National Numeracy Strategy

Unit 6a
Handling data

Year 5
Summer term

This Unit Plan is designed to guide your teaching.

You will need to adapt it to meet the needs of your class.

Unit Objectives

Year 5

• Discuss the chance or likelihood of particular events.	Page 113
• Solve a problem by representing and interpreting data in tables, charts, graphs and diagrams, including those generated by a computer.	Pages 115, 117
• Find the mode of a set of data.	Page 117

Link Objectives

Year 4

- Solve a problem by collecting quickly, organising, representing and interpreting data in tables, charts, graphs and diagrams, including those generated by a computer.

Year 6

- Use the language associated with probability to discuss events, including those with equally likely outcomes.
- **Solve a problem by** representing, **extracting and interpreting data in tables, graphs, charts** and diagrams, including those generated by a computer.
- Find the mode and range of a set of data. Begin to find the median and mean of a set of data.

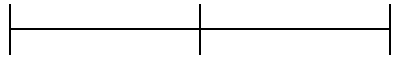
(Key objectives in bold)

Resources needed to teach this unit:

- Activity sheet 6a.1
- OHT 6a.1
- OHT 6a.2
- OHT 6a.3
- OHT 6a.4
- Self-assessment sheet 6a.1
- OHP calculator
- Calculators
- Sheets of squared paper
- Large digit cards numbered 0 to 9
- Cards numbered 1 to 6
- Sheets of A4 paper
- Sheets of squared paper
- Whiteboards
- Balls of different sizes
- Ramps
- Measuring equipment

department for education and skills

Planning sheet	**Day One**	**Unit 6a** ***Handling data***		**Term:** ***Summer***	**Year Group:** ***5***
Oral and Mental		**Main Teaching**			**Plenary**
Objectives and Vocabulary	**Teaching Activities**	**Objectives and Vocabulary**	**Teaching Activities**		**Teaching Activities/Focus Questions**
Read and write any whole number. VOCABULARY digit increase decrease	• Write on the board: 6748 Ask the children to read aloud the number. As they do record under 6748 the numbers: 6000 700 40 8 **Q** If we change the digit 4 to 1, what is the new number? Collect answers and record the numbers making 6718 on the board. • Emphasise that the change has decreased the number 40 to 10, a decrease of 30 overall. **Q** If we change the 7 to 9 in the original number, what is the new number? Collect answers and record 6948 on the board. **Q** How has the size of the original number changed? Ensure the children recognise the number has increased by 200. • Repeat increasing and decreasing other digits. Use other four-digit numbers.	Discuss the language associated with chance and likelihood of particular events. VOCABULARY chance likelihood certain unlikely possible even chance good chance unlikely probable RESOURCES OHT 6a.1	• Say that one day the weather forecast was that: rain was likely, strong winds were certain and it was possible that the temperature could reach 8°C. **Q** What time of the year was it? Discuss the vocabulary likely, certain and possible and record those on the board. Agree that the time of year was probably winter. • Repeat with the forecast: There was a good chance of sun, light winds were possible, it was unlikely the temperature would reach 20°C, and there was an even chance of showers. **Q** What time of the year was it? Discuss the vocabulary and agree the likely time of year is early summer. • Show OHT 6a.1. Ask the children to work in groups and put as many of the words shown on the OHT into a sentence about the weather and say if the sentence relates to winter, summer, autumn or spring. Give as an example: There is a fair chance of blue skies today. Say this is for springtime when the weather gets warmer.	• Collect children's sentences and ask the class to determine the season associated with the sentence. **Q** Which of the words were the most difficult to put into a sentence? Discuss these words and examples of sentences that contain them. • Ask pairs of children to put selected words, e.g. low risk, good chance, probable, into three sentences that relate to what they will be doing at lunchtime. Collect and discuss their sentences to establish they understand the meanings of the three terms. **By the end of the lesson the children should be able to:** • **Use the vocabulary of probability to describe events which have a good chance of happening and those which have a poor chance.** (Refer to supplement of examples, section 6, page 113.)

Planning sheet	**Day Two**	**Unit 6a** ***Handling data***	**Term:** ***Summer***	**Year Group:** ***5***
Oral and Mental		**Main Teaching**		**Plenary**
Objectives and Vocabulary	**Teaching Activities**	**Objectives and Vocabulary**	**Teaching Activities**	**Teaching Activities/Focus Questions**
Read and write any whole number. VOCABULARY digit increase decrease	• Write 40 9765 on the board. **Q** Can you read aloud this number? Ensure the children can read the number accurately and identify the value of each digit. • In turn, increase each digit by one and ask the children to read aloud the new number. **Q** How much bigger is the new number? Collect answers and discuss the changes. Ensure the children understand the effect of increasing the digit by one. • Return to the number 40 976 and decrease each digit by one. Ask the children to read aloud the new number. Ensure the children understand what to do to decrease the zero by one and the effect it has on the original number. • Repeat with other four-digit, five-digit or six-digit numbers.	Discuss the chance or likelihood of particular events. VOCABULARY See OHT 6a.1 RESOURCES OHT 6a.1 Large digit cards numbered 0 to 9 Activity sheet 6a.1	• Shuffle the digit cards numbered 0 to 9 and place them face down. Say that you are going to turn the cards over one at a time. Turn a card over and show it to the class, e.g. 7. Remind the children about some of the 'chance' words they used on day one. Show OHT 6a.1 and discuss some of the words. **Q** Is the number on the next card likely to be greater than 7? Discuss children's suggestions. Encourage them to make statements such as 7 is impossible, 9 is unlikely, a number less than 7 is probable. Turn the next card over and compare it with the children's suggestions. Ask about the likelihood of the next card and collect children's comments and chance statements. Encourage the children to use the vocabulary on OHT 6a.1. • Repeat until the last card is ready to be turned over. Agree this can be predicted with certainty. • Shuffle the cards and repeat. This time choose a word from OHT 6a.1. Ask pairs of children to make up a sentence about the next number that uses this word. Ask questions such as: **Q** Can you make up a sentence using 'good chance'? **Q** Why would it be difficult to use '50 : 50 chance' in a sentence? Ensure the children recognise that for some situations particular words are inappropriate. **Q** There is only one card to turn over, what words could we use to say something about this card? • Give out Activity sheet 6a.1. Say that the children are to take words from OHT 6a.1 and write them under the chance scale. Emphasise that the centre represents a 50 : 50 or even chance. **Q** Where should we write 'poor chance'? Agree it is to the left of the centre and near to the end of the line. Ask the children to work in groups and agree where the words should go before they record them. • Collect and discuss the position of the words with the children.	• On the board draw 50 : 50 chance 50 : 50 chance  and write: read a book, watch TV, go for a walk, do nothing. Point to a position on the line and to one of the four activities. **Q** What does this position say about the chance of my doing this activity? Ask children for a sentence, e.g. it is possible I will read a book. Ask for alternatives using different vocabulary. HOMEWORK – Give the children five words from the list on OHT 6a.1 and ask them to write five sentences about the weather in summer using one of the words in each sentence. **By the end of the lesson the children should be able to:** • **Discuss events which have a good chance of happening and those which have a poor chance.** (Refer to supplement of examples, section 6, page 113.)

Planning sheet	**Day Three**	**Unit 6a** ***Handling data***	**Term:** ***Summer***	**Year Group:** ***5***

Oral and Mental		**Main Teaching**		**Plenary**
Objectives and Vocabulary	**Teaching Activities**	**Objectives and Vocabulary**	**Teaching Activities**	**Teaching Activities/Focus Questions**
Read and write any whole number. VOCABULARY thousands increase decrease RESOURCES Whiteboards	• Write 215 637 on the board. Ask the children to read aloud this number. Emphasise how the thousands are read before the rest of the numbers. Change the thousands digits, e.g. 1 to 6 and record the number 265 637. Ask the children to read aloud the new number. **Q** By how much has the number increased? Collect answers and ensure the children recognise the number has increased by 50 000. • Repeat, increasing and decreasing the digits. Each time ask the class to read aloud the new number and record the increase or decrease in the size of the number. Collect and discuss answers.	Collect and represent data on a bar chart and product outcomes. Find the same mode of a set of data. VOCABULARY most frequent least frequent mode RESOURCES OHT 6a.2 Self-assessment sheet 6a.1 Sheets of squared paper Sheets of A4 paper	• Discuss the homework and the children's sentences. Show OHT 6a.2. Say that the data on the OHT are answers to questions asked to a group of children. **Q** If everyone asked gave an answer, how many children were asked the questions? Ensure that the children recognise that groups of 100 were asked the questions. **Q** What was the most frequent answer to the first question? Establish that this was dog. Say that the most frequent is called the mode so the answer dog was the mode. • Work through each question and establish the mode in each case. • Return to the first question and ask: **Q** What was the least frequent answer? Establish that this was rat, but that the least frequent does not have a special name. Work through each question to find the least frequent answer. • Give each child a clean sheet of A4 paper. Ask them to fold the paper in half long ways, then in half again, and again. **Q** When you unfold the paper, how many sections of paper do you have? Agree it is eight and have the children unfold the paper. Ask them to write the numbers 1 to 8 in the top right hand corner of each section. Say you want them to record the following information in each section without anyone else seeing. Read out these statements. Ask the children to record the data in the relevant section. 1. Your first name and the number of letters in your first name. 3. A number between 19 and 28 you like best. 7. Your last name and the number of letters in your last name. 2. The month you were born, and the number of letters in that month. 5. Any three-digit number, and that number rounded to the nearest 100. 6. A number between 99 and 108 you don't like. 4. The month after you were born, and the number of letters in that month. 8. Any two-digit number, and that number rounded to the nearest 10. • Divide the class into eight groups. Label the groups 1 to 8. Say that group 1 is to use the class information from statement 1, group 2 from statement 2, etc. Ask them to discuss in their groups how they might collect and organise the data and represent it so the whole class is able to see it. • Collect answers. Establish that if each child cuts their sheet into eight parts, they can distribute the data to each of the groups. Discuss and clarify the use of tables, tally marks, and bar charts to organise and represent the data. Remind groups 1, 2, 4, 7 they are to use the number of letters in the words. Give out sheets of squared paper for the bar charts and tables.	• Remind the children of the eight pieces of information that were collected. Take each in turn and ask the children in the groups not involved in analysing the data, for a statement to predict the mode, e.g. the most frequent number of letters in children's first names was six. Record these predictions on the board. • Ask each group to present their tables and bar charts and say what the mode was in each case. Ask additional questions such as: **Q** How many letters are there in the shortest/ longest first name? **Q** Which months have five letters? Which months could the mode represent? **Q** Which bar charts have familiar axes. Why? Confirm that statements 1 and 7, 3 and 6, 2 and 4, and 5 and 8 have similar axes. Compare these and point out the reasons why. ASSESSMENT – Give out Self-assessment sheet 6a.1. Allow the children time to complete the first cloud question on the sheet. **By the end of the lesson the children should be able to:** • **Develop understanding of the mode (most common item) and the range (difference between greatest and least) of a set of data;** • **Discuss bar charts showing frequency, and check predictions.** (Refer to supplement of examples, section 6, page 115.)

Planning sheet	**Day Four**	**Unit 6a** ***Handling data***	**Term:** ***Summer***	**Year Group:** ***5***

Oral and Mental

Objectives and Vocabulary	Teaching Activities
Read and write any whole number. RESOURCES Whiteboards	• Read out a five-digit number, e.g. 32 419. Ask the children to record the number on their whiteboards. Collect answers and discuss the way the number is constructed and read. • Repeat with other numbers with five or six digits. Include numbers with zeros as place holders, e.g. 120 407. Collect answers and ensure the children are able to record the numbers correctly, and read them accurately. • Ask questions such as: **Q** What is 120 407 decreased by 7000? Correct and discuss answers.

Main Teaching

Objectives and Vocabulary	Teaching Activities
Solve a problem by representing and interpreting data in tables and graphs. VOCABULARY bar line chart prediction risk conclusion RESOURCES OHT 6a.3 Sheets of squared paper Cards numbered 1 to 6 Self-assessment sheet 6a.1	• Show OHT 6a.3. Explain that instead of thick bars as used on a bar chart the bars are lines, so it is called a bar line chart. Say that the chart shows how often each number card was selected from a pack of cards. **Q** What numbers were on the cards selected? Agree the numbers were 1 to 8. **Q** What number was selected most/least often? Agree 7 was the least selected, 8 the most selected. **Q** How many times were cards selected? With the class read the different frequencies and have the children sum them. Agree there were 40 selections. • Tell the children that there were in fact ten cards in the pack not eight. **Q** What do you think the numbers were on the ten cards? Discuss suggestions. Establish that it was most likely that there were two cards numbered 4 and two cards numbered 8. **Q** Was there a fair chance of selecting each number 1 to 8? Remind the children of the language they had used to describe chance earlier in the week. Agree that the chance of selecting a 4 or an 8 was greater than a 1, 2, 3, 5, 6 or 7. • Say that you want the children to conduct an experiment. They are to work in pairs. Each pair is to take six 6 numbered cards 1 to 6. They can add two more cards, e.g. a 2 and 5 or two 3s, so they have eight cards to work with. They are to shuffle their eight cards, select a card at random, note down the number, return the card, shuffle the pack and then repeat until they have selected 40 cards. They then organise their data and draw the bar line chart. Say that each pair must be the only ones to know what the numbers on their eight cards are. Give out cards and sheets of squared paper for the children to gather their data and represent it as a bar line chart.

Plenary

Teaching Activities/Focus Questions

• Ask a pair of children to display their chart to the class.

Q What do we think the numbers on the eight cards were for this experiment?

Collect predictions. Ask the children to explain why they predicted the numbers and encourage them to use the language of probability, e.g. it is most likely there were two 3s, etc. Compare predictions with the actual set of eight cards.

Repeat with another pair, then ask the pairs to work together to compare their predictions and results.

• Discuss how successful the children were at making predictions on the basis of the results from the experiment. Emphasise that they were working with chance events which are very difficult to predict and there is a high risk of a wrong conclusion.

ASSESSMENT – Give out Self-assessment sheet 6a.1. Allow the children time to complete the second cloud question on the sheet.

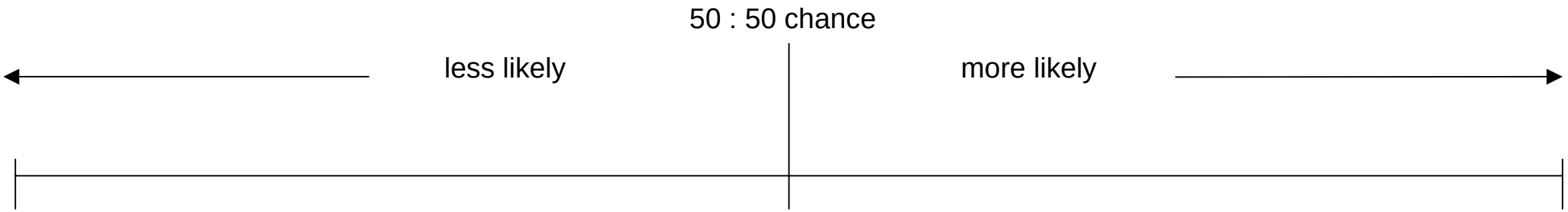
By the end of the lesson the children should be able to:

- **Test a hypothesis about the frequency of an event by collecting data;**
- **Discuss a bar line chart showing the frequency of the event and check the position.**

(Refer to supplement of examples, section 6, page 115.)

Planning sheet	**Day Five**	**Unit 6a** ***Handling data***	**Term:** ***Summer***	**Year Group: *5***

Oral and Mental		**Main Teaching**		**Plenary**
Objectives and Vocabulary	**Teaching Activities**	**Objectives and Vocabulary**	**Teaching Activities**	**Teaching Activities/Focus Questions**
Record and write any whole number. VOCABULARY more than less than	• Write 12 995 on the board. Ask the children to read aloud this number. **Q** What is 5 more than this number? Collect answers, and confirm by counting up in steps of one. **Q** What is 3000 less than this number? Collect answers and confirm by counting back in steps of 1000. • Repeat, asking for other numbers more than and less than a given number. Include multiples of 10, 100, 1000, etc. and include examples where the increase or decrease will cross boundary values.	Solve a problem by representing and interpreting data in tables, charts, graphs and diagrams. VOCABULARY line graph steepness estimate approximate RESOURCES Balls of different sizes Ramps OHT 6a.4 Measuring equipment Self-assessment sheet 6a.1	• Show the first graph on OHT 6a.4. Say that it is called a line graph. The points represent temperature measurements which are joined up to show the changes in temperature over the day. **Q** When was the temperature highest? Agree it was at 10:30 when the temperature was about 19°C. **Q** When was it coldest? Establish this was at 09:00 when it was 15°C. **Q** When did it warm up the most? Agree that the temperature increased by 2°C between 09:00 and 09:30 and nearly 2°C between 10:00 and 10:30. Explain that the points are joined together to show how the temperature might have changed between the half hours, and the points on the lines have meaning. **Q** What was the temperature at 10:15? Agree it was about 18°C if the graph is accurate but the lines are only approximate and 18°C is an estimate. • Show the second graph on OHT 6a.4 and ask similar questions to get the children to interpret the graph. Explain again that the lines joining the points show what might have happened between the time the measurements were taken. • Explain that you want the children to solve a problem. They are to work in groups and investigate the distance travelled by a ball rolled down a ramp when the steepness of the ramp is changed. Say that each group will test a ball of a different size. Discuss with the children what they think will happen as the steepness of the ramp changes. With the class make a number of predictions and record them on the board, e.g. the steeper the ramp the farther the ball will roll, the bigger the ball the less it will travel. • Explain that you want the class to test the predictions. They are first to collect data and then represent this on a line graph. Draw two axes on the board. **Q** What will each axis represent? Establish that the vertical axis will represent the steepness of the ramp; the horizontal axis the distance the ball rolls. Explain how they are to take measurements and plot the points using crosses on their graphs, and what scales they should use.	• Discuss the children's experimental results and graphs. **Q** Does the data support our predictions? Select graphs and ask questions to help them interpret their results. **Q** What has happened here as the steepness increased? **Q** These groups had different sizes of balls, whose rolled farthest? Collect suggestions and agree on the accuracy of the predictions. **Q** Can we join up the points with straight lines? Establish that the intermediate points will have meaning as they indicate how far the ball might have rolled given the steepness of the ramp at that point. ASSESSMENT – Give out Self-assessment sheet 6a.1. Ask the children to complete the last cloud question. Remind them what mathematics they have been doing during the week – work with large numbers, chance, collecting data and solving problems. Say they are to set themselves a target, saying what they want to get better at in the mathematics they have been doing this week. **By the end of the lesson the children should be able to:** • **Draw and interpret a line graph;** • **Understand that intermediate points may or may not have meaning.** (Refer to supplement of examples, section 6, page 117.)


50 : 50 chance
less likely
more likely

Fair chance	50 : 50 chance	Certain
Uncertain	Probable	Possible
Impossible	Even chance	Good chance
Poor chance	No chance	Likely
Unlikely	Very likely	Definite
Low risk	High risk	No risk
Very probable	Not impossible	Almost certain

1. What is my favourite pet?

Cat	Dog	Budgie	Rabbit	Hamster	Rat
28	35	11	9	16	1

2. What is my favourite exercise?

Swimming	Football	Running	Cycling	Tennis
23	26	21	13	17

3. What is the best thing about school?

Science	Going home	Meeting friends	Mathematics	Reading	All lessons
21	2	23	17	17	20

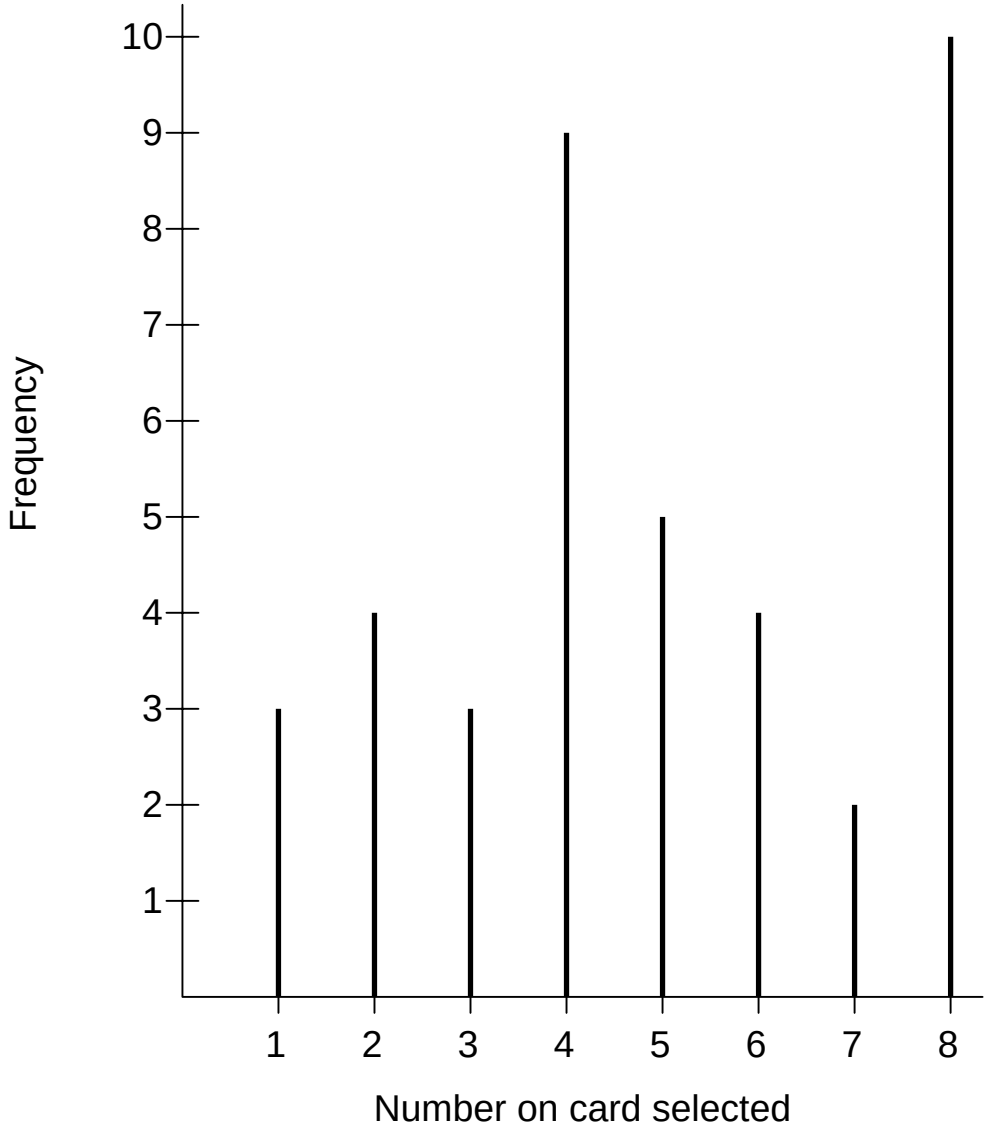
4. How do I spend my spare time?

Playing on the computer	Reading	Playing out	Watching TV	Washing up
31	29	17	20	3

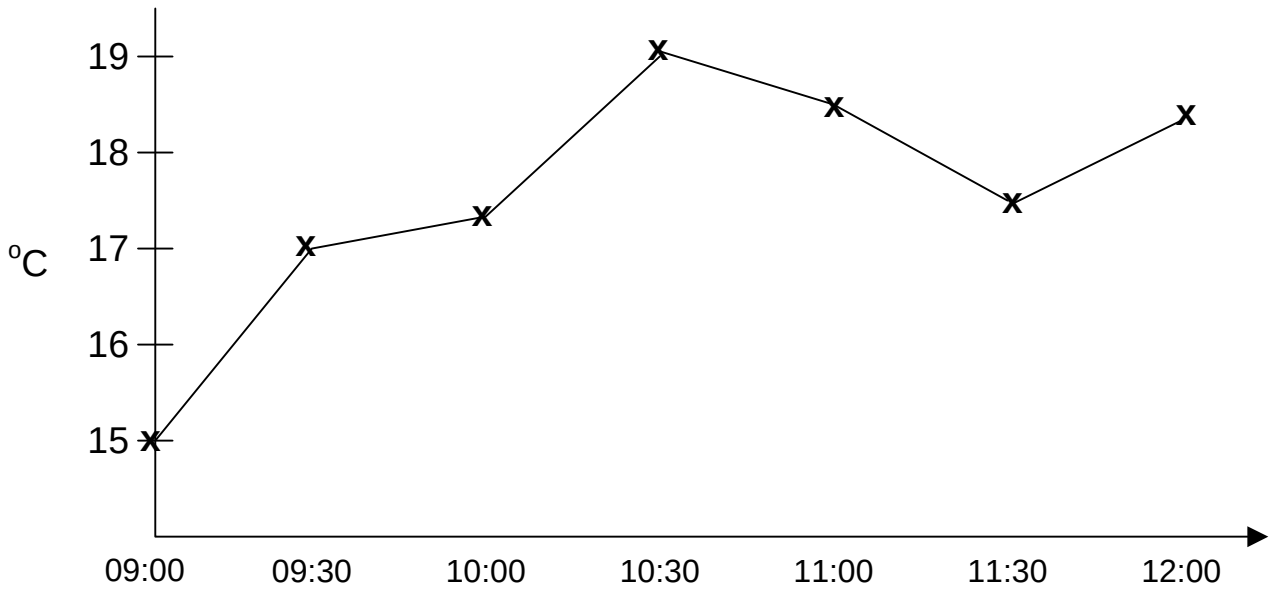
5. Which type of books do I like best?

Adventure story books	Sports books	Science books	Poetry books	All types of books
43	22	14	6	15

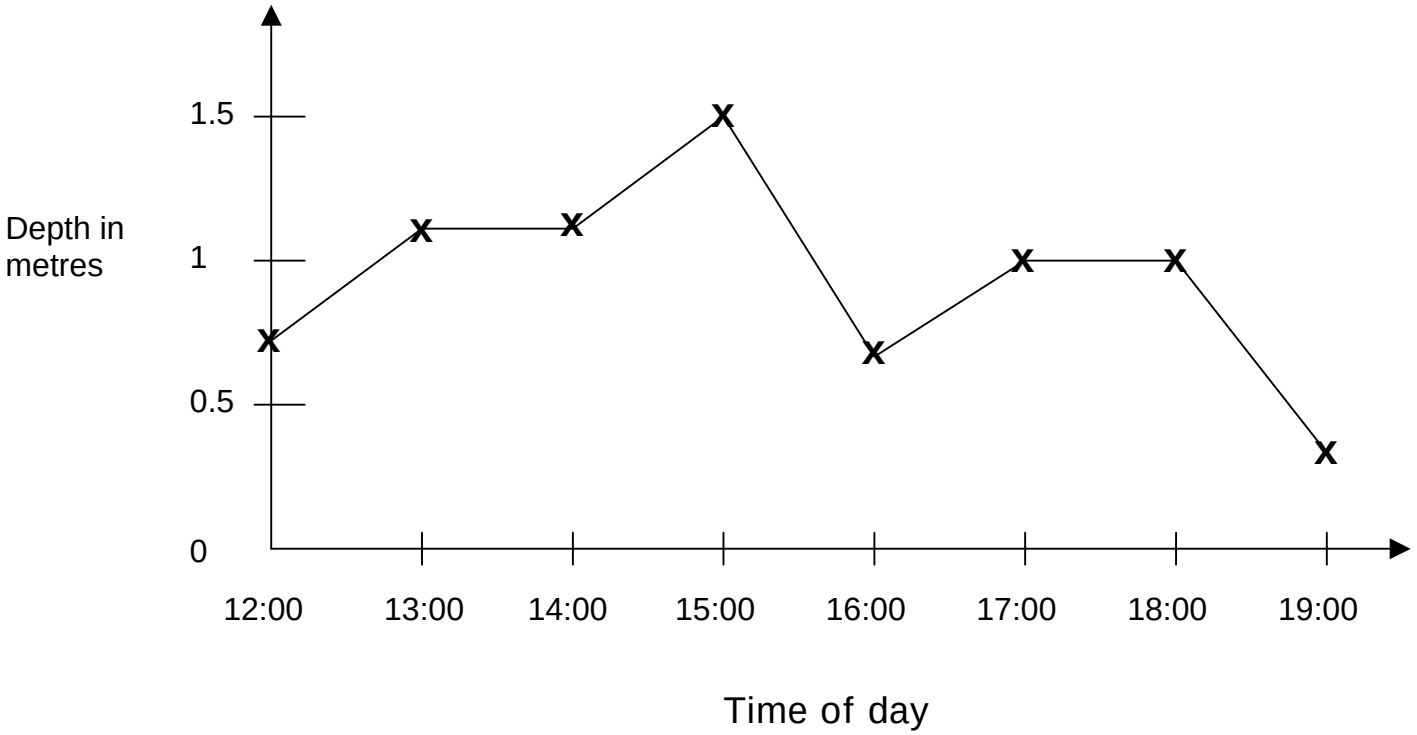
Bar line chart



Room temperature during one day



Depth of water in container during one day



My Mathematics

Write four statements about a future event that include these words:
1. Even chance
2. Probable
3. Low risk
4. Almost certain

My statements

1.

2.

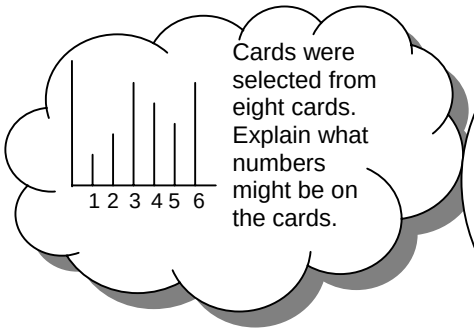
3.

4.

Show or discuss with a friend

I did this:

on my own ☐
with some help ☐



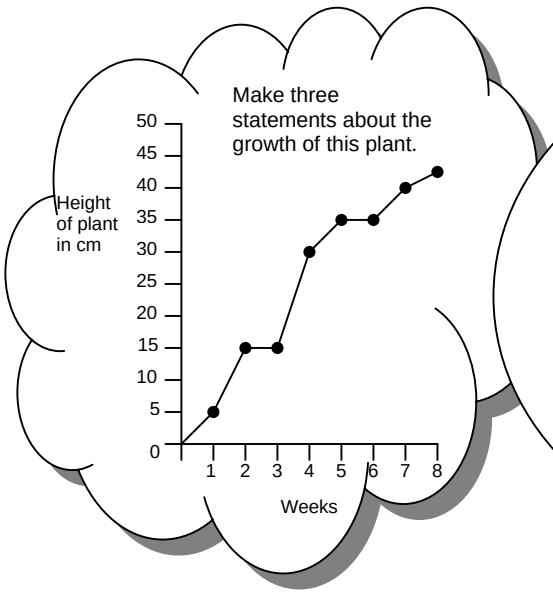
Cards were selected from eight cards. Explain what numbers might be on the cards.

My explanation

Show or discuss with a friend

I did this:

on my own ☐
with some help ☐



Make three statements about the growth of this plant.

My statements

1.

2.

3.

Show or discuss with a friend

I did this:

on my own ☐
with some help ☐

Name: _____

I want to get better at _____

_____

_____