**Crop Circles**

**Activity**

Good as a year 9 activity, useful for compass constructions (including inscribed polygons), symmetry and can be used to work with circle calculations and ratios.

It can work with all levels of ability.

**Cross-curricular opportunities**

Art, Music, Technology (Graphics)

**Resources**

These can be found at [www.coolmath.com/geometry-of-crop-circles](http://www.coolmath.com/geometry-of-crop-circles) and

[www.cropcirclesecrets.org/crop\_circles\_diatonics](http://www.cropcirclesecrets.org/crop_circles_diatonics).

Copies are provided here but it is good to display on a white board.

Otherwise compasses, rulers, pencils, paper

**What as a teacher did I hope to get out of it?**

Opportunities for students to improve their compass work and to develop creativity. The crop circles here, and their own designs, should support students understanding of mathematical problems they encounter involving overlapping or overlaying circles, or inscribed polygons.

**The task**

**First lesson**

* Project examples of crop circles on the board. Class discussion of symmetry and the shapes involved.
* Initially get the students to do a compass construction of a 6 petal flower. From this ask them to join points they have created to produce polygons (expect equilateral triangle, regular hexagon, rectangle, plus they may produce others).
* Issue them examples of crop circles with the accompanying mathematical construction (see resources). Let them choose a design and get them to construct the design and shade it to generate the given crop circle. (there is no need to be precise about the actual size/ratio of any of the shapes within the design as slight variations still create good crop circles)

**Second lesson**

Get them to design their own crop circle. Challenge them to use a variety of constructions from

* Equilateral triangles
* Regular hexagons
* Concentric circles
* Circles within circles
* Sequences of circles

And to make sure their design has line and/or rotational symmetry.

**Third lesson** (if your group can calculate areas of circles and simplify fractions)

Use the resource on diatonic scales and crop circles (see resources).

This links the ratio of pairs of circles to a musical scale and an extension of this generates all letters of the alphabet. There are several theories that since 1988 crop circles have their designers names embedded in them if you look at

* The ratios of the diameters of 2 circles adjacent to each other
* The ratios of the areas of 2 circles where one is inside another.

Students can either compare circles within their copied or own designs and see if any relate to letters of the alphabet or they can be challenged to embed their own initials in to a design.

**Outcomes**

An excellent set of display material! If you are up to the challenge you can pick the winning design and paint it in whitewash on your school field!

**Students views**:

Fun,fascinating and a challenge to get their initials into the design.