

Maths

Higher Level Coordinate Geometry

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 Coordinate Geometry	
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
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	Unscramble the letters	10
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	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 <i>English Language Support Programme</i> acknowledges the permission of Gill and Macmillan to reproduce excerpts from <i>Shortcuts to Success. Maths. Junior Certificate Higher Level</i> 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.

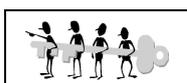


Have you ticked
this activity on your
Learning Record?

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**.

Keywords

The list of keywords for this unit is as follows:

Nouns

area
axis
coordinates
distance
equation
formula
geometry
image
isosceles
line
midpoint
origin
parallelogram
point
slope
triangle
type

Verbs

to construct
to cut
to draw
to evaluate
to extend
to find
to form
to give
to intersect
to join
to let
to measure
to plot

to prove
to satisfy
to show

Adjectives

axial
collinear
constructed
end
equal
given
intersecting
measured
middle
opposite
parallel
perpendicular
sample
straight
vertical

Other

from
vertically

Symbols

$|ab|$ length from point a to point b
 $\angle abc$ angle formed as you move from point a to point b to point c
 70° 70 degrees

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Vocabulary file 1

Word	Meaning	Note or example*
area		
axis		
coordinates		
equation		
formula		
origin		

*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.

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Vocabulary file 2

Word	Meaning	Note or example
measured		
opposite		
perpendicular		
sample		
straight		
vertical		



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

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



Working with words

1. How do you say these equations? Tick the correct answer

$$\frac{Y_2 - Y_1}{X_2 - X_1}$$

- a) y two minus y one over x two minus x one
- b) y squared minus y on top of x squared minus x
- c) x squared minus x underneath y squared minus y
- d) x squared minus x on the line below y square minus y

$$\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

- a) x squared minus x plus y squared minus y squared
- b) the square root of x squared minus x plus y squared minus y
- c) the square root of x two minus x one, squared, plus y two minus y one, squared
- d) x minus x plus y minus y , squared

2. Now practise saying the following equations: (Note, you pause when you see a comma)

$$y = \frac{1}{2}x - 1$$

$$y = -2x - 1$$

$$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

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Language Level: A1/A2
Type of activity: pairs or individual
Suggested time: 30 minutes



Picture Sentences

1. Draw a line or lines, to represent the words. Compare your drawings with other students.

a) Slope of a line.

b) Distance between two points.

c) Point on a line.

d) Point of intersection.

2. Put these words in the correct order to form instructions.

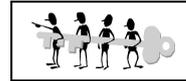
three all plot points

the calculate of the triangle area

of the find slope [fg]

equation find of [fg] the

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*

axis	y	disco	x
point	garden	coordinates	line
warm	find	line	slope
prove	evaluate	colour	measure

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 evaluate _____

to extend _____

to measure _____

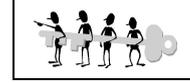
to show _____



Check that these key words are in your personal dictionary.

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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.

dis__nce _____

eva__ate _____

per__ndi__lar _____

mi__oint _____

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

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MATHS: Higher Level Coordinate geometry

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



Unscramble the letters

1. These are lines that meet at right angles EARENDIRPCULP

Answer _____

2. This is the point (0, 0) - the point from which other points are measured IGRION

Answer _____

3. A group of numbers that tell you where a point or line is OSINCAORDTE

Answer _____

4. A fixed reference line that you use to measure coordinates SAXI

Answer _____



Solve the secret code

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

example: (code) LVPHB = STORY (English)

YWPCWVHB KL XAQ! =

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Language Level: B1
Type of activity: individual/pair
Suggested time: 20 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. You can use your textbook to help you.

1. Isolate the term _____ the left of the '=' term.
2. Divide across by the _____ before the y term.
3. The _____ of the line is the number before the x term.
4. To find where a _____ cuts the x-axis, let y equal to 0.
5. To find where a line cuts the y-axis, let y _____ to 0.
6. When squaring a negative number be sure to first put the number in a _____.
7. Please check the first diagram and understand clearly why the base is 8 units and why the _____ height is 3 units.
8. Find the _____ of point d, the midpoint of [ab].
9. Prove that the _____ of the Δ prw is equal to 14.
10. To find the _____ of a line we need: the slope of the line [m] and a point on the line [x,y].

Word Box

slope	equation	area	coordinates	number
on	equal	perpendicular	line	bracket

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



Multiple choice

Question 2

- (a) Given $t(-2, 3)$ and $u(5, -1)$
- Find the slope of $[tu]$.
 - Find the equation of $[tu]$.
- (b) $r(O, -4)$, $p(O, 3)$ and $w(4, 1)$
- Calculate distance $|pr|$.
 - Plot points r , p and w .
 - Prove that the area of Δprw is equal to 14.
- (c) Find t given that $(2, 3t)$ is on the line $5x + 2y - 4 = 0$.

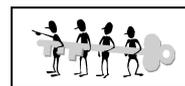
Question 3

- (a) Given T: $3x - 2y - 12 = 0$
Find:
- Point k , where line T intersects the x -axis.
 - Point l , where line T cuts the y -axis.
 - Calculate the area of the triangle klo where O is the origin.
- (b) With $v(3, -4)$ and $w(-2, 6)$ find:
- The slope of $[vw]$.
 - The equation of $[vw]$.

- In Question 2, which of these are you asked to find?
 - equation of $[pr]$
 - slope of $[tu]$
 - slope of $[tx]$
 - equation of $[xy]$
- What are you asked to do with points r , p and w ?
 - wash them
 - nothing
 - plot them
 - find their slope
- What must you prove about the area of Δprw ?
 - that it is greater than 14
 - that it doesn't exist
 - that it is less than 14
 - that it is equal to 14
- Should you calculate the area of the triangle klo ?
 - Yes
 - No
- Should you find the slope of $[lk]$?
 - Yes
 - No

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



Grammar points

1. Nouns and verbs

There are nouns and verbs from this unit in the box below. Beside each word, put a n - noun or v - verb.

(Careful: one of the words could be either a noun or a verb, depending on the way it is used).

prove area construct draw form coordinates distance
equation find geometry midpoint origin line axis give
intersect measure show cut formula

2. Compare your answers with another student's, or with the Answer Key.

3. This unit is full of instructions: find the co-ordinates, prove that the area...

Practise giving instructions by using the base of the verb (the imperative) to give instructions for one of the following:

- How to draw a triangle.
- How to use a compass.
- How to use a dictionary.

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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.

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

AREA	EVALUATE	MIDPOINT	TRIANGLE
AXIS	FIND	ORIGIN	TYPE
COORDINATES	GIVEN	PERPENDICULAR	
CUT	INTERSECTS	POINT	
DISTANCE	LET	PROVE	
EQUATION	LINE	SLOPE	

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Play Snap:

Do up Snap cards with 2 sets of the same keywords on them, shuffle them and let your students play cards.

Get the students to write the words for you.



midpoint	midpoint
distance	distance
prove	prove

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slope	slope
triangle	triangle
axis	axis

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equation	equation
perpendicular	perpendicular
given	given

NAME: _____ DATE: _____
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line	line
type	type
let	let

Answer key

Working with words, page 6

1. a, c

2.

y is equal to half x minus one

y is equal to minus two x minus one

x one plus x two over two (or divided by two) comma y one plus y two over two (or divided by two) comma

Picture sentences, page 7

Plot all three points.

Calculate the area of the triangle.

Find the slope of [fg].

Find the equation of [fg].

Odd One out, page 8

1. disco, garden, warm, colour

Maths Keywords, page 9

Distance (noun), evaluate (verb), perpendicular (adjective), midpoint (noun)

Unscramble the letters, page 10

Perpendicular, origin, coordinates, axis

Secret Code: Geometry is fun.

Completing Sentences, page 11

1. on the left of

2. number

3. slope of the line

4. line cuts the axis

5. let y equal to 0

6. put the number in a bracket

7. perpendicular height

8. coordinated of

9. area of

10. the equation of a line

Multiple Choice, page 12

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

Grammar points, page 13

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Verbs: prove, construct, draw, find, give, intersect, measure, show, cut
Nouns: area, coordinates, distance, equation, geometry, midpoint, origin, line,
axis, formula

Noun and verb: form (a shape) to form (to make a shape)

Word Search

```

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