# How does the self-assembling cube work? Teachers' Notes

## Curriculum Links

Working with nets is popular task especially at Level 3 and Level 4 as students explore the relationships between 2D and 3D representations and begin to create accurate models of solids and identify geometric properties. This task extends the common "cut and paste" net tasks to investigating the relationship between the net and the action of using a string tension to fold the net without touching it. This task represents the intentions of Level 5 Shape statements. As students explore the cube nets and design a self-assembling net for another shape, they are asked to think about applying the model to a practical problem-where would a self-assembling net be useful? This is a design problem that can be linked to Technology, Arts, and Science contexts.

## Background

This activity is adapted from: http://www.murderousmaths.co.uk/books/BKMM7xcu.htm

This investigation involves creating a working model of a self-assembling cube from a net and strategically placed string. Students will be able to easily follow the instructions to make the model. However, the investigation involves thinking about how the model **works** and what impact the particular net and the position of the string makes of the assembling action.

Students should experiment with alternative cube nets and string placements to understand what the relationships between tension and angles and edges. Once they feel confident about the working of the model then they should begin designing a self-assembling octahedron. Recording their ideas in the form of diagrams and plans will provide the basis for explaining how the model works. Encourage them to use correct geometric vocabulary when explaining their models.

## Suggestions:

Extending this task could go in various directions including these:

- What other nets can be used to create self-assembling 3D shapes? (a further exploration in same direction)
- What are the possible practical applications of the models? (an extension of the modeling to application of design in another context).

If the student is having trouble imagining applications, investigate tents and other temporary structures, packaging, or kites.

The following is a link to a unit on constructing with nets based on triangles: http://www.nzmaths.co.nz/resource/building-triangles

**Possible nets for octahedrons:**