

Beyond the blackboard.....

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Abstract

My presentation 'Conic section : Ellipse' covers the basic information about ellipse where I have tried to make the topic meaningful and interesting. In first few slides, the meaning of conic section is very well depicted with the help of the animation showing the intersection of a double napped cone with a plane at various angles forming conic sections such as parabola, ellipse, circle and hyperbola. The next animation shows the intersection of a cone with a plane when the plane is perpendicular to the axis of cone forming an ellipse. The concept of eccentricity and its effect has also been discussed with the help of a figure. Another animation demonstrates that the sum of distances of any point on ellipse from both the foci is a constant. Then the definition of ellipse with many other formulae and terminology has been discussed. Students have been involved in drawing an ellipse making use of reflecting property of ellipse. To create interest and make it more interesting, I added a few slides on the application of ellipse in real life. A short class assignment has been given to assess the understanding of the students after the lesson is over. A home assignment as a group project has been given which involves IT and the basic knowledge of ellipse.

Keywords

Power point presentation, discover facts, Maths activities, animations, three dimensional pictures, Application in real life

These days education is more concerned with drawing out and developing a student's abilities and with encouraging independent thought. IT has really helped students to innovate in classroom because I feel that students tend to accept commands more rapidly from computers than from humans. Information Technology has shown to stimulate students' thinking. Use of IT in classroom depends on how well it is used.

I generally involve my students in IT related group activities and projects where they need to search and explore the topic in detail and thereby learning at their own pace. They are also given an opportunity to present their work using multimedia. Without any formal training of computers, I try my best to make learning an enjoyable experience making appropriate and judicious use of technology in my classroom.

IT has empowered me with the tools where I can bring lab to my classroom. I am able to enhance teaching – learning process by explaining various abstract concepts using 3D animations particularly in the topics like Conic Sections, intersection of a plane with a line, plane, sphere etc.

- Real life examples/pictures related to the lesson (which cannot be brought to the classroom otherwise) make the teaching, learning very effective.
- What they hear does not retain longer than what they see.
- Chapters like vectors, 3 – Dimensional geometry, trigonometry etc. can be very well understood using technology.
- Recapitulation of the lessons can be done effectively in very less time.
- Graphical solutions of geometrical equations can be drawn very accurately taking innumerable examples in the class.
- Geopad has empowered me to make as many graphs/geometric figures as I want to make my students understand the effect of changing variables.

I would like to share an experience in context of your question. Last year, I was taking up the topic 'Linear Inequations' at senior secondary level in a class. While discussing the solution of a system of Linear Inequations graphically, I taught the same using computers through Smart – Class facility available in our school. The graphs of all the four inequations were drawn beautifully on the monitor showing the solution of each one of them using shadings with different colours. The common shaded region was shown blinking in the graph making it more clear. A weak student who was repeating the class came to me after the class and told me that I am a wonderful teacher. He said that he didn't prepare for the topic last year considering it very difficult. But this time, with the help of the smart class lesson, he was able to understand the topic very well and found it so easy. This is just one incident, I can see a spark in the eyes of my students when I tell them that we are going to have a smart class.

The use of technology has really enhanced my professional life in the following ways:

- Interaction with colleagues and teachers from other parts of India and world has increased through the use of e-mail.
- Use of computer-aided presentations has helped in group-discussions among faculty members.
- Use of audio-video presentations with multimedia has helped the colleagues to bring in and share the new knowledge/ advantages acquired in the subject with better understanding.
- Technology has helped to reduce the time for interaction with colleagues.
- I have been conducting teachers' workshops using multimedia and IT tools.

I am recognized as a techno savvy teacher among the staff and my students also look up to me.

Ellipse : A conic section

As a mathematics teacher of senior classes, I would always find certain concepts quite abstract that required a lot of imagination on the part of students. I utilized my basic knowledge of computers and made powerpoint presentations on such topics. This worked wonders in sustaining the students' interest in Mathematics and they learnt to appreciate the relevance of mathematics in real life. Ideally, the role of a teacher is to facilitate learning and use innovative methods to help students discover facts on their own. This is far more challenging than the conventional classroom teaching.

It has been rightly said that learning never stops. In this fast changing world, professional development is a must for a teacher. In past few years I have evolved as a teacher who aims at making mathematics teaching more relevant by setting to day to day life. People have this notion that mathematics can be taught the best by the conventional chalk and talk method. But, I never looked back the day I realized the importance of using IT tools and power point presentations. Use of computers have redefined the role of a teacher. The teacher acts as a facilitator for students' 'discoveries' rather than providing the solutions on the blackboard. I have made power point presentations on various topics, one of which I would like to share in the conference if given a chance. It is based on 'Ellipse : A conic section' which is a topic taught in class XI. I did an actual **case study** by teaching this topic to two different groups of students of similar caliber with or without using my presentation. The results I observed in the test were quite encouraging for me to go for more such presentations. The results of case study are in the form of a graph and are included in my presentation. Within last few years, my students started calling me "smart teacher".

My teaching strategy includes the conventional chalk and talk method supported by

- **Appropriate use of technology in the form of power point presentations made by the teacher.**
- **Involving students in making individual /group projects using computers.**
- **Help my students discover facts by actually performing the activities/experiments in mathematics lab.**

Objectives of lesson plan on Ellipse

- To explain the meaning of a conic-section.
 - To make the students observe how an ellipse is formed by intersection of a plane and a cone as a conic-section.
 - To demonstrate that the sum of distances of any point on an ellipse from both the foci is a constant.
 - To describe the geometrical meaning of eccentricity and its effect on a conic-section as it changes its value.
 - To enable the students to define an ellipse in terms of eccentricity.
 - To explain the terminology and formulae related to ellipse.
 - To enable the students to identify the equation of an ellipse.
 - To make the students appreciate the reflection property of an ellipse.
 - To relate ellipse to day to day life to create interest in the topic.
 - To involve the students in an activity of drawing an ellipse.
 - To assess the students' knowledge through a short class-assignment.
- To encourage the students to use the basic concept through an interesting home-assignment.

Introduction about the topic

My presentation deals with the topic "Ellipse : A conic section" in detail. Use of computers helped in sustaining students' interest in the topic. The three dimensional pictures and animations used in the presentation make the topic lively and very easy to understand even for the weakest student of the class. The power of visualization is brought to the classroom by a moving plane intersecting a cone and formation of various conic sections like circle, parabola, ellipse and hyperbola can actually be seen by the students in this presentation. Various concepts related to ellipse like reflection property of ellipse is

very well grasped by the students by when taught using animations. Various examples of real life application of ellipse make it more meaningful. "The sum of distances of any point on an ellipse from its foci always remains constant", this property can be used in drawing the ellipse actually. I also went beyond teaching my subject and made presentations on "Female foeticide" to create awareness about the ill effects of the same in the society.

Here are a few slides from my presentation:

Lesson on ellipse: My PPT

Meaning of a conic-section

- Different conic-sections are formed when a plane intersects a cone.

Ellipse as a conic-section

- Ellipse is formed when the plane cuts the cone entirely and is not perpendicular to the axis.

Classic definition of ellipse

- Sum of distances of a point on ellipse from foci is constant.

Eccentricity Of An Ellipse

Eccentricity is the ratio of a point on ellipse from a focus to its distance from directrix.

Terminology And Formulae

Components of an ellipse in standard form $\frac{(x-h)^2}{b^2} + \frac{(y-k)^2}{a^2} = 1$

Components of an ellipse in standard form $\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$

a focus gets reflected to the other one.

planes with only one focus.

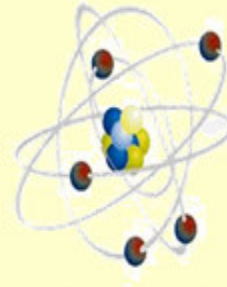
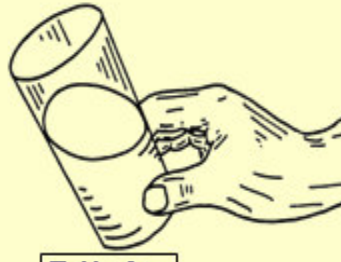
using pins and a taut loop of string.

Class-Assignment

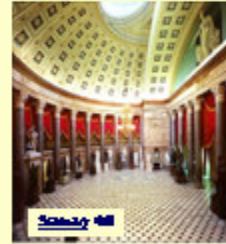
Home assignment

STUDENTS' ASSIGNMENT

Real life examples



Applications of reflection property of ellipse



Teachers' Seminar At State Level

MEASUREMENT OF QUANTITIES MEASUREMENT OF - LENGTH - VOLUME - WEIGHT - TIME	 MEASURING LENGTH BY CHOOSING A UNIT	COMMON STANDARD UNIT OF LENGTH COMMON STANDARD UNIT OF LENGTH	WAVELENGTH OF CRYSTAL LIGHT STANDARD UNIT OF LENGTH WAVELENGTH OF CRYSTAL LIGHT
 RELATION BETWEEN SHAPE AND VOLUME	 MEASURING VOLUME OF AN IRREGULAR SOLID	 MEASURING VOLUME OF AN IRREGULAR SOLID	 MEASURING VOLUME OF AN IRREGULAR SOLID

Feedback of the People Around

This is in the form of certificates from the director of school, Microsoft, Educomp etc.

Conclusion: As a teacher, my basic objective in the classroom is to make teaching simple, interesting and at the same time very effective. To achieve this, I make appropriate and innovative use of technology and apply best instructional strategies. I make sincere efforts to make learning a joyful experience using IT tools. I try to seize every opportunity to share my ideas and knowledge beyond the classroom for the betterment of society.