

NAME: \_\_\_\_\_ DATE: \_\_\_\_\_  
 MATHS: Coordinate geometry

# Maths

## 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   | Coordinate geometry  |       |
|---|--|-------|
| <b>All students:</b><br>Activities that are suitable for <b>Learning Support, Language Support</b> and the <b>Mainstream Subject Class</b> include: | Keywords   | 3     |
|   | Vocabulary File  | 4-5   |
|   | Completing Sentences   | 11    |
|   | Multiple Choice  | 12    |
|   | Wordsearch   | 15    |
| <b>Learning support and Language support:</b><br>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 |
| <b>Language support:</b><br>Additional activities for Language Support:   | Grammar points   | 13    |
| <b>Levels for Language Support</b>  | <b>A1 – B1</b> The language level of each activity is indicated in an information box.   |       |
| <b>Learning focus</b>   | Using Maths textbooks and accessing curriculum content and learning activities.  |       |
| <b>Acknowledgement</b>  | 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 Ordinary 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.

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## 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.

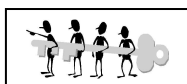


Have you ticked this activity on your Learning Record?

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  
line  
midpoint  
origin  
point

### 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 show

### Adjectives

constructed  
end  
equal  
given  
intersecting  
measured  
middle  
opposite  
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  
 $70^{\circ}$  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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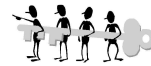
### Vocabulary file 2

| 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

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

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

- 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

---

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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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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 |

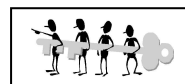
example: (code) LVPHB = STORY (English)

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  $\Delta$  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  $u(5, -1)$   
(i) Find the slope of  $[tu]$ .  
(ii) Find the equation of  $[tu]$ .  
(b)  $r(O, -4)$ ,  $p(O, 3)$  and  $w(4, 1)$   
(i) Calculate distance  $|pr|$ .  
(ii) Plot points  $r$ ,  $p$  and  $w$ .  
(iii) Prove that the area of  $\Delta prw$  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:  
(i) Point  $k$ , where line T intersects the  $x$ -axis.  
(ii) Point  $l$ , where line T cuts the  $y$ -axis.  
(iii) Calculate the area of the triangle  $klo$  where  $O$  is the origin.  
(b) With  $v(3, -4)$  and  $w(-2, 6)$  find:  
(i) The slope of  $[vw]$ .  
(ii) The equation of  $[vw]$ .

1. In Question 2, which of these are you asked to find?

- |                       |                       |
|-----------------------|-----------------------|
| a) equation of $[pr]$ | b) slope of $[tu]$    |
| c) slope of $[tx]$    | d) equation of $[xy]$ |

2. What are you asked to do with points  $r$ ,  $p$  and  $w$ ?

- |              |                     |
|--------------|---------------------|
| a) wash them | b) nothing          |
| c) plot them | d) find their slope |

3. What must you prove about the area of  $\Delta prw$ ?

- |                               |                           |
|-------------------------------|---------------------------|
| a) that it is greater than 14 | b) that it doesn't exist  |
| c) that it is less than 14    | d) that it is equal to 14 |

4. Should you calculate the area of the triangle  $klo$ ?

- |        |       |
|--------|-------|
| a) Yes | b) No |
|--------|-------|

5. Should you find the slope of  $[lk]$ ?

- |        |       |
|--------|-------|
| a) Yes | b) No |
|--------|-------|

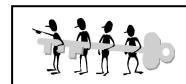
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Language Level: B1

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.

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### 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:

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



|          |          |
|----------|----------|
| midpoint | midpoint |
| distance | distance |
| prove    | prove    |



NAME: \_\_\_\_\_ DATE: \_\_\_\_\_  
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|          |          |
|----------|----------|
| slope    | slope    |
| triangle | triangle |
| axis     | axis     |

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|                      |                      |
|----------------------|----------------------|
| <b>equation</b>      | <b>equation</b>      |
| <b>perpendicular</b> | <b>perpendicular</b> |
| <b>given</b>         | <b>given</b>         |

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

NAME: \_\_\_\_\_ DATE: \_\_\_\_\_  
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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
```