Interactive I.T. Student Activity Sheets Junior Certificate Strand 1

- **Student Activities written to match the I.T. interactive modules on the Project Maths Junior Certificate Student's CD Strand 1**
- **Interactive Activity Sheets included to enhance students' understanding of mathematical concepts**
- **Simple and clear guidelines are provided to facilitate learning**
- **Interesting questions are provided to lead students to explore, construct and consolidate their learning**

Preface

The NCCA have pointed out particular Key Skills in their Draft Syllabus. "While particular emphasis is placed in mathematics on the development and use of information processing, logical thinking and problem-solving skills, the new approach being adopted in the teaching and learning of mathematics will also give prominence to students being able to develop their skills in communicating and working with others. By adopting a variety of approaches and strategies for solving problems in mathematics, students will develop their self-confidence and personal effectiveness." To help our students to adapt to and take advantage of this new spirit of the syllabus, we have produced Interactive I.T. Student Activity Sheets which incorporate an innovative and diversified learning environment for mathematics.

As we all know, the advancement in technology has changed the way we can learn mathematics. Therefore we have developed a number of interactive modules on our student's CD to match this new development. With the help of these interactive modules, students can not only enhance their understanding in mathematics, but they can also enjoy learning it.

In order to help our students use the I.T. tools more effectively, ***Interactive I.T. Student Activity Sheets Junior Certificate Strand 1*** are produced in this booklet. A student activity sheet is designed for the majority of the interactive modules on the CD. All student activity sheets provide simple and clear guidelines including:

1. Reference to the related topics in ***Project Maths Student's Junior Certificate Strand 1 section***
2. Purpose of the I.T. tools
3. Instructions for using the I.T. tools.

These Student Activity Sheets, which include many interesting questions, will lead students to explore, construct, and consolidate their knowledge of mathematics on their own with ease. We believe that with the help of these activities, students' knowledge and understanding of mathematics will grow.

Table of Contents

Instructions for use

This booklet contains student activities to accompany the majority of the interactive files on the Junior Certificate Strand 1 section of the student disk. The specific section of the course that the activity relates to is specified in the name of the activity. At the top of each student activity the students are told what interactive file on the student disk is to accompany the student activity.

Technical Problems

The student disk has a link situated on the left hand side of its front page called "Troubleshooting" this section gives instructions, if any of the following problems are encountered:

- Problems opening Office 2007 documents
- You do not have Java on your machine
- You do not have a PDF reader on your machine.

Student Activity: To find the mean of a set of numbers

Use in connection with the interactive file "Mean" on the Student's CD.

1. Find the mean of the following set of numbers 50, 40, 50, 20, 30 and 80.

2. By changing the sliders in the interactive file, find the mean of the following set of numbers 50, 40, 50, 20, 30 and 80. Check that this result agrees with answer in No 1.

3. Find the mean of the following set of numbers 10, 10, 10, 10, 10 and 100.

4. By changing the sliders in the interactive file, find the mean of the following set of numbers 10, 10, 10, 10, 10 and 100. Check that this result agrees with answer in No 3.

5. Find the mean of the following set of numbers -8, -66, -30, 8, 30 and 66.

6. By changing the sliders in the interactive file, find the mean of the following set of numbers -8, -66, -30, 8, 30 and 66. Check that this result agrees with answer in No 5.

7. Using the interactive file, find 3 sets of numbers whose means are zero?

8. Why does the interactive file always divide by 6?

9. If the mean of a set of 6 numbers is 50 and we know 5 of the numbers are 35, 40, 50, 64 and 15, find the 6^{th} number.

_____

_____

Check your answer using the interactive file

_____

10. Using the interactive file, determine what is the effect on the mean of increasing one or more data items?

_____

_____

_____

11. Using the interactive file, determine what is the effect on the mean of decreasing one or more data items?

_____

_____

12. Click the Reset button on the interactive file and record the mean. By adjusting the sliders increase each of the numbers by 5. What do you notice about the new mean in comparison to the original mean?

_____

_____

13. Click the Reset button on the interactive file and record the mean. By adjusting the sliders multiply each of the numbers by 2. What do you notice about the new mean in comparison to the original mean?

_____

_____

14. Click the Reset button on the interactive file and record the mean. By adjusting the sliders divide each of the numbers by 2. What do you notice about the new mean in comparison to the original mean?

_____

_____

<u>Student Activity</u>: To investigate the effect of adding a common constant to all data

Use in connection with the interactive file "Effect on Mean by adding a constant" on the Student's CD.

1. Calculate the mean of the following data set 5, 4, 3, 2, 1 manually.

   _____

   _____

2. Insert the data set 5, 4, 3, 2, 1 into the interactive file. Click the arrow No 2 to calculate the mean.

   _____

3. Calculate the mean of the following data set 10, 9, 8, 7, 6 manually.

   _____

   _____

4. Insert 5 as the common constant in the interactive file and click to calculate the new mean. Explain what this does to each data item and record the new mean.

   _____

   _____

5. Repeat with different common constants. Do you notice any relationship between the mean before the common constant is added and the mean after the common constant is added?

   _____

   _____

6. What is the effect on the mean of a set of data items of adding a common constant to all items in the data set?

   _____

   _____

7. If the mean of a set of 100 data items is 55 and 10 is added to each data item, what will the new mean be?

   _____

   _____

8. If 5 is added to each item in a data set and the mean is found to be 23, what would the mean of the original numbers have been?

   _____

   _____

Student Activity: To investigate the effect of multiplying all the data by a common constant

Use in connection with the interactive file "Effect on Mean by multiplying by a constant" on the Student's CD.

1. Insert the data set 8, 7, 6, 5, 4 into the interactive file and click the arrow to calculate the mean.

   _____

   _____

   _____

2. Insert 5 as the common constant and click to calculate the new mean. Explain what this does to each data item and record the new mean.

   _____

   _____

   _____

3. Repeat with different common constants. Do you notice any relationship between the mean before the data items are all multiplied by the common constant and the mean after the data items are all multiplied by the common constant?

   _____

   _____

   _____

4. What is the effect on the mean of multiplying all the data items by a common constant?

   _____

   _____

5. If the mean of a set of 10 data items is 34 and each data item is multiplied by 5, what will the new mean be?

   _____

   _____

   _____

6. If each item in a data set is multiplied by 10 and the mean is found to be 23, what would the mean of the original numbers have been?

   _____

   _____

   _____

<u>Student Activity</u>: To investigate the effect on the mean of adding an extra data item to a data set, when the value of this data item is zero

Use in connection with the interactive file "Effect on Mean by adding a new data item" on the Student's CD.

1. Calculate the mean of the data set 8, 7, 6, 5, and 4 manually.

   _____

   _____

2. Insert the following data set 8, 7, 6, 5, 4 into the interactive file. Click to calculate the mean.

   _____

3. What was the mean in the interactive file and did it agree with the answer you got in No 1? If not recheck your work in No 1.

   _____

4. Calculate the mean of the data set 8, 7, 6, 5, 4 and 0 manually.

   _____

   _____

5. Click arrows 3 and 4 in the interactive file to check your answer to No 4.

   _____

6. What was the difference in the data sets in No 1 and No 4 and are their means equal?

   _____

   _____

   _____

7. Click the button to reset the interactive file. Insert a data set of your own and after clicking the arrows 1-4 answer the question "Are the Mean and New Mean related?" Repeat this question once more.

   _____

   _____

8. If one adds a new data item that is equal zero to a data set, is the mean of the new data set always going to be bigger or smaller than the mean of the original data set? Explain why.

   _____

   _____

<u>Student Activity</u>: To find the mean, mode and median of a set of numbers

Use in connection with the interactive file "Mean, Mode and Median" on the Student's CD.

Number of CDs students purchased this month to date

{3, 2, 2, 2, 3, 3, 4, 2, 2, 1, 5, 4, 3, 4, 2, 3, 3, 2, 3, 2, 3, 2}

Mode = {2} Median = 3 Mean = 2.73

☐ Click to see list of the 3 types of averages

1	Mary	3
2	Paula	2
3	Martha	2
4	John	2
5	Joe	3
6	James	3
7	Paul	4
8	Declan	2
9	Peter	2
10	Joan	1
11	Teresa	5
12	Sheila	4
13	Alan	3
14	Michael	4
15	Jean	2
16	Liam	3
17	Barbara	3
18	Ann	2
19	David	3
20	Brian	2
21	Hazel	3
22	Rose	2

1. Looking at the spreadsheet in the interactive file, what is the most common number of CDs purchased and what is this number called?

   _____

   _____

2.
   a. List the data in ascending order.

      _____

      _____

   b. What is the middle data item and what is the middle data item called?

      _____

      _____

   c. Does your answer correspond with the answer in the interactive file?

      _____

3.
   a. Find the mean of the list. Show calculations.

      _____

      _____

   b. Does your answer correspond with the answer in the interactive file?

      _____

4. If you change the number of CDs bought by Michael to 3, why are there now two values for the Mode?

_____

_____

_____

5.

   a. If Paula found a website selling cheap CDs and she bought 12, calculate the new mean, mode and median.

   _____

   _____

   _____

   b. Click the Reset button on the interactive file, insert 12 for Paula in the spreadsheet and now record the mean, mode and median. Do they agree with your calculations?

   _____

   _____

   _____

   _____

6. Name the three types of averages and explain what is meant by each.

   _____

   _____

   _____

   _____

Student Activity: To calculate the range of match scores

Use in connection with the interactive file "Range" on the Student's CD

1. If the following is a set of match scores: 11, 23, 2, 5, 6, 24, 16, 18, 14 and 29, what is the minimum score?

   _____

2. If the following is a set of match scores: 11, 23, 2, 5, 6, 24, 16, 18, 14 and 29, what is the maximum?

   _____

3. If the following is a set of match scores: 11, 23, 2, 5, 6, 24, 16, 18, 14 and 29, what is the range of the match scores?

   _____

4. Input the following scores 11, 23, 2, 5, 6, 24, 16, 18, 14 and 29 into the interactive file and check your answers to questions 1, 2 and 3.

   _____

5. What is meant by the range of a set of data items and explain how this was calculated?

   _____

6. Calculate the minimum, maximum and range of the following set of data items 11, 2, 2, 5, 6, 4, 16, 8, 14 and 17.

   _____

   _____

   _____

7. Change the results to: 11, 2, 2, 5, 6, 4, 16, 8, 14 and 17 in the interactive file. What is a) the new minimum, b) the new maximum and c) the new range in the interactive file and does it agree with the answer you got in question 6?

   _____

   _____

8. If the range is large, what does this tell you about the data items?

   _____

   _____

9. If the range is small, what does this tell you about the data items?

   _____

   _____

Mean, Mode, Median and Range Quiz

Use in connection with the interactive file "Mean, Mode, Median and Range Quiz" on the Student's CD.

1. What is the mode of the following set of numbers?
   2, 3, 4, 5, 6, 4
   A. 2 B. 6 C. 4 D. 5

2. What is the mode of the following set of numbers
   2, 3, 4, 5, 3
   A. 5
   B. 2
   C. 3
   D. 4

3. What is the median of the following set of numbers?
   -1, 12, 2, 3, 5, 7, 8
   A. 5
   B. 12
   C. -1
   D. 7

4. What is the range of the following set of numbers?
   10, 12, 2, 3, 3, 5, 7
   A. 2
   B. 10
   C. 6
   D. 12

5. What is the range of the following set of numbers?
   2, 3, -1, 5, 6
   A. 4
   B. None of the above
   C. 5
   D. 7

6. What is the range of the following set of numbers?
   4, 6, 2, 2, 3, 1
   A. 1 B. 6 C. 5 D. 4

7. What is the mean of the following set of numbers?
   10, 12, 2, 3, 3, 5, 7
   A. 10
   B. 6
   C. None of the above
   D. 12

8. What is the median of the following set of numbers?
   10, 12, 2, 3, 3, 5, 7
   A. 2
   B. 7
   C. 10
   D. 5

9. What is the mean of the following set of numbers?
   4, 6, 2, 2, 3, 1
   A. 4
   B. None of the above
   C. 3
   D. 6

10. What is the mode of the following set of numbers?
    4, 6, 2, 2, 3, 1
    A. 6
    B. 4
    C. 2
    D. 1

11. What is the mean of the following set of numbers?
    2, 3, 4, 5, 6
    A. 2
    B. 4
    C. 5
    D. 6

12. What is the median of the following set of numbers?

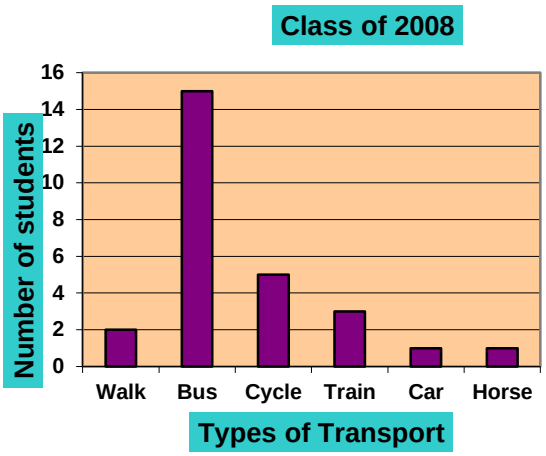
    2, 3, -1, 5, 6

    A. 6 B. -1 C. 2 D. 3

Student Activity: To examine how a bar chart works

Use in conjunction with the interactive file "Bar Chart" on the Student's CD.

Types of Transport	Walk	Bus	Cycle	Train	Car	Horse
Number of Students	2	15	5	3	1	1



1. How many students are in the class represented in the diagram?

   _____

   _____

2. What is the most popular type of transport? Why?

   _____

   _____

3. What are the least popular types of transport? Why?

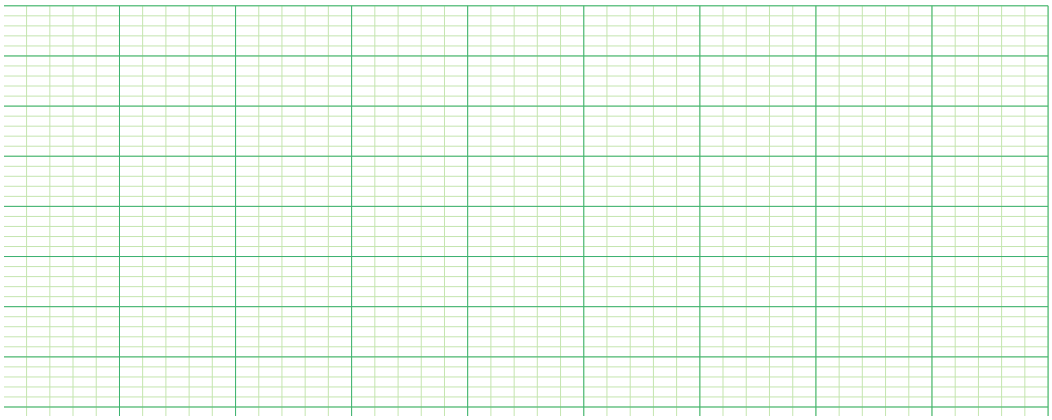
   _____

   _____

4. Three members of the class were late and must now be included in the table. One of these travels by car, one by horse and one walks. Complete the table below.

	Walk	Bus	Cycle	Train	Car	Horse
Number of Students						

5. Draw the bar chart after the adjustments in No 4.



6. Change the figures on the interactive chart and check if your bar chart is accurate.

_____

_____

7. Change the number of students in the table, who travel by bus to 15. What happens to the Bar Chart?

_____

_____

8. What would have been the effect on the chart if a student who walks to school was absent the day the survey was conducted?

_____

_____

9. What changes would you have to make to the table and chart, if a student said they arrived by boat?

_____

_____

10. What circumstances might cause the data to be different?

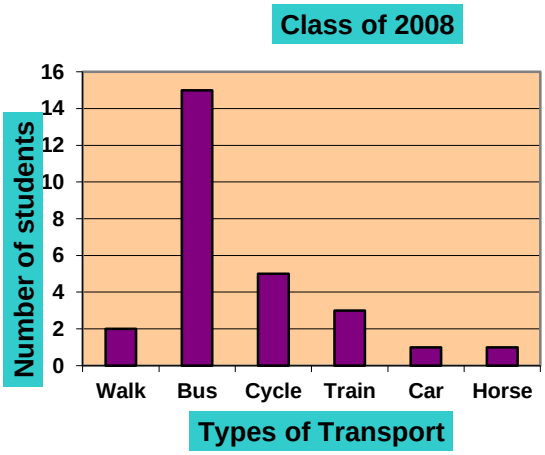
_____

_____

Bar Chart Quiz

Use in conjunction with the interactive file "Bar Charts Quiz" on the Student's CD.

Types of Transport	Walk	Bus	Cycle	Train	Car	Horse
Number of Students	2	15	5	3	1	1



1. How many students are in the class?
   A. 6

   B. 23

2. How many students cycle to school?
   A. 5

   B. 4

3. What is the most popular mode of transport?
   A. Bus

   B. Car

4. What are the least popular modes of transport?
   A. Walk and train

   B. Car and horse

5. When the bar chart was drawn 3 students were not included because they were late. If these were now included and these students cycle to school: how many would now cycle to school?
   A. 3

   B. 8

6. If 2 new students join the class next week and all arrive by car, how many would now be in the class including the ones who arrived late?
   A. 28

   B. 27

7. What effect would bad weather have on these figures?
   A. More people would walk.

   B. Less people would walk or cycle and more use car, train or bus.

8. What would be the effect on the chart, if 1 girl who normally walks to school was absent when the chart was drawn?
   A. All the bars would go down in height by 1.

   B. The walk bar would go down in height to 1.

9. What effect would a fuel strike have on the chart?
   A. More people would walk or cycle.

   B. More people would come by bus.

10. If this data was collected in a city with an excellent public transport system, which of the following would be true?
   A. More use cars

   B. Less use cars

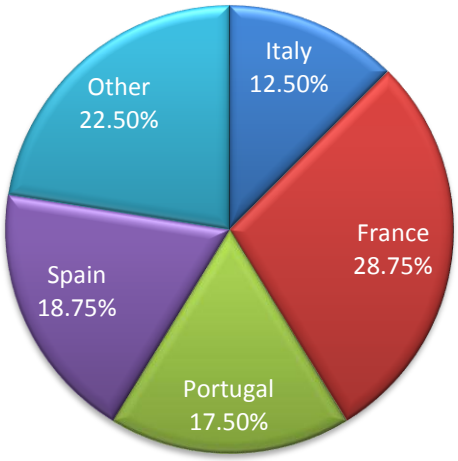
11. If this survey was conducted in a city school, where most of the children lived locally, what change would you expect in the number of children using the bus?
   A. More.

   B. Less, as they would tend to walk.

Student Activity: To examine how a pie chart works

Use in conjunction with the interactive file "Pie Chart" on the Student's CD.

Italy	France	Portugal	Spain	Other
10	23	14	15	18



1. What is the most popular country for school trips, among the group of teenagers interviewed? Explain why you say it is this country.

   _____

   _____

   _____

2. What is the least popular country for school trips among the group of teenagers interviewed? Explain why you say it is this country.

   _____

   _____

   _____

3. Explain how the percentage 17.5 was calculated for Portugal in the pie chart.

   _____

   _____

4. Calculate the angle corresponding to France in the pie chart.

_____

_____

5. Record the current percentage shown on the interactive file for each country in the table below.

Table A	Italy	France	Portugal	Spain	Other
Original Percentage					

Now change the data in the table in the interactive file to the following:

Italy	France	Portugal	Spain	Other
20	46	28	30	36

Now complete the following table:

Table B	Italy	France	Portugal	Spain	Other
New Percentage					

By comparing the Original Percentage in Table A with the New Percentage in Table B, state what was the effect on the pie chart of changing the data? Explain your answer.

_____

_____

6. What is the total percentage represented in the pie chart? Change the figures in the data table and check what the total percentage represented in the pie chart is now. Do you notice any pattern? Explain your answer.

_____

_____

7. If all the students in the sample said they preferred France, draw the pie chart.

8. What happens to the pie chart if when Norway is introduced as an option, the number of students preferring to go to each of the named countries still remains the same and none choose Norway?

_____

_____

9. A different class was surveyed. This class had visited France last year on a school trip. What effect might this have on the data and pie chart? Explain your answer.

_____

_____

10. Design the question that the students could have been asked to provide the data supplied in the interactive file.

_____

_____

_____

Pie Chart Quiz

QUESTION

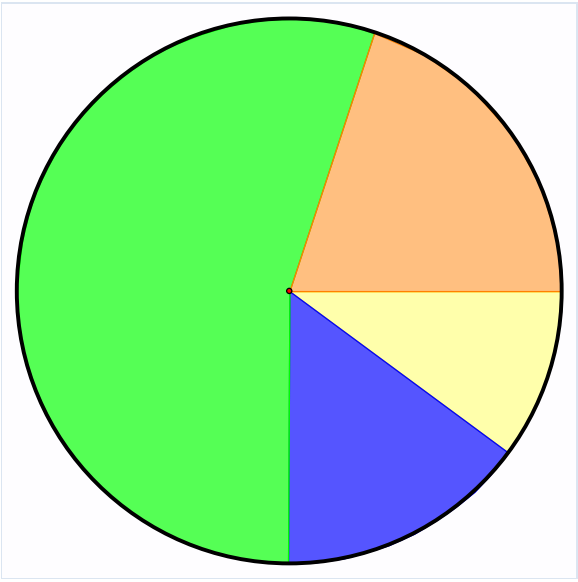
100 people were asked which car they drove. The results were recorded in the following table.

Type of Car	Ford	Toyota	VW	BMW
Number	20	55	15	10

INSTRUCTIONS

1. For each type of car select the corresponding angle for the pie chart below and label the pie chart.

Toyota	140º	120º	54º
Ford	30º	72º	110º
BMW	60º	130º	80º
VW	150º	198º	36º



Stem and Leaf Quiz

Use in connection with the Interactive file "Stem and Leaf" on the Student's CD.

1. 29 is the data item, is 2 or 9 the stem?
   A. 2 B. 9

2. 45 is the data item, is 5 the stem?
   A. No B. Yes

3. When the data item is a single digit like 6, is the stem 0?
   A. Yes B. No

4. Can a stem and leaf diagram deal with two data items being the same?
   A. Yes

   B. No

5. Are stem and leaf diagrams confined to dealing with item items between 0 and 100?
   A. Yes

   B. No

6. Which stem has more leaves?
   A. The least popular

   B. The most popular

7. Do the stems for a set of marks have to stop at 9?
   A. No

   B. Yes

8. Students are allowed marks between 30 and 80 inclusive, what numbers would be in the stem if they went up in 10's?
   A. 3,4,5,6,7,8

   B. 3,4,5,6,7

9. Do Stem and Leaf diagrams have to be in colour?
   A. Yes

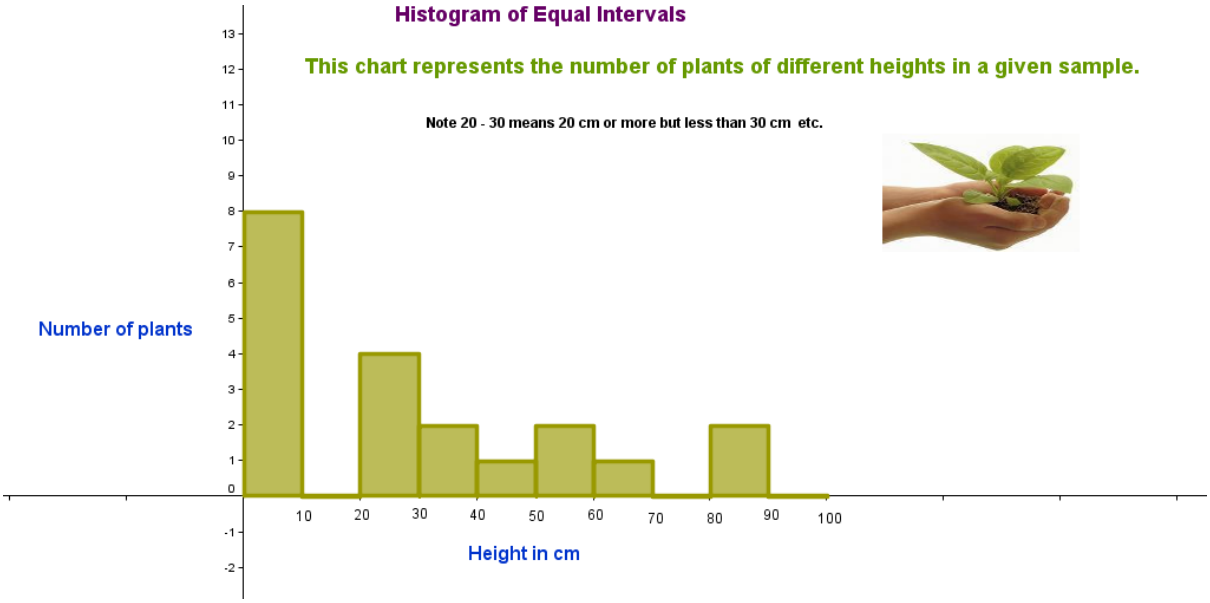
   B. No

10. What is the median of the following stem and leaf?
    20: 7 8
    30: 5 5 5 6 7 9
    40: 1 3 6 8
    50:
    60: 3
    A. 37

    B. 35

Student Activity: To examine how a histogram of equal intervals works

Use in connection with the Interactive file "Histogram Equal Intervals" on the Student's CD.



1. What is the most common height for the plants sampled?

   _____

2. How many plants have heights from 10-20cm?

   _____

3. How many plants were in the sample?

   _____

4. How many plants are between 50 and 90 cm in height?

   _____

5. Complete the frequency table:

0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100

6. If after 1 week all the plants had grown 10 cm, **complete the frequency table and draw the new histogram.**

0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100

<u>Student Activity</u>: To investigate the Fundamental Principle of Counting

Use in conjunction with the file "Fundamental Principle of Counting" on the Student's CD.

1. John is buying a car and he has a choice of 3 makes in his price range. Each car comes in 4 colours. How many cars does he have to choose from, if these are the only options to be considered? Show calculations.

   _____

   _____

2. A café offers 5 types of bread and 6 types of sandwich filling. How many different sandwiches can they offer their customers, using only 1 filling at a time? (Note each slice of bread in a sandwich must be of the same type.) Show calculations.

   _____

   _____

3. A T shirt factory has 5 designs and each come in 6 colours. How many different types of T shirts can be produced? Show calculations.

   _____

   _____

4. A café offers starters, main courses and desserts. It has 4 kinds of starters, 6 kinds of main courses and 5 desserts.

   a. How many choices is it offering it's customers, if each takes a starter, main course and dessert? Show calculations.

      _____

   b. How many choices is it offering it's customers, if each customer only takes a starter and main course? Show calculations.

      _____

5. Sheelagh is buying a jumper and she has 12 jumpers to choose from. Each brand of jumper comes in 4 colours. How many brands is she choosing from? Show calculations.

   _____

   _____

6. A café offers it's customers 18 choices and each customer has a starter, main course and dessert. It offers 3 main courses and 2 starters. How many different desserts does it offer? Show calculations.

   _____

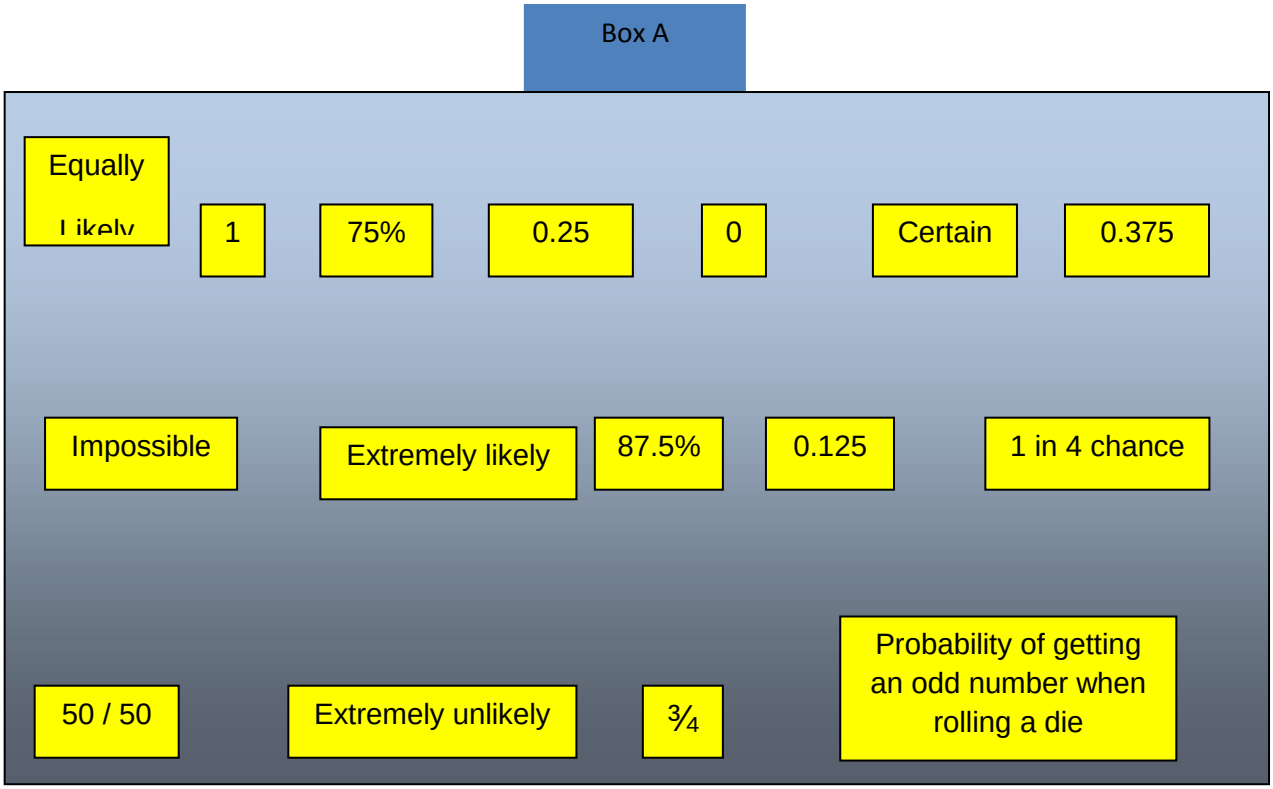
   _____

Probability Scale

Use in connection with the Interactive file "Probability Scale" on the Student's CD.

INSTRUCTIONS

1. The line below represents probabilities ranging from the lowest on the left to the highest on the right.
   Drag the mouse over the item until it changes to a double headed arrow, then hold down the left mouse button and drag to the required position.



Student Activity: To investigate the throwing of a die.

Use in connection with the interactive file "Throwing a die" on the Student's CD.

1. What are the possible outcomes when one throws a die?

   _____

2. How many times approximately would you expect each outcome, if you throw a die 50 times?

   _____

3. Each time you click the button "Click to throw the die 50 times" on the interactive file do you always get the same result? Explain.

   _____

4. On the interactive file click the "Click to throw the die 50 times" button and record your results in the table below. Repeat this step four more times and then complete the total column.

	First click	Second Click	Third Click	Fourth Click	Fifth Click	Total
Number of 1's						
Number of 2's						
Number of 3's						
Number of 4's						
Number of 5's						
Number of 6's						

5. Did you see any pattern emerge after 250 throws of the die in question 4 and would you regard this as a fair die. Explain your answer

   _____

   _____

6. Was this pattern evident after 50 throws? Explain your answer.

   _____

7. Which of the following spinners would give a similar set of results as the interactive file? Explain your choice.