Equality by taking the example of sun 3.Research Study and report & presentation on the assigned topic 3. Assignment: write views opinion. How can we promote equality in the world?

Materials / Resources needed

Value Integration:-

1. Picture &Puzzle work sheets, for the context activity
2. Facilities and Equipment to show videos & conducting games
3. BB, Pen
4. Ncert Text Book, Reference books,(R.D Sharma , R.S.Aggarwal)

Description (of the points of discussion)

Value Integration:-

In this chapter the activities are incorporated in such a manner that students learn importance of equality. Equality demands everyone should be treated the same regardless of differences. Equality means ensuring that every individual has an equal opportunity to make the most of their lives and talents. It is also the belief that no one should have poorer life chances because of the way they born, where they of have come from, what they believe, or whether they have a disability. Equality is unwavering and effortless respect for people regardless of their place in the world. Whether man, woman or child, equality is when all physical, mental, social, religious, political, educational professional differences are embraced.

The equality effect can appear magical. In more equal countries, human beings are generally happier and healthier, there is less crime, more creativity, more productivity.

The key discussions are:

1. Using picture of Circle teacher demonstrate its different parts , encourage students to think a life with out circles and use cross word puzzle worksheet revise the previous knowledge of students.

2.By Explanation & discussion by taking the example of sun teacher inculcate the sense of Equality among students

3.Research Study and report& presentation on the assigned topic

3. Assignment:

Write views opinion .How can we promote equality in the world?

Grade X No: of Periods – 8Hrs

Unit 10

Circles

Equality, Unity & Self control

I. Introduction

Circles are still symbolically important today they are often used to symbolize harmony and unity. For instance, take a look at the Olympic symbol. It has five interlocking rings of different colours, which represent the five major continents of the world united together in a spirit of healthy competition.

Through this lesson students learn the significance of unity, treat each other with respect and equality. Furthermore, this lesson teaches us the importance of boundaries, and self-control in maintaining peaceful and healthy relationships with yourself and the world at large.

II. Learning Objectives / Outcomes

Through this unit, the students will achieve the following grade appropriate academic and value based goals:

- Draw, identify and differentiate between secant and tangent of a circle and prove and apply various theorems related to circles.
- Prove and apply theorems related to tangent of a circle and determine number of tangents from the given point(s)
- Prove and apply theorem related to tangent of a circle and determine length of the tangent.
- Learn Unity, equality and self-control

III. Process & Action Plan

Two qualities play very crucial role in our life .One is equality and the other one is keeping good relations with everyone. At the same time keeping a balance of our mind whenever we face any situations in our life. Through Linear equations teacher shall imbibe these qualities among students. Your role as a teacher is significant, as you have the power and the means to shape the lives under your guidance. One of the most important goals you may have as a teacher, is the character education of the students using the academic content at hand.

The values and life skills integration within this unit may follow the following process and action plan, as depicted in the flow chart on next page:

A.
Introduce the **context** activity:
Discussion & Worksheet. Ref-A1

B. Carry out the varied **activities** in class (given below) in the sequence specified.

1.
Equality, Unity& Harmony
Discussion& Debate about the speech of Dr. Martin Luther King Jr.
Ref-B1

C. Aid generalization of the concepts learnt, through **assignments** (given below).

1.
Write about a leader who influenced you who worked for equality/Unity/Harmony.
Ref-C1

While it would be ideal to expose the students to all the activities as given, and the discussion that would ensue, you may choose as per your convenience and availability of time, the activities that would be relevant to the content being taught and/or suited to the cognitive and emotional maturity of the students.

This topic incorporates the *core approach* – Knowing, Understanding, Valuing and Acting the values embedded in the topic.

The *core values* being considered are *Equality, Unity & Self-control* along with other sub-values *like Harmony, unity, kindness.*

The unit also provides the scope to develop the following life skills in the students*: problem solving, logical reasoning and abstract thinking.*

IV. Activities & Related Discussion

A: The context activity for the teacher to start:

Circles are still symbolically important today they are often used to symbolize harmony and unity. Through this lesson students learn the significance of unity, treating each other with respect and equality.

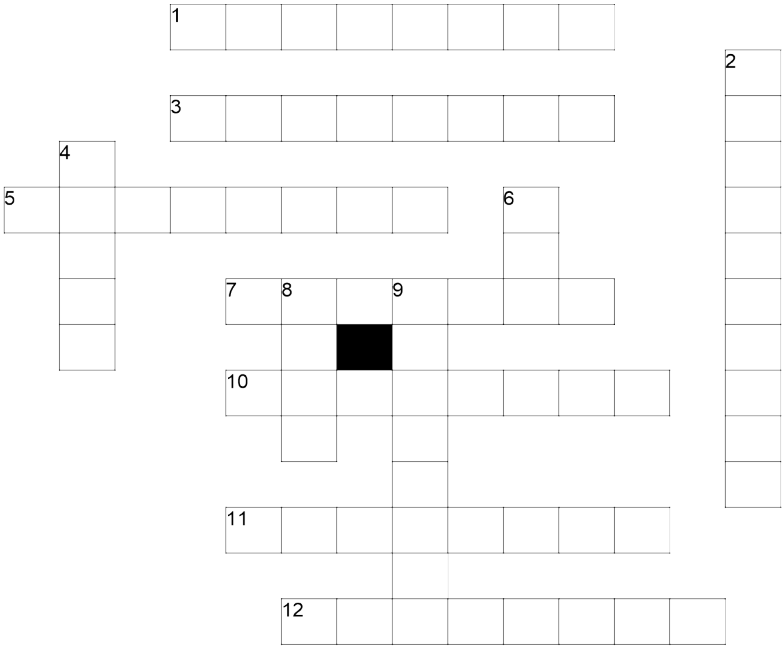
A1: Teacher provide a crossword puzzle group wise to revise their previous knowledge regarding their academic concepts and at the same time it promotes the quality of team work, sharing and respecting views of fellow students.

Across

5. a region of a circle bounded by a central angle and its corresponding arc
8. a polygon with each side tangent to a circle
9. a set of points that satisfy a given condition
10. a set of points along a circle defined by a central angle
11. a segment whose endpoints are the center of the circle and a point on the circle
13. a polygon that has every vertex of the polygon on the circle
14. circles that lie in the same plane, have the same center, and have radii of different lengths
15. a chord that contains the center

Down

1. part of the circle in the exterior of the central angle
2. the distance around a circle
3. arcs of a circle which one point in common
4. an angle whose vertex is the center of a circle and whose sides intersect the circle
6. a segment whose endpoints are on the circle
7. congruent arcs whose endpoints lie on a diameter of the circle
12. part of the circle in the interior of the central angle and has a measure less than 180



Ref: https://wordmint.com/public_puzzles/340766

Teacher shall discuss about diverse application of circles in daily life like Circular cylinders are used to print newspapers. Engineers exploit the circle's symmetrical properties as seen by the use of the circle in making watches, clocks, bicycles, cars, trains, ships, aeroplanes, radios, telephones, trolleys, wheel-barrows, air-conditioners, rockets etc. Civilization has progressed dramatically because of the invention of the circular wheel. Teacher shall highlight the characteristics of circle that make it unique from all other geometrical figures. Circle; symbolize harmony, equality & unity by all over the world because of its unique properties.

B: Value Based Activities:

B1: Dr. Martin Luther King Jr Speech – I Have a Dream: Review& Learning on Equality, unity & Harmony.

Teacher shall discuss (Show Video/Reading the speech) about the most influential speech of Dr Martin Luther King Jr and its impacts on People.(Excerpts from the famous speech)

Nearly every American and millions of people around the world are familiar with Martin Luther King Jr.'s **"I Have a Dream"** speech, yet most know little about the March on Washington at which it was delivered. The tremendous eloquence and elegant simplicity of the speech meant that many, then and now, came to associate the broader goals of the demonstration with King's compelling vision of interracial harmony—a dream of a nation that would finally live up to its founders' proclamations about the "self-evident" equality of all people, in which children would be judged "by the content of their character" rather than the color of their skin, and in which citizens would "be able to work together, to pray together, to struggle together, to go to jail together, to stand up for freedom together, knowing that we will be free one day."

https://www.youtube.com/watch?v=6dKimoybmEo 4 **min**

https://www.youtube.com/watch?v=vP4iY1TtS3s 6:45 Min

I Have a Dream: August 28, 1963, at the Lincoln Memorial, Washington D. C.

(Teacher shall ask students to listen /read the complete speech)!

http://wmasd.ss7.sharpschool.com/common/pages/UserFile.aspx?fileId=8373388

Discussion:

Once the video is shown to students/excerpts of the speech is readout and discussed Ask students to identify the value that is evident.

1. Have you ever experienced anybody illtreating you because your caste, race, gender or any other factor?
2. How did you feel at that time?
3. Do you feel the need to bring about change in our society?
4. How will you try to bring a change?

Teacher summarizes that.

In this speech Dr. Martin Luther King boldly addresses the issues of racial inequality plaguing America in the 1960s. This speech encapsulates what equality means for those who are under-represented. Through this speech students need to understand how important it is for everyone to be seen under the same light and given the same opportunities. The fight for equality is bigger that all of us, however everyone can contribute to this in their own unique way. This requires students to exhibit compassion, empathy in how they treat every individual. This is the key takeaway from this speech.

B2: Teacher shall conduct a debate on equality by dividing the class into two groups and moderate the debate. Teacher shall choose any topic on equality as per the situation and standard of the class?

Topics:

1. When attempting to create a more harmonious society, gender is a more important factor than class or income.
2. Is Investment and inequality correlated?
3. Can we eradicate the inequality caused because of digital divide? How?

After the debate teacher concludes by highlighting the significance of equality, unity in different areas of life.

V. C: Assignments

C1: Write about a leader who influenced you who worked for equality/Unity/Harmony

Resources

1. Ncert Textbook, Reference books,(R.D Sharma , R.S.Aggarwal)
2. Links given under the respective activities

Unit 11

Topic	Values / Life skills integrated & imbibed	Activities
Constructions	**Core Values considered :** Accuracy, Precision & Aesthetics **Other Sub-Values:** stability, confidence, and teamwork. **Life skills:** observation, thinking, problem solving, and critical thinking, drawing.	**Value integration Activities:-** 1Discussion in the class room and solve crossword puzzle worksheets to revise the previous knowledge of students 2. Discussion & explanation to instil the importance of accuracy& precision among students and make them aware the beauty & stability which provides to the product. 3. Group discussion and presentation activity on the assigned topics 4. Assignment: Teacher instruct students and give assignment Brief description of the application Accuracy & Precision in any monuments you have observed which has aesthetic beauty

Materials / Resources needed

Value Integration:-

1. Worksheets to conduct context activity
2. Facilities and Equipment to show videos and for conducting activities
3. BB, Pen
4. Ncert Text Book, Reference books,(R.D Sharma , R.S.Aggarwal)

Description (of the points of discussion)

Value Integration:-

In this chapter the activities and games are incorporated in such a manner that students learn that significance of beauty and precision. Anything built with precision and accuracy will be stable, beautiful and long-lasting. Architects use geometry to study and divide space as well as draft detailed building plans. Builders and engineers rely on geometric principles to create structure safely. Designers apply geometry (along with colour& scale) to make the aesthetically pleasing spaces inside. Application of geometry in design is very much essential

The key discussions are:

1.By doing discussion in the class room and by solving crossword puzzle worksheets teacher shall revise the previous knowledge of students

2.By Discussion & explanation teacher shall instil the importance of accuracy& precision among students and make them aware the beauty & stability which provides to the product.

3.By Group discussion and presentation activity on the assigned topics teacher shall inculcate how precision& accuracy is important in every walks of life

4. Assignment:

Teacher instruct students and give assignment

Brief description of the application Accuracy & Precision in any monuments you have observed which has aesthetic beauty

Grade X No: of Periods – 8Hrs

Unit-11

Constructions

Accuracy, Precision & Aesthetics

I. Introduction

The word construction in geometry has a very specific meaning: the drawing of geometric items such as lines, angles, triangles and circles accurately using only compasses and straightedge or ruler. This chapter discuss about the construction of tangents of a circle from external point, similar triangles and dividing a line segment in a given ratio.

While learning and doing constructions students learn the significance of beauty and precision. Anything built with precision and accuracy will be stable, beautiful and long-lasting.

II. Learning Objectives / Outcomes

Through this unit, the students will achieve the following grade appropriate academic and value based goals:

- Divide a line segment in a given ratio by using geometrical construction
- Construct a triangle similar to a given triangle as per a given scale factor.
- Construct a pair of tangents from an external point to a circle and justify procedures
- Learn the application of accuracy & precision in real life.

III. Process & Action Plan

This chapter gives teacher an opportunity to instil the significance of accuracy & precision among students. Children should made understand the Triangles & Circles are effective tools for architecture and are used in the design of buildings and other structures as they provide strength, stability and beauty. The triangle's use in architecture dates back more years than other common architecture shapes such as the dome, arch, cylinder, and even predates the wheel. Triangles & similar triangles are used in bridges because they evenly distribute weight without changing their proportions.

The values and life skills integration within this unit may follow the following process and action plan, as depicted in the flow chart on next page:

A.
Introduce the **context** activity:
Discussion & Work sheets .Ref-A1

B. Carry out the varied **activities** in class (given below) in the sequence specified.

1.
Accuracy& Precision
Explanation& Discussion on NASA Big Space Craft.
Ref-B1

2.
Accuracy& Precision
Group discussion on the given Topic.
Ref-B2

C. Aid generalization of the concepts learnt, through **assignments** (given below).

1.
Brief note on the importance of accuracy & precision in life.
Ref-C1

While it would be ideal to expose the students to all the activities as given, and the discussion that would ensue, you may choose as per your convenience and availability of time, the activities that would be relevant to the content being taught and/or suited to the cognitive and emotional maturity of the students.

This topic incorporates the *core approach* – Knowing, Understanding, Valuing and Acting the values embedded in the topic.

The *core values* being considered are *Accuracy, Precision & Aesthetics* along with other sub-values like *stability, confidence, and teamwork*.

The unit also provides the scope to develop the following life skills in the students: *drawing, observation, thinking, problem solving, and critical thinking, drawing.*

IV. Activities & Related Discussion

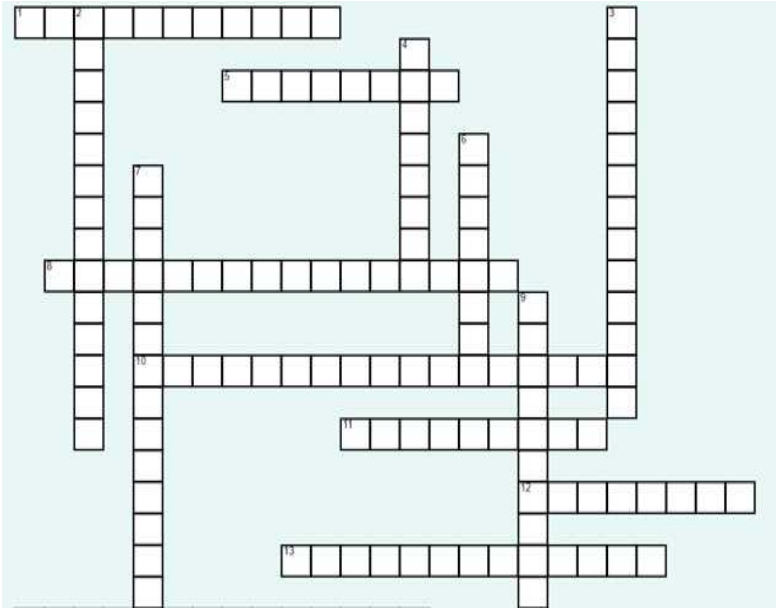
A: The context Activity for the teacher to Start

This chapter discuss about the construction of tangents of a circle from external point, similar triangles and dividing a line segment in each ratio. While learning and doing constructions students learn that anything built with precision and accuracy will be stable, beautiful and long-lasting.

Teacher shall provide students group wise to solve the crossword puzzle to revise geometry concepts studied in the previous classes and to promote teamwork and confidence among them.

1. A line that intersect two or more lines.	2.Angles that share a common side & vertex
5.A line that cuts a shape into two equal pieces	3.Two angles that add to 90 degrees
8. Angles made by a transversal. They are on the same side of the transversal and are in between the parallel lines.	4.Points on the same line
10. Angle made by a transversal, they are on opposite sides of the transversal and are inside the parallel lines	6.The middle point of a segment, cuts a segment into to equal pieces
11.Figures that are equal in size and shape	7.Angle made by a transversal, they are on opposite sides of the transversal and are outside the parallel lines

12.Two lines that never intersect in a plane	9.Angles made by a tranversal,they are in the same relative location
13.Two angles that add to 90 degrees	
14.Angles that are formed by two lines intersecting and are congruent	



https://crosswordhobbyist.com/Browse/Math/Geometry

Discussion Activity:

Teacher shall discuss with students once they complete worksheet. Ask students to identify some values they need to remember while doing construction in the class. Give them hints or clues if necessary but elicit from them (accuracy, precision & beauty/aesthetics.)

B.Value Based Activity:

Teacher shall revise the importance of accuracy & precision they have acquired while learning the chapter construction in std IX.Then teacher shall explain many other fields where accuracy & precision has applied in detail which leads stability and aesthetics.

B1: The lesson can proceed with an activity: Teacher shall divide students into teams. Each team consists of 6 members. Ask students to work in pairs. Each team can be given a task to measure different areas of school. Each team will measure three times. Or three teams can do all three tasks (Teacher shall decide how to go about it0

Activity1:- Students will measure length, breadth and calculate area of their class room (teacher can decide any part of school for accommodating more students)

Activity 2:- Students will measure the volume of water given in small bucket (teacher can accommodate more students)

Activity:3:-Students will check the pulse rate of each other

Things needed: Meter scale, measuring cylinder, Sheets for writing the observation and calculation

Once the task is done, teacher shall compare the results & discuss with students

1. All the three times is the result same?
2. If it is different what needs to be done?
3. Why always while doing experiments or activities we take minimum three tests?
4. Can you give any other examples where we do activities more than once to get accuracy?
5. What is the difference between precision and accuracy?

This activity helps students to understand the importance of accuracy and precision, also the difference between them. Through these hands on activity teacher can inculcate values in them and help them to understand the significance of accuracy & precision.

.Any mistakes can cost dearly. Similarly in life students need to understand that whatever work they do they need to give 100% to it and ensure it gets done with meticulous attention to detail. This comes into focus more so when one starts their professional career and the work that they do has an impact on the world and adds value to the same. Errors can cost companies dearly and can negatively impact one's reputation, which is all one has in the professional world. That is especially true for giant rockets designed to operate under extreme temperatures and pressures at liftoff or space stations the size of a six-bedroom house that must support people living and working in space for years.

B2: Teacher shall divide the class into groups and assigned topics for Group discussion & presentation.(Teacher shall give time for students for preparation as they need to research the topics)

Group-I: Discussion of Importance of accuracy of Time- NASA Navigation Tech Shows Timing Really Is Everything. Without accurate timekeeping, space navigation would be impossible. As NASA goes forward to the Moon with the Artemis missions, precise measurements of time are key to mission success:

Group –II: Discussion of Importance of accuracy of location - NASA Brings Accuracy to World's Global Positioning Systems.

Group-III: The Importance of Measurement Accuracy within the Metal working Industry. The metalworking industry has always placed great emphasis on having tools that can increase measurement accuracy, help with quality control, support reliability, and that can support the objective of 'making it right the first time'

Group-IV: ISRO Moon Landing: Experts believe that soft-landing operation is the most critical, complex and challenging phase of the whole chandrayaan 2 mission. To land the Vikram lander module at the predefined location requires high precision and accuracy.

V. C: Assignments

C1: Prepare a brief note on the importance of accuracy & precision in one's own life.

Resources

References:

1. Ncert Textbook, Reference books,(R.D Sharma , R.S.Aggarwal)
2. Links given under the respective activities

Unit 12

Topic	Values / Life skills integrated & imbibed	Activities
Heron's Formula	**Core Values considered :** Precision & Accuracy, Self-Discipline& Self Awareness **Other Sub-Values:** Self Control. **Life skills:** logical thinking, Problem solving, calculation& computing.	**Value integration Activities:-** 1.Worksheets to revise the previous knowledge students. 2. Discussion, explanation & by interactive method to instil accuracy & precisions play crucial role in the success of any activity. 3.Discussion & brief description of self awareness & self discipline ,and how it is leading to success. Organise a debate on the assigned topic to instil self discipline. 4. Narrate a story from Ramayana and discussion on Self discipline& awareness 4.Assignment: 1:Prepare the advantages of self-awareness & self-Discipline in every walks of life

Materials / Resources needed

Value Integration:-

1. Worksheet to conduct context activity
2. BB, Pen, scissor, colour pencils.
3. Facilities and Equipment to show videos & presentations
4. NCERT Text books, reference books (R. D. Sharma, R.S Agarwal) pen, board, Duster.

Description (of the points of discussion)

Value Integration:-

In this chapter the activities incorporated in such a way that students learn the importance of discipline along with precision & accuracy. If the calculations are not accurate & precise then there will be always problem in every field or activities. At the same time, area is the space occupied by any substance. Only available space can be occupied. There is always limitations & controls. Therefore, it is imperative that one should know capacity & potential about oneself. They learn self-discipline & self-awareness because if we do not take care of limitations and parameters then it can lead to errors.

The key discussions are:

1.By using Worksheets teacher revise the previous knowledge students.

2.By discussion, explanation & by interactive method teacher elicit from students the instances where accuracy & precisions play crucial role in the success of any activity.

3.By discussion & brief description teacher narrate the importance of self awareness & self discipline ,and how it is leading to success. Organise a debate on the assigned topic to instil self discipline.

4.Teacher shall narrate a story from Ramayana and discuss with them to inculcate self awareness in them An understanding of the self allows students to develop one's character and help in creating healthy, happy people with a drive to achieve

5.Assignment:

1:Prepare the advantages of self-awareness & self-Discipline in every walks of life

Grade X No: of Periods – 12Hrs

Unit-12

Area Related to Circles

Accuracy, Precision, self-awareness, Self-discipline

I. Introduction

This chapter review the concepts of perimeter (circumference) and area of a circle and apply this knowledge in finding the areas of two special 'parts' of a circular region (or briefly of a circle) known as sector and segment. It also discusses how to find the areas of some combinations of plane figures involving circles or their parts.

If the calculations are not accurate & precise then there will be always problem in every field or activities. Through this lesson the teacher shall inculcate in students that they should always set a boundary and space for them. Boundary means a control and discipline in every walk of their life and the space, the amount of surface in a closed figure means one should know about oneself, i.e. self-awareness. Therefore, students learn self-discipline & self-awareness as they do not take care of limitations and parameters then it can lead to errors.

II. Learning Objectives / Outcomes

Through this unit, the students will achieve the following grade appropriate academic and value based goals:

- Describe the relationship between circumference and diameter of a circle and define Π
- Apply the concepts of circumference and area of and solve in for various circular objects in real life
- Describe sector and segment of a circle and differentiate between the two
- Describe minor and major sector & minor and major segment of a circle and differentiate between the two
- Apply the formula of area of sector and segment of a circle, and compute the area of a specified region
- Calculate the length of an arc of a circle and comment whether it is the major arc or minor arc

- Calculate the area of various combinations of plane figures and apply the concepts of circles, quadrilaterals and triangles.
- Learn the role of precision and accuracy required in real life
- Realize the use of self-discipline & self-awareness to avoid any mistakes or errors in life

III. Process & Action Plan

Teacher imbibes self-awareness and self-discipline through this chapter along with precision& accuracy. Perimeter and area are two important and fundamental mathematical topics. They help you to quantify physical space and also provide a foundation for more advanced mathematics found in algebra, trigonometry, and calculus. Some examples of area and perimeter of circle used in real life are Cycle wheels, wheel barrow (thela), dartboard, round cake, papad, drain cover, various designs, bangles, brooches, circular paths, washers, flower beds, etc. So, the problem of finding perimeters and areas related to circular figures is of great practical importance. By taking the above mentioned practical examples teacher can explain the importance of precision, accuracy self-discipline and awareness in every field .One of the most important goals you may have as a teacher, is the character education of the students using the academic content at hand.

The values and life skills integration within this unit may follow the following process and action plan, as depicted in the flow chart on next page:

A.
Introduce the **context** activity:
Discussion & worksheets. Ref-A1

B. Carry out the varied **activities** in class (given below) in the sequence specified.

1.
Precision& Accuracy
Explanation & Group Discussion on the assigned topic.
Ref-B1

2.
Self-Discipline& Self Awareness
Discussion, Activity & Guidance SWOT Analysis, for

C. Aid generalization of the concepts learnt, through **assignments** (given below).

1.
Case study on the effect of accuracy& precision in real life.Ref-C1

2.
Prepare a chart of strength & weakness analysis.Ref-C2

While it would be ideal to expose the students to all the activities as given, and the discussion that would ensue, you may choose as per your convenience and availability of time, the activities that would be relevant to the content being taught and/or suited to the cognitive and emotional maturity of the students.

This topic incorporates the *core approach* – Knowing, Understanding, Valuing and Acting the values embedded in the topic.

The *core values* being considered are *Precision& Accuracy, Self-Discipline& Self Awareness* along with other sub-values like *Self-control, beauty, stability. Team work, cooperation& respect.*

The unit also provides the scope to develop the following life skills in the students: *problem solving, reasoning, critical thinking, logical thinking computation.*

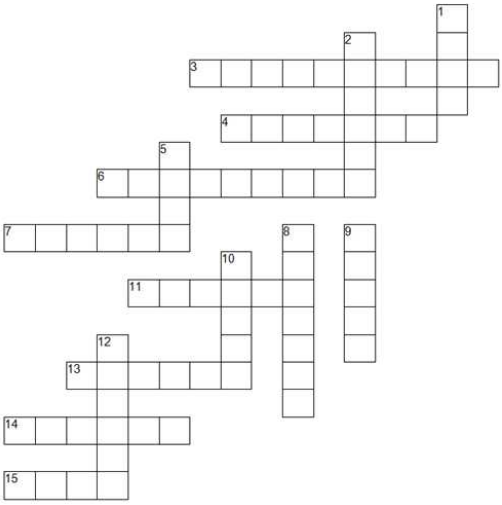
IV. Activities & Related Discussion

A:The context Activity for the Teacher to Start:

This chapter review the concepts of perimeter (circumference) and area of a circle and discusses how to find the areas of some combinations of plane figures involving circles or their parts.

If the calculations are not accurate & precise then there will be always problem in every field or activities. Through this lesson the teacher shall inculcate in students that they should always set a boundary and space for them.

A1: Teacher shall provide work sheet of Crossword Puzzle to solve in the classroom group wise to test the previous knowledge of academic concepts and thereby introduce the new concept. Students learn values like teamwork, cooperation and respect along with academic concepts



Across

3. If the radius of circle is 18 in, what is the area of the circle?

4. If the height of a parallelogram is 18 in and the base is 24 in , what is the area?

6. If the diameter of a circle is 12 inches, what is the area?

7. If the radius of a circle is 9 in, what is the circumference?

11. If the radius of a circle is 13 inches, what is the circumference?

13. What is the area of a trapezoid if the bases are 3 in and 9in and the height is 5 in?

14. If the height of a parallelogram is 18 in and the base is 24 in , what is the area?

Down

1. If the sides of a trapezoid are 6in, 3in, 8in, 6in. What is the perimeter?

2. If the bases of a trapezoid equal 14 in and the height is 8 in, what is the area?

5. What is the value of the second base of a trapezoid if the perimeter is 29 sq in and the other 3 sides' equal 16in?

8. If the area of a triangle equal 27 sq inches and 2 of the sides equals 18 inches. What is the value of the missing side?

9. What is formula for finding the perimeter of a triangle?

10. What is the area of the parallelogram if the base is 18 in and the height is 2x the base?

Ref: https://wordmint.com/public_puzzles/83013

Discussion Activity:

Teacher shall discuss with students about area & perimeter of different types of geometrical figures and elicit the values from them.(Accuracy, precision, self-discipline & self-awareness)

1. What will happen to the area or perimeter if you change the measurement of any one side of the figure?(importance of accuracy& precision)
2. If a particular land-area is given to a farmer for doing cultivation of crops. Can he use the neighbouring area from other farmer without his permission?(awareness & discipline)
3. If you are in std X-A. Can you attend classes in X-B without permission from the authority?(Self Discipline & awareness)

Help students to understand that how each one of their timely actions help them to grow better. Self-awareness & self-discipline have a refreshing effect on their success and growth as a person.

B: The Value Based Activity:

B1: Activity on Precision & Accuracy:

Teacher shall demonstrate a Ferris wheel to students. Ask the following questions.

1. Are all the points on the outer rim of the wheel equidistant from the centre?
2. Comment on the area of sectors formed by two radius and length of the arc? Are they equal?
3. Do you think is there any relation between area of circle and sum of the areas of sectors?
4. What is the relation between circumference of the circle and sum of the length of arc of each sector
5. What will happen if there is error while constructing this Ferris wheel?

Teacher elicits answers from students and explains to them that utmost care needs to be taken while constructing it to avoid malfunction or accidents. Here every part of the circle area, circumference diameter chord, segment sector, arc, radius etc,plays a crucial role in the accuracy of its measurement.

Teacher shall discuss about the importance of measurement with students and explain that measurement permeates every aspect of human life. Modern society simply could not exist without measurement. We overlook the importance of measurement because we are surrounded by it and have grown accustomed to it. It is only when our measurement tools malfunction or are unavailable that we begin to appreciate just how important they are. Truly, we only know what we have got when it is gone. Therefore teacher should ensure children that precision accuracy should be a habit and a part of their life to make them happy and other too.

Teacher divide students into groups, give them a topic for group discussion, ask them discuss in groups and make a presentation for whole class. But it is necessary different

group address different areas of measurement. Teacher shall give them some books or website for reference

- The Necessity of Measurement in Everyday Life

Ref:https://sites.google.com/site/circleswagger/circles-in-real-life

B2: Activity on Self Awareness & Self Control:

Teacher shall discuss the relation between self-control & self-awareness with students which they have already studied in previous class. Then explain to them that Self-control is not possible without self-awareness. It is a double-edged sword. If you can use it right, it can be sharpened weapon to help you to win the fight. But if you, do it wrong, it will hinder you from your goal achievement. So, we need our self-awareness to help us rein ourselves and self-control to make sure we are on the track of our goal achievements.

Teacher shall discuss with students and ask students to do an introspection about their weak points and strong points and list them in a paper which will help them to know self, After teaching them about self-awareness teacher guide them how to achieve self-discipline by eliciting from them so that everyone in the class will be benefitted

Set your goals: – Teacher asks students to set their goals in life. Ask them to write in their book and not to disclose in the class

Ask students

1. Why they need a goal in life?
2. What type of goals?
3. Whether it should be long term or short term

Teacher shall elicit different answers from them and summarize to them that the first step towards leading a disciplined life is to set goals. Goals give you a clear idea about what needs to be achieved. One must always set a timeline for your goals. This serves as a driving force and motivates you to work hard. It is a good idea to set both short term and long-term goals and create a well thought out plan to achieve them.

Stay away from distractions: - Teacher discuss with students about different types of distractions which hamper their studies and relation in the family.

Ask students

1. Where you spend more time after school hours?(Playground,Mobile,TV)
2. Do you like to read books or watch TV?
3. Do you like to spend time on social media platforms (Face book, Instagram, whatsapp…)

Teacher shall elicit different answers from them and summarize to them that.

In this technology-driven world, there are numerous things that can distract us and take charge of our lives. Our mobile phones, television, and chatting apps are some of the new age things that are a big hindrance in practicing self-discipline. No matter how determined we are to study, work or sleep on time, we tend to get distracted at the beep of our phone. Social media platforms, chatting apps and web series are extremely addictive and hamper work. In order to practice self-discipline, it is important to stay away from these distractions. Put your phone on silent or keep it at a distance when you sit to study or work. Similarly, just put your phone away at bedtime and instead pick a book to read.

Reward yourself:- Teacher discuss with students about different types of rewards when you accomplish a mile stone

Ask students

Do you reward yourself anytime?(when you get good marks in tests/win a competition/control on temptation of junk food/helping someone)

Teacher shall elicit different answers from them and summarize to them that reward yourself for every goal you achieve. This will motivate you to work harder to achieve more. This is a good way to trick your brain to inculcate self-discipline.

Stay Positive:– Many people want to inculcate self-discipline but are unable to because they somehow believe that it is difficult to achieve. They feel that it is too much to ask for and that they shall not be able to practice it. This is the wrong approach. You can achieve anything in life if you stay positive and believe in yourself. So, you should stay positive. It is a pre-requisite for inculcating self-discipline.

Teacher shall take a SWOT Analysis in class and guide students how to assess themselves and formulate a plan to improve on one's negative traits.

Ref: https://www.toppr.com/guides/essays/essay-on-self-discipline/

V. C: Assignments

C1: Do case study on the effect of accuracy & precision in real life

C2: Prepare a chart of strength & weakness analysis under the guidance of teachers and teacher shall help them to improve on their negative points.

Resources

References:

1.Ncert Textbook, Reference books,(R.D Sharma , R.S.Aggarwal)

2.Links given under the respective activities

Resources for Teachers:

https://www.measurement.govt.nz/metrology/measurement-in-daily-life/

Unit 13

Topic	Values / Life skills integrated & imbibed	Activities
Surface Areas & Volumes	**Core Values considered:** Precision& Accuracy, Self-Discipline& Self Awareness **Other Sub-Values:** Self-control, beauty, stability. **Life skills:** problem solving, reasoning, critical thinking, logical thinking computation.	**Value integration Activities:-** 1. Worksheets are used for revision and test the previous knowledge of students. 2.Discussion & explanation on self-awareness 3.By Group discussion to improve self Awareness and its benefits 4.Assignment: Prepare a list of benefits of being self-aware and present them to class

Materials / Resources needed

Value Integration:-

1. BB, Pen, board, Duster.
2. Worksheets to conduct context activity
3. Facilities and Equipment to show videos& presentations
4. NCERT Text books, reference books (R.D.Sharma, R.S Agarwal)

Description (of the points of discussion)

Value Integration:-

In this chapter the activities and games are incorporated to help children in learn importance of d At the same time, Volume is the capacity of liquid any vessel can hold, area is the space occupied by any substance. Only available space can be occupied. This concept emphasizes about parameters, limitations & controls that one must adhere to. Therefore, it is imperative that one understands their own capacity & potential. This lesson teaches students the importance of self-discipline & self-awareness. If we do not take care of limitations and parameters then it can lead to errors. discipline along with precision & accuracy. If the calculations are not accurate & precise, it may lead to critical errors in any field of work or activity.

The key discussions are:

1. Worksheets are used for revision and test the previous knowledge of students.

2.By discussion & explanation teacher instil self-awareness and how to achieve self discipline to make it a habit in their daily life.

3.By Group discussion teacher ask students to reflect and suggest methods to improve self Awareness and its benefits and how it is played a significant role and yielded a better result in daily life situations

4.Assignment:

Prepare a list of benefits of being self- aware and present them to class.

Grade X No: of Periods – 12Hrs

Unit 13

Surface areas & Volumes

Togetherness & Teamwork

I. Introduction

Mensuration is the branch of geometry which deals with the measurement of area, length or volume of different geometrical shapes. This chapter discusses regarding combination of solids made up of two or more of the basic solids. Mensuration is directly useful in important activities like, measurement of agricultural fields, floor areas or site areas, estimation of painting houses buildings and measurement of volumes required for packaging milk, liquids, solid edible food items or non-edible items. Volumes and heights are useful in knowing water levels and amounts in river or lakes and construction of overhead tanks.

Therefore, while learning Mensuration students learn the importance of discipline along with precision & accuracy. If the calculations are not accurate & precise then there will be always problem in every field or activities. At the same time, Volume is the capacity of liquid any vessel can hold area is the space occupied by any substance. Only available space can be occupied. There is always limitations & controls. Therefore, it is imperative that one should be aware of one's own capacity & potential. Students learn self-discipline & self-awareness because if we do not take care of limitations and parameters then it can lead to errors.

As in this chapter we are learning about combination of two or more different solid shapes give a new dimension, new shape and new purpose. These basic shapes conjoin and form a shape different from the original .This proves that whenever there is *togetherness and teamwork* we acquire a different level of success.

II. Learning Objectives / Outcomes

Through this unit, the students will achieve the following grade appropriate academic and value based goals:

- Apply formulae of surface area & volume of different 3D solids and derive the surface area & volume of combination of these solid objects
- Apply the formula of surface area & volume of a cone and derive the total surface area of the frustum.

- Use concepts of surface areas and volumes for variety of 3-D objects and apply them into real life situations.
- Realize togetherness & teamwork leads to a new form of success.

III. Process & Action Plan

Togetherness and team work are the two qualities everyone should possess to lead a happy &peaceful life. By taking examples of combination of different shapes teacher inculcate the values in students. In our day-to-day life, we come across several solids made up of combinations of two or more of the basic solids. Tents, capsules, and ice-cream cones are the most common examples. You might have also seen trucks with capsule-shaped containers carrying petrol or Liquefied Petroleum Gas. They are all different from the basic shapes, these are certainly a combination of two or more shapes. So, in a nutshell, the combination of solids includes shapes formed from the fusion of two or solid shapes, which together form a new shape. These examples give an insight in students that togetherness and team-work lead to success

The values and life skills integration within this unit may follow the following process and action plan, as depicted in the flow chart on next page:

A. Introduce the **context** activity:
Discussion & Worksheets.
Ref-A1 & A2

B. Carry out the varied **activities** in class (given below)
in the sequence specified.

1.
Togetherness & Teamwork
Group Discussion, Activity & presentation
on the topic by students.
Ref-B1& B2

C. Aid generalization of the concepts learnt, through **assignments**
(given below).

1.
Preparation of Togetherness &
Teamwork Quotes for school
display board.
Ref-C1

While it would be ideal to expose the students to all the activities as given, and the discussion that would ensue, you may choose as per your convenience and availability of time, the activities that would be relevant to the content being taught and/or suited to the cognitive and emotional maturity of the students.

This topic incorporates the *core approach* – Knowing, Understanding, Valuing and Acting the values embedded in the topic.

The *core values* being considered are *Togetherness & Team Work* along with other sub-values like Precision, Accuracy, self-discipline, self-awareness.

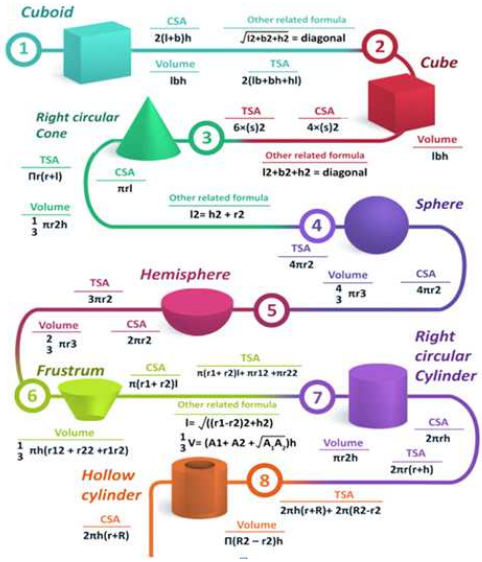
The unit also provides the scope to develop the following life skills in the students: observation, logical thinking, Critical thinking, and problem solving, computation & calculation skills.

IV. Activities & Related Discussion

A: The context Activity for the Teacher To Start:

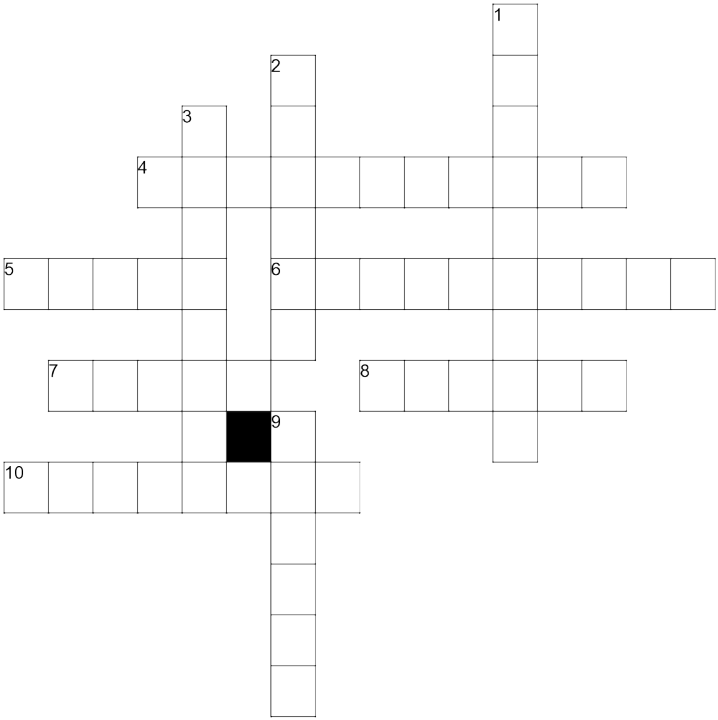
Mensuration teaches students the importance of discipline along with precision & accuracy. If the calculations are not accurate & precise then there will be always problem in every field or activities, the same has been emphasized through the below activities.

A1: Teacher provides two worksheets to students to solve in the classroom to revise the academic concepts and to promote team-work & cooperation amongst them. The first one can be conducted in a quiz format to revise all formula they are going to apply while studying the chapter.



Ref:https://www.toppr.com/guides/maths/surface-areas-and-volumes/area-and-volume-of-combination-of-solids/

A2:



Across

4. The width is 10mm, the length is 15mm and the height is 6mm. what is the volume? (mm3)
5. finding an area is: length x _____
6. what is the area of this shape?(cm2) Length=12cm, width=7cm
7. The width is 14, the length is 16 and the answer is 672. What is the height?
8. V=π r2 h. what does the 'r' stand for?
10. π r2 h=volume of a _____

Down

1. there are 6 sides of this 2d shape, the sides are 8cm, 10cm, 5cm, 6cm,5cm and 2cm. Find the perimeter.(cm)
2. If the length is 12m, and the answer is 132m2. What is the width? (m)
3. perimeter: 28cm+32cm+15cm+____=93cm
9. the volume of a rectangular prism is width x ____ x height

Ref: https://wordmint.com/public_puzzles/530859

Discussion Activity:

After revising the previous knowledge by the group activity teacher shall ask students to identify different objects which are combination of two or more shapes from their daily life. Elicit from students.

1. Bicycle, car, aeroplane…

2. School building

Students will give many examples, Ask them name of the shapes & what they have learned from this. Provide them clues and elicit the values… (Togetherness, unity, team work, cooperation, collaboration)

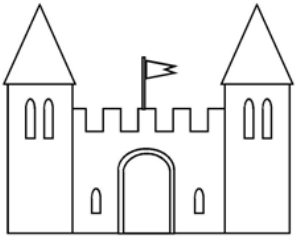
Explain students together always they can achieve more in life. Guide the students to understand the beauty and importance of togetherness & team work why it is essential for our very existence. These qualities helps children cope with life when things get difficult. It provides a healthy way for students to live and helps them be happier and have a more meaningful life.

B: Value Based Activities:

Togetherness & Teamwork

As in class 8th & 9th grade, students learnt about precision & accuracy, self-awareness & self-discipline, teacher shall revise it and focus on togetherness and teamwork .Teacher shall start the explanation with the African Proverb, "**If you want to go fast, go alone. If you want to go far, go together" & another quote of Mother Teresa "I can do things you cannot, you can do things I cannot: Together we can do great things".**

B1: The lesson can proceed with an interesting game activity. Teacher can divide the class into four or five teams each having five to six members each. Now each team can be given a task of making meaningful items by the combination of different shapes. (Students use pencil and paper and they should make drawing of the item) within a given time say one minute. An example of a model is shown in the figure. The team that makes maximum number of meaningful & useful item will be the winner.



Picture Courtesy:

https://www.pinterest.dk/pin/727612883531338859/

https://www.alamy.com

This activity helps students understand the combination of shapes and encourage their creativity & imagination. This also an example of togetherness and unity. Teacher shall discuss with students the benefits and importance of team work & togetherness. A "team" is not just people who work at the same time in the same place. A real team is a group of very different individuals who share a commitment to working together to achieve common goals. Most likely they are not all equal in experience, talent or education, but they are equal in one vitally important way, their commitment to the good of the organization. Any group of people your family, your workplace or your community gets the best results by working as a team.

B2: Divide students into groups and ask them to discuss each other in groups and prepare presentation and explanation for the class.

Topic:

1. Teamwork vs Individual Work – Which is Better?
2. Striking the balance between individual and team contributions in a group project.
3. Can the lessons learned when working as part of team be applied to general life? Why/ why not?

When students learn by discussion in the group and shared ideas it will register in them very deeply. Teacher shall give time to each group for presentation and insist each group member will speak their views separately.

V. C: Assignments

C1: Prepare Teamwork & Togetherness quotes for school display board

Resources

References:

1. Ncert Textbook, Reference books,(R.D Sharma , R.S.Aggarwal)
2. Links given under the respective activities.

Unit 14

Topic	Values / Life skills integrated & imbibed	Activities
Statistics	**Core Values considered:** Honesty, Responsibility, Comparison **Other Sub-Values:** accuracy, discipline, teamwork, respect, courage, honesty, consistency, decision making, cooperation, Confidence & Interpersonal Skills. **Life skills:** planning, organisation, observation, recording, analytical, interpretation, drawing, computation.	**Value integration Activities:-** 1.Discussion and solving worksheets in the class room & Interpretation of a bar graph 2.Assignment topics for research and taking the report and presentation 3.Assignment: comparative study of marks scored in math in semesters& trimesters of by using mean, median& mode .

Materials / Resources needed

Value Integration:-

1. BB, Pen, Duster,
2. Facilities and Equipment to show videos.
3. NCERT Text books, reference books (R.D. S harma, R.S Agarwal)
4. Worksheet of frequency table, bargraph ,pie diagram with questions

Description (of the points of discussion)

Value Integration:-

In this chapter the activities are incorporated to teach students how the data is collected and the ways in which it can be represented will enhance the skills of the individuals. Data handling is a set of skills, which includes: Collecting data using a planned methodology, organising data, recording and representing data with precision and accuracy. Analysing data to draw conclusions. Sharing data in a way which is useful to others. Through this lesson the learners acquire many qualities and values like confidence, honesty, decision making and responsibility while handling data. Graphical Representation of data is best for comparison of individual items.

The key discussions are:

1.By discussion and solving worksheets in the class room & Interpretation of a bar graph teacher shall revise the previous knowledge of students.

2. By assigning topics for research study , giving right guidance & encouragement for the report and presentation teacher shall instil the value of responsibility ,honesty, decision making ,&confidence among students

3.Assignment:

Teacher shall encourage students to do a comparative study of marks scored in math in semesters& trimesters of by using mean, median& mode

Grade X No: of Periods – 18Hrs

Unit 14

Statistics

Comparison & Judgement

I. Introduction

Statistics is the science of average & estimates. It is the study of collection, analysis, interpretation & organization of data for specific purpose. This Chapter discuss about the study of mean, median, mode from grouped data and the concept of cumulative frequency, the cumulative frequency distribution and how to draw cumulative frequency curves, called ogives. A measure of central tendency describes a set of data by identifying the central position in the data set as a single value, it as a tendency of data to cluster around a middle value.

Through this lesson students learn to weigh the pros and cons of any decision using statistical tools. By evaluating the consequences of a decision using mathematical tools, one can remove the bias caused because of emotions, thereby allowing students to make astute judgements. With practice this will be become inherent to a student's personality. Therefore, through this lesson students learn significance of comparison and taking a right judgement in different situations of life.

II. Learning Objectives / Outcomes

Through this unit, the students will achieve the following grade appropriate academic and value based goals:

- Apply direct & assume method and calculate the mean of the grouped data.
- Compute the mean and mode of the given data and interpret these two measures of central tendency
- Apply formula for the median of a given grouped data and calculate missing values of frequency.
- Differentiate between mean, median and mode with examples and use most effective measure of central tendency in various cases.
- Derive the co-ordinates to plot a graph and represent the two ogives, Graph both ogives for the data obtained and determine the median of the given grouped data
- Able to take right decision at right time by logically comparing and weighing consequences

III. Process & Action Plan

Right judgement at the time of crucial situation and significance of comparison can be taught through this lesson. Teacher shall use Mean, median & mode which shows different perspective of same data to explain in detail to students how they need to take right judgement. Mean gives average of the data. It is used in case where all data is important. E.g. Average salary of employees in an organization Median is used to find middle most data. It is used to determine a point from where 50% of data is more & 50% data is less. It is used where extreme cases can be ignored. E.g. To find the performance of a cricketer where his worst & best extreme performance can be ignored to give his consistent performance. Mode is used where we need to find the most frequent data. E.g. if we need to find the most favourite subject of students in a given class, mode can be used. Teacher shall use mean ,median and mode to explain the significance of comparison. One of the most important goals you may have as a teacher, is the character education of the students using the academic content at hand.

The values and life skills integration within this unit may follow the following process and action plan, as depicted in the flow chart on next page:

A.
Introduce the **context** activity:
Discussion & worksheet solving. Ref-A1& A2

B. Carry out the varied **activities** in class (given below) in the sequence specified

1.
Comparison & Team work
Experiential study with the help of examples.
Ref-B1

2.
Judgement
Narration of story of Solomon& Discussion.
Ref-B2

C. Aid generalization of the concepts learnt, through **assignments** (given below)

1.
Study of given example by using compare& contrast method.
Ref-C1

While it would be ideal to expose the students to all the activities as given, and the discussion that would ensue, you may choose as per your convenience and availability of time, the activities that would be relevant to the content being taught and/or suited to the cognitive and emotional maturity of the students.

This topic incorporates the *core approach* – Knowing, Understanding, Valuing and Acting the values embedded in the topic.

The *core values* being considered are *Comparison & Judgement* along with other sub-values like *precision, clarity, accuracy& team work*

The unit also provides the scope to develop the following life skills in the students: *computation, decision making skills, thinking, and communication*

IV. Activities & Related Discussion

A: The Context Activity for the Teacher to Start:

Statistics is the science of average & estimates. It is the study of collection, analysis; interpretation & organization of data for specific purpose, Therefore, through these lesson students learn significance of comparison and taking a right judgement in different situations of life.

Teacher shall provide worksheet to solve in the class to test previous knowledge of academic content at the same time promotes the value of comparison and judgement while solving the problems.

A1:Fill in the blanks:

1. Median of first 10 odd natural number is _____

   1) 3 2) 7 3) 9 4) 5

2. The maximum frequency 10 is for the observation 4. The mode of the data is _____.

   1) 10 2) 4 3) 3 4) None of these

3. The median of observations 17, 18, 20, 22, x+2, x+4, 31, 35, 37 is found to be 24. If the observations have been arranged in ascending order, the value of x will be _____.

   1) 22 2) 30 3) 20 4) 25

4. The data has been arranged in ascending order: 14, 19, 25, 29, x, 39, 41, 48, 54. If the median of the data is 35. Find x.

   1) 34 2) 39 3) 33 4)35

A2: Solve the following

5. The mean of 20, 25, x, 35, 40 is 30. What is the value of x?
6. Find the mode of 14, 25, 14, 28, 18, 17, 18, 14, 23, 22, 14, 18.
7. The points scored by the team of kabaddi in a series of matches are as follows:

   17, 2, 7, 27, 15, 5, 14, 8,10, 24, 48,10, 8, 7, 18, 28. Find the median of the points scored by the team.
8. Five people were asked about the time in a week they spend in doing social work in their community. They said 10, 7, 13, 20, and 15 hours, respectively. Find the mean (or average) time in a week devoted by then for social work

Ref: https://www.urbanpro.com/cbse-class-9-maths-statistics-worksheets

Discussion Activity:

Teacher discusses with students, ask and elicit from them the values, if necessary give them clues

1. What did you learn while solving the sums of mean median and mode? (Comparison)

2. Were you able to give a justified answer while solving Qno.8 & 9

Explain to the students that we come across many such situations in life where we need to take right decisions or give right judgement. Teacher should highlight that statistics can help students take this right judgement and teach them to comparative thinking. This skillset will help them in making the right decisions in the future.

B:Value Based Activities:

B1: Activity on comparison & team-work

The lesson can proceed with an activity. Teacher shall divide the class into 4 groups. Ask each group to find mean, median and mode of their Mathematics & English marks they have scored in recent test conducted. Ask them to do a comparative study and present to the class. According to their team which is most accurate (Mean, median or mode) with justification. Allow each group to present in the class.

This activity helps students to improve their understanding of mean median and mode and recognize the benefits of comparative thinking. Comparative thinking is one of our first and most natural forms of thought. This strategy strengthens students' ability to remember key content. Asking students to identify similarities and differences through comparative analysis leads to eye-opening gains in student achievement. This is an opportunity for teacher to inculcate the value & benefits of comparison in the minds of the children and help them to understand the essential elements of good teamwork.

By nourishing these habits in our students, we give them the tools they need to use their minds well, thus increasing their chance for future success. Using Compare &

Contrast in the classroom will help students develop these habits of mind: thinking flexibly; striving for accuracy; applying past knowledge to new situations; and thinking and communicating with clarity and precision and take right decisions(Judgement).

B2: Judgement:

Teacher shall explain the meaning of judgment by narrating the story of King Solomon from Bible. Judgement is an act or process of forming an opinion or making a decision after careful thought.

The Judgement of Solomon is a story from the Hebrew Bible in which King Solomon of Israel ruled between two women both claiming to be the mother of a child. Solomon revealed their true feelings and relationship to the child by suggesting the baby be cut in two, each woman to receive half. With this strategy, he was able to discern the non-mother as the woman who entirely approved of this proposal, while the actual mother begged that the sword might be sheathed and the child committed to the care of her rival. This story is an archetypal example of an impartial judgement.
https://en.wikipedia.org/wiki/Judgement_of_Solomon

Discussion:

1. What is your opinion about the judgement?
2. Do you have any suggestion for any other way?
3. Can you share any other incident/story regarding unbiased judgement?

Explain to the students that we come across many such situations in life where we need to take right decisions or give right judgement. In such situations we must develop courage and mental strength to rise-up and take wise decisions.

V.C: Assignments

C1: Teacher shall give a situation for compare and contrast study for students

Resources

References:

1. Ncert Textbook, Reference books,(R.D Sharma , R.S.Aggarwal)
2. Links given under the respective activities

Unit 15

Topic	Values / Life skills integrated & imbibed	Activities
Probability	**Core Values considered :** Fearless & Courage **Other Sub-Values:** patience, hard work, confidence, Team building. **Life skills:** logical thinking, observation, critical thinking, decision making.	**Value integration Activities:-** 1. Discussion and using daily life examples -to introduce the topic to students. 2. Discussions to emphasise to take courageous decisions to become successful in life, 3.Group discussion on the assigned topics teacher emphasize how to become successful in life, 3. Assignment: Research some instances observed where probability is used to take decisions

Materials / Resources needed

Value Integration:-
1. Facilities and Equipment to show videos & conducting games
2. BB, Pen
3. Ncert Text Book, Reference books,(R.D Sharma , R.S.Aggarwal)

Description (of the points of discussion)

Value Integration:-

In this chapter the activities are incorporated in such a manner that students learn that Knowledge of probability and statistics helps you to look at the world in an entirely different angle, to model and analyse situations, which involve uncertainty, the knowledge of probability is of great use. The main reason for learning probability which comes under statistics is , you can make up your own mind and take courageous decisions independently. Through the topic Probability , teacher can inculcate the value of courage, courage to take wise decisions during moments of uncertainty in life. Along with this quality students learn, team building, handling success & failures and managing expectations equally.

The key discussions are:

1. Discussion and using daily life examples - teacher shall explain instances where probability is used to introduce the topic to students.

2.Discussion regarding courage teacher emphasize that one should take courageous decision at the time of uncertainity to become successful in life,

3.Conduct group discussion on the assigned topics teacher emphasize how to become successful in life, one must take risks and venture out of their comfort zones. However, the teacher should help students develop a mind-set to allow students to weigh consequences of their decisions.

4. Assignment:

Research some instances observed where probability is used to take decisions

Grade X No: of Periods – 10Hrs

Unit 15

Probability

Fearless & Couraget

I. Introduction

This chapter, give an introduction to the theoretical (also called classical) probability of an event, and discuss simple problems based on this concept. In theoretical probability we assume that the outcomes of the experiment are equally likely. Knowledge of probability and statistics helps you to look at the world in an entirely different angle, to model and analyse situations, which involve uncertainty. The main reason for learning probability which comes under statistics is, you can make up your own mind and take courageous decisions independently based on logical reasoning by using lessons learned in this topic.

Through the topic Probability the teacher can inculcate the value of courage, courage to take wise decisions during moments of uncertainty in life. Along with this quality students learn, team building, handling success & failures and managing expectations equally.

II. Learning Objectives / Outcomes

Through this unit, the students will achieve the following grade appropriate academic and value based goals:

- Differentiate between Empirical Probability and Theoretical Probability and find the two for a variety of cases
- Calculate the probability of given events in an experiment and comment whether they are
- Complementary Events /Sure Events/Impossible Events
- Represent using organized lists, tables, or tree diagrams and list the sample space for compound events
- Calculate the probability of various events and rank them from most to least probable events.

- Realize probability, the mathematics of chance, is the only tool that one applies in each and every thing in life. Take decisions courageously in any situations of uncertainty. Learn to accept success and failures as they are two sides of a coin.

III. Process & Action Plan

Fearless and courage are the two powerful values which can make one's life very promising and successful. These qualities are the greatest assets every human being needs to possess in life. The study of probability helps them to achieve these qualities. Teacher shall inculcate these qualities by explain the right examples from real life. Probability has been used extensively in many areas such as biology, economics, genetics, physics, sociology etc.. One of the most important goals you may have as a teacher, is the character education of the students using the academic content at hand.

The values and life skills integration within this unit may follow the following process and action plan, as depicted in the flow chart on next page:

A.
Introduce the **context** activity:
Discussion of daily life examples. Ref-A1

B. Carry out the varied **activities** in class (given below) in the sequence specified.

1.
Courage & Decision Making
Discussion of application probability on daily life.
Examples
Ref-B1

2.
Courage & Decision Making
Presentation by students about courageous decision .
Ref-B2

C. Aid generalization of the concepts learnt, through **assignments** (given below).

1.
Research submit report where probability is used to take decisions.
Ref-C1

While it would be ideal to expose the students to all the activities as given, and the discussion that would ensue, you may choose as per your convenience and availability of time, the activities that would be relevant to the content being taught and/or suited to the cognitive and emotional maturity of the students.

This topic incorporates the *core approach* – Knowing, Understanding, Valuing and Acting the values embedded in the topic.

The *core values* being considered are *Fearless & Courage* along with other sub-values like *patience, hard work, confidence*, *Team building*.

The unit also provides the scope to develop the following life skills in the students: *logical thinking, observation, critical thinking, decision making*

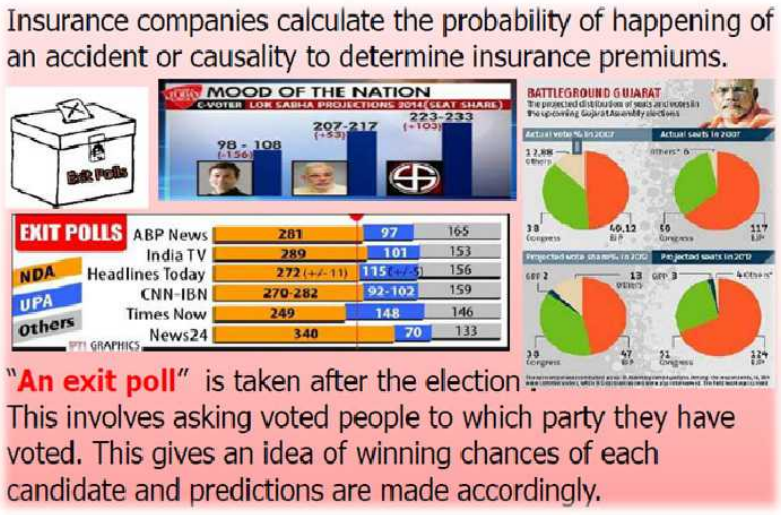
IV. Activities & Related Discussion

A: The Context Activity for the Teacher to start:

Through the topic Probability the teacher can inculcate the value of courage, courage to take wise decisions during moments of uncertainty in life. Along with this quality students learn, team building, handling success & failures and managing expectations equally.

Teacher can introduce the topic by taking many examples from daily life such as:

Exit polls & Insurance companies. Teacher shall explain /discuss how probability is used by Insurance companies & Exit polls.



Ref: https://www.slideshare.net/siripurapuramu/ppt-uses-of-probability-by-rambabu

Discussion activity:

1. Have you ever thought how insurance company pay such large pay out to accident victims even if they pay less premiums?
2. Do you know how exit poll is taken and declare the result before election?

Teacher shall elicit answers from students by providing hints and clues (Courage & fearless).Teacher explain to students experience fear is normal but to overcome fear and taking courageous decision in life is very important. Otherwise they may lose many opportunities thereby reduce their growth to move forward in life.

B: Value Based Activity:

B1: Discussion activity: Courage

Medical Decisions:

Teacher Explains and discusses with students

1. Why do hospitals collect consent from relatives of the patient before a critical surgery?(It is necessary to the relatives to take fear less decision)
2. On what basis doctors & relatives decide that a surgery should be done?(Fearless & courage)
3. Are they sure about the success of the surgery? (On chance & courage)

Teacher explains to students that when a patient is advised to undergo surgery, they often want to know the success rate of the operation which is nothing but a probability rate. Based on the same the patient takes a decision whether to go ahead with the same.(Both doctors & Relatives decide it on chance and courage).similarly if we do not take right decisions courageously, we lose many chances in life.

Even though we do not realize the use of mathematical probabilities in everyday life, subconsciously we use it in every step we take .The use of real life probability is a huge area of research and development since it is an ever evolving field

B2: Through the below topics, the teacher can emphasize how to become successful in life, one must take risks and venture out of their comfort zones. However, the teacher should help students develop a mindset to allow students to weigh consequences of their decisions.

Teachers should divide the class into groups and given them the following topics to discuss.

1. In life, when should you play it safe or should you take risks?
2. Should students be encouraged to take risks? Where should you draw the line?
3. Are mistakes a blessing or a boon? Should you be afraid of making mistakes?

V. C Assignments

C1: Research some instances observed where probability is used to take decisions.

Resources

References:

1. Ncert Textbook, Reference books,(R.D Sharma , R. S.

Integration of Values

Teacher's Manual

Maths

Grade X

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