HEM *harmonize*

Integration of Values

Maths

Grade IX

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 IX

IDEA conceived and executed by

Vijayam Ravi, PhD

Academic Director @ HEMA Foundation

(Senior Educational Consultant, Curriculum expert, Academic quality Assessor and Leadership Trainer, Competency analyst, with 40 years of experience)

Authors:

1. Dr Sobhana Nanadakumar Nair -Department of Math

(Ex-Principal, & Edu. Consultant)

(State Awardee for Best teacher from State of Maharashtra)

2. Ms. Shobha Rajkumar -Department of EVS

(Retired) Head -Preprimary

(Smt Sulochanadevi Singhania School, Thane

Shri Vasantrao Davkhare Memorial School, Pune)

3. Ms. Priya Cibi- Department of English

(HOD, Special Educator School Counsellor & Educational Consultant)

4. Ms. Sopna T.R –Department of Science

(Er & Tr. in Chemical Engg and IT, N. S from BLTS Pilani)

5. Ms. Rashmi Menon

(Specialist in Endocrinology and Physiology)

First Edition: 2021

Publisher:
HEMA Foundation
Ram Ratna House, Oasis Complex,
P. B. Marg, Worli, Mumbai - 400 013
Tel.: 022-2494 9009 / 9142, Extn.: 6178
Mob: 72280 01342
E-mail: admin@hemafoundation.org
Website: www.hemafoundation.org

Printer:

Cooperation amount : ₹ 200/-

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
Managing Trustee

Anita

Anita Maheshwari
Trustee & Creative Director

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."

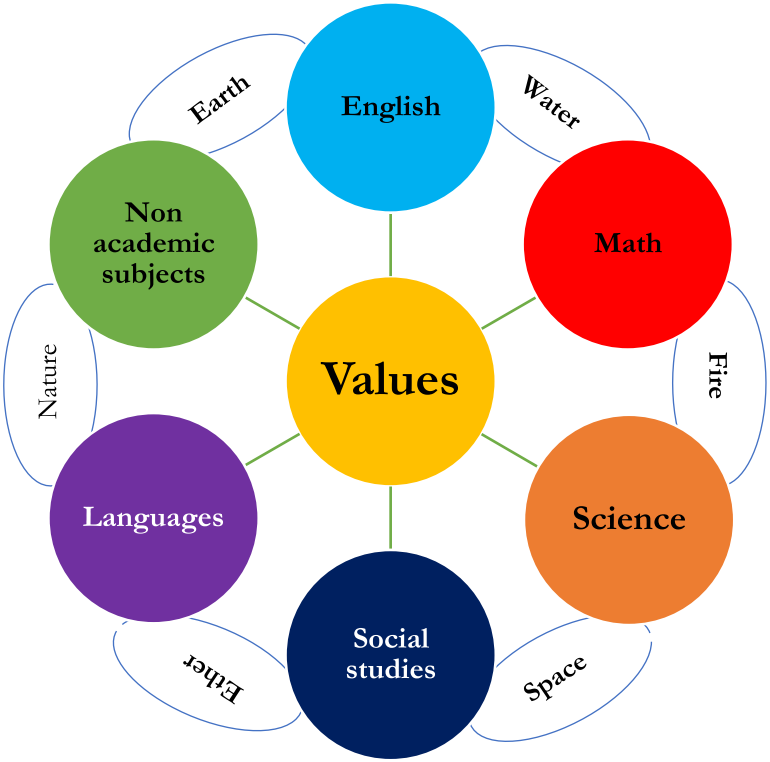
The new NEP and therein the NCERT insist on integration of values with essential subjects. Nature is the mother of all knowledge- Every learning that takes place with human beings is connected through the mind and intellect. While giving food for thought at the intellectual level, teachers have to supplement 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

INDEX

01 Unit 1

I. Introduction 1
II. Learning Objectives / Outcomes 1
III. Process & Action Plan 2
IV. Activities & Related Discussion 4
V. Assignments 9
VI. Resources 9

02 Unit 2

I. Introduction 1
II. Learning Objectives / Outcomes 1
III. Process & Action Plan 2
IV. Activities & Related Discussion 4
V. Assignments 7
VI. Resources 7

03 Unit 3

I. Introduction 1
II. Learning Objectives / Outcomes 1
III. Process & Action Plan 2
IV. Activities & Related Discussion 4
V. Assignments 8
VI. Resources 8

04 Unit 4

I. Introduction 1
II. Learning Objectives / Outcomes 1
III. Process & Action Plan 2
IV. Activities & Related Discussion 4
V. Assignments 7
VI. Resources 7

05 Unit 5

I. Introduction 1
II. Learning Objectives / Outcomes 1
III. Process & Action Plan 2
IV. Activities & Related Discussion 4
V. Assignments 7
VI. Resources 7

06 Unit 6

I. Introduction 1
II. Learning Objectives / Outcomes 1
III. Process & Action Plan 2
IV. Activities & Related Discussion 4
V. Assignments 7
VI. Resources 7

07 Unit 7

I. Introduction 1
II. Learning Objectives / Outcomes 1
III. Process & Action Plan 2
IV. Activities & Related Discussion 4
V. Assignments 7
VI. Resources 7

08 Unit 8

I. Introduction 1
II. Learning Objectives / Outcomes 1
III. Process & Action Plan 2
IV. Activities & Related Discussion 4
V. Assignments 7
VI. Resources 7

09 Unit 9

I. Introduction 1
II. Learning Objectives / Outcomes 1
III. Process & Action Plan 2
IV. Activities & Related Discussion 4
V. Assignments 7
VI. Resources 7

10 Unit 10

I. Introduction 1
II. Learning Objectives / Outcomes 1
III. Process & Action Plan 2
IV. Activities & Related Discussion 4
V. Assignments 7
VI. Resources 7

11 Unit 11

I. Introduction 1
II. Learning Objectives / Outcomes 1
III. Process & Action Plan 1
IV. Activities & Related Discussion 3
V. Assignments 5
VI. Resources 5

12 Unit 12

I. Introduction 1
II. Learning Objectives / Outcomes 1
III. Process & Action Plan 2
IV. Activities & Related Discussion 4
V. Assignments 8
VI. Resources 8

13 Unit 13

I. Introduction 1
II. Learning Objectives / Outcomes 1
III. Process & Action Plan 2
IV. Activities & Related Discussion 4
V. Assignments 7
VI. Resources 7

14 Unit 14

I. Introduction 1
II. Learning Objectives / Outcomes 1
III. Process & Action Plan 2
IV. Activities & Related Discussion 4
V. Assignments 7
VI. Resources 7

15 Unit 15

I. Introduction 1
II. Learning Objectives / Outcomes 1
III. Process & Action Plan 2
IV. Activities & Related Discussion 4
V. Assignments 7
VI. Resources 7

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 IX No: of Periods – 16Hrs

Unit 1

Number systems

Inclusivity, Harmony diversity

I. Introduction

The collection of all rational and irrational numbers is called real numbers. When we include irrational number with all other numbers that has becomes number system or real numbers Number system consists of different types of numbers, in other words diversity of numbers and 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 create a conducive environment for stimulating ideas, thoughts and actions.

II. Learning Objectives / Outcomes

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

- Recall natural numbers, whole numbers, integers and rational numbers and classify a given number as either of them.
- Represent a given number in the form p /q in order to show whether the given number is rational or not.
- Calculate and find rational numbers between any two rational numbers in order to prove that there are infinite rational numbers between any two given rational numbers
- Modify a given non-terminating decimal number in the form of p /q and comment whether this number is irrational.
- Use Pythagoras' theorem and create a Pythagorean triplet and construct the length equivalent to root of a given number.
- Deduce the value of a given fraction in its decimal form and infer if the decimal number is terminating or non-terminating.

- Use successive magnification and represent a given decimal number on a number line.
- Use the commutative, associative and distributive laws for addition and multiplication for irrational numbers and determine whether the sum, difference, quotients and products of irrational numbers are irrational or not.
- Rationalize the denominator of a given expression with a square root term in the denominator and convert it to an equivalent expression whose denominator is a rational number
- Extend the laws of exponents and simplify a given expression
- Learn the value of inclusivity harmony & diversity through this chapter.

III. Process & Action Plan

This chapter help teacher to instil inclusivity which in turn teach them, how diversity& harmony help them to grow a better person. A number is a mathematical object used in counting and measuring. It is used in counting and measuring. Numerals are often used for labels, for ordering serial numbers, and for codes like ISBNs. In mathematics, the definition of number has been extended over the years to include such numbers as zero, negative numbers, rational numbers, irrational numbers, and complex numbers. We all use math in everyday applications whether we're aware of it or not. Mathematics is the universal language of our environment, helping mankind explain and create. From playing games to playing music, build things, in grocery stores, in cooking, in travel, saving money etc, math is vital to helping students fine tune their creativity and turn their dreams into reality. 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.
Inclusivity, Harmony Diversity
Explanation of interconnection between number system & values.
Ref-B1

2.
Inclusivity, Harmony Diversity
Debate on the topic of Inclusivity, Diversity& Harmony.
Ref-B2

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

1.
Prepare poster on Harmony, Diversity & inclusivity quotes.
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 *Inclusivity, Harmony Diversity* along with other sub-values like, *unity, kindness, confidence, helping nature*

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

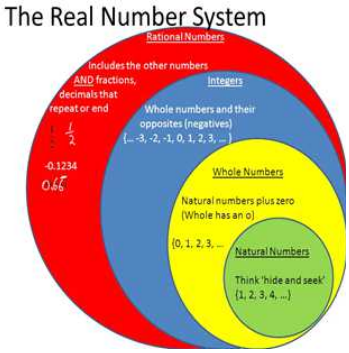
IV. Activities & Related Discussion

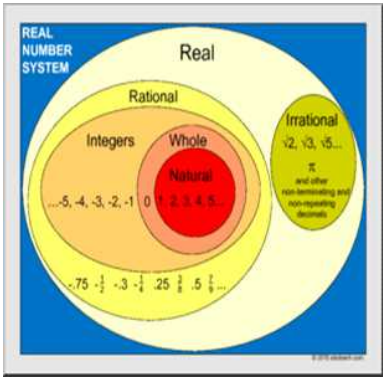
A: The Context Activity for The Teacher to Start

The collection of all rational and irrational numbers is called real numbers. Through this lesson the teacher shall inculcate the value of inclusivity, harmony & diversity to students

A1: Teacher shall revise the different types of numbers students studied in previous classes by using the Venn diagram and introduce the new number (Irrational Numbers) by using the second diagram.

Teacher shall use these worksheets as per time. The purpose is not only for academics concepts but at the same time to instill along with teamwork and sharing knowledge.





Ref: https://slideplayer.com/slide/8631773/

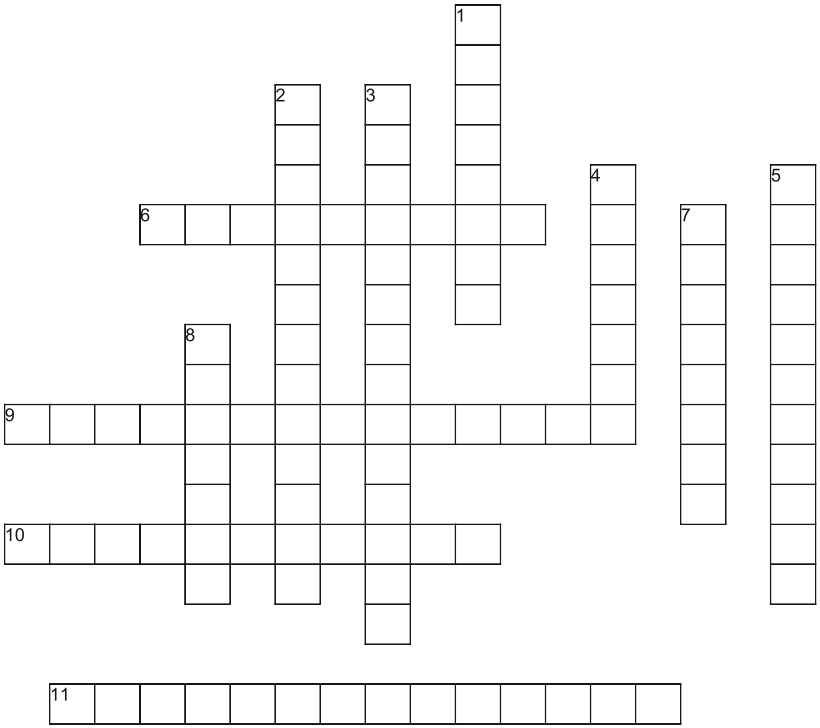
A2: Solve the following cross word puzzle after revising the previous knowledge

Across

6. Two numbers that are the same distance from zero on the number line (but in the opposite direction)
9. A number greater than zero
10. Zero and all positive numbers that have no fraction or decimal part: 0,1,2,3...
11. A number less than zero

Down

1. The answer to a division question
2. The distance a number is from zero. It is always positive.
3. A number that can be written as a/b (a fancy word for a fraction)
4. The number being divided by
5. A picture used to show relationships between groups of numbers
7. A number being divided
8. A member of the set of the whole numbers and their opposites



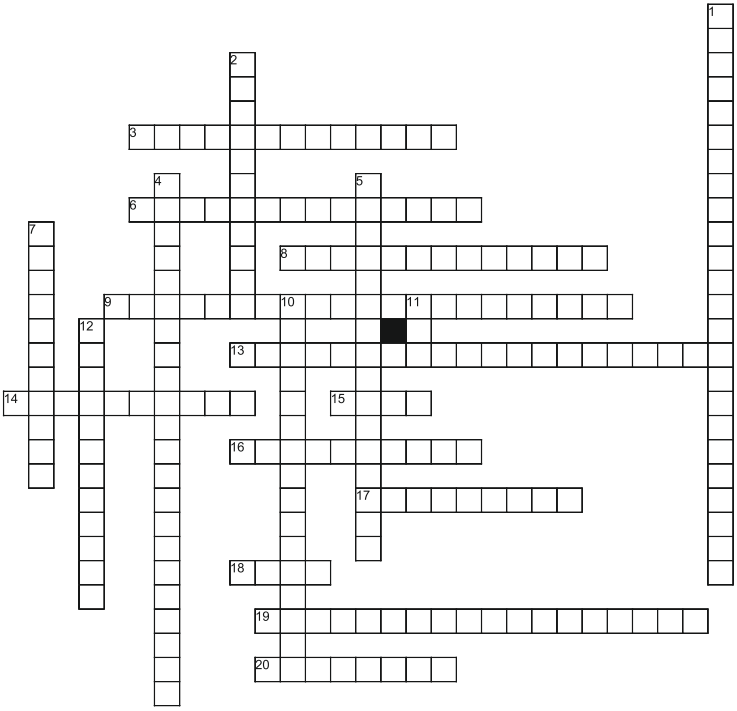
A3: Solve the cross word puzzles based on the previous knowledge of rational n umbers

Across

3. 10.6 +20.4 -91
6. -4/ 1/3
8. -3/4+ (- 9/4)
9. 5.1+ 8.3
13. 5.6(-5)
14. -2.6 -(-3.1)
15. -4.7 -(-4.7)
16. -2.7+ 3.2
17. 9.3+ 12.7
18. -3 1/2 -(- 3 1/2)
19. -60 -90+ 50
20. 2/3(1/2)

Down

1. 8.1(3)
2. -27.6-15.4
4. 2/3(-156)
5. 1/4+ 1/4+ 1/4 -3/4 +10/4
7. 6/5 / 2
10. -52/ 4
11. 5/10 / 1/2
12. 1/2 -(-1/4)



Ref: https://wordmint.com/public_puzzles/160590

After completing the work sheet teacher can elicit values(inclusivity, harmony and diversity by asking suitable questions and providing clues.

Teacher shall discuss with students and ask

When you were in lower classes

1. Which was first type of numbers you have studied? (Counting numbers or Natural numbers)
2. Which number was included to make it whole number? (Zero-0)
3. What value have you learned for life from the above example? (Inclusion)
4. By including zero with natural numbers what are the benefits one could get?

Teacher shall frame different questions to elicit the values from students and explain to them its importance in life.

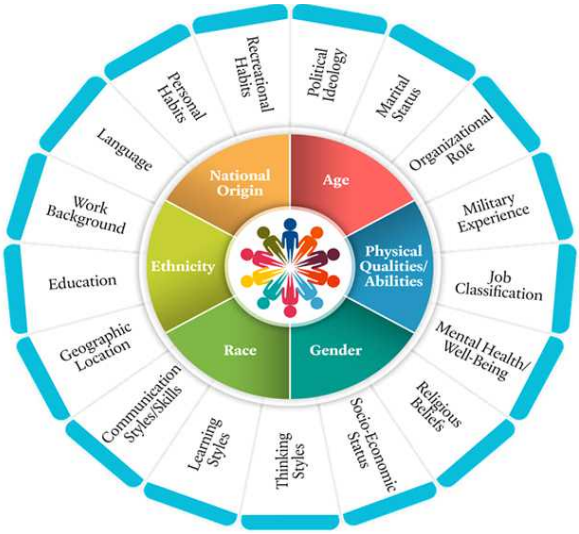
B: Value Based Activity-

B1: Discussion: Teacher shall discuss and coordinate the number system to different values with students. Different numbers are included as part of the syllabus as one moves from lower classes to higher. To complete the number system, thereby expanding the number system and made it useful to humanity in different ways.

- Inclusion of Zero to natural numbers resulted whole numbers
- Inclusion of negative numbers to whole numbers resulted - Integers
- Inclusion of fractions, decimals, recurring & non-terminating numbers to integers has become -Rational numbers.
- Inclusion of Irrational Numbers to rational numbers has become -Number system/Real numbers

Each time we include a new set of numbers, it opens new opportunities and avenues for application. Similarly inclusivity in the class room teaches you many qualities. When we include different type of numbers, we get diversity of numbers to use in any situation we see better applications of numbers to solve problems. Similarly, when there is diversity of talents, ideas, opinions, thoughts & views, we learn a lot from each other. Therefore inclusivity & diversity brings harmony and togetherness in the classroom.

B2: Teacher shall divide the class into groups and give topics for discussion & debate based on inclusivity, diversity & Harmony which in inculcating the importance of these values. Teacher shall explain that diversity & Inclusion wheel which will help them for discussion & debate.



Diversity & Inclusion Wheel

Discussion

Teacher shall ask students that when think about inclusion what comes to their mind, elicit different opinions words from students:-

1. Differently abled
2. Religion
3. Gender wise
4. Age wise
5. Nation wise/state wise
6. Ethnicity- Different culture

Students may come out with many examples. Teacher shall discuss and explain to them in details and ask them when we include and accept people of different types in a community or society

What do we learn from them? Again elicit from them

This way teacher shall inculcate diversity & harmony among them. Now teacher shall conduct a debate in the class room.

Does diversity & inclusivity encourage harmony in the classroom?

Teacher shall moderate the debate and conclude by taking the positive points discussed by students. Inclusivity attitude always helps one to grow as better human being in life.

Ref-https://www.prdaily.com/4-steps-for-adopting-a-diversity-first-practice-in-pr/

V. C: Assignments

C1: Prepare Poster on Harmony, Diversity& inclusivity quotes group wise for school bulletin board.

Eg: Every single person is different, no matter how big or small. Let's celebrate our differences, learn from each other and stand tall

Resources

References:

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

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 IX No: of Periods – 23 periods

Unit 2

Polynomials

Interconnectedness & Collaboration

I. Introduction

A polynomial is a mathematical expression that consists of variables and constants combined/connected using addition, subtraction and multiplication. Students will learn to prove identities using distributive law and multiplications techniques and simplifies the problems. While teaching teacher shall teach 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. Polynomials can be factorized using factor theorem, remainder theorem and also by using algebraic identities. 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 solves one block at a time until the whole problem is resolved. This way one can overcome even the most difficult challenges in life. 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. This requires teachers to emphasize on sharpening one's problem-solving skills, critical thinking and strategizing skills to break down a tough task into smaller easy to do tasks.

II. Learning Objectives / Outcomes

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

- Classify polynomials on the basis of the number of terms and the degree. identify the coefficients and variables of polynomials
- Use the method of zeroes in order to find the remainder of a polynomial and in order to check whether a given polynomial is the factor of the other given polynomial or not. Learn to find roots of polynomial and understand the relation between zeroes and value of polynomials. Use remainder and factor theorem for factorizing the polynomial

- Use identities in order to find the product of two polynomials and in their factorization.
- Develop the ability to analyze that whether the given polynomial is divisible by another or not by checking on to its remainder's value becoming zero or not.
- Develop the ability to analyze that whether the given polynomial satisfies factorization of Polynomials p(x), therby,analyse Factor Theorem for polynomials. And critically examine splitting the middle term method to find factors
- Learn to factories the algebraic expressions and understand their utility in computation
- Learn the ability to break down complex problems into smaller blocks and solve easily.
- Learn the value of collaboration and inter connectedness through polynomials

III. Process & Action Plan

While teaching polynomials teacher can relate the interconnectedness and collaboration Algebraic polynomials work as the building block for higher level mathematics. Just like add, subtract, multiply, and divide, lead to algebraic relations. Sometimes you need to learn the basics in order to solve more complex problems. Polynomials are used for various purposes in life. Polynomials are used in modelling, physics, industries, finance, construction, gravitation, chemistry 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 & solving worksheets. Ref-A1, A2 &A3

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

1.
Interconnectedness & Co-operation
Narration of Wolves life to enlighten the importance of values& Group Discussion.
Ref-B1

2.
Interdependence & collaboration
Balloon Game activity to instil the collaboration
Ref-B2

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

1.
Drawing & writing quotes on Global Inter connection.
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& Collaboration* along with other sub-values like *collaboration, interdependence, team work, caring sharing& 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

A polynomial is a mathematical expression that consists of variables and constants combined/connected using addition, subtraction and multiplication. Through this lesson, teachers should emphasize on sharpening one's problem-solving skills, critical thinking and strategizing skills to break down a tough task into smaller easy to do tasks.

Teacher shall provide worksheets to revise the concepts of exponents& powers and Algebraic expression to prepare students for the introduction of Polynomials.

A1: Fill in The Blanks

1. The value of 3^4 = ……..
2. $125° + 5^2$ = ……
3. Multiplicative inverse of 2^{-5} = ……..
4. $11^4 \times 11^{-2}$ = …….
5. The value of $(-1)^{55}$ is …….
6. The value of $(-1)^{500}$ is …….
7. In standard form 56700000 is written as …….
8. Usual form of the expression 9×10^5 is given by ……
9. Simplified exponential form of $52 \times 57 \times 512$ ……
10. Find the number: $9 \times 10^5 + 2 \times 10^2 + 3 \times 10^1$ ……

A2: Identify the terms and their coefficients for each of the following expressions:

(i) $3x^2y - 5x$

(ii) $xyz - 2y$

(iii) $-x - x^2$

A3:Solve the following

i) Add: 8x2 + 7xy – 6y2, 4x2 – 3xy + 2y2 and -4x2 + xy – y2

ii) Subtract: (4x + 5) from (-3x + 7)

iii) Multiply: 3xy2 × (-5x2y)

iv)Simplify: $a^2(b^2 - c^2) + b^2(c^2 - a^2) + c^2(a^2 - b^2)$

https://www.learncbse.in/

https://www.worksheetsbuddy.com

Discussion:

Teacher gives an example of polynomial to students and asks them different questions and elicits the values from students if necessary give them hints.

(Collaboration, interconnectedness, Interdependendence.)

1. Can you see exponents and powers in the given polynomial?
2. How many algebraic expressions do you see in it?
3. How the expressions are connected?
4. Have you ever felt you need support and guidance from someone?
5. Have you ever felt sad when your friend falls ill?
6. When your class mate gets less mark in math do you feel like helping?

Guide students to understand collaboration & interconnectedness by giving examples and interactive method.

B: Value Based Activity

B1:Teacher shall discuss, and revise inter connectedness & interdependence which students have learned in std VII & VIII.

Polynomials teach inter connectedness and interdependence as we connect monomials with algebraic operators it becomes binomial, trinomial, and polynomial with one variable, two variables, three variable etc. Here when we combine the terms we learn about togetherness and harmony. When we use identities, factorization using identities we inculcate equality and teach them to simplify a problem and get solution. Through the below article on the life of wolves to students the teacher should explain to students just like how interconnectedness/Interdependence, togetherness, equality exist in wolves humans should also develop those qualities to live a harmonious life. The teacher should encourage students to discuss the article and analyze how the social behavior of wolves contributes to a peaceful community.

Family Groups (or Packs) of Wolf & their bond

Wolves are complex, highly intelligent animals that are caring, playful and above all devoted to family. 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.

After reading this a part of life story of wolves' teacher divide students into groups and give different values which exist in wolves' life. The students are expected to discuss how these values are important for cohesive community and how it can help create a harmonious & inter connected environment.

- Inter connectedness/Interdependence.
- Collaborative& Cooperative learning

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

B2: Balloon game Activity: Teacher shall take a game in the class to teach the importance of interdependence & collaboration. Teacher shall inform students in advance to bring one balloon.

Round1: Teacher asks everyone to blow their balloon and write their name on the balloon.

Teacher sends all students outside the class

Round 2: Teacher calls students back to the class room but added more balloons without names and scattered around. Teacher asks students to find out their balloons with their names within 5 minutes. The first three students who find the balloons will be the winners and the won that pops the balloon will be disqualified.

Round 3: For the third round teacher asks students if any student finds a balloon with a name on it, give the balloon to the person whose name was on it.

After the game Teacher asks students

What did you learn today? Get different answers from students then

Teacher summarize and say in the 2nd round no one was able to find their balloons as we were working on individual target but in the final round within a couple of minutes everyone had their balloon with you all that's the power of inter-dependence & collaboration and sharing to each other.

Most of the time people hide information, avoid collaboration, and distance themselves from their near & dear ones. This kind of mindset creates obstacles for the growth and in the long run it affects the individual growth also.

V.C: Assignments

C1: Make drawings of global interconnectedness with apt quote to display in school bulletin board.

Resources

References:

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

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 IX No: of Periods – 6

Unit 3

Coordinate Geometry

Interdependence & Compassion

I. Introduction

Coordinate geometry is an important branch of mathematics. It is 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 also the geometric interpretation of algebraic equations. 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. Through this chapter students learn *inter-dependence& compassion*

II. Learning Objectives / Outcomes

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

- Determine the x & y co-ordinate of a point from a graph and write the co-ordinates of the point as an ordered pair.
- Plot a point on the Cartesian plane and determine quadrant of the point. Observe a given ordered pair and comment on its location.
- Apply concepts of coordinate geometry and simplify given real life problems
- Develop inter-dependence and compassion

III. Process & Action Plan

Interdependence & compassion are the two basic values teacher can inculcate through coordinate geometry and its applications. The two coordinates together helps in all these applications It mainly helps us to locate the points in a plane. Its uses are extended in all fields like trigonometry, calculus, dimensional geometry etc. For finding the distance between the places we are using coordinate geometry and in geography also it has many applications. 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

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

1.
Interdependence
Interaction & Discussion.
Ref-B1

2.
Compassion
Story narration & discussion to instil the values.
Ref-B2

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

1
Research study on one application of Coordinates Geometry in real life situation.
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& Compassion* along with other sub-values like integrity, *kindness, helping, honesty, inter-relationship.*

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

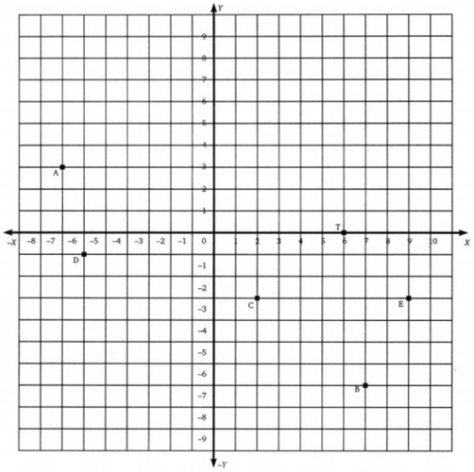
IV. Activities & Related Discussion

A: The Context Activity for the Teacher to Start

Coordinate Geometry involves the use of algebraic processes in the study of geometric problems and the geometric interpretation of algebraic equations. This topic teaches students the value of being helpful to others and developing interpersonal skills& interdependence.

A1: Choose the correct Answer from the Multiple choice with reference to the Graph given below.

Teacher provides these worksheets to revise the previous knowledge of academic concepts at the same time students will take a note of inter-dependence of the coordinates and how it is complementing each other. Teacher shall use this as per time allotment.



1. The coordinate of A in the adjacent graph is:

(a) (-7, 3) (b) (7, -7) (c) (-6, -1) (d) (2, -3)

2. The coordinate of B in the adjacent graph is:

(a) (-7, 3) (b) (7, -7) (c) (-6, -1) (d) (2, -3)

3. The coordinate of C in the adjacent graph is:

(a) (-7, 3) (b) (7, -7) (c) (-6, -1) (d) (2, -3)

4. The coordinate of D in the adjacent graph is:

(a) (-7, 3) (b) (7, -7) (c) (-6, -1) (d) (2, -3)

5. The coordinate of E in the above graph is:

(a) (9, -3) (b) (-4, 2) (c) (-3, -4) (d) (-7, 9)

6. If y – coordinate of a point is zero, then this point always lies:

(a) I quadrant (b) II quadrant (c) x-axis (d) y-axis

7. If x – coordinate of a point is zero, then this point always lies:

(a) I quadrant (b) II quadrant (c) x-axis (d) y-axis

8. The point (-4, -3) means:

(a) $x = -4, y = -3$ (b) $x = -3, y = -4$ (c) $x = 4, y = 3$ (d) None of these

9.. Point (-2, 3) lies in the:

(a) I quadrant (b) II quadrant (c) III quadrant (d) IV quadrant

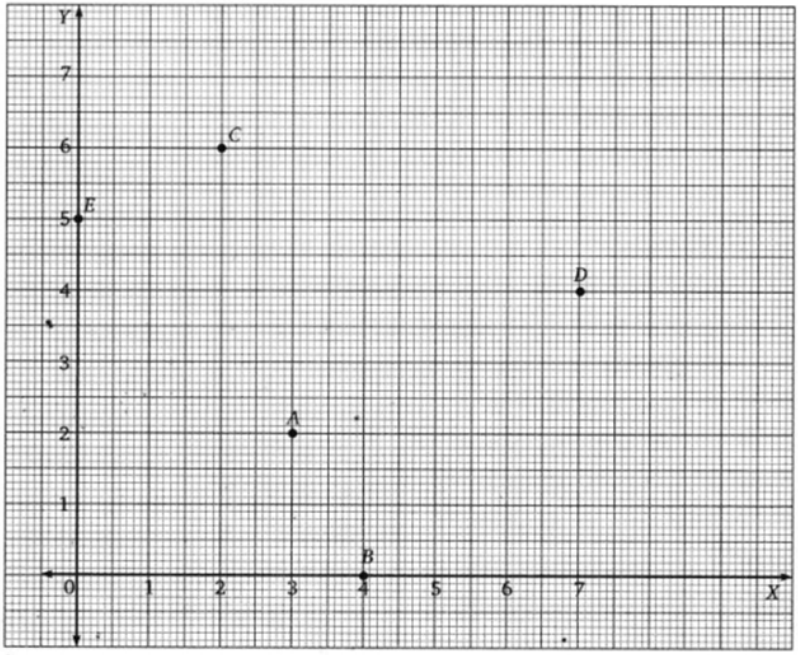
10. Point (0, -2) lies:

(a) on the x-axis (b) in the II quadrant (c) on the y-axis (d) in the IV quadrant

12. Abscissa of the all the points on x-axis is:

(a) 0 (b) 1 c) -1 (d) any numbers

A2: From the given graph, locate the position of points A, B, C, D and



Ref:https://www.worksheetsbuddy.com/grade-8-introduction-to-graphs-worksheets/

Discussion

Teacher shall discuss with students regarding the relation between the x-coordinates & y coordinates and elicit the values. Teacher shall frame suitable questions like

1. For locating the position of a point on the graph do you need X & Y coordinates? What does that teach us? (interdependence)
2. Can you draw a graph with only one set of point?
3. How many axes do you have in a graph?
4. How do you relate coordinate geometry with life values?

Teacher shall discuss with students in coordinate geometry how the coordinates are inter-dependent/inter-connected to each other. To plot or to locate a position we need x-coordinate and y coordinates together, which is applicable in real life too. Without x there is no value for y and vice versa- teacher shall explain the interdependency of coordinates and relate this with real life, how each one of us dependent on each other and help each other to lead a happy and peaceful life)

B: Value Based Activity-

B1: Inter dependence Activity

Discussion Activity:

Teacher asks the following questions

1. If someone in the house falls ill, who do you depend on?
2. If there is some problem with electric supply to your house. What will you do?
3. Who will repair the furniture in your house?
4. If there is some problem with the water tap in your house, to whom will you approach?
5. Who takes care of your studies?

Through these examples what did you understand?

Elicit from students different answers and teacher shall summarize and explain to students that one way or other way how each one of your family depends on so many people to make life comfortable and peaceful. By ensuring good communication, sharing and helping each other we will be successful in creating a happy and conducive environment, thereby promoting harmony, peace and a general sense of togetherness. Here we have taken example of a small unit family. When we open our eyes wide and look into the world outside we can see inter dependence all over. Remind students that they need to have an attitude of help each other, learn from each other to make this world a happy place to live in.

B2: The teacher can cite the below story.

A man was driving his car, when he saw an old lady, stranded on the side of the road. He saw that she needed help. So, he stopped his Fiat near her Mercedes and got out.

He smiled, while he was approaching her, still she was worried, as nobody had stopped for hours. Moreover, he did not look safe, as his appearance was so poor and shabby. He could see, how frightened she was, so he tried to calm her: I'm here to help you, don't worry. My name is Bryan Anderson.

The tire was flat, so he had to crawl under the car. While changing the tire, he got dirty and his hands were hurt. When the job was done, she asked how much she owed him for his help. Bryan smiled. He said: "If you really want to pay me back, the next time you see someone, who needs help, give that person the needed assistance. And think of me".

At the same evening, the lady stopped by a small cafe. That place looked dingy. Then she saw a waitress, nearly eight months pregnant, wiping her wet hair with a towel. The waitress had a sweet friendly smile, although she had spent on her feet the whole day. The lady wondered how someone, who has so little, can be so kind and giving to a stranger. Then she remembered Bryan.

The lady had finished her meal and paid with a hundred dollar bill. The waitress went to get change and when she came back, the lady was gone. She left a note on the napkin: You don't owe me anything. Somebody once helped me, just like now I'm helping you. If you really want to pay me back, do not let this chain of love end with you". The waitress found four more one hundred bills under the napkin.

That night the waitress came home earlier. She was thinking about the lady and the money she left. She was wondering, how the lady could know, how much she and her husband needed it, especially now, when the baby will soon arrive. She knew that her husband worried about that, so she was glad to tell him good news. Then she kissed him and whispered Now everything will be all right. I love you, Bryan Anderson".

Ref: https://www.inspirationalstories.eu/inspirational-stories-about-helping-others/

Discussion

Teacher shall ask students

What did they learn from the story?

Listen the review of different students and conclude that this story imparts an important lesson that in this world 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. Every person is connected to each other in one way or the other and all good deeds always come back.

V. C: Assignments

C1: 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,…)

Resources

References:

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

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 IX No: of Periods – 15

Unit 4

Linear Equations with Two Variables

Equality& Balance

I. Introduction

In this chapter, the knowledge of linear equations in one variable is recalled and extended to that of two variables. Linear equations in two variables, explain the geometry of lines or the graph of two lines, plotted to solve the given equations, which consist of unknown variables. Linear equation is an algebraic equation in which each term has an exponent of one and the graphing of the equation results in a straight line. 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.

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

II. Learning Objectives / Outcomes

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

- Recall concepts of coefficients and variables and construct a linear equation from a given statement.
- Compare a given linear equation to the standard form ax+ by + c + 0 and deduce the values of a, b and c
- Use substitution method and deduce whether the ordered pair is solution to a given linear equation
- Plot the points on a graph and represent a linear equation in two variables

- Solve an equation and represent it on a number line and a Cartesian plane
- Using principles of linear equations, formulate and solve variety of problems in real life situations
- Translates a real-life situation in the form of a linear equation in order to arrive at a generalized problem and solution by maintaining equality& responsibility to bring balance and lead a peaceful life.

III. Process & Action Plan

Teacher use this chapter to teach the value of balancing their life. For balancing their life students need to have control on their emotions and many other factors. Through this chapter teacher through light on all that factors and help those to lead a healthy balanced life. We use equations very frequently in daily life. An equation is the mathematical representation of those two things which are equal. Linear equations are an important tool in science and many everyday applications. They allow scientist to describe relationships between two variables in the physical world, make predictions, calculate rates, and make conversions, among other things. 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
Discussion activity on the balance behaviour in class room
Ref-B1

2.
Equality
Explanation & discussion on the essential ingredients for a healthy equitable balanced relationship.
Ref-B2

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

1
Prepare poster by using equality, relations & balancing life quotes.
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 & Balance* along with other sub-values like *responsibility, trust, honesty& Fairness*

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

IV. Activities & Related Discussion

A: The Context Activity for the Teacher to Start

Linear equation is an algebraic equation in which each term has an exponent of one and the graphing of the equation results in a straight line. Through this lesson students learn equality& responsibility to bring balance and lead a peaceful life.

Teacher provides the worksheets to solve in the class to test the previous knowledge of academic concepts and introduce the values connected to it by discussion method. Teacher shall choose the worksheet as per time allotment

A1: Convert the following statements into equations.

(a) 5 added to a number is 9.

(b) 3 subtracted from a number is equal to 12.

(c) 5 times a number decreased by 2 is 4.

(d) 2 times the sum of the number x and 7 is 13.

A2: Solve the following word problems:

1. Ten added to thrice a whole number gives 40. Find the number.
2. Four-fifths of a number is greater than three-fourths of a number by 8. Find the number.
3. Two numbers are in the ration 4:3. If they differ by 18, find these numbers.
4. Twenty years from now, I will be 4 times as old as my present age. What is my present age?
5. Two supplementary angles differ by 500 Find measure of each angle.

Ref:https://www.math-only-math.com/worksheet-on-word-problems-on-linear-equation.html

Discussion Activity (Elicit the values by asking right questions)

1. What do you understand by the term equation?
2. In the sums while finding out solution did you maintain balance (RHS & LHS)
3. Will you able to find out solution without making equation?
4. What value did you learn from this lesson (Equality & Balance)

Teacher shall explain without equality& balancing we will not be able solve problems. similarly we need to apply this quality in our life to lead a peaceful & healthy life.

B: Value Based Activity-

In linear equations we can see the relation between two variables that make the equation balanced. Similarly in real life we need to treasure relations, relation between classmates, friends & family to have well balanced life**.**

B1: Balancing behavior in the class room: Activity

Teacher shall discuss with students and prepare balance class room action plans/Chart for the class one variable, two variables, three variable etc. Here when we combine the terms we learn about togetherness and harmony. When we use identities, factorization using identities we inculcate equality and teach them to simplify a problem and get solution. Through the below article on the life of wolves to students the teacher should explain to students just like how interconnectedness/Interdependence, togetherness, equality exist in wolves humans should also develop those qualities to live a harmonious life. The teacher should encourage students to discuss the article and analyze how the social behavior of wolves contributes to a peaceful community.

1. What do we need in a class room for it to function efficiently & harmoniously in a balance way?

(Elicit from students and prepare a chart with the help of students so that they will follow systematically. Some points are given below, teacher shall chose right & necessary points in discussion with students

- Punctuality
- Discipline-Avoid unnecessary discipline problems in the class room
- Regularity in homework& class work
- Behaviour with class mates & teachers(reinforce positive behaviour)
- Strike a balance between studies and other activities.
- Change of seating arrangement once in a week
- Develop patience, compassion, genuine respect and care for each other in the class room

- Adapt cooperative learning, Team learning, peer tutoring & group projects. Flexibility of seating arrangement for these activities
- Maintain neatness in the class room
- Maintain positive climate characteristics, develop a sense of interdependence, positive constructive conversations

Balancing behavior in the class room is important because this makes teaching and learning process in an efficient and safe manner. This is a tool to empower students to think about their needs and wants in a healthy, equitable relationship. Teacher shall discuss with students and inform that it is very important to keep cordial relationship between the class mates. Having just one friend can make a big difference to a student's academics, mental health and resilience. Grouping students and prioritizing cooperative learning at school can help cultivate some of those friendships Friends can make mundane tasks more fun. In one study, adolescents working together took part in more exploratory behavior, learned faster, and completed tasks better than they did working alone.

B2: Equality Wheel-The essential ingredients for a healthy equitable balanced relationship

Teacher divides the class into groups and allot topic given in the wheel to each group asks them to discuss in groups and explain in detail about how each point is important to maintain equality& balance and how one can exhibit these traits when interacting with others to maintain a good balanced relationship in class and in life.

After hearing explanation from each group teacher shall summarize and explain to them that to maintain a healthy, peaceful and balanced life we must develop the qualities like respect, trust, honesty, self-confidence, sharing, fairness, good communication & equality …mentioned in the equality wheel. Tell them when they make this as habit they will be very happy in life.

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

V. C: Assignments

C1: Prepare poster by using equality, relations & balancing life quotes for the class to display-groupwise

Resources

References:

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

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 IX No: of Periods – 6

Unit-5

Introduction to Euclid's Geometry

Innovation, Creativity& Curiosity

I. Introduction

Euclidean geometry, the study of plane and solid figures on the basis of axioms and theorems employed by the Greek mathematician. Geometry was being developed and applied everywhere in the world. But this was happening in an unsystematic manner. 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.

II. Learning Objectives / Outcomes

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

- Give examples of theorems, postulates and axioms and differentiate between them with examples. Reproduce Euclid's axioms in own words and give examples for each. List Euclid's five postulates and visualize and illustrate them through a diagram
- Analyse given statements /postulates and determine if they are extensions of Euclid's postulates.
- Apply Euclid's postulates and prove basic geometrical concepts about lines, points, planes, shapes, etc.
- Illustrate the equivalent of Euclid's fifth postulate through a diagram and list conditions for two lines to be parallel.
- Understand the importance of values such as curiosity, creativity & innovation.

III. Process & Action Plan

Teacher shall instil innovation, creativity& curiosity through this lesson.by citing the example of Euclid a, mathematics teacher. His innovation and creativity has given a great contribution to the world. .

Euclidian geometry is the study of geometrical shapes and figures based on different axioms and theorems. It is basically introduced for flat surfaces. The excavations at Harappa and Mohenjo-Daro reveal well planned towns of Indus Valley civilization (about3300-1300BC). The flawless construction of Pyramids by the Egyptians is yet another example of extensive use of geometrical techniques used by the people. In India ,The Sulabha Sutras, textbooks on geometry depict that the Indian Vedic Period had a tradition of geometry. Euclidean geometry is majorly used in the field of architecture to build a variety of structures and buildings. 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.
Innovation, Creativity & Curiosity
Explanation, Quiz & Group discussion/Debate by students on the assigned topic & presentation.
Ref-B1& B2

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

1.
Research study on ancient Mathematics.
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 *Innovation, creativity &curiosity* along with other sub-values like creativity,

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

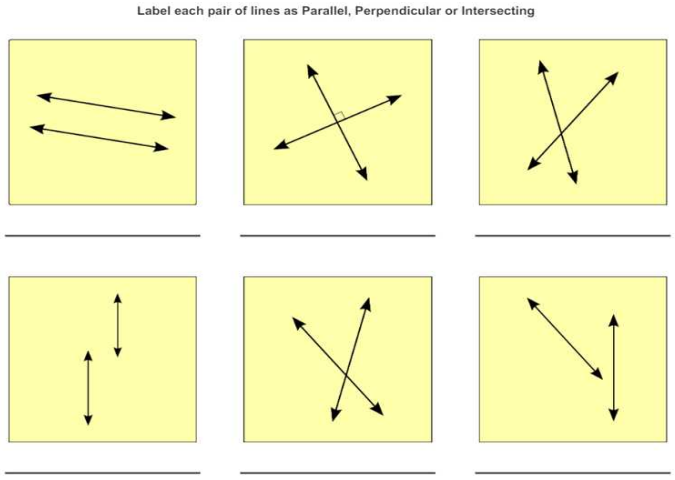
IV. Activities & Related Discussion

A: The Context Activity for the Teacher to Start

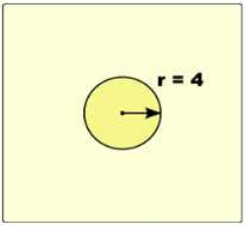
Coordinate Geometry involves the use of algebraic processes in the study of geometric problems and the geometric interpretation of algebraic equations. This topic teaches students the value of being helpful to others and developing interpersonal skills& interdependence

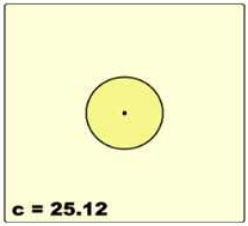
A1: Choose the correct Answer from the Multiple choice with reference to the Graph given below.

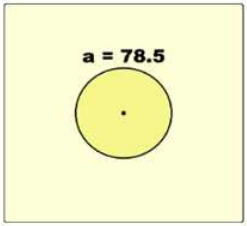
Teacher provides these worksheets to revise the previous knowledge of academic concepts at the same time students will take a note of inter-dependence of the coordinates and how it is complementing each other. Teacher shall use this as per time allotment.



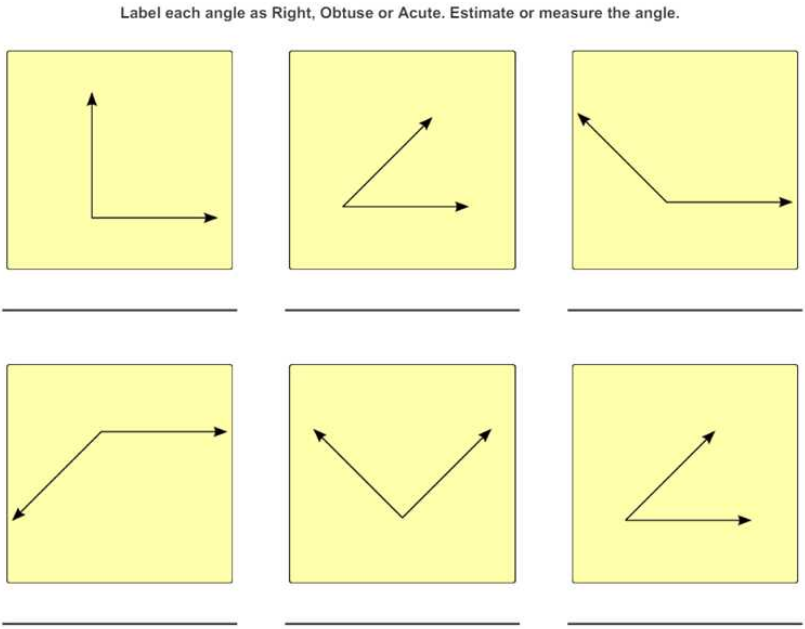
A2: Calculate radius, diameter, circumference & area, Use pi=3.14







A3:



https://www.dadsworksheets.com/worksheets/basic-geometry

Discussion:

Teacher shall different questions and elicits the values by providing hints

1. How did you identify and label the lines and angles? **(**Through previously learned definitions**)**
2. What helped you to calculate radius, diameter, circumference and area of circle? (Through previously learned formula)

A3. Do you know who is the innovator and creator of the definitions and formula for Euclids geometry? (Teacher shall ask them to research)

4. What are the values are you learning from this lesson? Provide clues

(Innovation, creativity, curiosity)

B: Value Based Activity:

B1- Discussion &Quiz (Innovation, creativity& curiosity)

Teacher shall conduct a quiz competition in the class mainly based on discoveries. Teacher shall tell students to say in advance so that they can prepare and come.(some questions as examples)

1. Who is known as the "Father of Geometry?" (Euclid)
2. He was a Greek mathematician known for shouting "Eureka!" in his bathtub. (Archimedes)
3. Which mathematician proved the famous formula e^(i*pi) + 1 = 0?(Leonhard Euler)
4. A famous textbook, "The Elements", was still used as recently as the twentieth century. Who was the author of this text? (Euclid of Alexandria)
5. What mathematician is known as the Father of Algebra? (Diophantus)
6. When finding the circumference and the area of circles, 'pi' is used. Pi is a number which never ends, and in some schools is given as approximately 3.14 or in fraction form as 22/7. Who is credited with the first value for pi, as between 3 10/71 and 3 11/71?(Archimedes of Syracuse)

Ref:https://www.funtrivia.com/trivia/People/Mathematicians-20174_5.html

The purpose of conducting this quiz is to instill curiosity among students and make them aware the importance of creativity & innovation, how it is helping the mankind. We should be proud of these great people but at the same time teacher shall motivate students they should be proud of their own qualities and capabilities and use appropriately

B2: Curiosity, Innovation& creativity: Debate:

Teacher shall discuss with students and explain that geometry is a set of systems which is consistent with the definitions and axioms as the determining rules based on various applications and needs or interests, and the conclusive truth is the result of social agreement of expert mathematician. This theoretical knowledge has led to some of the most fascinating discoveries and inventions that are still used to power some of our modern technologies

Why are we learning geometry? How does this topic help shape our personality and thereof our world view?

Aim of debate topic.

Through the above topic the teacher should ensure students understand how the curiosity of few led to documentation of some of the most fundamental concepts of mathematics which paved the way for individuals to innovate and build upon existing plethora of knowledge and create some of the most fascinating inventions that the world has ever seen.

Students should understand that that to achieve greatness in life, one must start with some thing as simple as curiousness to learn. This curiosity will lead to passion further paving the way for creativity and innovation.

Ref: https://aip.scitation.org/doi/pdf/10.1063/1.5028100

V. C: Assignments

C1: Research study regarding ancient mathematics advantages& disadvantages.

Resources

References:

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

Resources for Teachers:

https://blog.planbook.com/teaching-geometry/

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 – 13

Unit-6

Lines & Angles

Inter-connectedness & Inter-relationship

I. Introduction

Geometry is used to describe 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.

II. Learning Objectives / Outcomes

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

- Define segment, ray, collinear points, non-collinear points, acute angle, right angle, obtuse angle, straight angle, reflex angle, complementary angles, Supplementary angles and identify them in each figure.
- Label angles created by two intersecting lines and identify vertically opposite pairs, adjacent angles, linear pairs, complementary/supplementary pairs of angles.
- Apply the concepts of linear pairs of angles and vertically opposite angles and establish relationships between the angles in a given figure and solve for missing values.
- Label angles created by a transversal intersecting two parallel lines and identify corresponding angles, alternate angles, interior angles and define relationship between these angles.
- Find out the unknown angles created by a transversal in a given figure and infer if the lines are parallel or not.

- Define relationship between angles formed when a triangle is placed between two parallel lines and prove that exterior angle of a triangle is the sum of the two opposite interior angles.
- Observe the angles and sides of the given figures and find out whether they are congruent or not congruent.
- Understand that maintaining connections and relationships are important.

III. Process & Action Plan

Teacher shall use this lesson to teach inter-connectedness & inter relationships as when we connected points together we get lines and when we connect or relate two rays angles are formed. Similarly we need inter connectedness and inter relationship in life too. Engage students in a discussion of lines and angles in their lives. The horizon, an aerial view of the city, the proportions and shape of a desk, chair or door are the some of the examples of geometry. 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 :

1.
Introduce the **context** activity:
Discussion & Worksheets.
Ref-A1 & A2

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

1.
Inter-dependence
Video, Discussion & explanation regarding Globalisation & interdependence.
Ref-B1&B2

2.
Inter-connectedness
Explanation with example & Presentation by students on inter-connectedness on any topic.
Ref-B3 & B4

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

1.
Prepare/Research an example of Interdependence/Inter connectedness/ globally/locally.
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 *Inter-connectedness & Inter-relationship* along with other sub-values like *inter-dependence, happiness, discipline, teamwork.*

The unit also provides the scope to develop the following life skills in the students: *drawing, accuracy, observation, logical reasoning.*

IV. Activities & Related Discussion

Geometry is used to describe the relationship of figures and objects to the space around them. Though this lesson the teacher shall explain to students the importance of inter connectedness and interrelationships and its significance in life.

A: Context Activity for the teacher to start:

Teacher shall provide worksheet to solve in the class to test the previous knowledge and introduce the new chapter and the values associated with the lesson.

A1: Fill in the blanks:

a) Two _____ are said to form linear pair of the angels if their non-common arms are two opposite rays.

b) If a ray stands on a line, then the sum of the adjacent angles so formed is _____.

c) The sum of all angles around a point is _____.

d) An angle which is equal to its complement is _____.

e) Two angles are called a pair of _____ if their arms form two pairs of opposite rays.

f) If two lines intersect then the Vertically opposite angles are _____

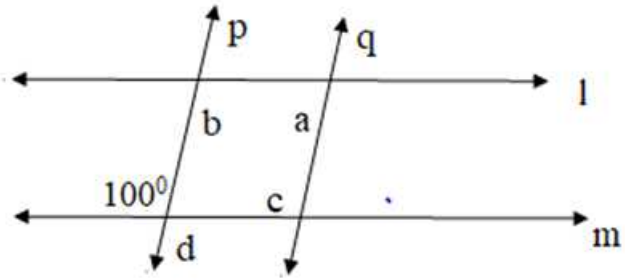
g) A line which intersects two or more lines at distinct points is called a _____

h) You can draw _____ transversals on a line.

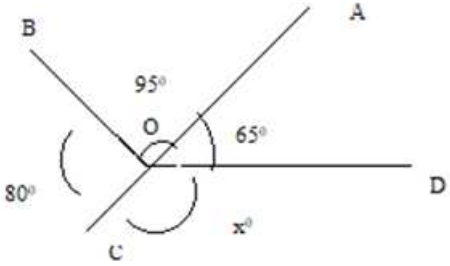
(I) If two lines are intersected by a transversal such that any pair of corresponding angles are equal then the lines are _____

A2: Solve the Following

1. In the given fig. I is parallel to m and p | | q. Find the measure of each of the angle's a, b, c, d.



2.In the given below figure rays OA, OB, OC and OD intersect at a point. Find the value of X



Ref:https://physicscatalyst.com/class-7/lines-and-angles-worksheet.php

Discussion:

Teacher shall ask different questions and elicit the values from students by giving clues if necessary

1. While solving sums could you find any relation between angles, lines, rays and points?
2. How are adjacent angles formed? (Interconnection between a lines & a rays)
3. Define linear pair angles formation?(Inter relation between two angles whose uncommon rays are opposite rays)

This way teacher shall frame questions and register the value of interconnectedness and inter relationship in students and tell them the importance in life.

B:Value Based Activity:

B1:https://www.youtube.com/watch?v=Zn9SE2wp-T4 - 20sec

Techer shall play the video and ask students

What did learn from the video? Encourage students to reflect upon the value they have learned and connect it to their own lives. Inter-connectedness between the nature and human being. This is a typical example of interconnectedness and existence

B2: The Effects of Human Interdependence & Globalization

Teacher shall discuss with students as they have already studied regarding lines & angles in std VII, teacher shall take a revision.

Think about the product you use daily

1. Mobile phones-many mobile phones design is made in America parts are made in Korea, china & japan, assembled in India
2. Computer/Laptop-many components are imported from Taiwan, china and assembled in India
3. Shoes-Chennai, Ludhiana, and Jalandhar are famous for making shoes; it is exported to different countries
4. Clothes-Indian formal clothes like Raymond's have high demand is most of the foreign countries.

Teacher shall elicit some more examples from students

We live in an interconnected world and countries economics are linked with each other. We have access to products from many places and locally produced goods are often exported.

B3: Teacher shall give an example of Human Inter dependence:

Consider the flour industry- one person specialises in growing crops, another on milling, one on packing, distributing, and finally selling it. They need each other to deliver the final product, and if one day the mill stops, everyone is affected: they are all interdependent. Nowadays, most countries are also interdependent because they rely on other countries for supplying local demand and for selling local products. This interdependence is strong, and one nation's actions often have consequences on another's. For example, China's labour costs impact employment in other countries, Russia's policies on gas affects transport costs in Europe, and air pollution generated in the United States has global effects.

From these examples and explanation teacher shall instill the significance of Inter-connectedness/inter-dependence.

B4: Teacher shall divide students into groups and give the topic for Group Discussion & presentation in class.

Based on above examples

1. Effects of human inter dependence and globalisation
2. Social networking vs In-person networking

With the emergence of new technology enabling networking to take place online, people are rushing to join the ever-growing population of online networkers. Has this caused traditional face-to-face networking to lose its place in contemporary cotemporary relations? Or does it still have a unique value that social networking on LinkedIn and other social networks lacks.

V. C: Assignments

C1: Prepare/research an example of how things are interdependent/Interconnected, how situations in different regions/countries/ individuals have an impact on you.

Resources

References:

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

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 – 20

Unit 7

Triangles

Strength, Ethics & Aesthetic

I. Introduction

This chapter elaborates on the congruence of triangles, rules of congruence, some more properties of triangles and inequalities in a triangle. 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.

II. Learning Objectives / Outcomes

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

- Observe the angles and sides of the given figures and find out whether they are congruent or not congruent.
- Apply concepts of linear pairs of angles, vertically opposite angles, corresponding angles, alternate angles, transversal angles &exterior angles of a triangle and prove congruence between two triangles in a given figure
- Illustrate the criteria of congruencies of triangles through diagrams (ASA, SAS, SSS. RHS) and prove relationships between given angles, sides and triangles of a given figure.
- Apply criteria for congruence in a triangle with two congruent sides and prove that the angle opposite to the sides are equal and apply it in a given figure to solve for the measure of an angle.

- Using properties of inequalities in triangles prove the relationship between any given sides or angles in each figure.
- Application of congruence in life which teach Strength, Ethics & Aesthetic appeal of personality.

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. Whenever identical objects have to be produced, the concept of congruence is used in making the cast. You can find numerous examples where congruence of objects is applied in daily life situations which gives them strength and aesthetics. Ice tray in the refrigerator where all the moulds for making ice are all congruent, pages of your notebook, Wheels of bicycles, biscuits in a pack are congruent.

. 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

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.
Steadfastness & congruence
Explanation on how congruence shape the quality
Ref-B2

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

1.
Collection of pictures of beautiful structures where principle of congruence is applied.
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 *Strength, Ethicality & aesthetic* along with other sub-values like *precision, accuracy, discipline.*

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

IV. Activities & Related Discussion

This chapter elaborates on the congruence of triangles, rules of congruence, some more properties of triangles and inequalities in a triangle. 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.

A: The Context Activity for the Teacher to Start

A1: Fill in the Blanks:

1.Two angles are congruent if they have ----------

a) same name b)equal measure c) unequal measures d) none of these

2. Δ ABC and Δ PQR are congruent under the correspondence: ABC ↔ RQP, then the part of AABC that correspond to Pis ----------

a) A b) B c) C d)none of these

3. Which one of the following is the value of congruency?

a) SAS b) ASS c) SSA d) none of these

4. In triangles ABC and DEF. AB = 7 cm. BC = 5 cm, B= 50°, DE = 5 cm, EF = 7 cm, E= 50°. By which congruence rule the triangles are congruent?

a) SAS b) RHS c) ASA d) SSS

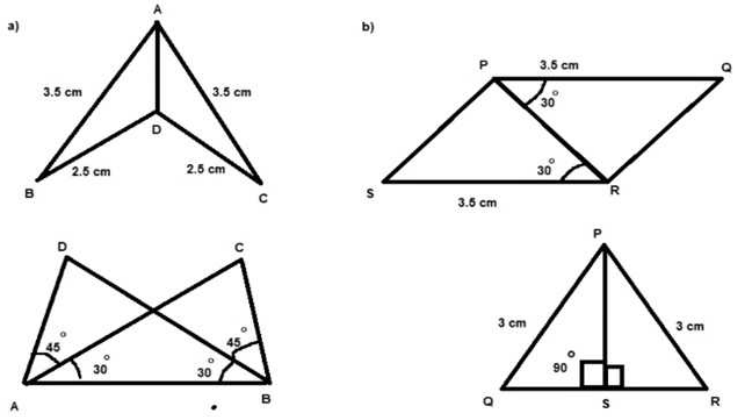
5. By which of the following criterion two triangles cannot be proved congruent?

a) AAA b) SSS c) SAS d) ASA

A2:Which congruence criterion will you use in the following. Write the congruence in symbolic form

Ref:https://www.worksheetsbuddy.com/grade-7-congruence-of-triangles-worksheets/

Ref:https://www.studiestoday.com/node/213109/viewfile.html



Discussion:

Teacher shall discuss with students

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 (Strength, ethics& aesthetics)) Guide the students that to make triangle congruent we need to follow certain defined rules. We will not be able to take as per our wish.

Similarly in life also we need to follow certain ethics and values. Congruence bring beauty & strength in structures. Talk to students in real life accepting differences and co-existing with everyone, which give stability and beauty in life.

B: Value Based Activity-

B1:

Teacher shall discuss about the application of congruence of triangles in real life. By using the principle of congruent triangles in architecture buildings are very stable, strong and with aesthetics beauty. The stability of such structures is derived from the hard work of all the people who built such structures without cutting corners and exhibiting exemplar ethical fortitude.

Teacher shall show few examples either by pictures or by presentation.

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

Teacher shall divide the class into groups and ask students to do a research and find out structures where gross mismanagement of conduction practices were done and how did it impact the world. The groups must present in the class with brief description and lessons learnt from such unethical practices.

The aim is to teach the negative impacts that are seen in other people's lives because of unethical practices and why one should always avoid this.

B2: How Congruency Shapes the Quality of Your Life

Teacher shall explain that: The people who are congruent (consistent, balanced & harmonious) in everything, they conduct themselves well in every situation, they interact in their personal relationships, and they treat themselves well and are always the most fulfilled people.

How can congruency be created in life?

It's created through incredible conviction to an identity that you create for yourself that rolls over into every aspect of your life. You treat the poor homeless man on the corner with the same compassion and respect you give to a rich person. You work as hard or harder on maintaining your personal health as you do on maintaining work relationships. You give the intimate relationships in your life the same attention and focus as you do in your other work/business relationships. Congruency is key to developing an unshakable identity. When you have the same amount of conviction in all aspects of your life it becomes your natural state. You won't have to ever "turn it on", because it will be who you truly are.

There is a redemptive quality to the universe when you are congruent in this way. People trust you and see you as a leader, because they can trust that how you do one thing is going to be how you do everything. Someone who lives with congruency acts in direct accordance with their dreams, desires, beliefs, values, mission and goals. They do not let the thoughts of others affect their approach to the world.

What can you upgrade that will make you more congruent?

Take an inventory on the different aspects of your life and see what you can improve in your own personality.

1. Start by taking small actions going forward that get you in complete alignment.
2. The next time you go to the gym, don't just go through the motions. Be incredibly intentional about what you want to accomplish and give it a 10/10 all-out effort.
3. The next time you sit down to do some work get yourself into the most resourceful mind-set possible, do your hardest task first and complete work that you believe to be 10/10 quality.
4. Sometimes you just need a little reminder of how great you can be.

"Your life changes the moment you make a new, congruent, and committed decision" - Tony Robbins.

"The need to learn is our mental need to develop and to grow. And the need to leave a legacy is our spiritual need to have a sense of meaning, purpose, personal congruence, and contribution" – Stephen R Covey

V. C: Assignments

C1: Prepare a collection of constructions of buildings or beautiful structures where congruence of triangle principle is applied.

Resources

References:

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

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 IX No: of Periods – 10

Unit-8

Quadrilaterals

Stability, Aesthetics and Diversity/Inclusivity

I. Introduction

In geometry, a simple closed curve made up of only line segments is called a polygon. We give different names to these polygons depending upon the number of sides. A quadrilateral can be defined as a closed, two-dimensional shape which has four straight sides. Depending upon its unique property we give different names to the quadrilaterals like square, rectangle, rhombus, parallelogram, kite, and trapezium etc. In this chapter, we discuss more about different types of quadrilaterals, their properties and especially those of parallelograms.

Because of their inability to be uniform, they make good designs and attract the eyes. Each quadrilateral is unique and different in its own way; however, they are independent with their own set of properties and purposes. Comparing the learnings from this lesson to 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. 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. Teacher can instil stability, aesthetics & diversity through this chapter.

II. Learning Objectives / Outcomes

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

- Apply angle sum property of quadrilateral and find the value of the unknown angle
- List the properties of quadrilaterals and classify real life objects into different types of Quadrilaterals
- List the properties of parallelogram and identify if a given quadrilateral is a parallelogram
- Apply properties of parallelogram and find a) an unknown angle b)an unknown side

- Prove the midpoint theorem of triangles using concepts of congruency and transversal angles and extend the application to quadrilaterals
- Learn the application of quadrilaterals in real life and how understanding the importance of stability, aesthetics and inculcating the value of inclusiveness in oneself.

III. Process & Action Plan

Quadrilaterals are very useful in field of architecture and construction of buildings. There are other irregular quadrilaterals which have the capacity to make things look good. Hence, they are used mostly by designers. Quadrilaterals are used in electronic devices like mobiles, laptops, computers, TVs, etc. In stationery items like books, copies, chart-papers, etc. Because of their inability to be uniform, they make good designs and attract the eyes. 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.
Stability, Aesthetics and Diversity
Discussion, Explanation & demonstration of different applications.
Ref-B1

2.
Stability, Aesthetics and Diversity
Group discussion on the assigned topic.
Ref-B2

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

1.
Research Study on the application of Quadrilaterals& Triangles in real 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 *Stability, Aesthetics and Diversity* along with other sub-values like *teamwork*, *curiosity, inter-connectedness, inter-relationship.*

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

IV. Activities & Related Discussion

In geometry, a simple closed curve made up of only line segments is called a polygon. Comparing the learnings from this lesson to 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.

A: The context activity for the Teacher to Start:

A1: Fill in the blanks

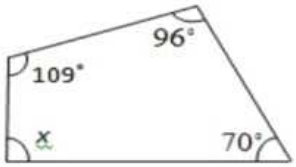
1. A quadrilateral has_____diagonals.
2. The sum of the angles of a quadrilateral is_____.
3. The sum of the angles of a quadrilateral is_____right angles.
4. The number of sides and the number of diagonals is same in a_____.
5. The regular polygon having 4 sides is called a_____.

A2: Solve the Following

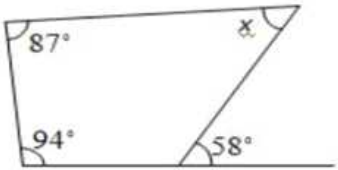
1. The angles of a quadrilateral are in the ratio 3:5:7:9. Find the angles of the quadrilateral.
2. Three angles of a quadrilateral are equal. Fourth angle is of measure 150°. What is the measure of each of the equal angles?
3. Three angles of a quadrilateral are 110°,50° and 40° . find the measure of its fourth angle.
4. If the sum of two angles of a quadrilateral is 180°, what is the sum of remaining two angles?

A3: Find 'x' in the following figures.

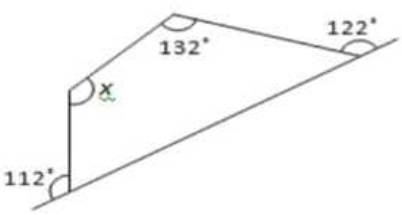
a)



b)



c)



Ref: http://www.aees.gov.in/htmldocs/downloads/

Discussion:

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 (Stability, Aesthetics and Diversity)

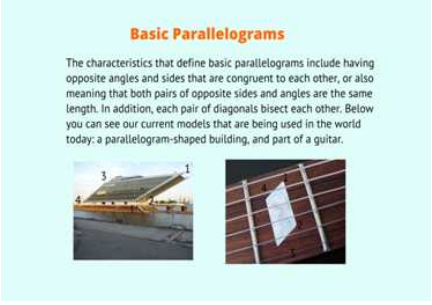
1. When the measure of angles of Quadrilaterals differs what happens to its shape?

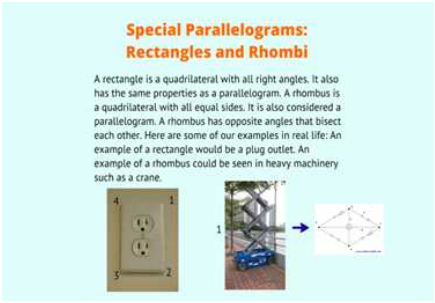
2. Do we use different types of quadrilaterals in daily life? Could you name some?

Guide the students to understand the beauty and importance of different shapes. Tell them just like triangles, Quadrilaterals also ensure beauty & stability in structures.

B: Value Based Activity-

B1: Teacher shall discuss regarding the application of quadrilateral in the real world. Teacher explains real-world applications where a quadrilateral has been used and the scientific reason for using any shape





https://prezi.com/x8bbulo_zjhh/quads-in-the-real-world/?

B2. Group Discussion

Teacher can further entrust students with the task of finding how different shapes are connected and how this connection makes it durable, strong & beautiful. It allows you to determine how different shapes and figures fit together to maximise efficiency and visual appeal. Teachers should emphasize that students should nurture healthy relationships and build sustainable networks with people from diverse backgrounds.

Teacher shall divide students into groups and assign the following tasks for discussion.

a. When working in a team, what is more important? Individual recognition or Team success? (value – Teamwork)

b. As part of a team, should everyone have fixed roles or should everyone play different roles as per the team's requirement? (value – Teamwork, Inter-connected)

c. How can inclusivity of ideas, opinions and people lead to success? (value – Inclusivity, diversity)

V. C: Assignments

C1: Do a research Study where Quadrilaterals & Triangles or its applications are used in real life and submit report

Resources

References:

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

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 IX No: of Periods – 7

Unit-9

Areas of Parallelograms and Triangles

Sturdiness, Aesthetics, Curiosity & Team Work

I. Introduction

Introduction to Euclid's Geometry, deliberated the study of Geometry, originated with the measurement of earth (lands) in the process of recasting boundaries of the fields and dividing them into appropriate parts**.** In this chapter, consolidate the knowledge about formula by studying some relationship between the areas of geometric figures under the condition when they lie on the same base and between the same parallels.

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.

II. Learning Objectives / Outcomes

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

- Identify the planar region and area associated and show that area of non-overlapping planar region formed is the sum of their areas.
- Identify if given figures lie on the same base and between the same parallels and write the common base and the two parallels. Extend the understanding of congruency of triangle and prove that: Parallelograms on the same base and between the same parallels are equal in area, Two triangles on the same base (or equal bases) and between the same parallels are equal in area, Two triangles having the same base (or equal bases) and equal areas lie between the same parallels.
- Develop curiosity, confidence, trust & teamwork, also to appreciate aesthetics& beauty in everything around them.

III. Process & Action Plan

Knowledge of Euclidean Geometry and specially the properties of various types of quadrilaterals plays very special role in work of architects as it helps them to design any building by making effective utilization of space. Quadrilaterals are second most popular shape used in architectural designs. With four corners and four edges it is possible to get many types of quadrilaterals such as trapezium, parallelogram, rectangle, square, rhombus and kite etc. by bringing variations in their angles and sides. This dynamic character of four-sided polygon gives lots of possibilities and freedom to architects to create beautiful buildings. 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.
Stability, Aesthetics
Discussion, Explanation & demonstration of different applications.
Ref-B1

2.
Stability, Aesthetics
Curiosity& Team work
Group discussion by students on the assigned topic.
Ref-B2

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

1.
Prepare a dream house/school plan group wise by using quadrilaterals and triangles and other geometrical shapes

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 **curiosity & teamwork** with other sub-values like *confidence, trust, courage, aesthetics, sturdiness, stability*

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

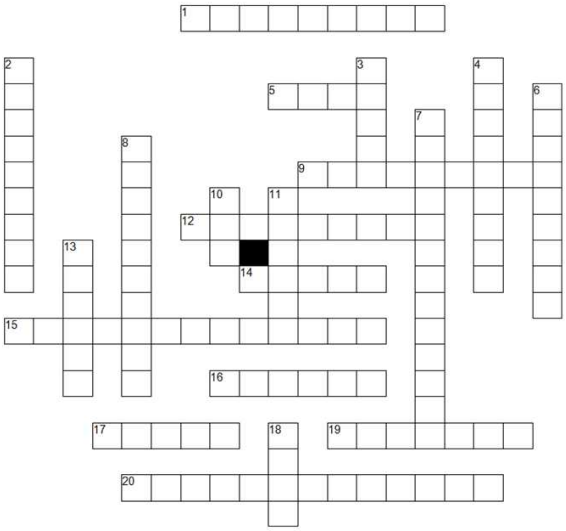
IV. Activities & Related Discussion

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.

A: The context activity for the teacher to start:

A1: Teacher shall provide worksheets GroupWise to solve in the class to inculcate team work & curiosity and to introduce new lesson and the values associated with the lesson**.**

https://wordmint.com/public puzzles/227134



Across

1. A parallelogram with four right angles
5. Quadrilateral with exactly two pairs of consecutive congruent sides.
9. If a parallelogram is a rectangle, then its diagonals are?
12. A polygon is a segment that connects any two nonconsecutive vertices
14. if parrallagram is ..... then the diagononals are congruent
15. Quadrilateral with both pairs of opposite sides parallel
16. Parallelogram with four congruent sides and four right angles
17. A quadrilateral with exactly two pairs of consecutive congruent sides
19. A parallelogram with all four sides congruent
20. If a parallelogram is a rhombus, then its

Down

2. if a trapezoid is isosceles, then each pair of base angles is what
3. how many triangles does an nonagon have
4. a quadrilateral with exactly one pair of parallel sides
6. If there was a 45, 90 degree angle, what is the other angle
7. If both pairs of opposite sides of a quadrilateral are congruent, then the quadrilateral is a what?
8. the angles formed by the base and one of the legs of a trapezoid
10. how many sides does a hexagon have?
11. What are base angles formed with?
13. if you have and 90 degree and 60 degree angle in a triangle was is the other angle
18. how many sides does a nonagon have?

Discussion:

Once students understand the concept ask students regarding worksheets.

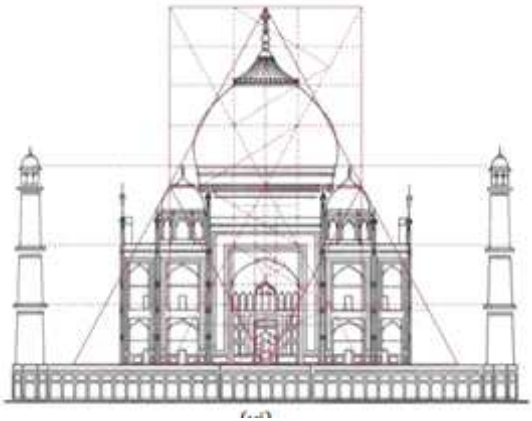
Could they learn any value from this exercise? Provide them some clues so that teacher can elicit from them (Sturdiness, Aesthetics, Curiosity & Team Work…) Ask students how they experienced the importance of team work and curiosity while solving cross word puzzle. Different types of quadrilaterals & triangles bring harmony, beauty & sturdiness in structures. Talk to students about harmony in relationships like accepting differences and co-existing with everyone, which give sturdiness and beauty in life.

B: Value Based Activities:

B1- Explanation& discussion of how Parallelograms & triangles give stability, sturdiness, aesthetic value in construction of buildings/Monuments

Teacher shall demonstrate some pictures where parallelograms and triangles are used in construction& design of building which make them sturdy, stable and beautiful. Ask students to observe the prominent use of parallelograms, rectangles, squares, rhombus and trapezium

etc. in designs of buildings. Architectural style of most of buildings can be understood using quadrilaterals. Right from foundation of the building to the vertical pillar and horizontal cross beams to the top roof one or the other type of quadrilateral is used. Very often it can be observed at construction sites that rectangular frame with a diagonal is used. It is done to provide strength to building as the diagonals provide rigidity in rectangular frame. Teacher shall demonstrate & explain a geometrical sketch of Taj is divided into rectangular grids. A careful and geometrical analysis of this sketch will help students to appreciate the symmetry in Taj.



The above picture clearly reflects that

- Tomb is comprised of rectangular building with dome over it. Height of the dome is equal to the height of building.
- Three chambers of side minarets are congruent trapezium.
- Simultaneous patterns on both sides of building of Tomb can be observed everywhere be it the wall or the windows or minarets.
- The concept of golden ratio was used in design of Taj Mahal.
- All rectangles used in the tomb building and its main arch are all Golden rectangle. That means Ratio of length to breadth in all rectangles is equal to 1.618. This ratio is known as Golden ratio and is represented by Φ

Using properties of quadrilaterals and mid-point theorem one can explore geometrical symmetry of Taj from different perspectives.

Discussion:

Did you get any new information today? Teacher should ask students to explore more, improve ones curiosity. To bring beauty and sturdiness to this monument teamwork and minute application of principles were used .Similar way to achieve stability beauty & success in life one need to have curiosity to learn more and teamwork is required.

B2: Teacher shall divide the students in to different groups and give a monument for case study to identify the application of quadrilaterals, triangles and its properties which give sturdiness, stability and aesthethetics. Ask students to do a presentation to class by group wise

- Group I-Taj Mahal
- Group II- United Nations Building, New York
- Group III- Eiffel Tower, Paris, France
- Group IV- The Kuggen Building, Gothenburg, Sweden

The case study shall be used as an opportunity to create interest of students in Geometry and to show them practical aspect of problems. Working together for a common goal will help students to develop team work, confidence & curiosity to explore more. They understand the sturdiness, stability and beauty of relationships.

Ref:http://cbseacademic.nic.in/web_material/Circulars/2016/47_Mathematics_Theme_1_2_Class_IX.pdf

V. C: Assignments

C1: Prepare a dream house/school plan group wise by using quadrilaterals and triangles and other geometrical shapes

Resources

References:

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

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 IX No: of Periods – 13

Unit 10

Circles

Equality

I. Introduction

This chapter discusses about circle, different terms related to circle, different theorems and properties related to circle. A circle is a closed two-dimensional figure in which the set of all the points in the plane is equidistant from a given point is called "centre". Through this lesson the teacher shall espouse the importance of equality among students. 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.

II. Learning Objectives / Outcomes

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

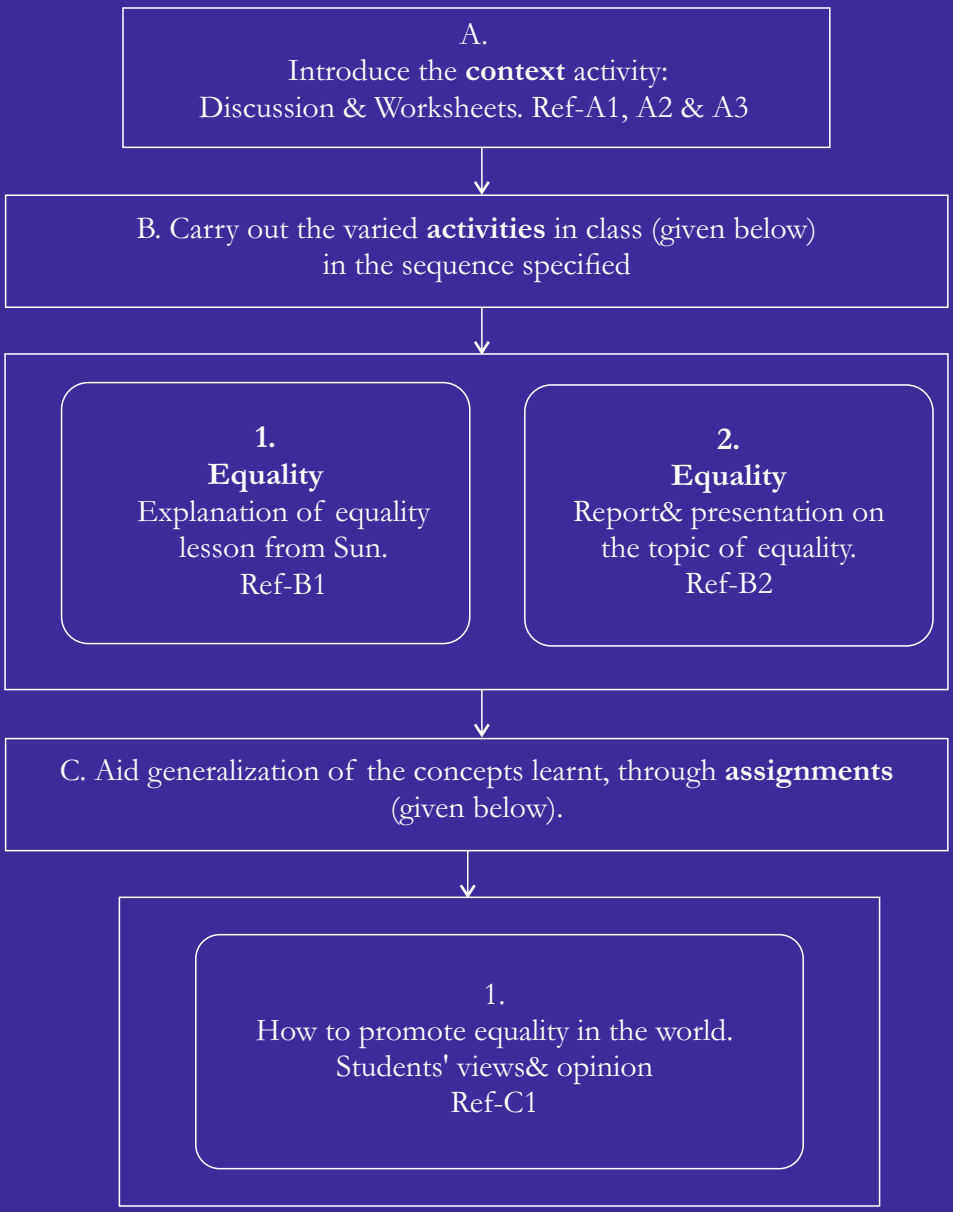
- Verify that the length of multiple segments drawn from the center of the circle to the circumference is equal.
- Define radius, chord, diameter, segment (major and minor), arc (major and minor), interior or exterior of a circle and illustrate and label them on a given circle.
- Apply theorems regarding angle subtended by a chord in a circle and find the measure of an angle in the given figure.
- Apply the property of perpendicular from the center to the chord and solve for the missing values (lengths and angles) in a given figure.
- Construct circle passing through 1, 2 & 3 non-collinear points and comment on how many circles can be constructed passing through them.

- Interpret and apply theorems on the angles subtended by arcs of a circle and solve for unknown values in given examples.
- Apply the relation between angles of a cyclic quadrilateral and solve for the value of a given angle
- Learn the significance of equality in real life situations

III. Process & Action Plan

The lesson teaches students the significance of equality and how one can implement that in life. The word 'circle' is derived from a Greek word that means 'hoop' or 'ring.' In geometry, a circle is defined as a closed two-dimensional figure in which the set of all the points in the plane is equidistant from a given point called "centre." The history of the circle is ancient. People used to believe that the moon, sun, and other planets are circular because there was no concept of 3D shapes; mathematicians study circles which helped them develop calculus and astronomy. Circles are all around us! Some of the real-world examples of circles are: The wheel of a bicycle, Coin, Dinner plate, Wall clock, Ferris wheels. 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.
Equality
Explanation of equality
lesson from Sun.
Ref-B1
2.
Equality
Report& presentation on
the topic of equality.
Ref-B2
C. Aid generalization of the concepts learnt, through **assignments**
(given below).
1.
How to promote equality in the world.
Students' views& opinion
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* 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.*

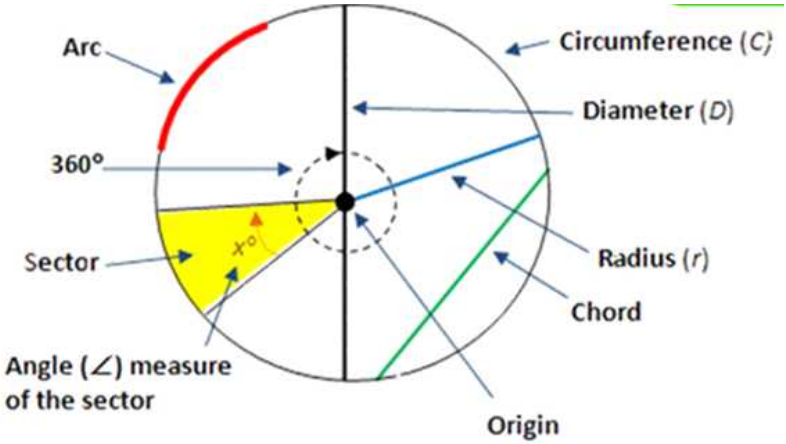
IV. Activities & Related Discussion

A: The Context Activity for the Teacher to Start

A circle is a closed two-dimensional figure in which the set of all the points in the plane is equidistant from a given point is called "centre". Through this lesson the teacher shall espouse the importance of equality among students.

A: The Context Activity for The Teacher to Start

A1: Teacher shall revise the definition of circle and different terms related to circle by interactive method and introduce the values associated with this lesson



Ref: https://paolinmath.weebly.com/circles.html

A2: Life without Circles

Teacher shall discuss daily activities where the shape of circle used.(Coins,Tyres of all vehicles, bangles, tawa, plates and elicit more from students. Tell them how circle has become an important part of our life.

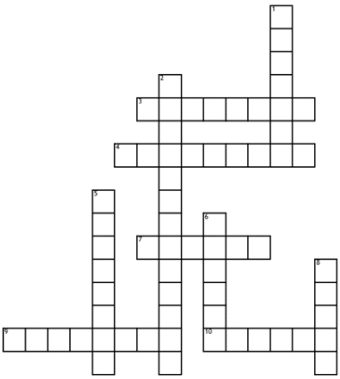
Teacher shall divide the students into teams. Each team can have maximum four students. Teacher shall tell them to write a note regarding "Life without circles"

What will happen "If wheels become square in shape".

What will happen "If cricket ball becomes triangle in shape".

Teacher encourages students to think creatively and reflect on the difficulties that may be faced if circle did not exist. Students can brainstorm and write points and discuss in the class as a fun activity.

Across	**Down**
3. Achord that passes through the center of a circle	1. Aline that intersects the circle in exactly one point
4. The distance between the end points along an arc, measured in linear units	2. The distance around the circle
7. Any line that intersects a circle in exactly two points	5. An arc with a measure less than 180 degrees
9. An arc with a measure greater than 180 degrees	6.Any segment with end points that are the center of the circle and a point on the circle
10. Aregion of circle bounded by a central angle and its intercepted arc	8.A segment wit end points that are on the circle



https://wordmint.com/public_puzzles/340766

Discussion:

Just as a Circle is uniform and equidistant from all points on its circumference, teacher should draw lessons from this lesson to one's life and explain the importance of treating everyone equally.

B: Value Based Activity-

B1:Equality lessons from sun

Teacher shall discuss the value, equality with the example of sun. If the sun didn't exist several things wouldn't occur. Elicit the answers from students (Conduct a discussion in Class)

The sun plays the most essential role for all living species on Earth, without the sun there would be no existence of life on Earth. Then teacher shall explain the quality of sun.

The process of photosynthesis would not take place, oxygen cannot be created, and therefore, life cannot be present.

Sun supplies Earth with never ending energy that we use in multiple ways. The energy comes in as heat and light and we transform the energy in different ways to create electricity.

The sun and its sunlight give us access to many resources. Sunlight helps the plants produce oxygen and overtime create fossil fuels.

The sun's positive effects help us find and progress ways to gain renewable resources, such as creating wind power, dams and solar energy.

The sun gives away all its resources equally to all living things on earth.

B2: Report/ Presentation on the Assignment

The teacher should encourage students to understand the importance of equality as a value and its implications to society. To achieve this, divide the students into groups and assign them a topic for research and presentation.

A few topics are listed below:

1. Social Justice in India and its propagation through the Constitution of India
2. How to achieve gender Equality in India
3. Universal Adult Franchise: Politico Legal Equality
4. Is Inequality a threat to Democracy?

Does income inequality affect our lives?

V. C: Assignments

C1: : Ask students to write their views&opinion .How can we promote equality in the world?

Resources

References:

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

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 IX No: of Periods – 10

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 angle bisectors, perpendicular bisectors, and triangles under given conditions. While learning and doing activities given in the topic construction 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:

- Constructs different geometrical shapes like bisectors of line segments, angles, and triangles under given conditions
- Learn the significance of accuracy & precision & aesthetics in every walk of life

III. Process & Action Plan

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. Usage of precision & accuracy in activities in life gives stability and beauty. 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 in 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.
Accuracy & Precision
Explanation & discussion regarding application of real life situations.
Ref-B1

2.
Accuracy, Precision & Aesthetics
Group discussion & presentation based on the given topic.
Ref-B2

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

1.
Brief description of application of Accuracy & Precision in monuments.
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*.

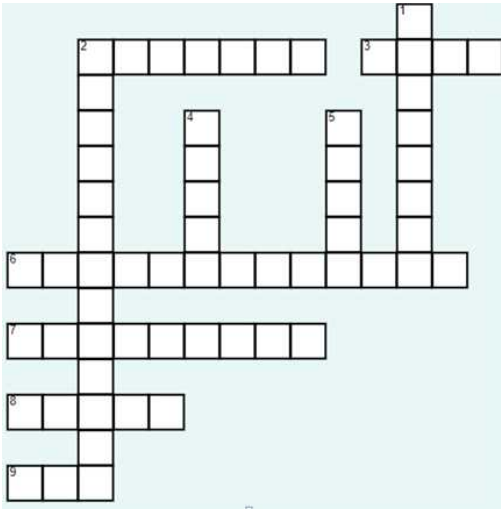
The unit also provides the scope to develop the following life skills in the students: *observation, thinking, problem solving, and critical thinking, drawing.*

IV. Activities & Related Discussion

This chapter discuss about the construction of angle bisectors, perpendicular bisectors, and triangles under given conditions. While learning and doing activities given in the topic construction students learn the significance of beauty and precision.

A: The context Activity for the Teacher to start:

A1: Teacher shall provide the crossword puzzle worksheet groupwise to revise the previous knowledge of students and introduce the new lesson and values associated with it**.**



Across	Down
2.A geometric figure with 2 end points, it is a piece of line	**1.**Something that cuts something else in half
3.A geometric figure with 1 dimension. It extends forever in two directions	**2.**Angles whose measures add up to be 180 are
6.Angles whose measures add up to be 90 are:	**4.**A geometric figure consisting of two rays with a common end point
7. Having the same measure.	**5.**A geometric figure having no dimension. It is represented by a dot.
8.A geometric figure with 2 dimensions. It is usually represented by a shape that looks like a parellogram	
9.A geometric figure with one endpoint. It goes forever in one direction	

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

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 Activities:

B1: Discussion

Teacher shall discuss with students about the importance of accuracy, precision which leads stability and beauty in any construction. When students do not take measures correctly while constructing any geometrical figure it goes wrong similarly in real life, construction of building or making machineries, vehicles, airplanes, ships, trains, bridges, roads etc. if we do not handle with accuracy & precision the result will be fatal. But if we take care of accuracy & precision it gives stability& beauty.

Teacher should frame different questions and elicit answers from students to make them aware about the importance of accuracy and the beauty in real life. (some examples)

1. What makes food tastier?
2. When you purchase garments why do you take trials?

Teacher shall summarize in the case of preparation of food items if we take the measurement of ingredients accurately the food becomes tastier.

When the body measurements are accurate, the garments can be fit. A well-fitted garment can enhance not only the look of the person but also the personality.

Therefore, one should be always careful regarding accuracy and need to make it a habit

B2: Group Discussion& Presentation

Teacher shall divide students into groups and assigned topics for each group to study the importance of accuracy & precision in the respective field and present in the class groupwise.

1. Group-1:Importance of accuracy & Precision - In Medical field (Medicines, surgery etc.)
2. Group-2: Importance of accuracy & Precision - In Construction field (buildings, bridges, roads etc.)
3. Group-3: Importance of accuracy & Precision-In mechanical Field (Cars, airplanes, ships, train, etc.)
4. Group-4: Importance of accuracy & Precision- In Hotel Industry(Food Item)
5. Group-5: Importance of accuracy & Precision- In Fashion/cloth Industry(clothes)

With this activity students learn how precision& accuracy is important in every walk of life. Teacher shall insist students every student follow this quality in their life.

V. C: Assignments

C1: Brief description of the application Accuracy & Precision in any monuments you have observed which has aesthetic beauty.

Resources

References:

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

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 IX No: of Periods – 4

Unit-12

Heron's Formula

Precision & Accuracy, Self-Discipline& Self Awareness

I. Introduction

In earlier classes students studied how to calculate area of different geometrical figures such as squares, rectangles, triangles and quadrilaterals. Students already know how to find area of triangle by using base and height of the triangle. This chapter discuss about area of triangle by using sides of triangle. As this formula is derived by famous mathematician Heron, it is named after him. Students learn to find area of quadrilateral by dividing it into triangular parts and then use the formula for area of the triangle

Therefore, while learning heron's formula 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.

II. Learning Objectives / Outcomes

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

- Calculate area of a given triangle to state the limitation of the Standard formula (Area of Triangle = ½ b.h)
- Apply Heron's formula and calculate the area of a Triangle.
- Breakdown a given polygon into triangles and find the area of a given polygon as a sum of areas of those triangles.
- Learn the importance of discipline along with precision & accuracy.
- Learn self-discipline & self-awareness because if we do not take care of limitations and parameters then it can lead to errors.

III. Process & Action Plan

Teacher shall use this lesson to instil precision, accuracy, self-discipline & self-awareness in students. Heron's formula is a fundamental concept that finds significance in countless areas. In real life ,we have many objects of the shape of a triangle. To find the surface area or the area of triangular land we use the heron's formula. By using Heron's formula, one can calculate the area of a triangle without measuring the angles or any other distances, this formula is known for its simple calculation based on the length of three sides of a triangle. 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.
Precision& Accuracy
Explanation by teacher, discussion & presentation by students.
Ref-B2

2.
Self-Discipline & Self Awareness
Explanation, Story Narration by teacher, discussion & presentation by students.
Ref-B2 & B3

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

1.
Prepare the advantages of self-awareness & self-Discipline in every walks of 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 *Precision& Accuracy, Self-Discipline& Self Awareness* along with other sub-values like *Self Control.*

The unit also provides the scope to develop the following life skills in the students: *logical thinking, Problem solving, calculation& computing.*

IV. Activities & Related Discussion

This chapter discuss about area of triangle by using sides of triangle. While learning heron's formula students learn the importance of discipline along with precision & accuracy.

A: The context Activity for the teacher to start

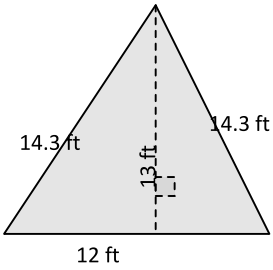
A1: Teacher shall provide worksheets to find the Area of Triangles and Parallelograms to revise and introduce new lesson and the values associated with the lesson

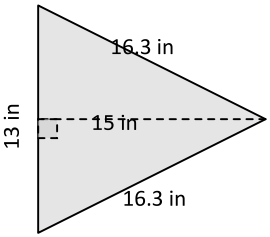
1) What is the equation for the area of a triangle?

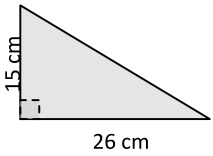
2) What is the equation for the area of a rectangle?

3) What is the equation for the area of a parallelogram?

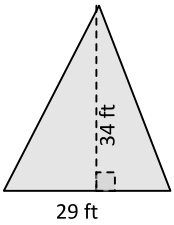
4) A=_____ 5) A=_____ 6) A=_____



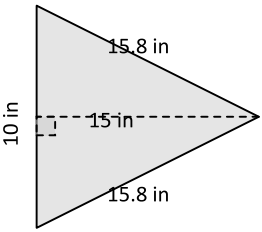




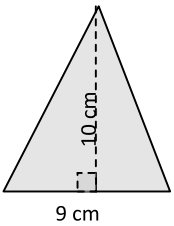
7) A=_____



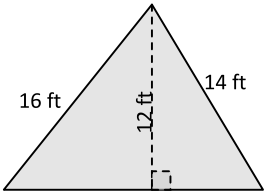
8) A=_____



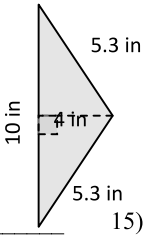
9) A=_____



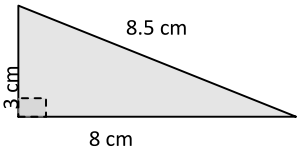
10) A=_____



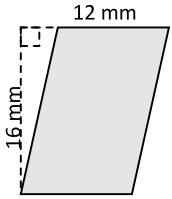
11) A=_____



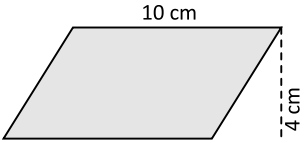
12) A=_____



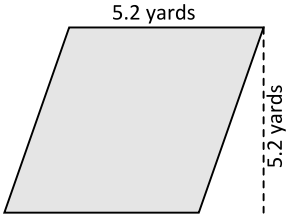
13) A=_____15 ft_____



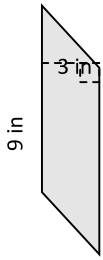
14) A=_____



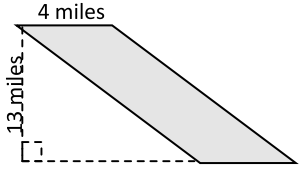
15) A=_____



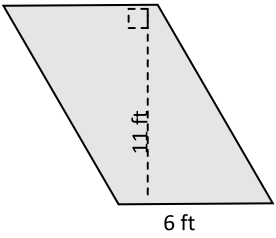
16) A=_____



17) A=_____



18) A=_____



Discussion:

Post worksheet solution teachers asks

1. Could they learn any value from this exercise?
2. Can you find area of Triangle by using the formula of Parallelogram?(Need to use accurate formula)
3. Can you interchange base & height? Will you get the same answer?(Awareness)
4. Can you identify base and height in each fig? How?(Discipline & observation)

Frame more questions, provide them some clues so that teacher can elicit from them (Precision & Accuracy, Self-Discipline & Self Awareness).

http://karen.mcnabbs.org/worksheets/area_perimeter/index.html

B: Value Based Activities:

B1: **Discussion& Explanation: The importance of accuracy & Precision needed in different fields**

Teacher explains that Engineers are highly aware of accuracy and precision in their work. They make calculations to assure a spacecraft's journey is timed exactly to land on an orbiting moon. Engineers who design medicines and medical instruments (x-rays, lasers, surgery equipment) must be careful so that these technologies are not harmful to people. Every day, engineers specify the structure of buildings and bridges so they are strong enough. Other engineers calculate the exact amount of fuel required for a rocket to make it to space, or design the controls systems and software to make sure missiles are consistently accurate and precise in reaching their targets**.**

Teacher elicits from students the instances where accuracy & precisions play crucial role in the success of any activity. Ask them to do a group presentation for the class group wise (Teacher shall divide the students into groups)

B2: While learning & doing problems of area students realize the limitations and parameters

If they do not take care of limitations or parameters while dividing quadrilateral into triangles or while finding area it may lead to error. Therefore self-discipline and self-awareness is very important while leaping into any activity, it is the secret of success in life. Discipline is necessary in all walks of life. Whether at school or at home, in the office or in the factory, in the playground or in the battlefield, discipline is a necessity. Discipline builds character, develops strength and unity and fosters co-operation. Teacher shall conduct a debate on the following topic in the class room on the given topic.

1. Self-discipline is one of the important ingredients of success. Do you agree?
2. Self-Discipline is the Best Discipline. Do you agree?

Teacher shall summarize by saying Self-discipline means self-control, which gives you inner strength and a way to control yourself, your actions, and reactions. It is one of the most important and useful skills to achieve success and everyone should possess this quality. Self-discipline comes naturally to some people. And some people can achieve it with some effort. The effort made is worth it as it changes life for the better. It just means exercising self- control. A person who stays in control has the ability to take charge of his/her actions and reactions.

B3: Self Awareness activity: Lakshman Rekha

Teacher shall explain the story from Ramayana Lakshmana Rekha is a typical example of self-awareness & self-control.

Lakshama Rekha is actually a line (border) drawn by Lakshama to protect Sita. When Sita sees a golden deer wandering around the forest, she insists Ram to catch it. Ram chases it into the forest. Meanwhile, Lakshmana hears scream of Ram, which was a trap set up by Marich, who was disguised as golden deer.

Sita insists Lakshmana to go and watch his brother. Lakshmana refuses at first, but then agrees on one condition. He draws a line around the cottage and requests Sita not to cross that line in any situation.

Ravan comes disguised as a sage, and tricks Sita to come out of that line, since he himself can't cross. And then he abducts her.

Discussion:

1. What is the shape of Lakshman Rekha?
2. What happened when Sita crossed the Lakshman Rekha?
3. What is the moral of the story?

Then teacher shall explain the importance of self-awareness

Social-emotional self-awareness means having the ability to understand own thoughts, emotions, and values, as well as knowing how those factors influence one's behaviour.

Students need to be able to identify their feelings. Learning the difference between frustration and anger will help students navigate their emotions. By recognizing the link between their feelings, thoughts, and actions, they can then address these feelings and react to them appropriately. Students' ability to see themselves, acknowledge their shortcomings/weakness, and embrace their strengths is a great confidence booster. An understanding of the self allows students to develop one's character and help in creating healthy, happy people with a drive to achieve, it is the secret of success in life

Ref:https://www.speakingtree.in/blog/lakshman-rekha-according-to-the-ramayana

V.C: Assignments

C1: Prepare the advantages of self-awareness & self-Discipline in every walks of life

Resources

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

Resources for Teachers:

https://www.positiveaction.net/blog/teaching-self-awareness-to-students

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 IX No: of Periods – 12

Unit 13

Surface Areas & Volumes

Precision& Accuracy, Self-Discipline& Self Awareness

I. Introduction

Mensuration is the branch of geometry which deals with the measurement of area, length or volume of different geometrical shapes. 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, it may lead to critical errors in any field of work or activity.

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.

II. Learning Objectives / Outcomes

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

- Visualize a cube and cuboid in its 2-D form and calculate the surface area (lateral and total) and determine the cost of painting /covering the given surface.
- Visualize a cylinder in its 2-D form and calculate the curved surface area and total surface area and determine the cost of painting /covering the given surface.
- Visualize a right circular cone in 2-D and calculate the surface area (curved and total) and determine the cost of painting /covering the given surface.
- Calculate the surface area of a sphere /hemisphere to determine the cost of painting /covering the given surface of a sphere /hemisphere.

- Calculate the volume of a given cube, cuboid, cylinder, cone, sphere & hemisphere and infer the quantity of any substance it can hold.
- Teaches the importance of self-discipline & self-awareness along with precision & accuracy. If we do not take care of limitations and parameters then it can lead to errors.

III. Process & Action Plan

This lesson deals with precision, accuracy, self-discipline & self-awareness, which is required in every aspects of their life. Mensuration tells us about the lengths of sides, heights and perimeters, measures of angles, surface areas and volumes of 2-dimensional plates and 3-dimensional solids. For example: Amount of carpet required for a particular room, Fencing needed for the perimeter of a garden, Volume of soil needed to fill in a ditch, the distance around a circular racetrack, Travel and roadmap reading, Amount of fuel needed for a given journey. 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.
Self-Discipline & Self Awareness
Explanation by teacher discussion & presentation by students about Self-awareness, its improvement & benefits.
Ref-B1

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

1.
Pepare a list of benefits of self-awareness.
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 *Precision& Accuracy, Self-Discipline & Self Awareness* along with other sub-values like *Self-control, beauty, stability.*

The unit also provides the scope to develop the following life skills in the students: *logical thinking, Critical Thinking, Problem solving, calculation & computing.*

IV. Activities & Related Discussion

Mensuration is the branch of geometry which deals with the measurement of area, length or volume of different geometrical shapes. Therefore, while learning Mensuration students learn the importance of discipline along with precision & accuracy.

A: The Context Activity for the Teacher to start

A1: Teacher provides the worksheet to solve in the class to revise the previous knowledge and introduce the new lesson and new values associated with the lesson.

1. The volume of a cube of side 0.03m is

a) $0.27\ m^3$ b) $0.027\ m^3$ c) $27\ m^3$ d) $2.7\ m^3$

2. If the height of a cylinder is halved, its volume will be of its original volume

a) 1/2 times b)1/3 times c) 2 times d) 3 times

3. The lateral surface area of a cuboid whose length, breadth and height are 2a, 2b and 2c respectively is.

a) 2(ab+bc+ca) b) 4(ab+bc+ca) c) 8(a+b)c d) none of these

4. The sum of the areas of all faces (excluding top and bottom) of a cuboid is the _____of the cuboid.

a) Volume b) lateral surface area c) total surface area d) none of these

5. The volume of a cuboid whose length, breadth and height are 2a, 3a and 4a is.

a)24a2 b)24a3 c)12a3 d)none of these

6. The curved surface area of a right circular cylinder of radius 2r and height 2h is

a) 2Πrh b)4Πrh c)8Πrh d)none of these

7. The lateral surface area of a right circular cylinder of radius 3cm is 94.2cm2. The height of the cylinder is

a) 5cm b)4.5cm c)5.5cm d)none of these

8. If each edge of a cube is doubled, how many times will its volume increase?

a) 2 times b)4 times c)8 times d)none of these

A2: Solve the Following

1. Find the height of a cuboid whose volume is $756cm^3$ and base area is $63cm^2$

2. The circumference of the base of a right circular is 220cm. If the height of the cylinder is 2m, find the curved surface area of the cylinder.

3. A road roller takes 1500 complete revolutions to move once over to level a road. Find the area of the road if the diameter of a road roller is 168 cm and length is 2 m

4. Find the height of a cuboid whose base area is 360 cm sq. and volume is 1800 cm cube?

http://davcae.net.in/

Discussion:

Post worksheet solution teachers asks

1. Could they learn any value from this exercise?
2. Can you find volume of cube by using the formula of cuboid or cylinder?(Need to use accurate formula)
3. Can you interchange length, breadth & height while calculating a volume? Will you get the same answer?(Awareness)
4. Can you inter change the values when you calculate the lateral surface area? Will you get the same answer?(Precision, accuracy discipline & observation)

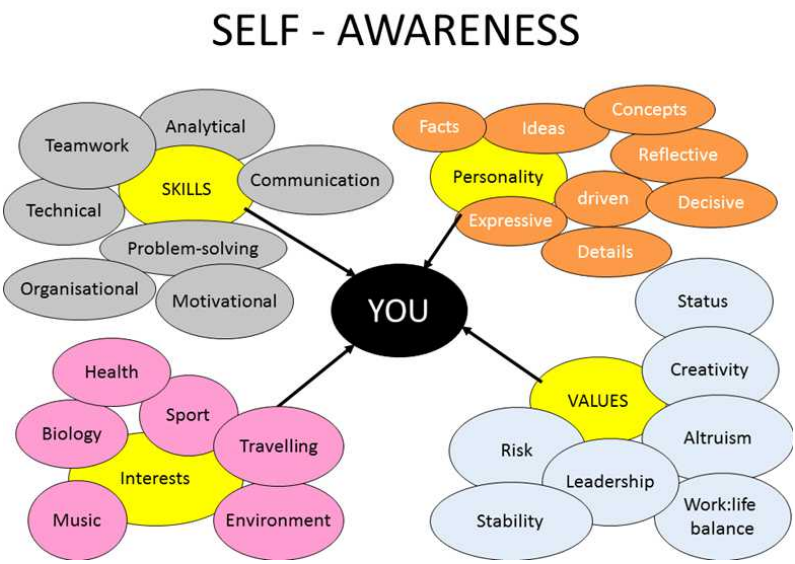
Frame more questions, provide them some clues so that teacher can elicit from them (Precision & Accuracy, Self-Discipline& Self Awareness).

B: Value Based Activities:

B1: Discussion& explanation

"Knowing others is wisdom, knowing yourself is enlightenment", Lao Tzu.

Through this lesson teacher shall guide students to understand oneself. This will help students to know where their strengths, interests lie, thereby allowing them to plan their career appropriately. Self-awareness is simply the capacity to observe ourselves, to take notice of and pay attention to patterns within our thoughts, feelings, and behaviours. And it's a skill that we all need to possess.



Teacher explains to students that Self-awareness can be defined by a range of personal factors including (amongst others) interests, knowledge, skills, personality, values, intelligence, personal situation, gender, cultural and social background. The two factors with which most of us define ourselves are knowledge and interests. They are also perhaps the most influential in terms of career choice. However, basing your career solely on your knowledge and interests can limit your options. Deep career thinking requires a broader awareness of 'you' so that you widen your career perspectives and broaden your options.

Self-awareness is critical to successful leadership development initiatives, awareness of your personality can also increase your personal effectiveness in many areas of your life including social influence. In addition to helping one to make informed career decisions,

self awareness can have a more subtle influence such as improving your understanding of others and thereby your personal and professional relationships.

Being aware of your personality type and your preferred way of doing things can help you to organise your time and workload more effectively and reveal areas for personal development. So, if you're wondering which career might be 'right' for you remember to consider factors such as your skills, personal qualities, interests and values to help you to make an informed decision.

B2: Group Discussion

Teacher divide the class into four groups. Ask them to reflect on the above pointers individuly and mainntain a note book. Ask them to discuss and find out & suggest some methods to improve self awareness. This is a skill that anyone can learn to improve with the right exercises and habits. Teacher shall use the following links to get more information to guide students.

https://myquestionlife.com/examples-of-self-awareness-in-everyday-life/
https://www.trackinghappiness.com/why-self-awareness-important/
https://nickwignall.com/self-awareness/
https://biosciencecareers.org/2016/10/the-right-way.html

V. C:Assignments

C1: Pepare a list of benefits of being self- aware and present them to class.

Resources

References:

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

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 IX No: of Periods – 13

Unit 14

Statistics

Honesty, Responsibility, Comparison

I. Introduction

Extraction of meaningful information is studied in a branch of mathematics called Statistics. Statistics deals with collection, organisation, analysis and interpretation of data. Every day we come across a lot of information in the form of facts, numerical figures, tables, graphs, etc. These are provided by newspapers, televisions, magazines and other means of communication. These may relate to cricket batting or bowling averages, profits of a company, temperatures of cities, expenditures in various sectors of a five-year plan, polling results, and so on. These facts or figures, which are numerical or otherwise, collected with a definite purpose, are called data.

This collection of data should be done with *honesty* and with *responsibility* as this data becomes the source for observations, inferences and has very important role to play when it comes to *decision making*. If the data collected is incorrect or manipulated then the outcome of the study will not be accurate. As soon as the work related to collection of data is over, the investigator must present/represent the data in a form which is meaningful, easily understood and gives its main features briefly. Graphical Representation of data is best for *comparison* of individual items.

Through this lesson students acquire three core values *honesty, responsibility & comparison*

II. Learning Objectives / Outcomes

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

- Record and label a given data set and create a frequency table
- Identify an appropriate scale and labels and represent given data through a bar graph. Read a given bar graph and infer a variety of information from it.
- Read the given data and create a histogram for continuous and discontinuous data sets Read a given histogram and infer a variety of information from it
- Read the given data and create a frequency polygon for given data set .Read a given frequency polygon and infer a variety of information from it.

- Differentiate between mean, median and mode with examples and understand most effective measure of central tendency in various cases
- Apply appropriate formula and calculate the mean and median of even and odd number of data points. Recall and use the formula for mean in order find the value of a missing observation
- Learn to be honest and responsible while doing any activities

III. Process & Action Plan

Students learn honesty, responsibility & comparison while studying this lesson and will be able to implement in their life. A systematic collection of data on measurements or observations, often related to demographic information such as population counts, incomes at different ages, etc... Measures of central tendency explains summary of an information which help in real life for decision making and comparative study The mathematical theories behind statistics rely heavily on differential and integral calculus, linear algebra, and probability theory. 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 & Solution of worksheet. Ref-A1, A2 & A3

↓

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

↓

1.
Honesty, Responsibility, Comparison
Discussion & explanation, Allotment of different situations to different groups to survey & present in class.
Ref-B1& B2

↓

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

↓

1.
Find mean, median& mode of mathematics mark of respective groups.
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 *Honesty, Responsibility & Comparison* along with other sub-values like *accuracy, discipline, teamwork, respect, courage, honesty, consistency, decision making, cooperation, Confidence & Interpersonal Skills.*

The unit also provides the scope to develop the following life skills in the students: *planning, organisation, observation, recording, analytical, interpretation, drawing, computation.*

IV. Activities & Related Discussion

Extraction of meaningful information is studied in a branch of mathematics called Statistics. Through this lesson students acquire three core values honesty, responsibility & comparison.

A: The Context activity for the teacher to start:

A1: Teacher provide worksheet to students to solve group wise to revise previous knowledge and to introduce new lesson and the values associated with the lesson.

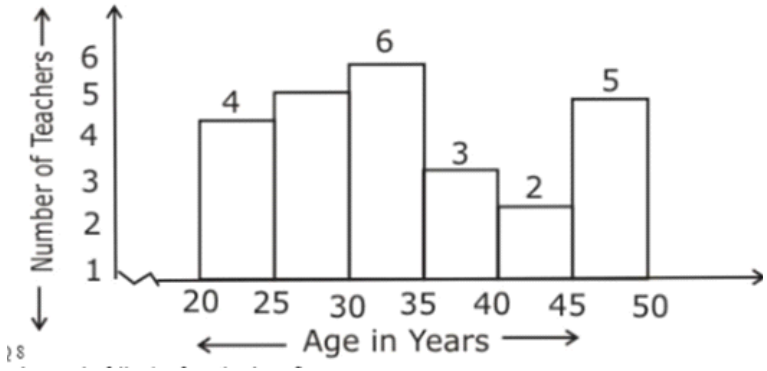
Frequency Distribution of income of 20 workers

Class interval (Daily Income in Rs)	Frequency of workers
100-125	5
125-150	6
150-200	4
200-250	3
250-300	2

Answer the following Questions from the frequency table

1. What is the class size of the class interval?
2. Which class has the highest Frequency?
3. Which Class has the Lowest Frequency?
4. Which class has 3 as the frequency?

A2:



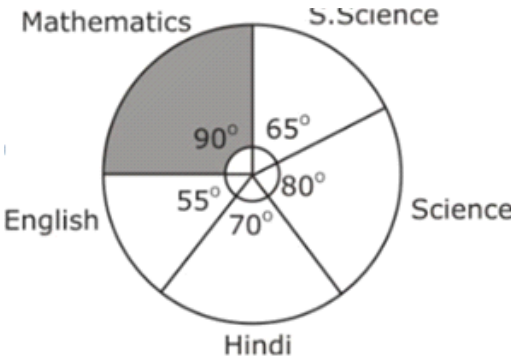
Answer the following from the above figure

1. How many teachers are of age 45 yrs. or more but less than 50 years?
2. How many teachers are of age less than 35 years?

A3:

The pie chart gives the marks scored in an examination by a student in Hindi, English, Mathematics, Social science, and science. If the total marks obtained by the students were 540, answer the following questions

1. In which subject did the student score 105 marks
2. How many more marks did the student in Mathematics than in Hindi obtain?



Ref: https://www.studiestoday.com/node/213207/viewfile.html

Discussion:

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

1. What did you learn while interpreting the frequency table, graph & pie diagram? (Comparison)
2. Do you think the information given is correct?
3. How did they collect the information for graphs?
4. Do you think the information which we see in newspapers & magazines are collected honestly & with responsibility?

Teacher should highlight that statistics can help students in learning honesty and responsibility in every walks of life. This skillset will help them in real life for decision making and comparative study while handling different situations.

B: Value Based Activities

Teacher shall divide students in 4 groups. Allot each group the work of collecting one of the following kinds of data and instruct them to do proper analysis and do a presentation in the class in a form which is meaningful, easily understood and gives its main features briefly. It is well said that one picture is better than a thousand words.

Group –I- ICC Cricket World Cup 2019 Analysis

Group-II- FIFA World Cup 2018 Analysis

Group-III-Hockey World Cup 2018 Analysis

Group IV -FIBA Basketball World Cup 2019 Analysis

Collect information, record by using tally marks, represent by using Graphical method of student choice.

Step 1: Planning: During this stage, students are expected to do a pre-liminary analysis of your topics. Students shall then draw up a plan of how to complete this task, accordingly, divide the work to your team members (Remember to include time constraints)

Step 2: Collecting data: Collect the data during recess, or any available free time.

Step 3: Recording Data: Choose two methods of recording that information that was collected remember the different colors. Frequency table (with the tally), Class frequency table.

Step 4: Comparing Data: Students are expected to form groups, discuss the data collected and compare the same.

Step 5: Displaying Data: Now using data that the students collected. They must represent that information using suitable graph of your choice.

Step 6 : Interpreting Data: Frame questions & Answer the questions: so that they can submit the report to their teacher.

Step 7: Conclusion: Write a short Report (10 – 15 lines) about what was learnt from this activity. Remember to write about likes and dislikes of the entire activity.

From this activity students learn to conduct a survey and collect information with confidence, record the information systematically and in a disciplined manner and present it in a graphical mode with utmost responsibility and honesty. During the survey while collecting the information from each other, working together students realize the importance of cooperation & inter personal skills and to be honest while giving answers. At the end of the presentation students learn to prepare meaningful questions for interpreting the graph.

V. C: Assignments

C1: Ask students to find out mean median and mode of their groups mathematics marks obtained in std VIII and do a comparative study between semesters/ trimesters.

Resources

References:

1. Ncert Textbook, Reference books,(R.D Sharma , R.S.Aggarwal)
2. https://www.studiestoday.com/node/213207/viewfile.html

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 - teacher shall elicit key words related to probability and revise the previous knowledge of students. 2.Discussion of text book example& activity 3. Discussion about personalities who have made a mark on this world by taking clear and courageous decision 4. Assignment: Conduct an exit poll in school regarding (Teacher Shall give different topics) 1. Healthy diet habits of students 2. Liking of sports & Games

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 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. Probability is the logic of uncertainty and randomness. Uncertainty and randomness occur in just about every field of application and in daily life, so it is extremely useful and interesting to understand probability. One area in which this is extremely important is in understanding risk and relative risk. We use the application of probability in Exit polls, Weather Forecasting and Stock Market

The key discussions are:

1. Discussion and using daily life examples - teacher shall elicit key words related to probability and revise the previous knowledge of students.

2.Discussion of text book example& activity teacher appreciate students about their decision making and fearless attitude

3. Discussion about personalities who have made a mark on this world by taking clear and courageous decision

4. Assignment:

conduct an exit poll in school regarding (Teacher Shall give different topics)

1. Healthy diet habits of students
2. Liking of sports & Games

Grade IX No: of Periods – 9

Unit 15

Probability

Fearless& Courage

I. Introduction

Probability is the study of things that has uncertainty. Without thinking we use it many times in our daily life. We don't implement actual probability problems daily. But use subjective probability to decide the course of action or to arrive at conclusions. Probability is in everything around us, right from weather forecasting to our chances of winning an election. Probability is the possibility/chance that something will occur. It is the capability to recognize and guess the possibility/chance of any different combination of outcomes.

Through the topic Probability the teacher can inculcate the value of *fearless&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.

Probability is the study of things that has uncertainty. Through the topic Probability the teacher can inculcate the value of fearless&courage, courage to take wise decisions during moments of uncertainty in life.

II. Learning Objectives / Outcomes

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

- Calculate the probability for a simple event by using the formula for Empirical probability.
- Create a flow chart of all the terms related to random experiments (coins, dice, cards) and calculate the total number of trials of a given experiment and calculate the Empirical Probability
- Compute the total number of trials and trials for a given event E represent in various forms (table, histogram, pie-charts, etc.) to solve for the value of Empirical Probability P(E)
- Calculate empirical probability of a situation and predict the likelihood of an event

- Arrange events from least likely to most likely and predict outcomes in a given experiment
- Calculate the sum of probabilities of all events and prove that the sum of the probability of all events in a single experiment is 1
- Realize probability, the mathematics of chance, is the only tool that one applies in each and every thing in life. Take decisions courageously& fearlessly in any situations of uncertainty. Learn to accept success and failures as they are two sides of the same coin.

III. Process & Action Plan

This lesson helps teacher to inculcate fearless and courage in students while taking decision on the basis of chance. Probability is the logic of uncertainty and randomness. Uncertainty and randomness occur in just about every field of application and in daily life, so it is extremely useful and interesting to understand probability. One area in which this is extremely important is in understanding risk and relative risk. We use the application of probability in Exit polls, Weather Forecasting and Stock Market 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 & Introduction of different terms related to Probability. Ref-A1

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

1.
Courage & Decision making
Conduct Textbook activity to instill courage of decision making.
Ref-B1

2.
Courage & Decision making
Narrate the life story of Amitabh Bachan.
Ref-B2.

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

1.
Conduct an exit poll in the school.
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

Probability is the study of things that has uncertainty. Through the topic Probability the teacher can inculcate the value of fearless & courage, courage to take wise decisions during moments of uncertainty in life.

A: The Context Activity for the teacher to start:

Teacher shall teach the meaning of probability by asking different questions and elicit the different words used in probability like **Possibility, Likelihood, Chance, Expected, Uncertain, Probably…**The idea here is to ensure students frame their mind-set to identify different terms used to describe uncertainty.

Some questions that can be used to teach terms that describe uncertainty:

- What is the chance of X scoring 80% marks in the coming class test?
- Can you predict the temperature of tomorrow?
- What is the possibility – house of winning the football game scheduled tomorrow in our school?
- What is the chance of a head when I toss the coin?
- What is the chance of 6 on top when I toss the dice?
- What is the chance of getting a queen when I pull one card from the pack of Cards?

Teacher introduces different terms related to probability Randomness, Trial, Independent trial, Experiment, event, and sample point, sample space etc. Teacher shall introduce to students that probability is the possibility/chance that something will occur. It is the capability to recognize and guess the possibility/chance of any different combination of outcomes.

You might calculate the probability that.

· The fan above your head doesn't fall

- Giant wheel where you're enjoying the ride doesn't breakdown
- Right from buying a face cream to investing in stock market
- While having a race or examination, we calculate our expected position

B: Value Based Activity:

B1: Courage

Teacher will be teaching this part by taking different activities which is already mentioned in the text book (coins/dice/cards / different colour balls) in group. Each activity the class can be divided into groups (team1, team2, tosser, and scorer)

There will be always a winning team and losing team as per their predictions on the outcomes and each time the formula can be derived P(E) = No of events /Total no of Trials

Teacher can appreciate students for taking decisions courageously without the fear of winning or losing, now after practice on different trials and experiments teacher should explain that as one grows in experience the decision making keeps getting better. Therefore, one should be fearless in their actions as there can be only two outcomes, one where you succeed and two where you learn and grow.

B2: Courage

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.

The value of Probability Lies Between (0-1) (Uncertainty and Certainty)we inculcate equality and teach them to simplify a problem and get solution. Through the below article on the life of wolves to students the teacher should explain to students just like how interconnectedness/Interdependence, togetherness, equality exist in wolves humans should also develop those qualities to live a harmonious life. The teacher should encourage students to discuss the article and analyze how the social behavior of wolves contributes to a peaceful community.

Ref:https://studiousguy.com/8-real-life-examples-of-probability/

By the application of the formula students learn the probability of any event always lies between 0 and 1 and total probability of an experiment is always 1

The life of Amitabh Bachan is an example who has the courage to take decision irrespective of all odds and brought his life back on track. Teacher shall narrate briefly about the crucial incident and life of Mr .Amitabh Bachan

Amitabh Bachan- The superstar and Shahenshah of Indian Cinema, Amitabh Bachchan (full name- Amitabh Harivansh Srivastava) has struggled hard to take his strong place in Bollywood. He is the son of poet Harivansh Rai Bachchan and Teji Bachchan. After completing his studies, he went to Mumbai to try his luck in Bollywood. His unconventional looks and great height became a reason of rejection there. Even he faced rejection in the radio jockey job due to his heavy voice. Later, due to his hard work and patience, he finally got a chance in Bollywood in the film Saat Hindustani (released in the year 1969) which did not work well in the box office. In the initial years of his career, he had given 9 flops continuously where he played small roles and did voice-overs. From the film Zanjeer (released in the year 1973), his destiny took him on the track of success and prosperity.

Well after achieving success in Bollywood, he faced a difficult situation in 2000 when his company Amitabh Bachchan Cooperation limited was declared a 'Sick' company. It was a period when he was under a lot of debt and had many sleepless nights. His friends and relatives advised him to shut down the company but he did not give up. During this period he got a role in the film of Yash Raj Productions named Mohabbatein and a huge break came from his TV Show Kon Banega Crorepati which brings his life back on track. Since then he never turned back

Discussion:

Teacher can explain students that life of all existence in life is between 0 and 1 i.e. between certainty and uncertainty. So one should always be courageous, clear and confident while taking any decisions. Probability helps us to take decisions courageously in the strangest of situations; It is the mathematics of chance and the only tool that can be applied in everything.

https://appindianews.com/10-indian-great-personalities-who-marked-the-history-with-their-success

V. C: Assignments

C1: Ask students to conduct an exit poll in school regarding (Teacher Shall give different topics)

1. Healthy diet habits of students: 2. Liking of sports & Games

Resources

References:

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

Integration of Values

Maths

Grade IX

Teacher's Manual

HEMA Foundation
Ram Ratna House, Oasis Complex, P. B. Marg, Worli, Mumbai - 400 013 | **Tel.:** 022-2494 9009 / 9142.
Extn.: 6178 **Mob:** 72280 01342 | **E-mail:** admin@hemafoundation.org
Website: www.hemafoundation.org