Year 3: Block C   Three 2-week units

Handling data and measures

Collecting, organising, presenting and interpreting data to follow a line of enquiry

Identifying further questions

Sorting information using lists, tables and diagrams

Presenting data in frequency tables and bar charts

Choosing and using appropriate units of measurement

**BLOCK C
Handling data and measures**

Reading times and calculating time intervals

Knowing relationships between units of measure

Using ICT

Objectives	Units		
End-of-year expectations (key objectives) are highlighted	1	2	3
• Follow a line of enquiry by deciding what information is important; make and use lists, tables and graphs to organise and interpret the information	✓	✓	✓
• Describe and explain methods, choices and solutions to puzzles and problems, orally and in writing, using pictures and diagrams			✓
• Know the relationships between kilometres and metres, metres and centimetres, kilograms and grams, litres and millilitres; choose and use appropriate units to estimate, measure and record measurements	✓	✓	✓
• Read, to the nearest division and half-division, scales that are numbered or partially numbered; use the information to measure and draw to a suitable degree of accuracy	✓	✓	✓
• Read the time on a 12-hour digital clock and to the nearest 5 minutes on an analogue clock; calculate time intervals and find start or end times for a given time interval		✓	
• Answer a question by collecting, organising and interpreting data; use tally charts, frequency tables, pictograms and bar charts to represent results and illustrate observations; use ICT to create a simple bar chart	✓	✓	✓
• Use Venn diagrams or Carroll diagrams to sort data and objects using more than one criterion	✓	✓	

Speaking and listening objectives for the block

Objectives	Units		
	1	2	3
• Use talk to organise roles and actions	✓		
• Identify the presentational features used to communicate the main points		✓	
• Explain a process or present information, ensuring items are clearly sequenced, relevant details are included and accounts ended effectively			✓

Opportunities to apply mathematics in science

Activities		Units		
		1	2	3
3a	Teeth and eating: Investigate, for example: Do all cats eat the same food? Discuss what evidence to collect, decide how to collect it and present evidence.	✓		
3c	Characteristics of materials: Plan how to find out which paper is best for mopping up spills. Measure water/material accurately. Record results and draw conclusion.		✓	
3e	Magnets and springs: Plan how to investigate whether magnets are equally strong. Choose how to record results (table, pictogram, bar chart).			✓

Key aspects of learning: focus for the block

Enquiry	Problem solving	Reasoning	Creative thinking
Information processing	Evaluation	Self-awareness	Managing feeling
Social skills	**Communication**	Motivation	Empathy

Vocabulary

problem, enquiry, solution, calculate, calculation, method, explain, reasoning, reason, predict, pattern, relationship, collect, organise, compare, sort, classify, represent, interpret, effect

information, data, survey, questionnaire, table, frequency table, block graph, bar chart, Carroll diagram, Venn diagram, axis/axes, horizontal axis, vertical axis, label, title, scale, interval, division
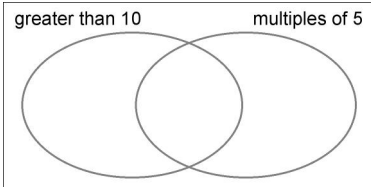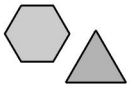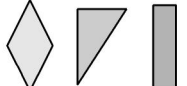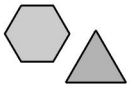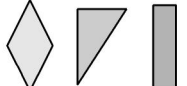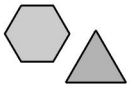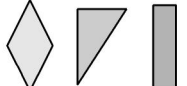
frequency, how often?, how frequently?, more/less, most/least, most/least popular, most/least frequent, greatest/least value, approximately, close, about the same as, ten times, hundred times

metric unit, standard unit, millimetre (mm), centimetre (cm), metre (m), kilogram (kg), gram (g), litre (l), millilitre (ml), degree Celsius (°C), ruler, tape measure, balance, scales, thermometer, capacity, weight, length, width, height, depth, temperature

time, timer, clock, second, minute, hour, day, week, month, year, before, after, interval, start time, end time, how long ago?, how long will it take to …?, how long will it be to …?

Building on previous learning

Check that children can already:

- collect and record the data needed to answer questions
- begin to organise results and solutions, and present data as block graphs and pictograms
- sort objects using lists, tables and diagrams
- explain decisions, methods and results in words, pictures or written form
- choose and use standard units (m, cm, kg, litre) to estimate and measure
- choose and use suitable instruments and equipment to measure and collect data
- recognise multiples of 10 and derive and recall the 10 times-table
- read scales with numbered divisions and interpret the divisions shown
- identify and use units of time and work out time intervals
- begin to use ICT to organise and present data

Unit 3C1   2 weeks

Objectives *Children's learning outcomes in italic*	Assessment for learning
• Follow a line of enquiry by deciding what information is important; make and use lists, tables and graphs to organise and interpret the information *I can decide what information to collect to answer a question*	What question are you trying to answer? What information will you collect? Who will you ask? How will you find it? What lists can you see in the classroom? Why are they there?
• Know the relationships between kilometres and metres, metres and centimetres, kilograms and grams, litres and millilitres; choose and use appropriate units to estimate, measure and record measurements *I can suggest sensible units to measure lengths*	A metre stick is how many cm long? Which is the most sensible estimate for the length of your hand span? A 80 cm B 16 m C 14 cm D 12 km Suggest something you would measure in kg, in ml, in km.
• Read, to the nearest division and half-division, scales that are numbered or partially numbered; use the information to measure and draw to a suitable degree of accuracy *I can use a ruler or a tape measure to measure a length to the nearest $\frac{1}{2}$ cm*	Show me where $24\frac{1}{2}$ cm would go on this tape measure/ruler. What length is shown below?
• Answer a question by collecting, organising and interpreting data; use tally charts, frequency tables, pictograms and bar charts to represent results and illustrate observations; use ICT to create a simple bar chart *I can explain what a frequency chart tells me*	You have to find out what sport your class prefers. Explain what you would do. How would you record the information? Say three things that you can tell from this frequency table. **School dinners for class 4** <table><tr><td>**Day**</td><td>**Number of school dinners**</td></tr><tr><td>Monday</td><td>11</td></tr><tr><td>Tuesday</td><td>13</td></tr><tr><td>Wednesday</td><td>17</td></tr><tr><td>Thursday</td><td>8</td></tr><tr><td>Friday</td><td>13</td></tr></table> Why might so few children have chosen to have school dinner on Thursday?
• Use Venn diagrams or Carroll diagrams to sort data and objects using more than one criterion *I can place objects on a Venn diagram*	Where would you place these numbers on the diagram? 13, 20, 10, 7 One of these shapes is in the wrong place on the diagram. Which one?

Objectives *Children's learning outcomes in italic*	Assessment for learning
• Use talk to organise roles and actions *I can discuss how to work together to solve a problem*	You have to work as a group to measure each person's height, foot length and hand span. Start by deciding what each person will do.

Learning overview

Children **classify objects, numbers or shapes** according to one criterion, progressing to two criteria, and **display this on a Venn diagram**. They understand that a Venn diagram uses two rings within a rectangle to show the relationship between two criteria, and that the objects which do not match either criterion are placed outside of the rings. For example, they enter the numbers 1 to 20 onto a Venn diagram and answer questions such as:

Which numbers are multiples of 5 but not even?

Explain why the number 17 is not in either ring.

Children choose other properties to create their own Venn diagrams. They **explain how they decide to place each item**.

Children **pose a problem** such as:

What is our favourite TV show, sport, comic, colour, …?

What game shall we make to run at the school fair?

Do all cats eat the same food? (see links to science)

They discuss questions such as:

How can we find out?

What information should we collect, and how?

How shall we organise it?

To answer the problem, they **collect data quickly**, for example by voting with a show of hands. They **present this information in a frequency table**. Children understand the term *frequency* as *how many there are of something* or *the number of times that something happens*. They discuss the outcomes and **respond to questions** such as:

How many more children chose … than …?

What are the three most popular choices?

How might the table change if everyone had two votes?

Children **choose appropriate instruments and units** to measure and record measurements such as their height, shoe size, length of foot and hand span, measuring where appropriate to the nearest half-centimetre. They discuss how to work together as a class so that every child's measurements are collected and recorded efficiently. They **enter these measurements into a database** and interrogate this to answer questions such as:

How many children have a shoe size bigger than 12?

How many children are shorter than 125 cm?

Children keep this database to use for comparison in the summer term. They **make and record predictions** about the differences they expect to see in their measurements in the summer term.
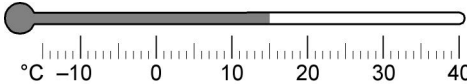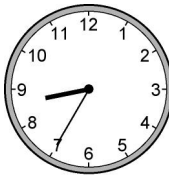
Children **investigate** the lengths of feet which fit into shoes of the same size. They measure their feet to the nearest half-centimetre, recording this measurement in both cm and mm. They **produce a simple class pictogram** showing the shoe size of all children in the class by using a sticky note

to represent each child. On the sticky note they put their name and foot length. They use the information to answer questions such as:

What length of foot will fit into a size 1 shoe?

Do all children with the same length of foot wear the same size of shoe?

They **pose simple questions of their own** for other children to answer from the graph.

Unit 3C2   2 weeks

Objectives *Children's learning outcomes in italic*	Assessment for learning
• Follow a line of enquiry by deciding what information is important; make and use lists, tables and graphs to organise and interpret the information *I can decide what information to collect to answer a question*	What are you trying to find out? What information will you collect? How? How did you record your results? Why did you choose this sort of table/graph? What did it show?

• Know the relationships between kilometres and metres, metres and centimetres, kilograms and grams, litres and millilitres; choose and use appropriate units to estimate, measure and record measurements
I know that temperature can be measured in degrees Celsius
	What measuring instruments would you choose to measure:
	   the distance around your head?
	   the temperature in the classroom?
	   the weight of an orange?
	   how much water a cup will hold?
	Holly estimates that the temperature outside today is 1 °C. Do you think that this is a good estimate?
	A bottle holds 2 litres of juice. How many millilitres is this?

• Read, to the nearest division and half-division, scales that are numbered or partially numbered; use the information to measure and draw to a suitable degree of accuracy *I can read the temperature on a thermometer to the nearest degree*	What temperature does this thermometer show? Choose a set of scales to weigh how heavy your shoe is to the nearest 100 g.
• Read the time on a 12-hour digital clock and to the nearest 5 minutes on an analogue clock; calculate time intervals and find start or end times for a given time interval *I can find how long a journey took if I know the start and end times*	How would this time appear on a 12-hour digital clock? Kevin leaves home at quarter past 8 and arrives in school at 20 to 9. How long is his journey? How did you work this out?
• Answer a question by collecting, organising and interpreting data; use tally charts, frequency tables, pictograms and bar charts to represent results and illustrate observations; use ICT to create a simple bar chart *I can show information in a pictogram where each picture represents 2 people*	You have to test the suggestion: *We think most children in our class walk to school*. What information will you collect? How? This pictogram shows how the children in a class came to school this morning. How many children came to school by car? On foot? By bike? By bus? Explain how to work out how many children there are in the class. Did most of the class walk? How can you tell?

Objectives *Children's learning outcomes in italic*	Assessment for learning
• Use Venn diagrams or Carroll diagrams to sort data and objects using more than one criterion *I can place objects on a Carroll diagram*	Write each multiple of 5 up to 50 in the correct place on the diagram. What sorts of numbers are in the 'even' column? **Multiples of 5 up to 50** 	even	not even
	| Is a cylinder a prism? Does it have any vertices? Where should it be placed on this Carroll diagram? |	prism	not a prism
---	---	---
has vertices		
does not have vertices			
• Identify the presentational features used to communicate the main points *I can say what parts of a presentation helped me to understand*	You have to tell the rest of your group which month contains most birthdays in the class and how you found out. Think of some important things you will say. What did Henry say or do that helped you to understand?

Learning overview

Children **test a hypothesis** such as: *We think most children in our class walk to school*. They decide what data is needed, collect it quickly then **create a simple pictogram** where a **symbol represents 2 units**. They use the diagram to pose and answer appropriate questions to test the hypothesis, such as:

> *Did most of the class walk to school today? How do you know?*
>
> *Do you think that the data would be the same in Year 6? Why or why not?*
>
> *How do you predict the graph will be different in the summer term?*

They save their information for **comparison** in the summer term.

Children **find the duration of their journey to school** by recording the time when they leave home and the time when they arrive at school to the nearest 5 minutes. They calculate the difference in order to establish how long their journey lasts, drawing a time line to support calculation where it would be helpful. Each child cuts a strip of paper to show the duration of their journey (for example, a 15 cm strip to represent a 15-minute journey). These strips are stuck on a class bar chart. Children agree a title for their bar chart and discuss how the axes should be labelled. They **interpret the bar chart** to answer questions such as:

> *Who has the longest journey to school?*
>
> *How many children take longer than 10 minutes to get to school?*
>
> *What is the difference between the shortest and longest journey times?*
>
> *Do the children with the shortest journey time walk to school?*

Children **use data in a frequency table** linked to a problem that the class is trying to solve (for example, *In which month do most birthdays in the class fall?*) to **draw a simple bar chart** with the vertical axis labelled **in twos**. They understand that the bars on the chart should not be touching. Children decide on a title for the chart and label the axes correctly. They discuss questions arising from the chart such as:

> *In which months are there more than five birthdays?*
>
> *How many children were born in the second half of the year?*

Children present their answer to a group, demonstrating how they used the chart to inform their answer. The group considers which features of the explanation were most useful in justifying the answer. Children **interpret information** from other simple **bar charts** from a variety of sources, including some produced on a computer, with the vertical axis labelled in ones and twos.

Children **measure** the outside temperature at the same time on each day for a week. They **use ICT** to record the temperature each day in a suitable data handling program. At the end of the week they use the program to display the results on a bar chart. They answer questions such as:

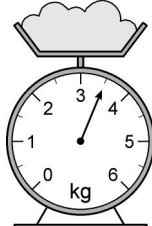*On which days was it warmer than 15 degrees?*

What is the difference between the temperature on the hottest day and the temperature on the coldest day?
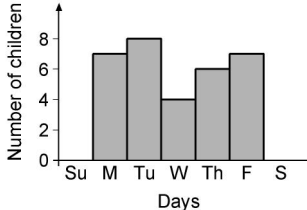
Children discuss **how rapidly the computer was able to generate the chart**, explore what other charts it can produce and discuss which chart, graph or table shows the information most clearly.

Children **classify objects, numbers or shapes** according to one criterion, progressing to two criteria, and display this work on a **Carroll diagram**. They understand how a Carroll diagram sorts objects into those which *do* fit a criterion and those which *do not* fit a criterion, using rows and columns. For example, children sort a collection of 3-D shapes into this Carroll diagram.

	prism	not a prism
has vertices		
does not have vertices		

Unit 3C3 2 weeks

Objectives *Children's learning outcomes in italic*	Assessment for learning
• Follow a line of enquiry by deciding what information is important; make and use lists, tables and graphs to organise and interpret the information *I can decide what information to collect to answer a question* *I can choose how to show others what I have found out*	What are you trying to find out? What information will you collect? How? How did you record your results? Why did you choose this sort of table/graph? What did it show? Did anything you found out surprise you?
• Describe and explain methods, choices and solutions to puzzles and problems, orally and in writing, using pictures and diagrams *I can explain how the class used information to solve a problem*	You are going to make a poster to show another class how we decided which class race we chose for sports day. What will you write down? What diagrams or drawings will you use?
• Know the relationships between kilometres and metres, metres and centimetres, kilograms and grams, litres and millilitres; choose and use appropriate units to estimate, measure and record measurements *I can choose suitable units to estimate and measure length*	Complete this table. Table below. How many 10 cm strips could you cut from 1 metre of tape? How do you know? Would you expect: a door to be 1, 2 or 5 metres tall? a hand span to be 5, 15 or 50 cm wide? a teapot to hold 1 litre, 10 litres or 100 litres?
• Read, to the nearest division and half-division, scales that are numbered or partially numbered; use the information to measure and draw to a suitable degree of accuracy *I can read a scale to the nearest division or half-division*	Draw a line that is 2 cm longer than this one [a line 5 cm long]. What measurement is shown on the scale?

kg	1	$\frac{1}{2}$	2	5	7	4	6	9
g								

Objectives Children's learning outcomes in italic	Assessment for learning
• Answer a question by collecting, organising and interpreting data; use tally charts, frequency tables, pictograms and bar charts to represent results and illustrate observations; use ICT to create a simple bar chart *I can show information in a tally chart or bar chart*	Complete this tally chart. | Transport	Tally	Frequency
---	---	---
Bus	lll	3
Bike	ll	2
Car		12
Walk	ⅡⅡⅡ lll		 Look at this bar chart. **Packed lunches brought to school** On which day were most packed lunches brought? How many packed lunches were there in the whole week? Why do you think that there are different numbers of packed lunches on different days?
• Explain a process or present information, ensuring items are clearly sequenced, relevant details are included and accounts ended effectively *I can explain how we found the information needed to solve a problem. I can explain each step in order*	You have found out how the heights of everyone in the class changed between autumn and summer. Imagine you are explaining what you did to a visitor. What steps would you explain? Make sure they are in order. What would you end by saying?

Learning overview

Children **process, present and interpret data** to pose and answer questions. They use all representations from the previous two terms (Venn and Carroll diagrams, bar charts, pictograms).

Children revisit their Unit 3C2 hypothesis: *We think that most children in our class walk to school.* Data is **collected quickly onto a class tally chart**. Children recognise that a tally involves grouping in fives and that this helps them to count the frequencies quickly and accurately. They **produce a simple pictogram**, where a symbol represents 2 units. They use the previous and new pictograms to **compare the data** and suggest responses to questions such as:

How has the data changed since the spring term?
What might be the reasons for the change in data?

In Unit 3C1, children created a database to show measurements such as their height, shoe size, foot length and hand span. They take the same measurements again and **compare the new results with previous results.** Children investigate questions such as:

How many children are more than 2 cm taller than they were in September?
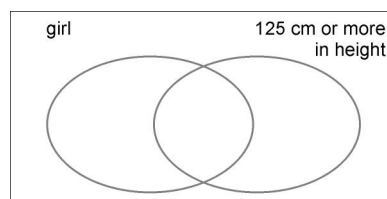*Which children still fit into the same shoes they wore in the autumn term?*
Which child has grown most since September?

They review whether the predictions they made in the autumn term were correct.

Children **sort and classify objects, numbers or shapes** according to two criteria, and display this work on Venn and Carroll diagrams. For example, they could use information from their database to enter the names of the children in their group on Carroll or Venn diagrams such as:

	125 cm or more in height	not 125 cm or more in height
girl		
not a girl		

Children **explain how they identify where to place an object** on the diagram and answer questions such as:

Which girls are not taller than 125 cm?

How many children in the group are taller than 125 cm?

Children **collect, represent and interpret data in order to answer a question** that is relevant to them, for example:

What new addition to the school play equipment would you like?

Which class race shall we choose for sports day?

They decide on the information they need to collect and collect it efficiently. They **collate the information** on a **tally chart** or **frequency table**, then use this to make simple frequency diagrams such as **bar charts**, using ICT where appropriate. They **discuss the outcomes**, responding to questions such as:

Which items had fewer than five votes?

Would the table be the same if we asked Year 6?

How might the table change if everyone had two votes?

Children present their conclusions to others, identifying key points that should be included. They **make suggestions as to how this data could be used**; for example, they may decide that they need to investigate the price of different equipment or discuss what they need to do to prepare for their chosen race.