# Maths and Me: Junior Infants – Short-Term Plan, Unit 17: Data (June: Week 3)

Strand(s) > Strand Unit(s)	Data and Chance > Data.
Learning Outcome(s)	Through appropriately playful and engaging learning experiences children should be able to explore, interpret and explain data in a variety of ways for a range of purposes.

Assessment	tuitive Assessment: sponding to nerging isconceptions	<b>lanned Interactions:</b> sponding to insights eaned from	nildren's responses o learning ¢periences	ssessment Events: formation gathered om completion of e unit assessment in	ne Progress ssessment Booklet age 30
Learning Experiences	<ul> <li>Concept Cartoon L1</li> <li>Concept Cartoon L1</li> <li>Reason &amp; Respond L1-4</li> <li>Sorting for Multiple Criteria L1</li> <li>Data L2</li> </ul>	C Our Favourite Toys L3 C Different Ways of Displaying Data L4 Print resources Pupil's Book pages 93–95 gl	Home/School Links Book page 40 ct PCMs 42, 60–61 ev	₽ ₽ ₽ <u>₽</u>	A. A.
CM					
Focus of Learning (with Elements)	<b>Sorting for Multiple Criteria:</b> Sorts and classifies objects and sets according to multiple attributes (R); Justifies classifications (R); Re-sorts data sets according to different attributes and justifies (R)	<b>Posing Questions:</b> Notices and discusses data in the direct environment (C); Explores data displays found in the immediate environment and in other areas of the curriculum (U&C)	<b>Collecting Data:</b> Collects data by asking simple questions of each other and gathering responses (A&PS); Collects data of personal relevance (U&C)	<b>Different Ways of Displaying Data:</b> Poses and responds to questions and/or problems that relate to the attributes of data sets (C); Displays and contrasts data in personal ways (A&PS); Reads and explains the information conveyed in various categorical and numerical displays (U&C)	<b>Review and Reflect:</b> Reviews and reflects on learning (U&C)
Lesson	-	2	m	t.	'n

have completed the focus of learning. Learning Experiences: 🖸 concrete activity; 🕑 digital activity; 🕑 activity; 🕑 activity based on printed materials, followed by lesson numbers. Key: Elements: (U&C) Understanding and Connecting; (C) Communicating; (R) Reasoning; (A&PS) Applying and Problem-Solving. CM: Cuntas Miosúil: please tick when you

# Additional information for planning

Progression Continua	See 'Junior Infants <i>Maths and Me</i> Progression Continua Overview' for a detailed breakdown of how all progression continua are covered.				
Maths Language	See 'Junior Infants Maths and Me Language Overview', individual lesson plans and Unit 17 Maths Language Cards.				
Equipment	See 'Junior Infants Maths and Me Equipment Overview' and individual lesson plans.				
Inclusive Practices	<ul> <li>See Let's Strengthen and Let's Deepen suggestions throughout lesson plans.</li> <li>See Unit 17 Let's Strengthen Suggestions for Teachers. (These address the Common Misconceptions and Difficulties listed below.)</li> <li>See Unit 17 Let's Strengthen PCM.</li> <li>See Unit 17 Let's Deepen PCM.</li> </ul>				
Integration	See individual lesson plans.				

# **Background and rationale**

- We may fall into the trap of thinking that the strand unit of Data is all about displaying information on graphs. Data is also about accumulating information (facts, numbers, preferences, etc.) in order to produce the graphs, as well as enabling the child to understand grouping of numbers, and comparing the groups to each other.
- Being able to find common properties for a collection of objects and to describe said properties are important skills in maths and statistics.
- In exploring the strand unit of Data in all classes, including Junior and Senior Infants, it is expected that the children will experience all (or particular stages) of the PPDAC cycle (see Data Investigations Using the PPDAC Cycle on page 315) as a way to use data to solve real-world problems or questions that are relevant to the children. Using the PPDAC cycle in Junior Infants is more exploratory than distinctly linear (the sequence steps of the PPDAC can become 'blurred').
- Note: collecting data should not become a popularity contest.
- While this single-week block of content is the unit dedicated to Data in Junior Infants, nevertheless the children have already had many opportunities, in a variety of strand units, to practise the skills involved (e.g. in Unit 16: Time 2, Day 4, Lesson 4). They have also engaged in many situations in which they sorted, classified and re-sorted objects and data sets according to different and multiple attributes (sorting items into sets by size, shape, colour, thickness, etc. as part of Sets and Operations).
- This unit will also revise and reinforce prior learning across many of the Number strand units (e.g. sorting, counting, adding, comparing).

While the overarching theme of this unit is **Our Favourite Things**, it is important not to limit possible investigative questions to this theme, as this might restrict the mathematical potential.

# **Common misconceptions and difficulties**

- The children may struggle to sort items into groups.
- They may struggle to recognise variation and/or the different attributes of items, and not appreciate how a sorted collection may be re-sorted according to different attributes.
- They may struggle to relate the pictorial representations to the concrete.
- They may miscount objects or pictures.
- They may struggle with comparing, i.e. identifying how many more/fewer chose X than Y, or preferred X to Y.
- They may count the representative icon on the horizontal or vertical line as well as the data items (e.g. counting the bear icon, as well as the three bears on the 'block graph').
- They may become confused by a representative icon (e.g. counting the amount of large bears, but the bear icon is smaller than/slightly different to the bears they are counting).

The Unit 17 Let's Strengthen Suggestions for Teachers address the common misconceptions and difficulties listed above.

# **Mathematical models and representations**

- Real objects, including cubes, bears, counters, and pictorial representations of the same
- Block graphs, with which a group of children indicate their preference/choice, count the marks for each choice, and present the concluding data



Teaching tip

A block graph manipulative printable is available to support this unit. Click on the resources icon on the *Maths and Me* book cover on **edcolearning.ie** 

# Day 1, Lesson 1 **Sorting for Multiple Criteria**

# Focus of learning (with Elements)

- Sorts and classifies objects and sets according to multiple attributes (R)
- Justifies classifications (R)
- Re-sorts data sets according to different attributes and justifies (R)

## Learning experiences

Digital activity: How Will We Sort Them? MAM Routines: Concept Cartoon, with **Reason & Respond** 

Concrete activity: Sorting for Multiple Criteria

Pupil's Book page 93: Sorting for Multiple Criteria

# Equipment

- Manipulatives such as bears, counters, beads, links and cubes
- Collections of objects from the classroom, and/ or from nature, such as pinecones, pebbles, leaves, twigs and seashells
- 2-D and 3-D shapes

# Maths language

How will we sort them?

# Warm-up

# **Digital activity: How Will We Sort Them? MAM Routines: Concept Cartoon, with Reason** & Respond

Display the Concept Cartoon, in which the characters must sort different collections of objects. There are multiple ways in which the objects can be sorted: by size, by colour, by type, as things we can eat/cannot eat, by shape, etc. Ask the children how they would sort themselves into sets:

- How could you sort *yourselves*?
- Could you sort by hair colour? What colours would you use? (blonde, black, brown, red)
- Could you sort by eye colour? What colours would you use? (brown, blue, green, grey)
- What other ways could you sort? (e.g. How do we get to school? Who has long/short/mediumlength hair? How many children are there in each child's family?)

# Main event

## Concrete activity: Sorting for Multiple Criteria

Distribute a collection of objects to each group and ask the children to sort their collection into different groups/sets. This Opportunity



activity revises and assesses sorting, using concrete materials, but focusing on the question of what criterion to sort by. There are multiple criteria to choose from.

# Let's strengthen

All children will benefit from the additional practice of sorting concrete materials, but you could initially give the children collections with

fewer options for sorting (e.g. size or colour). For example: With bears, you could tell the children to sort first by colour, and then by size. They could then move on to 2-D shapes, sorting first by size, colour and shape, and then by size, colour, shape and thickness.

Ensure that the children verbalise their chosen criterion (e.g. thickness) and revoice it when they have concluded their sorting. Each group will appoint a spokesperson. The group then moves on to sorting their collection by their next criterion (e.g. shape).

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## **Teaching tip**

Being able to find common properties for a collection of objects and to describe those properties are important skills in maths and statistics.

## Let's deepen

The children might like to use phonics to sort objects in a collection from nature (e.g. objects that begin with 's', objects that begin with 't').

# Let's deepen

Distribute scissors and a copy of the Unit 17 Let's Deepen PCM to each child. This is a progression from using concrete materials to a pictorial option. There are multiple ways in which the ice creams can be sorted (e.g. shape/form, number of scoops, with or without sprinkles). The children cut out the nine ice creams and decide how to sort them.

Pupil's Book page 93: Sorting for Multiple Criteria



# **Optional consolidation and extension possibilities**

**Role Play** The children role-play tidying up/sorting out the kitchen in the Play Area after Monty has been cooking there. How will they set about tidying the area? What will they sort first (e.g. cutlery, napkins, plates, cups)? Where will they put the items (e.g. spoons in a drawer/box)?

**Story** Read *Rooster's Off to See the World* by Eric Carle, in which Rooster assembles a group of friends to set off to see the world. The story features a 'data' chart, showing all the animals assembled. A reading of the story is available at: edco.ie/6qjn **Games Bank** Play 'Sorting By Shape' from the Games Bank.

**Letters of the Alphabet** Using a set of either upper-case or lower-case letters, the children sort the letters according to whether they are straight or curved, tall or short, or have a closed shape (a, b, d, g, o, p, q) or not. This is a great activity for helping children to notice the different attributes of the letters. You could also use an alphabet set with both upper- and lower-case letters.

# Day 2, Lesson 2 Posing Questions

#### Focus of learning (with Elements)

- Notices and discusses data in the direct environment (C)
- Explores data displays found in the immediate environment and in other areas of the curriculum (U&C)

## Learning experiences

Concrete activity: Data

Digital activity: Which Fairytale Would You Like? MAM Routine: Reason & Respond

#### Equipment

- Sticky notes
- Monty the puppet
- Picture book: Hansel and Gretel (optional)
- Picture book: Rapunzel (optional)
- Picture book: Rumpelstiltskin (optional)

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## Maths language

#### prefer, rather

## **Teaching tip**

The focus of this lesson is on the first three stages of the Data Investigation Cycle (PPDAC), namely: Pose the question, Plan, and Data. (See Data Investigations Using the PPDAC Cycle on page 315 for more information.) Even though you will be planning, compiling data, analysing, and coming to a conclusion, the use of the PPDAC cycle in Junior Infants is more exploratory than distinctly linear.



# Warm-up

Assess whether the children are responding to the purpose of collecting data. Do they see the point of it and its relevance to them?

Assessment Opportunity

🕑 Concrete activity: Data

Ask the children what 'data' (facts) they can see around them. Each child states a fact about the 'data' in the classroom. For example: Lily has black hair. Nilesh has short hair. Karl has brown eyes. There are five copies on the table. Alternatively, are there any charts in the classroom that show data? (Prompt the children to look at the charts for: jobs for the week, the weather for each day, etc.) Distribute a sticky note to each child. Choose a question that inspires the children to find the 'answer'.

- Do you like clowns?
- Would you like to be a lion?
- Have you ever touched an earthworm?
- Do you like playing in the rain?
- Which do you prefer, strawberries or grapes? Ask:
- How will we find out the answer to the question?
- What if we put the words 'Yes' and 'No' up on the board? Then what will we do?
- What exact question do we want to ask?

Tell the children to each place their sticky note (or make a tick/tally mark) beside their chosen option of 'Yes' or 'No'. Monty the puppet could help with keeping the tally.

Pose the question (examples):

# Main event

# Digital activity: Which Fairytale Would You Like? *MAM* Routine: Reason & Respond

Display the slideshow, which shows pictures of three fairytales: 'Hansel and Gretel', 'Rapunzel' and 'Rumpelstiltskin'. Ask the children which fairytale they would like you to read. The fairytale with the greatest number of 'votes' (the favourite) is the one that you read at the end of the activity.

# **Teaching tip**

A reading of each story is also available at the links below.

- Hansel and Gretel: edco.ie/8yqk
- Rapunzel: edco.ie/bpvt

• Rumpelstiltskin: edco.ie/h6qj

Pose the question:

• Which of these fairytales would you like me to read to you?

Once the children have had time to decide, take a vote as a class. Record the votes in three columns on the board. (Alternatively, if you have physical copies of the stories, you could display them in the classroom by leaning them against a wall, then asking each child to 'vote' by placing a sticky note on the wall above their choice of story.)

Count the votes for each fairytale. Which one got the most votes? Did any two stories get the same number of votes? (You could explore the actual data in more detail in a later lesson.) Read the chosen story.

# **Optional consolidation and extension possibilities**

**Song** Play the song 'Would You Rather Be a Bullfrog?' at: edco.ie/e55v

**Story** Read any of the following books, which discuss choices: *Would You Rather* ... by John Burningham, *Would You Rather Be a Bullfrog?* by Dr Seuss, or *Which Would You Rather Be?* by William Steig. Readings of the stories are available at: edco.ie/kxcq and edco.ie/fvda and edco.ie/ajbn

# Day 3, Lesson 3 Collecting Data

# Focus of learning (with Elements)

- Collects data by asking simple questions of each other and gathering responses (A&PS)
- Collects data of personal relevance (U&C)

Learning experiences	Equipment
<ul> <li>Class discussion: What is your favourite toy? MAM Routine: Reason &amp; Respond</li> <li>Concrete activity: Our Favourite Toys</li> <li>Pupil's Book page 94: Collecting Data</li> </ul>	<ul> <li>Toy catalogues (approximately five), toys from the Play Area or printed images of toys downloaded from the internet</li> <li>Scissors</li> <li>Glue</li> <li>PCM 60</li> </ul>

# Maths language

• favourite, most popular

# Warm-up

# Class discussion: What is your favourite toy? MAM Routine: Reason & Respond

Begin by asking the children a question of personal relevance, e.g. 'What is your favourite toy?' You could use toys from the Play Area as concrete examples if you wish. List the 'main' toys on the IWB (small pictures of the toys will help some children to 'read' the list). Try to keep the list simple (avoid 'obscure' toys) and short (three or four toys). When the options have been shortlisted, explain to the children that they are going to find out which of the toys listed is the favourite among their group. Ask:

- How will you find out which is the favourite/most popular toy among your group?
- What question will you ask? (e.g. Which toy would you prefer? Which is your favourite toy? Which toy do you like best?)

 How will you gather/show/record the answers? (Guide the children here.)

# Let's strengthen

The children may need additional help to form the question and record the answer.

# **Teaching tip**

The children are not expected to immediately grasp how to collate data but will learn best by doing and figuring out the process along the way.

Check in with the groups to see how they are progressing. How are they attempting to gather the information? Has a 'scribe' been appointed in the group? Are they recording the individual children's choices on a MWB? A 'spokesperson' for the group shares the results. (They will need help to compile and articulate their findings.) Ask:

- Has any group got an answer?
- What was the favourite toy among your group?
- How many children said ... was their favourite?
- What is the favourite toy/most popular toy among your group? How do we know?

Was there any group that had no conclusive answer?

## Let's deepen

What is the favourite toy among the *class*? How will we find out?

Ask some additional questions, such as:

- What is your favourite snack?
- What snack do you have at small break? What is the most popular snack?
- What is your favourite thing to do? (e.g. swimming, playing with your friend, climbing)

The children could also come up with their own questions they would like to investigate.

and write the number in the box below it. They

# Main event

Assess whether the children have grasped the idea



O Concrete activity: Our Favourite Toys

behind collecting data and how they are

to go about collecting it. Some children

will need 'scaffolding'.

Distribute scissors, glue, one copy of PCM 60: Collecting Data, and a toy catalogue or printed images of toys to each group. Each group chooses their two favourite toys from the catalogue/images. (There might be a lot of discussion in order to narrow down their favourites to two!) The children cut out the two images and stick them to the PCM. Each child makes a tick/tally mark below the toy they like best. The children then count the total marks for each toy

## present their findings to the class (i.e. Which toy was the favourite? How do they know?). The children might also have questions to ask of the other groups.

Pupil's Book page 94: Collecting Data



# **Optional consolidation and extension possibilities**

**Nature Collection** Ask the children to work in groups to find out how many of each object there are on the nature table (e.g. six pinecones, five twigs, three pebbles). How will they record the information? Now that we have the information, do we need to add more pinecones/twigs/pebbles?

**Cluiche as Gaeilge: 'Cé Mhéid?'** Using the names for numbers 1 to 10 in Irish (or English or one of the other languages among your class), each child silently chooses a number. How many times can they find their chosen number in the classroom (e.g. on charts, number sequences or lists)? How will they record each 'sighting' (e.g. with a mark on their MWBs)? Which number got the highest score?

**Sorting Photos** Try this as a class activity, depending on numbers, or as a group activity. Each child brings in a photo of themselves from home. The children sort the photos by their chosen criteria and record/ relate the results. For example, they might sort by hair colour, or by age, location, or type of clothing worn in the photo.

# Day 4, Lesson 4

# **Different Ways of Displaying Data**

# Focus of learning (with Elements)

- Responds to questions and/or problems that relate to the attributes of data sets (C)
- Displays and contrasts data in personal ways (A&PS)
- Reads and explains the information conveyed in various categorical and numerical displays (U&C)

## Learning experiences

- Digital activity: Count the Characters MAM Routine: Reason & Respond
- Concrete activity: Different Ways of Displaying Data
- Pupil's Book page 95: Different Ways of Displaying Data

#### Equipment

- Monty the puppet
- Bear manipulatives of all three sizes, in red, green, yellow and blue
- Scissors
- PCM 61
- PCM 42

# Maths language

• There is no new maths language for this lesson.

# Warm-up

#### Digital activity: Count the Characters MAM Routine: Reason & Respond

Use Monty the puppet alongside this activity. Distribute a copy of PCM 61: Count the Characters to each child. Explain to the children that in the slideshow, *Maths and Me* characters will appear in different scenes. The children record every appearance by Mia, Jay and Monty by making a tick/ tally mark in the correct grid on the PCM. To create additional interest, tell the children to choose one character and see if their chosen character will 'win'. Play the slideshow, and afterwards, ask:

- How many times did we see Mia?
- How many times did we see Jay?
- How many times did we see Monty?
- Did we see Mia more times than Jay?
- Which character did we see the most times? How do we know?
- Which character did we see the least number of times? How do we know?
- Which group chose the character that we saw the most?

# Main event

## Concrete activity: Different Ways of Displaying Data

Distribute ten assorted bear manipulatives (red, green, yellow and blue in the three different sizes) and a set of numerals 1 to 10 from PCM 42: Numerals 1–10 (Small) to each child. Each child sorts their bears by colour and then by size. Ask:

- Can you sort your bears by *colour*?
- How many red bears have you got?
- How many blue bears have you got?
- Have you got more red bears or more blue bears?

Check to see if the children have sorted the bears into distinct sets by *colour*. Then, say/ask:

- We are going to show the information about our bears using numbers. How will we do this?
- Could we start by putting the numbers 1 to 10 in a line? (The children might automatically arrange the numerals 1 to 10 in a row.)

This is an opportunity to assess the children's number recognition, ordering of number, and retention of their chosen sorting criteria.





#### Ask:

- Are the spaces/gaps between the numbers about the same size? Does it matter what size they are?
- How could we show/place our bears on this line of numbers?
- Who has one red/yellow/green bear?
- Where will you put this one bear?
- Who has two red/blue/yellow bears?
- Where will you put these two bears?

Continue until all the children's bears have been placed along the line of numbers. Ask:

- Could you show your line of numbers in a different way?
- Could the line of numbers go up instead of across?

Ensure the children sequence the numerals 1 to 10 vertically instead of horizontally, and align their bears by colour again.

# Let's deepen

Tell the children to gather up their bears. Ask:

- Can you sort your bears in a *different* way?
- Can you now sort your bears by size?
- Can you put your bears onto the line of numbers?

Ensure the children align their bears on the line of numbers, by size.

## Let's strengthen

Distribute scissors; red, green, yellow and blue small bear manipulatives and a copy of the Unit 17 Let's Strengthen PCM to each child. Ask:

• Is there any other way we could show the information about our bears?

- Look at the *pictures* of the bears on your sheet of paper. How could we use these pictures?
- Who has a blue bear? (Place a 'concrete' bear beside the *picture* of the blue bear.)
- Does anyone have a few yellow bears? How many? Where will we put them? (Beside the picture of the yellow bear.)

Guide the children in displaying their data. They could align their numerals 1 to 10 with the Block Graph.



# **Teaching tip**

Note: using bears of different sizes with the Unit 17 Let's Strengthen PCM could cause confusion, as the children might think that they have to match their manipulatives by size to the image size on the PCM.

Pupil's Book page 95: Different Ways of Displaying Data



# **Optional consolidation and extension possibilities**

**Sorting Insects** Display a collection of different types of insects on the IWB. The children choose how to categorise/sort the insects (e.g. by colour or with/ without wings). How many of each type can they count? How could they show this information?

**Home/School Links Book** Page 40 can be completed any time after this lesson.

**Story** Read *Giraffes Can't Dance* by Giles Andreae, and investigate how often each kind of animal (giraffe, warthog, chimp, rhino, lion and baboon) appears in the story. In what different ways could we show this information? A reading of the story is available at: edco.ie/e5dh

# Day 5, Lesson 5

# **Review and Reflect**

# Focus of learning (with Elements)

Reviews and reflects on learning (U&C)

# Warm-up

Carry out a warm-up activity of your choice from one of the lessons in this unit.

# **Main event**

Use this menu of activity ideas to choose how best to structure this last lesson of the unit to suit your needs and the needs of your class.

Let's talk!	Let's play!
Explore some of the data collected during the week or data that can be seen around the classroom.	Play Cluiche as Gaeilge: 'Cé Mhéid?' from the Optional Consolidation and Extension Possibilities for Lesson 3, if you did not have time for this earlier in the week.
Maths language	Let's investigate!
Use one of the digital resources you may not have had enough time to use. Explore the language of data. Use the maths language cards for this unit to revise the key terms. For example: if the image and text are cut apart, can the children match them?	<ul> <li>The children choose a question of personal relevance, and collect the data, for example:</li> <li>What is your favourite drink?</li> <li>Would you like to live in a tree house?</li> <li>Would you sleep in a spooky house?</li> </ul>
Progress Assessment Booklet	Maths eyes
Complete questions 67–68 on page 30. Alternatively, these can be left to do as part of a bigger review during the next review week.	<ul> <li>The children collect data in the yard, for example:</li> <li>How many children are wearing something blue?</li> <li>How many children are wearing a coat?</li> <li>What games are being played?</li> </ul>
Let's strengthen	Let's deepen
Use concrete materials to help some children understand the abstract nature of data. Identify children who might benefit from extra practice with some of the key concepts or skills in this unit. Consult the Unit 17 Let's Strengthen Suggestions for Teachers and/or use the Unit 17 Let's Strengthen PCM.	Give a group of children a picture book, and tell them to find out how many times each character or animal appears. Use the Unit 17 Let's Deepen PCM.

# Appendix

# Data Investigations using the PPDAC Cycle

We typically think of data as being presented with premade graphs and charts, which then need to be read and interpreted. But in real life, we all collect, analyse and draw conclusions from data all the time, without such representations. Babies and children are constantly taking in information (data) about the world around them. Their processing of this data (unconsciously and consciously) is essential to language and cognitive development, decision making, etc. For example, through collecting and processing data, young children learn: which shapes can enter which holes in a shape sorter; how rotating puzzle pieces often results in a better fit; and how blue and yellow paint mixed together makes green paint. As we get older, we can use data gained through new experiences to learn more about any aspect of the real world, and to make informed decisions and take informed actions.

In the real world, statisticians typically use the data investigation cycle or PPDAC cycle. This consists of the five stages involved in processing data: pose a problem/question, plan, data, analysis, conclusion. In exploring the stand unit of Data, in all classes, including Junior and Senior Infants, it is expected that the children will experience all of, or stages of, the PPDAC cycle as a way to use data to solve real-world problems or questions that are relevant to the children.



# Investigative questions versus survey questions

Investigative questions are the big questions that should consider the whole sample/group, e.g. *What are the favourite ice-cream flavours of the children in our class?* 

Investigative questions are also often reused or adapted to create a title for the completed data display, e.g. *Our favourite ice-cream flavours.* 

Survey questions (if being used) usually evolve from the investigative question and are rephased to be asked of an individual respondent, e.g. *What is your favourite ice-cream flavour?* 

# **Pose a question**

- Ask an investigative question that is interesting, relevant, worth investigating and answerable. Invite the children to pose questions that they find interesting, while also guiding them towards selecting questions that will be feasible to answer.
- What do you notice?
- What do you wonder?
- What do you want to find out?
- What is the question to investigate?

# Appendix

Plan Discuss a to be coll collected involved, done. This may survey qu be asked collect th investiga Predict li on what i	nd decide what data needs ected and how it will be I, e.g. who and what is to be where and how this is to be also involve developing a uestion (i.e. the question to of individuals) in order to be data needed to answer the tive question. kely/possible answer(s) based s already known.	How can we find out? What should we do? Who will we ask/survey? Where? What survey question do we need to ask? How will we present the choices/questions? How will the information/responses be gathered/recorded? What do you think the answer(s) will be? How long do we have to do this?
Data Collect the investiga the surver recorded using a fr cubes/im	ne data for the chosen tive question(s) by answering by question(s). The data is according to the plan (e.g. equency table, using physical bages, tally marks).	How might we sort these? Are there other ways? Which ones belong together? Explain why. Which ones don't belong together? Explain why. Was it easy to decide where to put them? Explain why. What and how many categories/groups are there?
Analysi Decide th the colled Write or n about the highest a frequent	<b>s</b> ne best way to present/display cted data. make descriptive statements e data (e.g. identify the nd lowest values, most ly occurring values).	How might we display this data for others? What do you notice? Are there any patterns? Which group/category has the most/least? What does that tell us? How does this group compare to that group? Are there any groups or categories that are the same?
Conclus Answer t question Compare predictio Consider required now be p cycle aga	ion he original investigative posed. the data to the initial ns. what further actions are now or what new question could osed; in doing so, start the in.	What is the most important thing that this information tells us? What was our original investigative question? Can you now answer that question? Prove your answer: refer to your display. Were any of your results surprising? Based on our results, if we asked this question of another Junior class, what do you think would be the most likely answer? If we asked this question on a different day/in winter/of a Senior class, would you expect the results to be the same or different? Explain why.

For authentic data collection and analysis to take place, there must be an authentic problem or question, one whose solution/answer is not obvious or predetermined. This means that the way the data-gathering and analysis process evolves in each classroom will be as individual as the children in that room. For the teacher, this unpredictability brings its own challenges, e.g. allowing the children the freedom to investigate their own questions and to try their chosen methods, even if we would reject the questions for being unanswerable, or reject the methods as being ineffective or inefficient.

While the PPDAC cycle is described sequentially, the reality may often be 'messier', where the children may move forwards and backwards through stages and may go around the cycle more than once. Furthermore, depending on the scope of the specific question being investigated, the PPDAC cycle may 'fit' in one lesson, or the stages may be spread over a number of lessons. And, depending on the needs of the class, the teacher may choose a particular stage to be the focus of a specific lesson. For example, while the focus of any unit on data should not solely be on answering questions on manufactured graphs and data sets, it may sometimes be appropriate to spend time developing these data and analysis skills, as part of (or in preparation for) predesigned tasks and assessments.

In addition to the suggestions below, see also the Optional Consolidation and Extension Possibilities section in each lesson.

## Possible Investigative Questions

#### Questions about personal preferences

- What are the favourite toys of the class?
- In this class, what are the favourite sports, fruits, fast foods, pets, vegetables, after school pastimes?

## **Other options**

 In this class, what are the favourite: colours? animals? months? days of the week? seasons? breakfasts? snacks? dinners? desserts? pizza toppings? drinks? TV programmes? computer games? movies? birthday presents to receive? places to have a birthday party?

# Questions about frequency (and most commonly occurring)

- What items are in our lost and found box?
- How many pets do the children in our class have? What pets do the children in our class have?
- How did the children in this class come to school today?
- What birds appeared at our bird table?

## **Other options**

## In this class:

- What are the hair colours of the children in this class?
- What are the eye colours of the children in this class?
- In what kinds of homes do the children in this class live?
- In what months do our birthdays fall?
- How did the children in this class travel on holidays?
- How many children are in the families of this class?

## Weather survey:

What was the weather like each day of the month?

## Traffic survey:

- What vehicle types did we see?
- What kind of trees are there in the park?
- What colours of car are there in the car park?
- What minibeasts were seen in the garden?

# Appendix

#### Comparing data samples

- How many children are there in each class in the school?
- How many boys/girls are there in each class in the school?
- How many hours do the children in this class spend watching TV/on screens?
- How many books did the children in this class read this past month?

# **Possible Survey Questions**

- What is your favourite ...?
- How many ... do you have/spend ...?
- How many ... are in your ...?
- How did you travel to school today?
- What would you choose?



