Maths
Higher Level Constructions and transformations

It is not necessary to carry out all the activities contained in this unit.
Please see *Teachers' Notes* for explanations, additional activities, and tips and suggestions.

Theme	Higher Level Constructions and transformations
Levels	**A1 – B1**
Language focus	Key vocabulary, word identification, sentence structure, extracting information from text, grammar.
Learning focus	Using Maths textbooks and accessing curriculum content and learning activities.
Activity types	Matching, word identification, structuring sentences and text, cloze, multiple choice, reading comprehension, categorising vocabulary, recording learning, developing a learning resource.
Acknowledgement	**Extracts from *Shortcuts to Success. Maths. Junior Certificate Higher Level*. Mark Halpin.** Gill & Macmillan. We gratefully acknowledge Gill & Macmillan for the right to reproduce text in some of these activities.
Learning Record	A copy of the Learning Record should be distributed to each student. Students should: 1. Write the subject and topic on the record. 2. Tick off/date the different statements as they complete activities. 3. Keep the record in their files along with the work produced for this unit. 4. Use this material to support mainstream subject learning.

Making the best use of these units

- **At the beginning of the class,** make sure that students understand **what** they are doing and **why**. '*We are doing the exercise on page (12) to help you to remember key words / to help your writing skills / to help with grammar*' etc.

- You can create your **personal teaching resource** by printing these units in full and filing them by subject in a large ring binder.

- **Encourage students** to:

   o Bring the relevant **subject textbooks** to language support class. It does not matter if they have different textbooks as the activities in these units refer to vocabulary and other items that will be found in all subject textbooks. These units are based on curriculum materials.

   o Take some **responsibility for their own learning** programmes by:

   Developing a **personal dictionary** for different subjects, topics, and other categories of language, on an on-going basis. This prompt is a reminder.

   Recording what they have learnt on the *Learning Record,* which should be distributed at the start of each unit.

   Keeping their own **files** with good examples of the work produced in language support for different subjects and topics. This file will be an invaluable **learning resource** in supporting mainstream learning.

- Don't forget that many of the activities in these units are suitable as **homework** tasks, for **self-study,** or for use in the **subject classroom** with the agreement of the subject teacher.
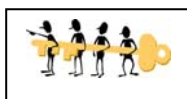
   Indicates that answers may be found at the end of the unit.

Keywords

The list of keywords for this unit is as follows:

Nouns
angle
arc
area
bisector
compass
construction
distance
image
label
line
measure
point (pt)
radius/radii
reason
rotation
side
symmetry
triangle
transformation
translation

Verbs
to be able to
to construct
to draw
to find
to follow
to investigate
to map
to measure

to outline
to prove
to shade
to swing
to transform

Adjectives
axial
both
central
clockwise
congruent
corresponding
equal
first
mean
opposite
perpendicular
same

Adverb
therefore = as a result
when

Preposition
under

Symbols
Δ triangle

Vocabulary file 1

This activity may be done in language support class or in the mainstream subject classroom.

Word	Meaning	Word in my language
angle		
distance		
measure		
point(pt)		
radius		
symmetry		
triangle		

Get your teacher to check this and then file it in your folder so you can use it in the future.

Vocabulary file 2

This activity may be done in language support class or in the mainstream subject classroom.

Word	Meaning	Word in my language
axial		
congruent		
to construct		
to investigate		
to measure		
to outline		
to prove		

Get your teacher to check this and then file it in your folder so you can use it in the future.
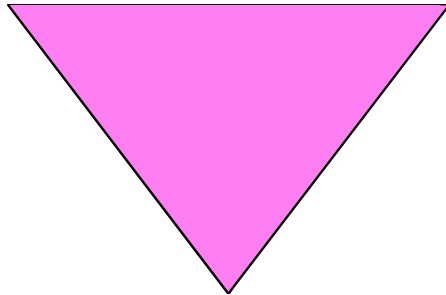
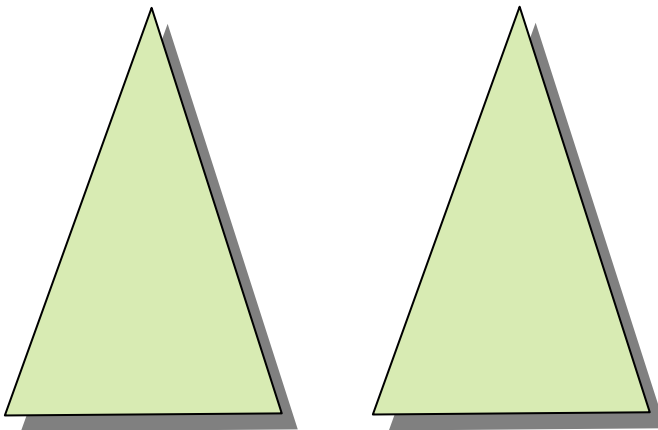|	
Level: A1 **Type of activity:** pairs or individual	**Focus:** vocabulary **Suggested time:** 20 minutes

Working with words

1. Tick the correct answer

This is :

- ☐ a) a triangle
- ☐ b) a square
- ☐ c) a rectangle
- ☐ d) a circle

These two triangles are:

- ☐ a) falling down
- ☐ b) growing
- ☐ c) pink
- ☐ d) identical

2. In maths, the two green triangles above are <u>congruent triangles</u>. Select the best meaning of the mathematical word, congruent

        a) different

        b) identical

        c) normal

3. In maths, what do we call the corner of a triangle?

        a) a corner

        b) a side

        c) an angle

Level: A1/A2 **Type of activity:** pairs or individual	**Focus:** vocabulary, sentence construction **Suggested time:** 10 minutes

Sentences

1. On these triangles, with a coloured pen, mark the following:

a) the angles
b) the sides
c) the area
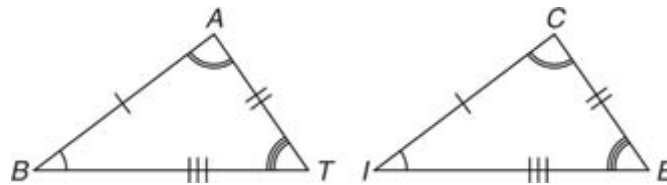
Compare your markings with another student's.

2. Put these words in the correct order to describe different triangles. The first one is done for you.

Ex: **Equilateral** – are of in which a triangle three sides length equal.

Equilateral – a triangle in which three sides are of equal length.
_____

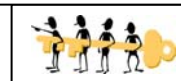**Isosceles** – in which a triangle are of equal length two sides

_____

Right-angled – one angle where is 90º a triangle

_____

Scalene – or sides are equal in which a triangle no two angles

_____

Level: A1 / A2 **Type of activity:** pairs or individual	**Focus:** vocabulary **Suggested time:** 30 minutes

Odd One Out

1. Circle the word which does not fit with the other words in each line.

Example: *apple*   *orange*   *banana*   (*taxi*)

point (pt)	angle	butter	line
triangle	hair	congruent	sides
symmetry	central	point (pt)	green
water	construct	image	translation

2. Find these words in your textbook. Then put them in short sentences in your own words. Use a dictionary if necessary.

to   construct _____

to   measure _____

to   outline   _____

to   prove   _____

to   correspond to _____

Check that these key words are in your personal dictionary.

Level: A1 / A2 **Type of activity:** individual	**Focus:** key vocabulary **Suggested time:** 10 minutes

Maths Keywords

1.   Fill in the missing letters of the keywords listed below.
On the line next to the keywords, write down whether this word is a noun,
an adjective or a verb.

con_ _ue_t   _____

sym_ _t_y   _____
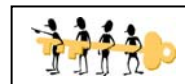
inv_ _ti_ _te _____

dis_ _nce _____

2. Write as many words as possible related to **congruent triangles / this
unit**. You have 3 minutes!

_____
_____
_____
_____
_____
_____

Check that these key words are in your personal dictionary.

Level: A1 / A2 Type of activity: pairs or individual	Focus: key vocabulary, spelling Suggested time: 20 minutes

Unscramble the letters

1.   A figure with three straight sides   LIGATRNE

   Answer _____

2.   Another way of saying that you build something   STOTNCRCU

   Answer _____

3.   When a maths figure is moved from one point in space to another
                                    NANSATTILOR

   Answer _____

4.   When two maths figures are exactly the same   TONURCENG

   Answer _____

Solve the secret code

English	A	E	G	I	L	N	P	R	S	T	Y
Code	B	X	Y	F	Z	Q	W	O	K	U	D

ex: YFOZ = GIRL

UOFBQYZXK BOX WOXUUD =

_____

Level: A2/B1 **Type of activity:** pairs or individual	**Focus:** vocabulary, basic sentence structure **Suggested time:** 30 minutes
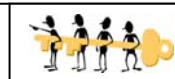
Completing sentences

The sentences on this page are all from your textbooks. Fill in the blanks in these sentences. Use words from the Word Box below.

<u>Angles of a triangle</u>

A triangle has _____ sides and three angles. Each corner of the triangle is

called a vertex (plural _____)

<u>Congruent Triangles</u>

What does it mean if two triangles are congruent?

If two triangles are _____ -

The measure of all _____ and angles in the first _____

are equal to the measure of all *corresponding* sides and _____ in

the second triangle. Two sides are corresponding when they are opposite
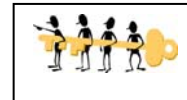
_____ angles.

Word Box:

three	equal	triangle	angles	congruent	vertices	sides

Level: A2 / B1 **Type of activity:** individual	**Focus:** key vocabulary, topic information, reading comprehension **Suggested time:** 30 minutes

Multiple choice

We prove that two triangles are congruent therefore if we show any one of the following:

(1) SAS

(2) AAS

(3) SSS

(4) RHS

Investigate whether Δ *mon* and Δ *por* are congruent.

Please follow the three steps outlined here for all congruent triangle questions.

(1) Investigate if any side in Δ *mon* is equal to a side in Δ *por*. (You must be able to give a reason.)

(i) | mo | = | or | ... both radii

(ii) | no | = | op | ... both radii

(2) Investigate if any angle in Δ *mon* is equal to an angle in Δ *por*. (Again, you must be able to say why.)

| ‹mon | = | ‹por | ... vertically opposite.

(3) Investigate if Δ *mon* is congruent to Δ *por*.

From the above diagram, we see that the triangles are congruent because of SAS.

1. What do SAS, AAS, SSS or RHS prove?
   - a) triangles are congruent
   - b) a show
   - c) nothing
   - d) that the sun is shining

2. How many outlined steps are there to follow?
   - a) none
   - b) one
   - c) three
   - d) two

3. What must you be able to give in part **(1)**?
   - a) a side
   - b) a reason
   - c) equality
   - d) a smell

4. Are | ‹mon | and | ‹por | vertically opposite?
   - a) Yes
   - b) No

5. Are the triangles congruent because of SSS?
   - a) Yes
   - b. No

Level: A2/B1 **Type of activity**: individual and pairs	**Focus**: prepositions **Suggested time**: 40 minutes

Grammar points
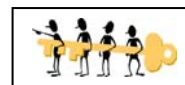
1. Preposition Hunt

Preposition: a word or group of words that is used before a noun or pronoun to show place, direction, time etc.

Circle the 10 prepositions in this box. Score 4 points for each correct answer. Who will score the highest? Perhaps you will. Good luck!

maths	through	at	circle		across
triangle	divide	up		along	measure
of	central	onto		equal	side
out	off	angle		distance	symmetry
image	outline	in		mean	congruent

2. Missing Prepositions. The following are six sentences from your maths textbook. Some of the prepositions are missing. Decide which ones.

- When a circle contains a four-sided figure the opposite angles add _____ to 180°.

- Under a translation, the object moves _____ a given straight line.

- Mark the five main points on M and find the image _____ each point.

- Under axial symmetry, the object is reflected _____ a line.

- From point c draw a perpendicular line _____ A.

- Under central symmetry, the object is reflected _____ a fixed point.

3. Now it's your turn! Go to your maths textbook and the unit on congruent triangle. Rewrite some of the sentences, leaving out the prepositions. Swap your sentences with another student, fill them in and correct them for one another.

Levels A1 and A2 - **Alphaboxes**

Using your textbook, find **one** word beginning with each of the letters of the alphabet. Write the word in the relevant box. You could also write the word in your own language.

a	b	c
d	e	f
g	h	i
j	k	l
m	n	o
p	q	r
s	t	u
v	w	xyz

Maths Word Search

Level: All levels

Find the words in the box below.
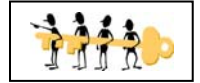
```
                        W  I
                        X  S
                  L  I  N  E
                  V  F  Z  L
               P  O  I  N  T  D
               I  S  P  B  N  B
   I  P  U  T  T  L  S  T  R  A  N  S  L  A  T  I  O  N  Z  Q
   Y  J  M  N  G  R  K  T  R  I  A  N  G  L  E  S  Q  K  Q  A
      C  O  N  G  R  U  E  N  T  H  J  Q  M  E  A  N  M  V
         E  Q  U  A  L  V  I  D  I  S  T  A  N  C  E  C
            Y  C  E  N  T  R  A  L  B  C  S  I  D  E
               G  H  T  R  I  A  N  G  L  E  N  A
            O  O  D  I  N  V  E  S  T  I  G  A  T  E
            Y  I  S  C  O  N  S  T  R  U  C  T  Q  O
         I  S  Y  M  M  E  T  R  Y  A  S  A  X  I  A  L
         I  M  A  G  E  D  H     I  A  N  G  L  E  Q
      D  O  L  D  H  T  B        L  M  M  X  H  B  W
      F  I  N  D  S              K  S  W  S  K
   V  Q  H  O                    U  Q  B  B
   K  T                                   C  E
```

ANGLE	DISTANCE	TRIANGLE	EQUAL
AXIAL	FIND	TRIANGLES	LINE
CENTRAL	POINT	IMAGE	MEAN
CONGRUENT	TRANSLATION	SYMMETRY	
CONSTRUCT	SIDE	INVESTIGATE	

Play Snap

Make Snap cards with 2 sets of the same keywords. See *Notes for teachers* for ideas about how to use the cards.

✂

translation	translation
distance	distance
under	under

find

find

same

same

construct

construct

symmetry	**symmetry**
angles	**angles**
pt (point)	**pt (point)**

central	**central**
congruent	**congruent**
line	**line**

Answer key

Working with words, page 6
1. a,d
2. b
3. c

Sentences, page 7
2. Isosceles – a triangle in which two sides are of equal length.
Right-angled – a triangle where one angle is 90⁰.
Scalene – a triangle in which no two angles or sides are equal.

Odd One Out, page 8
Butter, hair, green, water

Maths key words, page 9
congruent (adjective), symmetry (noun), investigate (verb), distance (noun)

Unscramble the letters, page 10
Triangle, construct, translation, congruent
Secret Code: triangles are pretty

Completing Sentences, page 11

Angles of a triangle
A triangle has **three** sides and three angles. Each corner of the triangle is called a vertex (plural **vertices**).
Congruent Triangles
What does it mean if two triangles are congruent?
If two triangles are **congruent** - .
The measure of all **sides** and angles in the first **triangle** are equal to the measure of all corresponding sides and **angles** in the second triangle. Two sides are corresponding when they are opposite **equal** angles.

Multiple Choice, page 12

1a, 2c, 3b, 4a, 5b.

Grammar points, page 13

1. Preposition Hunt: through, at, across, up, along, onto, of, out, off, in

2. Missing prepositions:

- When a circle contains a four-sided figure the opposite angles add **up** to 180°.
- Under a translation, the object moves **along** a given straight line.
- Mark the five main points on M and find the image **of** each point.
- Under axial symmetry, the object is reflected **across** a line.
- From point c draw a perpendicular line **onto** A.
- Under central symmetry, the object is reflected **through** a fixed point.

Word Search, page 15

```
                        W  I
                        X  S
                     L  I  N  E
                        V  F  Z  L
                  P  O  I  N  T  D
                     I  S  P  B  N  B
    I  P  U  T  T  L  S  T  R  A  N  S  L  A  T  I  O  N  Z  Q
    Y  J  M  N  G  R  K  T  R  I  A  N  G  L  E  S  Q  K  Q  A
       C  O  N  G  R  U  E  N  T  H  J  Q  M  E  A  N  M  V
          E  Q  U  A  L  V  I  D  I  S  T  A  N  C  E  C
             Y  C  E  N  T  R  A  L  B  C  S  I  D  E
                G  H  T  R  I  A  N  G  L  E  N  A
                O  O  D  I  N  V  E  S  T  I  G  A  T  E
                Y  I  S  C  O  N  S  T  R  U  C  T  Q  O
          I  S  Y  M  M  E  T  R  Y  A  S  A  X  I  A  L
          I  M  A  G  E  D  H        I  A  N  G  L  E  Q
       D  O  L  D  H  T  B           L  M  M  X  H  B  W
       F  I  N  D  S                 K  S  W  S  K
    V  Q  H  O                          U  Q  B  B
    K  T                                   C  E
```