

## LESSON 1. THE CARTESIAN COORDINATE SYSTEM

### AIMS

Using and understanding the Cartesian coordinate system.  
Understanding teacher's instructions  
Reading and listening to the rest of the class  
Learning to work in pairs/group  
Giving instructions to work in pairs (teacher's notes)

### TEACHING OBJECTIVES

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| CONTENTS      | <ul style="list-style-type: none"><li>To distinguish x-axis and y-axis</li><li>To Graph points in the Cartesian coordinates system</li><li>To identify the coordinates of a point</li></ul>                                                                                                                                                                                                                                                                                                                                            |
| CULTURE       | <ul style="list-style-type: none"><li>To associate the contents of the lesson with real world situations</li><li>To be aware of the relation between Cartesian coordinates and Navajo rugs</li><li>To be aware of the relation between Cartesian coordinates and Urban Graffiti.</li><li>To be respectful with partners when working in groups/in the plenary</li></ul>                                                                                                                                                                |
| COMMUNICATION | <ul style="list-style-type: none"><li>To learn vocabulary related to the lesson</li><li>To interact in English when working in pairs.</li><li>To give instructions</li><li>To listen and understand instructions</li><li>To read and construct sentences</li><li>To ask questions</li><li>To give short answers</li><li>To read a short text</li><li>To give conclusions/results of the activities in the plenary</li><li>To learn position vocabulary</li><li>To pronounce correctly the main vocabulary</li><li>To compare</li></ul> |

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| COGNITION | To locate the position of a point<br>To remember which are the coordinates of a point<br>To identify the sign of the x or y-coordinate depending on the quadrant<br>To plot a point<br>To locate points in a map<br>To do a research task and put into practice the learnt concepts<br>To discuss and give recommendations about the power-point presentations of the classmates. |
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| <b>LEARNING OUTCOMES: learners will be able to:</b>            |
| Plot and identify the coordinates of a point                   |
| Identify the sign of the coordinates depending on the quadrant |
| Work in pairs                                                  |
| Understand and give instructions                               |
| Understand and asking questions                                |
| Talk in English in the plenary, giving answers or conclusions  |

## ASSESSMENT

The outcomes and participation of the students in the different activities, and the final activity.

## LESSON 2. GRAPHS AND FUNCTIONS.

### AIMS

Interpreting and drawing graphs  
Identifying the dependent and independent variable  
Identifying a function  
Giving instructions to solve word-problems

### TEACHING OBJECTIVES

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| CONTENTS      | <ul style="list-style-type: none"><li>To identify constants and variables</li><li>To distinguish the dependent variable from the independent variable, and locate them in the x and y-axis</li><li>To define a function</li><li>To learn the different ways of expressing a function</li><li>To interpret and draw graphs of functions</li></ul>                                                                                                                                                                                                                                                                                                                                                                   |
| CULTURE       | <ul style="list-style-type: none"><li>To be interested in finding real-life situations related to mathematics</li><li>To be aware that real life situations can be represented by a graph or a function: a trip, a movement, a walk...</li><li>To understand the distance-time-speed relation</li><li>To be aware of the climate conditions of a desert (The saharawis of western Sahara and their situation)</li><li>To be aware of the different temperatures around the world</li><li>To be aware of the existence of equations to predict the eruption of a geyser (Geysers in Kamchatka and discovering the peninsula)</li><li>To be respectful with partners when working in groups/in the plenary</li></ul> |
| COMMUNICATION | <ul style="list-style-type: none"><li>To pronounce in an accurate way the new vocabulary</li><li>To learn new vocabulary related to the lesson</li><li>To give answers (sentences)</li><li>To read short texts</li><li>To build sentences</li><li>To give reasons</li><li>To learn vocabulary of movement/changes used in graphs</li><li>To write short texts</li><li>To ask questions from sentences given previously.</li><li>To look for information on the net</li><li>To be motivated enough to start to talk in English</li></ul>                                                                                                                                                                            |

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| COGNITION | <p>To distinguish a variable from a constant in a real-life situation</p> <p>To analyse an algebraic expression, and identify the variables, constants, dependent and independent variables, and identify the functional relation.</p> <p>To associate a text with a function, and vice versa</p> <p>To learn to draw a function</p> <p>To identify in which way the function is expressed</p> <p>To read and interpret graphs related to real-life situations</p> <p>To understand word-problems, and solve them (Translate words into mathematic language).</p> <p>To discuss and give recommendations about the power-point presentations of the classmates.</p> |
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| <b>LEARNING OUTCOMES: learners will be able to:</b>                         |
| identify relationships between variables, and decide if they are a function |
| draw and interpret graphs                                                   |
| express a text as an algebraic expression, table, and graph                 |
| express a table as a graph, an algebraic expression, and a text             |
| express a formula as a text, graph or algebraic expression                  |
| express a graph as a text, algebraic expression or table of values          |
| understand and solve word-problems                                          |
| write short texts and sentences                                             |
| give reasons                                                                |
| ask questions                                                               |

## ASSESSMENT

The outcomes and participation of the students in the different activities, and the final activity.

## LESSON 3 . LINEAR FUNCTIONS. DIRECT VARIATION FUNCTIONS. CONSTANT FUNCTIONS.

### AIMS

Identifying linear relations, and direct variations.  
 Graphing linear functions, direct variation functions, and constant functions  
 Giving the algebraic expression of a linear function, direct variation function, and constant function.

### TEACHING OBJECTIVES

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| CONTENTS      | To draw the graph of a linear function, direct variation function and constant function<br>To write the algebraic expression of a linear function, direct variation function, and constant function<br>To understand the meaning of gradient or slope, y-intercept and x-intercept                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| CULTURE       | To associate the contents of the lesson with real world situations<br>To be respectful with partners when working in groups/in the plenary<br>To be aware of the currencies of different countries (dollar, pound, euro,...) and work with them.<br>To learn to estimate the height of a person from the length of the femur.<br>To understand that functions can be used to calculate the cost of a product or service<br>To be aware that there is a direct variation relation between the weight in Venus and the Earth.<br>To be aware of the most two common systems for measuring temperature: Celsius and Fahrenheit.<br>To choose a job through mathematics: studying and working with the wages of a job in U.S.A<br>To be aware of the different wages in Developed, Developing and non-developed countries, and working conditions. |
| COMMUNICATION | To talk in English: the learners will interact in English when working in pairs.<br>To give reasons/justify a choice<br>To read a word-problem, and understand what they are reading.<br>To make predictions<br>To ask questions<br>To show agreement/disagreement<br>To prepare questions for an interview<br>To summarize the conclusions of a research task<br>To express conditions                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

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| COGNITION | <p>To identify the slope in an algebraic expression</p> <p>To calculate the slope from the graph of a line</p> <p>To guess when the slope is positive or negative</p> <p>To identify increasing and decreasing functions</p> <p>To distinguish the algebraic expression of a linear function, direct variation function, or constant function.</p> <p>To build the algebraic expression from a graph (calculating the slope and y-intercept if it is necessary)</p> <p>To distinguish between linear relation and direct variation</p> <p>To calculate the constant of variation</p> <p>To associate equations with graphs</p> <p>To make predictions or estimations</p> <p>To discuss and give recommendations about the power-point presentations of the classmates.</p> |
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| <b>LEARNING OUTCOMES: learners will be able to:</b> |
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| Talk in a comfortable and relaxed way, putting the mistakes aside |
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| Read and understand word-problems |
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| Identify graphs and equations of linear functions, direct variation functions, and constant functions. |
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| Identify word-problems with linear functions, direct variation functions and constant functions. |
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| Learn to use graphs for units conversion |
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## ASSESSMENT

The outcomes and participation of the students in the different activities, and the final activity.