Broadcasting Maths Project – Lesson Plan 2

Main focus of activity:

- To introduce how satellite TV signals work through the maths curriculum

Learning objectives:

- To be able to work with numbers in standard form
- To be able to apply Pythagoras Theorem to real life problems
- To be able to apply circle theorems to real life problems
- To be able to work out speed = distance/time

Links to curriculum: Links to the maths curriculum are as follows

- Pythagoras Theorem
- Standard Form
- Circle Theorems
- Speed = distance/time

Activity outline:

Introduction

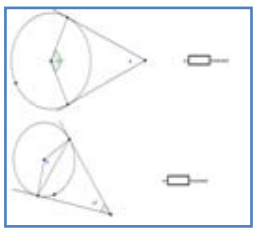
- Students need to complete a quick fire set of starter questions covering Pythagoras, Standard Form and circle theorems. These are the skills that will be needed for the main part of the lesson. These are on the prepared Interactive whiteboard flipchart. (see screenshot)

- A video clip/animation is then shown of how a satellite orbits the earth when it is in a geostationary orbit. This will show students why the maths is relevant to their everyday lives. The question "Why do all the SKY satellite dishes point in the same direction?" is designed to provoke thought and discussion.

Main Part of Lesson:

Teaching and Learning:

- Pupils have to work out several maths questions in order to find out the speed a satellite signal takes to travel from one destination to another. These relate to both Earth and Mars
- The students must spot that the radius of the earth meets the tangent at 90 degrees meaning they can apply Pythagoras. A self marking electronic activity is available to access knowledge of relevant circle theorems here if ICT access is available. (see screenshot). Also video links to the construction of these Theorems are given below.



- The students must also understand that the tangents are equidistant from the satellite in this problem to allow them to find the distance between the two destinations.
- The students then need to work out the speed of the signal and work out its speed as a proportion of the speed of light. These numbers are given as a combination of numbers in standard form and ordinary numbers
- This activity is aimed at a more able group and is designed to show that many different areas of the maths curriculum are required to solve one problem.
- This activity is available on paper and electronically (see screenshot)

Plenary:

- Is this model reasonable? Will the signal normally travel from the points where the two tangents meet the earth? If not what other maths may we have to use?
- There is a natural extension here as the distance may not be equidistant from the satellite.

Notes/links

GeoGebra is a free piece of software which is extremely powerful for demonstrating geometric concepts. To find out more click on the link below.

http://www.geogebra.org/cms/

Video link for using Geogebra to construct tangent to radius

http://videocentral.lgfl.org.uk/Watch.aspx?v=FsIJPtRJavXTHw

Video link for using Geogebra to construct to equidistant tangents to a circle

http://videocentral.lgfl.org.uk/Watch.aspx?v=8Chuq755FVM72y