Maths

Higher Level Trigonometry

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 Trigonometry	
All students: Activities that are suitable for **Learning Support, Language Support** and the **Mainstream Subject Class** include:	Keywords	3
	Vocabulary File	4-5
	Completing Sentences	11
	Multiple Choice	12
	Wordsearch	15
Learning support and Language support: Activities suitable for students receiving Learning or Language Support include:	Working with words	6
	Picture Sentences	7
	Odd One Out	8
	Maths Keywords	9
	Unscramble the letters	10
	Alphaboxes	14
	Play Snap	16-19
Language support: Additional activities for Language Support:	Grammar points	13
Levels for Language Support	**A1 – B1** The language level of each activity is indicated in an information box.	
Learning focus	Using Maths textbooks and accessing curriculum content and learning activities.	
Acknowledgement	The *English Language Support Programme* acknowledges the permission of Gill and Macmillan to reproduce excerpts from *Shortcuts to Success. Maths. Junior Certificate Higher Level* by Mark Halpin.	

Note: The categorisation of activities is indicative only and should not prevent teachers from using any activities that are considered suitable for a particular group of students.

Making the best use of these units

Learning Record

A copy of the Learning Record should be distributed to each learning support and language support 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.

Introduction of a topic or activity should ensure that students understand **what** they are doing and **why**. Many students will have some difficulty in understanding both the language in the activity and the instructions/purpose for carrying out the activity.

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:

- Bring the relevant **subject textbooks** to learning/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.
- 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.
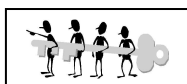
Recording what they have learnt on the *Learning Record,* which should be distributed at the start of each unit.

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

Indicates that answers may be found at the end of the unit.

Don't forget that many of the activities in these units are also suitable as **homework** tasks or for **self-study.**

MATHS: Higher Level Trigonometry

Keywords
The list of keywords for this unit is as follows:

Nouns
angle
arc
area
bisector
calculator
centimetre (cm/cms)
compass
construction
cos (cosine)
degrees
diagram
distance
equation
flagpole
formula
function
ground
hypotenuse
isosceles
ladder
length
measurement
metre/metres (m/ms)
plane
point (pt)
protractor
ratio
sides
sin (sine)
speed
step
tan (tangent)
trigonometry
x

Verbs
to calculate
to construct
to draw
to evaluate
to extend
to find
to form

to give
to intersect
to investigate
to join
to leave
to let
to measure
to plot
to prove
to show
to swing
to travel

Adjectives
adjacent
adj (adjacent)
after
end
false
following
known
longest
nearest
opposite
opp (opposite)
perpendicular
Pythagorean
rough
straight
trigonometric
true
vertical

Other
from
Pythagoras
vertically

Symbols
|ab| length from point a to point b
∠**abc** angle formed as you move from point a to point b to point c
70^0   70 degrees

Vocabulary file 1

Word	Meaning	Note or example*
equation		
degree		
formula		
length		
measurement		
ratio		

*You may wish to write a sentence or phrase, make a note of the page in your textbook where this word appears or, if English is not your first language, provide a translation into your language.

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

Vocabulary file 2

Word	Meaning	Note or example
adjacent		
opposite		
perpendicular		
vertical		
to plot		
to show		

Get your teacher to check this and then file it in your folder.

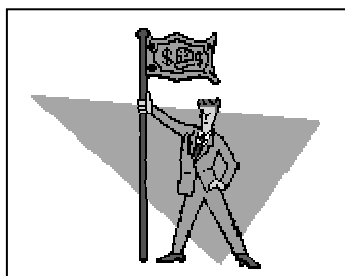| |
|---|
| **Language Level**: A1 |
| **Type of activity:** pairs or individual |
| **Suggested time:** 10 minutes |

Working with words

1. Tick the correct answer
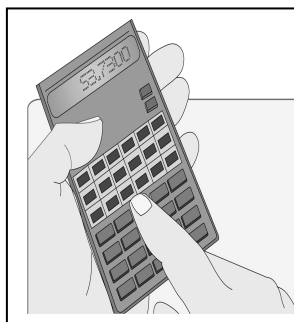
a) a compass

b) a calculator

c) a mobile phone

d) a watch
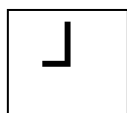
a) a flagpole

b) a street lamp

c) a goal post

d) a stick

2. Tick which answer you think is best.

In maths, trigonometry is about:
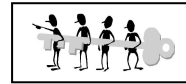   a) the sizes of angles and the lengths of the sides of a triangle.
   b) numbers and amounts which are shown in letters and symbols
   c) collecting and studying numbers to show information

The symbol in the box means:

a) a 360º angle
b) a 180º angle
c) a 90º angle

> **Language Level**: A1
> **Type of activity:** pairs or individual
> **Suggested time:** 30 minutes

Picture Sentences

1. **This is a right-angled triangle. Read the descriptions of the <u>hypotenuse</u>, <u>opposite</u> and <u>adjacent</u> and see if you can mark them on the triangle. You can check this in your textbook.**
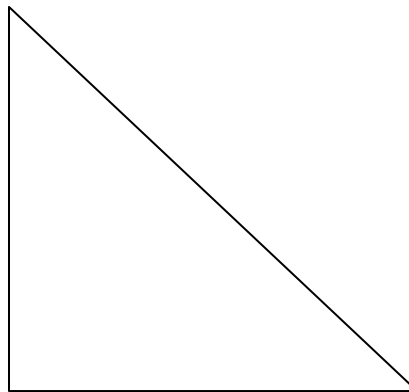
<u>Hypotenuse</u> – opposite the 90º angle
<u>Opposite</u> – opposite the second given angle
<u>Adjacent</u> – the side which joins the two angles

2. Put these words in the correct order to form <u>instructions</u>.

hypotenuse the length find of the

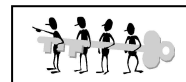_____

the side the find length of marked x

_____

the triangle why right angled explain is

_____

Language Level: A1 / A2
Type of activity: pairs or individual
Suggested time: 20 minutes

Odd One Out

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

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

sin	tan	cos	water
hypotenuse	angle	bird	triangle
blue	opposite	nearest	adjacent
calculator	grass	measurement	number

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

adjacent   _____

opposite   _____

perpendicular _____

vertical   _____

straight   _____

Check that these key words are in your personal dictionary.

Language Level: A2 / B1
Type of activity: individual
Suggested time: 20 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.

calc_ _at_r   _____

ad_ _ce_t   _____

tri_ _no_ _try   _____

eva_ _ate   _____

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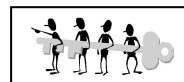
_____

_____

_____

_____

_____

Language Level: A1 / A2
Type of activity: pairs or individual
Suggested time: 20 minutes

Unscramble the letters

1.   This is Maths that deals with triangles   GIMORTYNTROE

    Answer _____

2.   The longest side of a right-angled triangle   SEPTYENUHO

    Answer _____

3.   Something that is next to something else   JANACTED

    Answer _____

4.   The space between two lines that cross each other   GALEN

    Answer _____

Solve the secret code

English=	A	E	G	I	M	N	O	R	S	T	Y
Code=	B	X	Y	F	D	Q	W	K	L	H	C

example: (code) DFKKWK = MIRROR (English)

HKFYWQWDXHKC FL YKXBH! =

_____

Language Level: A2/B1
Type of activity: pairs or individual
Suggested time: 30 minutes
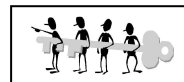
Completing sentences

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

In the given diagram
(1) we have two _____ of a right angled triangle.
(2) we are looking for the measure of the third side.
We therefore use the _____ of Pythagoras.

_____

Very important, before using your calculator ensure that it is in DEG mode (for a Sharp _____) or in D mode (for a Casio calculator).
This can be seen on the _____ of the screen.

_____

This is the first of two _____ that are asked very frequently.
Please read _____ and follow the steps below when answering any question of this type.

_____

Again, write _____ sides in fraction form and cross-multiply.

_____
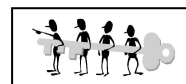
Calculate the _____ of the flagpole.

_____

Word Box

carefully	calculator	height	both
top	questions	sides	theory

Language Level: A2 / B1
Type of activity: individual
Suggested time: 30 minutes

Multiple choice
Sample Questions

Question 3
(a) A ladder is shown here leaning against a wall. The bottom of the ladder is 3 m out from the wall.
If the ladder is 4 m in length, calculate p, the angle formed by the ladder and the ground.

(b) If O = 50° and E = 20°
Investigate whether the following statements are true or false:
(i) 3 Cos D = Cos 3D
(ii) Sin (D + E) = Sin D + Sin E
(iii) Tan (D - E) = Tan D - Tan E

1. What is the ladder shown to be leaning against?
      a)   a wall   b)   a door
      c)   nothing   d)   the ground

2. How far out from the wall is the bottom of the ladder?
      a)   50 m   b)   20 m
      c)   3 m   d)   4 m

3. What is p?
      a)   a ladder   b)   an angle
      c)   the ground   d)   a wall

4. Should you use O = 50° and E = 20° in (b)?
      a)   Yes   b)   No

5. Should you work out if the statements are true or false?
      a)   Yes   b)   No

Language Level: B1
Type of activity: individual and pairs
Suggested time: 30 minutes
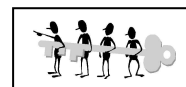
Grammar points

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!

Pythagoras		to	at	perpendicular		from
triangle	draw	up	between		evaluate	
of	false	onto		equal		step
out	down	angle		plane	symmetry	
image	outline	in		mean		nearest

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

- Find the height _____ the tower in metres, correct _____ one decimal place.
- A boy is flying a kite _____ a string of length 30m.
- A hot-air balloon is attached _____ the point *p* _____ a piece of string.
- Find the angle _____ elevation of the sun, correct _____ the nearest degree.
- Find the angle _____ the ladder and the wall.
- Use this information to find the height _____ the Eiffel tower, correct _____ the nearest metre.

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

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.

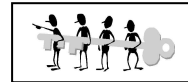| a	b	c
d	e	f
g	h	i
j	k	l
m	n	o
p	q	r
s	t	u
v	w	xyz

Do you understand all these words?

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

Word Search

Find the words in the box below.

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

ADJACENT	COSINE	NEAREST	SIN
ANGLE	EVALUATE	OPPOSITE	STEP
CALCULATE	FLAGPOLE	PLANE	TAN
CALCULATOR	HYPOTENUSE	SHIFT	TANGENT
COS	LADDER	SIDES	TRIGONOMETRIC

Play Snap

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

✂

calculator	calculator
opposite	opposite
calculate	calculate

angle	angle
sin	sin
cos	cos

tan	**tan**
X	**X**
nearest	**nearest**

sides	sides
plane	plane
evaluate	evaluate

Answer key

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

Picture sentences, page 7
Find the length of the hypotenuse.
Find the length of the side marked x.
Explain why the triangle is right angled.

Odd One out, page 8
1. water, bird, blue, grass

Maths Keywords, page 9
calculator (noun), adjacent (adjective), trigonometry (noun), evaluate (verb)

Unscramble the letters, page 10
trigonometry, hypotenuse, adjacent, angle
Secret Code: Trigonometry is great.

Completing Sentences, page 11
In the given diagram
(1)   we have two **sides** of a right angled triangle.
(2) we are looking for the measure of the third side.
We therefore use the **theory** of Pythagoras.

Very important, before using your calculator ensure that it is in DEG mode (for a Sharp **calculator**) or in D mode (for a Casio calculator).
This can be seen on the **top** of the screen.

This is the first of two **questions** that are asked very frequently.
Please read **carefully** and follow the steps below when answering any question of this type.

Again, write **both** sides in fraction form and cross-multiply.

Calculate the **height** of the flagpole.

Multiple Choice, page 12
1.a, 2.c, 3.b, 4.a, 5.a

Grammar points, page 13
Prepositions: to, at, from, up, between, of, onto, out, down , in

- Find the height **of** the tower in metres, correct **to** one decimal place.
- A boy is flying a kite **from** a string of length 30m.
- A hot-air balloon is attached **to** the point *p* **to** a piece of string.
- Find the angle **of** elevation of the sun, correct **to** the nearest degree.
- Find the angle **between** the ladder and the wall.
- Use this information to find the height **of** the Eiffel tower, correct **to** the nearest metre.

Word Search

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