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| **Halloween treasure hunt** |
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| Using coordinates, angles and directions to locate pirate treasure on a map |
| **Subject(s):** Maths**Approx. time:** 40 – 60 minutes |  | **Key words / Topics:** * Coordinates
* Vector
* Polar
* Direction
* Position
* Bearing
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| **Suggested Learning Outcomes**  |  |  |
| * To be able to describe a position on a map or grid
* To be able to give directions to a specific point on a map or grid using vector coordinates
* To be able to give directions to a specific point on a map or grid using polar coordinates.
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| **Introduction** |  |  |
| This is one of a set of resources developed to support the teaching of the primary national curriculum. They are designed to support the delivery of key topics within maths and science. This resource focusses on position and direction using vector and polar coordinates, with the theme of a pirate treasure map.  |
| **Purpose of this activity**In this activity learners will look at different methods to find position and direction on a map. They will learn how to use coordinates and bearings using angle and distance. They will work with a pirate treasure map and a series of worksheets to work out where the treasure is. Differentiated worksheets allow the learners to progress from using simple coordinates and vector coordinates to polar coordinates using bearings with angles and distances.This activity could be used as a main lesson activity, to teach learners how to use coordinates and angles. Further number skills may be used to work out map scale and distances. |
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| **Activity** |  | **Teacher notes** |
| **Introduction (5-10 minutes)**Teacher to explain that learners are going to find buried treasure on a pirate map, using various methods to find position and give direction.**Map Position and Direction (10 -15 minutes)**Use the prompts in the teacher presentation to help learner understanding by quick discussion of coordinates, vector coordinates and polar coordinates.**Treasure Hunt Worksheet Activity (20-25 minutes)****Worksheets 2 and 3**Hand out the Treasure Map and Treasure Hunt worksheet 2 to find the treasure using coordinates.Highlight the main features on the map and establish where the datum (0,0) starting point is.Learners to follow the instructions on the worksheet and add the positions and lines of direction on the map using a ruler and pencil. Refer to the answer sheet for the coordinate solution.Hand out worksheet 3 as required. Learners to complete each step, drawing on the treasure map the direction and distance of travel. The teacher presentation can be left on the whiteboard as a supporting guide as they do this.**Discussing the results of the activity (5-10 minutes)**Teacher to discuss with learners what methods of position and direction they found easy/difficult. Discuss how a compass uses angles to make a bearing when navigating. |  | This activity could be carried out as individuals or in pairs. **Treasure Hunt Activity and Worksheets**Print the activity and worksheets and distribute to the learners as required. The worksheets are progressive:Worksheet 1 for lower ability - coordinatesWorksheet 2 uses vector coordinatesWorksheet 3 uses polar coordinates.360-degree protractors will help with the working out of the angle of direction in worksheet 3.For each worksheet, the learners could use the same print out of the activity map, with different coloured pencils.  |
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| **Differentiation** |  |  |
| **Basic** |  | **Extension** |
| Learners to complete worksheet 1 using coordinates to find the treasure.Use just coordinates to plan directions to other features on the treasure map. |  | Starting from datum (0,0) learners to give directions to other features on the treasure map using one or both methods of position and direction.If map grids are of a scale 10mm = 0.5km, work out the distance travelled to find the treasure. |
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| **Resources** |  | **Required files** icon-docicon-pdficon-ppt |
| * Activity and worksheets
* Protractors (360 degree)
* Rulers
* Pencils/Coloured pencils/Pens
* Erasers
 |  | icon-ppt Teacher presentation – Treasure Hunticon-pdf Treasure Hunt Map – Activity sheeticon-doc Treasure Hunt Map – Worksheets 1-3icon-pdf Treasure Hunt Map – Activity Answers Sheets 1-3 |
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| **Additional websites** |  |  |
| * **BBC Bitesize** – What are Coordinates: <https://www.bbc.co.uk/bitesize/topics/zgthvcw/articles/z96k9qt>
* **BBC Bitesize** – How to plot coordinates: <https://www.bbc.co.uk/bitesize/topics/zdbc87h/articles/zvvmtv4>
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| **Related activities (to build a full lesson)** |  |  |
| **Starters** (Options) * Show video: **BBC Bitesize** – What are Coordinates: <https://www.bbc.co.uk/bitesize/topics/zgthvcw/articles/z96k9qt>
* Discuss how coordinates are used in Maths on maps and graphs.
* Watch video: **BBC Bitesize** – How to plot coordinates: <https://www.bbc.co.uk/bitesize/topics/zdbc87h/articles/zvvmtv4>
 | **Extension** (Options)* Starting from datum (0,0) learners to give directions to other features on the treasure map using one or both methods of position and direction.
* If map grids are of a scale 10mm = 0.5km, work out the distance travelled to find the treasure

**Plenary*** Discuss the findings of the activity – what did the learners find easy/difficult with each method of plotting position and direction.
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| **The Engineering Context** film |
| When planning to build new stadiums and large industrial sites, civil engineers need a good understanding of map reading skills to make sure that the buildings are built in exactly the right place. Engineers use special equipment to get the bearings and distance correct. |

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| **Curriculum links** |
| **England: National Curriculum**KS2 Y6 Maths – Geometry.* describe positions on the full coordinate grid (all four quadrants)
 | **Northern Ireland Curriculum**KS2 – Mathematics and Numeracy.Shape and space:* use co-ordinates to plot and draw shapes in the first quadrant
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| **Scotland: Curriculum for Excellence**Numeracy and MathematicsShape position and movement.Angle, symmetry and transformation:* MTH 4-18a
* MTH 4-18b
 | **Wales: National Curriculum** KS2 MathematicsUsing measuring skills.Area and volume Angle and position:* use coordinates to specify location
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| **Assessment opportunities** |
| * Formal teacher assessment of completed worksheets.
* Oral teacher feedback during the activities.
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