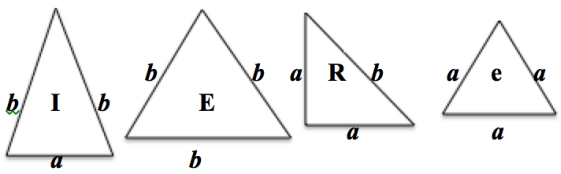
TRIANGLES TO TETRAHEDRA



A tetrahedron (plural tetrahedra) is a solid with four triangular faces. Suppose you have an unlimited supply of triangles of the 4 types shown in the diagram. How many different tetrahedra can you make with them?

Type R are right angled isosceles triangles with sides a, a and b units.

Type E are large equilateral triangles with sides of length b units.

Type e are small equilateral triangles with sides of length a units.

Type I are isosceles triangles with sides of length a, b and b units.

How can you be sure you have found them all?

HELP

To make all the tetrahedra you need:

8 large equilateral triangles,
8 small equilateral triangles,
10 isosceles triangles and
14 right angled triangles and some spares to experiment with.

If you work in a group to share the task, you should agree a system so each person looks for a different type of tetrahedron.

Cut out the triangles from scrap card using the template. First prick through the vertices to mark them. To make the tetrahedra, stick the edges together with selotape or tabs.

You could start by making:

the tetrahedron eeee with 4 e-type triangles,
the tetrahedron eIII with one e-type and 3 I-type triangles and
the tetrahedron eRRI with one e-type, two r-type and one I-type triangles.

Then look for seven more tetrahedra.

NEXT

Describe the symmetries of the tetrahedra, mentioning planes of symmetry, describing rotational symmetry and the identifying regular solids.

Template of triangles for making cardboard models.

Use scrap card and prick through the vertices of the triangles to mark them on the card. Join the prick holes to mark the triangles.

Check the lengths of the edges of the triangles are correct, then cut them out.

To make all the tetrahedra you need
8 large equilateral triangles,
8 small equilateral triangles,
10 isosceles triangles and
14 right angled triangles.

Make as many differently shaped tetrahedra as you can using 4 of these triangles for each tetrahedron