

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS

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**Cambridge ICT Starters
Initial Steps**

Scheme of Work

4271
Starting Graphs
Stage 1 Module



UNIVERSITY *of* CAMBRIDGE
International Examinations

Introduction

In this module, students begin to understand how to use ICT to classify information and present their findings in the form of simple charts or graphs. Students start to understand how they can use graphs and charts to answer questions or compare information.

What is Assessed in This Module?

Students will demonstrate how to:

- collect information
- sort and classify information
- use software to create simple charts and graphs
- use graphs to answer simple questions and make comparisons
- use graphs to help draw simple conclusions from the data

To Start This Module You Will Need

- simple graphing or charting software such as First Workshop from Black Cat Software or MS Excel or the spreadsheet from AppleWorks
- a selection of real objects or pictures to sort and classify
- boxes or labels to help with sorting
- some examples of real-life graphs

Underpinning Knowledge

Before commencing this module it is recommended that students know

- how to sort objects into groups
- how to use the keyboard and mouse to enter information into the computer
- how to understand simple data organised in a table or tally chart
- basic number skills

General Principles and Procedures

The following are further suggestions and considerations:

- before using the computer, refresh students understanding of sorting and classifying
- if using MS Excel or the spreadsheet from AppleWorks, it might be useful to change the toolbar options so that the icons, like Save and Print, appear as large buttons and so that the menus and toolbars are limited to those the students will need to use. It might also be useful to change the default font to a large and easy to read font type
- data sets should be kept small so that students can easily check they have entered data accurately
- always use easily countable or observable data to introduce graphing
- teacher demonstrations make it easy for students to appreciate and compare different graphs produced from the same information
- students need to be supported when creating graphs or charts to make sure that sensible graphs/charts are produced
- exposure to real life meaningful charts and graphs will help the students to understand why graphs and charts can be useful to answer real questions
- encourage good practice, like checking information for errors, giving charts a title and labelling the axes
- when practising what sort of conclusions can be drawn from graphs/charts you should encourage students to mention similarities as well as differences and develop an understanding that both are equally important observations

Scheme of Work

Learning Objectives	Classroom Ideas	Resources	Notes
Session Plan One			
<ul style="list-style-type: none"> • sort and classify information 	<ul style="list-style-type: none"> • teacher models the graphing program • sort students by asking them to move themselves into groups (sets) e.g. gender, hair/eye colour, type of shoe fastening, main colour in top (if not wearing a uniform) • ask them to think of a label that describes their set e.g. 'blonde hair'. Teacher writes a label to place beside the group • students count how many people are in their group. The number could also be recorded on this label • teacher asks questions using words more than, less than, most, less, and same • teacher models the use of the graphing program. Students suggest labels and provide the count of each set e.g. boys; five, girls; seven. Print off a bar graph to show students. Students could write a sentence about the graph 	<ul style="list-style-type: none"> • cards to write labels on 	<ul style="list-style-type: none"> • use easily countable or observable data when introducing graphing • students will enjoy suggesting other ways that they could group themselves e.g. colour of socks, type of clothing (trousers, shorts, skirts, dresses etc.)

Learning Objectives	Classroom Ideas	Resources	Notes
Session Plan Two			
<ul style="list-style-type: none"> • sort and classify information 	<ul style="list-style-type: none"> • teacher models the graphing program • class or small group activity – give each student a shape. Ask them to, in turn, place it in hoops (or circles of string) matching a teacher prepared label. Choose one attribute at a time e.g. colour. Ask students to explain their placement e.g. 'I'm putting my shape here because it is red and the label says red'. Accept all placements for now and offer the class the chance to reclassify any of the blocks later e.g. 'This shape is blue so it should go with the other blue shapes' • repeat the activity redistributing the shapes and choosing another attribute e.g. shape • teacher asks questions using words more than, less than, most, less, and same 	<ul style="list-style-type: none"> • shapes (or pictures of them) with different attributes of size, shape, and colour • teacher prepared labels of colours, shapes, sizes • hoops/string to group objects in 	<ul style="list-style-type: none"> • teacher may wish to model the graphing of one or more of the attributes using the computer or paper. Get students to count the blocks in each set. Compare the graph with the physical sets • Demonstrate how the graph can be changed to another type e.g. pie chart and print off both versions. Compare the graphs with the physical sets using words more than, less than, most, less, and same

Learning Objectives	Classroom Ideas	Resources	Notes
Session Plan Three			
<ul style="list-style-type: none"> • create pictograms • collect information • use graphs to answer simple questions and make comparisons 	<ul style="list-style-type: none"> • collect class data - favourite fruit, best toy, most enjoyed book, least favourite vegetable, favourite colour etc: <ul style="list-style-type: none"> - brainstorm a list of different types of fruit that people could choose from - predict which is likely to be the favourite, least favourite etc. - collect the data – each student is provided with a square of paper on which to draw his or her choice. Get them to write their name on the paper - students in turn place the squares on the paper, building up a bar graph (use blue tac to hold the square in place - this allows them to be moved) - suggest and write a label for each bar. Check that all the squares are in the right place before gluing • discuss this paper pictogram referring back to earlier predictions 	<ul style="list-style-type: none"> • small squares of paper for students to draw on • blue tac • large sheet of paper drawn up with two axes and spaces wide enough for the squares to be glued. Unless students are limited in their choices, you may need a wide sheet of paper 	<ul style="list-style-type: none"> • brainstorm (this is an idea to involve all the students in making suggestions. Students will become more skilled with the process each time you do a brainstorm like this): <ul style="list-style-type: none"> - In groups of four for a short period of time (two to four minutes) take turns to make a suggestion. One of the members could record the brainstorm or the paper could be passed around for each person to write down their suggestion. Accept all spellings, as this is a quick idea generating activity. Another person reads out the suggestions for the teacher to write on a large sheet of paper. Each group adds only suggestions that have not been mentioned previously • relate this activity to current class theme where possible

Learning Objectives	Classroom Ideas	Resources	Notes
Session Plan Four			
<ul style="list-style-type: none"> • enter data in the graphing software • use the software to create a bar graph • students compare different chart types 	<ul style="list-style-type: none"> • refresh students with the pictogram from the previous activity, drawing their attention to the number of squares in each category • students enter this data into graphing software and create a graph or chart <ul style="list-style-type: none"> - introduce the terms 'cell', 'row', and 'column' - students enter their data e.g. blue; five, red; seven etc. - select the cells and select the graphing icon • students try out different graph types with their data • students look at each others graphs and discuss their choices – trying to reach an opinion of which graphs or charts are useful and why 	<ul style="list-style-type: none"> • completed pictogram from the previous activity • computer with a suitable graphing program 	<ul style="list-style-type: none"> • the teacher will have modelled opening and moving about the graphing program in previous activities • encourage students to check their work for errors – it's very easy to enter data into a wrong row • students should be encouraged to label title and axes in charts or graphs they create as these will help when talking about the findings from their graphs

Learning Objectives	Classroom Ideas	Resources	Notes
Session Plan Five			
<ul style="list-style-type: none"> • create simple tally charts to collect information • create simple charts or graphs from their data • draw conclusions from the charts or graphs 	<ul style="list-style-type: none"> • students work in small groups to collect easily observable data e.g. the colour of cars in the car park • discuss how to use a tally to collect data. Practice this in the classroom before going outside • discuss appropriate labels for their data e.g. colours or car types - whichever is relevant • students collect and enter their data e.g. blue; five, red; seven & create their graph • ask students to talk about their results and share them with the other groups 	<ul style="list-style-type: none"> • a class visit to a car park, roadside, etc. • or a picture of a scene showing a number of different objects 	<ul style="list-style-type: none"> • tally – four vertical marks with one horizontal mark representing five objects • drawing conclusions from charts is often (at this level) stating the obvious – playing games about how many statements (conclusions) the class can find will help students to do to this for themselves

Learning Objectives	Classroom Ideas	Resources	Notes
Session Plan Six			
<ul style="list-style-type: none"> • use graphs to answer simple questions 	<ul style="list-style-type: none"> • students work in their groups (from the previous session) to decide on some questions they could ask other classmates to answer using their charts. This can be treated like a game: <ul style="list-style-type: none"> - 'what question have I asked if the answer is red' • groups write up their best questions and then take it in turns to write answers to the questions written by the other groups 	<ul style="list-style-type: none"> • data and graphs from previous session 	<ul style="list-style-type: none"> • answering questions and drawing conclusions is more interesting if the data used is meaningful to the students

Assessment Ideas

To show how the Assessment Idea fully incorporates the Learning Objectives tested, the Assessment Idea is cross-referenced with the Learning Objective table below.

Provide students with one of the following:

- a picture of a scene showing a number of objects that could be counted e.g. a street scene with houses, people, cars, trees or a farm yard with a number of different animals
- a class list with a colour, food, shape listed beside each name
- a collection of different coloured shapes

Ask students to produce a simple tally from the data (1). Ask students to enter this data into the graphing program and create a bar chart and one other type of chart (2). Save both charts as evidence for moderation. Ask some questions relating to their charts (3) and ask them to write at least 2 conclusions of the type 'My chart shows...' (4).

	Stage 1 Module - Starting Graphs
1	Store and classify information
2	Present information in charts or graphs
3	Use charts or graphs to answer simple questions
4	Draw simple conclusions from charts or graphs

Tutors should retain the following evidence for moderation:

- a copy of the original data & questions given to students
- students' saved chart (with answers & conclusions)