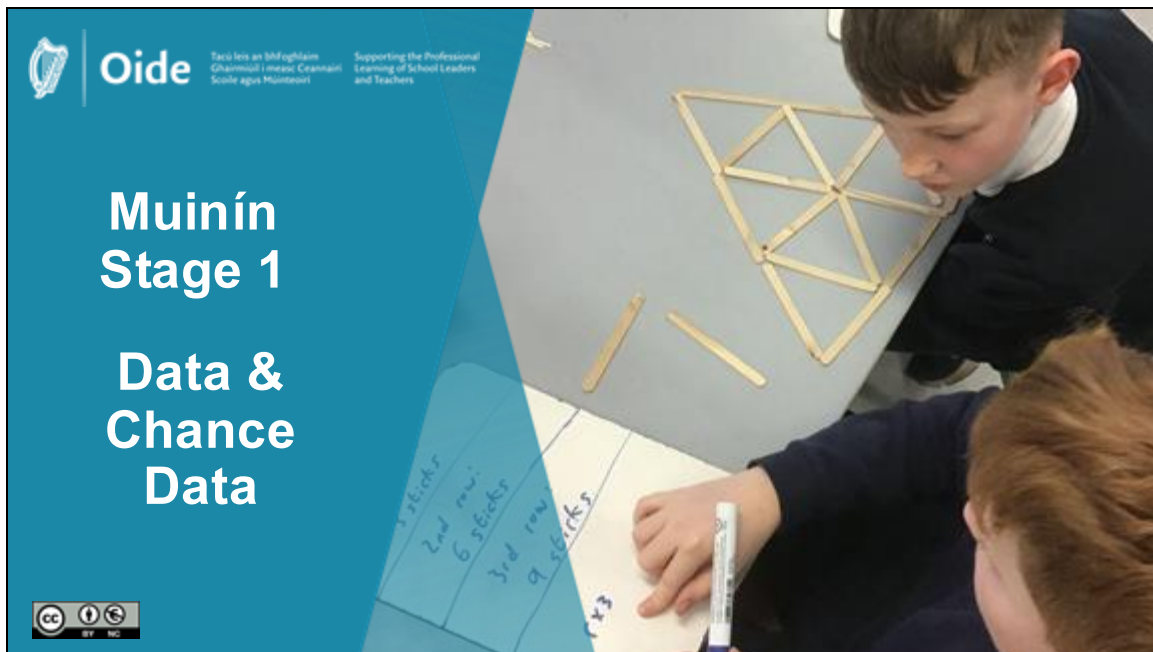




Purpose of slide:

Introduce the presentation and resources needed

Notes for teachers:

- This presentation will examine the strand unit Data in the context of stage 1 (Junior & Senior Infants)

Resources required:

- Notes for teacher
- Primary Mathematics Curriculum
- A device to access online materials referenced

Strand Overview

Data and Chance



Data

Chance

P
T
N

- Open page 20 of the primary mathematics curriculum document.
- There are 2 strand units in the primary mathematics curriculum. These are: Data and Chance.
- POINTS TO NOTE:
 - *Chance* is not in Stage 1 or Stage 2. It is introduced for stages 3 and 4 only *Data* is for all four of the stages
 - 'Sorting' now falls under 'data' rather than 'early number' in the 1999 curriculum - Many of the early number activities (ENA) are covered in ECCE years.
 - In the new Irish primary mathematics curriculum, sorting was moved to the data strand in Stage 1 to emphasize its role in developing foundational skills in data handling and analysis. By introducing sorting early on, children can engage with concepts such as categorization and classification, which are essential for understanding more complex data concepts later. Placing sorting

within the data context also encourages students to see mathematics as interconnected, rather than as isolated skills.

Overview

Data Talk

Sorting

Venn Diagrams, Carroll Diagrams, Tree Diagrams
Sort the Street

Data Cycle

Sample Investigation

Purpose of slide:

To provide an overview of the focus of the presentation.

Notes for teachers:

The following topics will be covered in this presentation:

- Data Talk: In a data talk we show students a data visualization and ask them what they see, and what they are curious about.
- Sorting: To demonstrate how data can be explored and collected in various ways using a real life context
- Data Cycle: We will explore the stages of the Data Cycle and we will look at a sample investigation that you could use in your classroom.

Data Talk

How did you experience data today?

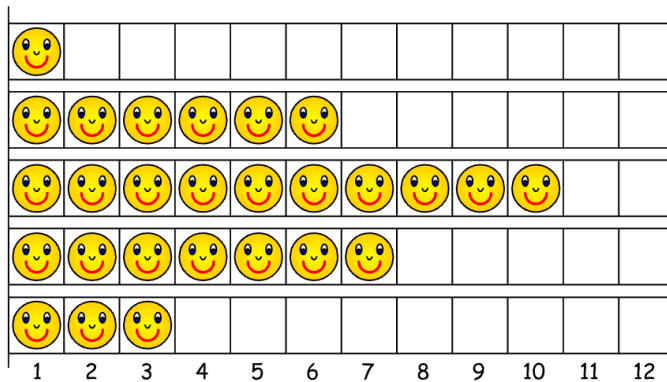
Purpose
To lead

Notes

- Consider how you might have experienced data today
- Your responses may include – online search engine, signing in to school, Aladdin, health tracking, weather forecasting, environmental awareness apps (energy consumption) using loyalty card, online shopping, social media, google maps etc.
- The ability to work with, understand and use data has become an essential life skill. Data is all around us.
- According to Professor Jo Boaler, 90% of the world's data has been created in the last 2 years.
- Never before has it been so important for children to become data literate citizens! There are 250 million emails and 16 million texts sent every minute
- We are constantly consuming and creating data, think of all the data you

created today – did you use a rewards card? social media?, google maps? Online shopping? Online resource search? All this information is used and interpreted.

Data Talk



What do you notice?

Purpose
To introduce

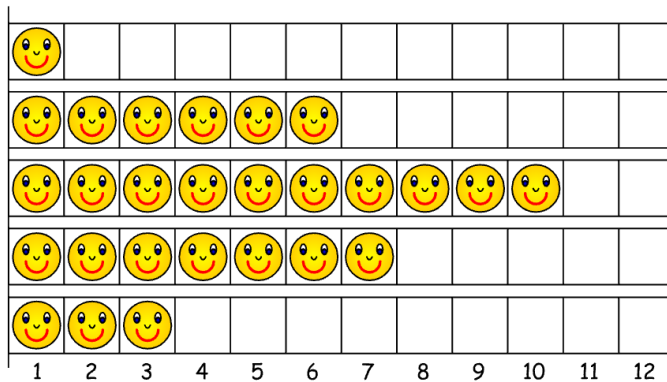
Notes for teachers:

- Data talks provide a space for students to practice considering and interpreting a variety of data and data representations in a low-stake, exploratory environment (More information will be available on [What-is-a-Data-Talk-1.pdf](#))
- The activity is centred around a data visualization of the teacher's choosing. Ideally, it represents a data set that might be interesting or relevant to the students, but also that displays data in a way they may have not been exposed to before or that might have some features that make the visualization particularly interesting.
- Students are shown the visualization, given some time to process it, and discuss what they notice. These can be observations about how the visual is structured, a question the data is answering, or a lingering

curiosity that is raised by the data or that the visual doesn't address.

- Looking at the slide, think about what you notice about this pictogram.
- When you have taken time to notice, go to next slide

Data Talk



What do you wonder?

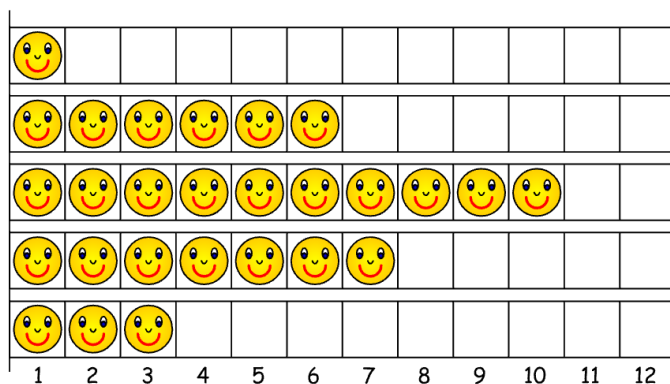
Purpose of this slide:

Introduce data talks by engaging in an example of one.

Notes for teachers:

- Looking at the slide think about what you wonder about this pictogram (an opportunity for open ended answers)
- When you have taken time to wonder, go to next slide

Data Talk



What might this pictogram represent?

Purpose of slide:

To demonstrate an open-ended data task

Notes for teachers:

- Consider what this pictogram might represent e.g. favourite food/ ways we travel to school/ most popular colour/ pets

Strand Unit: Data

Progression across the stages

Learning Outcomes for the Data Strand Unit			
Stage 1: Junior and senior infants	Stage 2: First and second classes	Stage 3: Third and fourth classes	Stage 4: Fifth and sixth classes
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.	pose questions of interest, record and use data as evidence to answer those questions and communicate the findings.	pose questions of interest and collect, display and critically analyse data in a range of ways for a range of purposes and communicate the findings.	pose questions, collect, compare, summarise and represent data selectively to answer those questions. critically analyse and evaluate findings; and communicate inferences, conclusions and implications from the findings.



Purpose of slide:

To explore the progression across the stages in the strand unit Data

Notes for teachers:

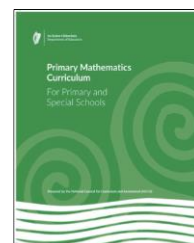
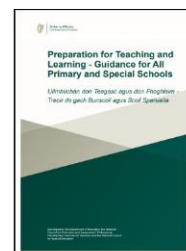
- Note the progression along the stages.
- Note how **language**, **knowledge** and **skills** are developed from stages 1 to 4
- Knowledge of progression is necessary so that we can **adapt and extend** our teaching based on the **knowledge we have of the children** in front of us.

Learning Outcome



Learning Outcome
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



Purpose of slide:

To highlight the Learning Outcome as the starting point for preparation for teaching and learning

Notes for teachers:

- This is the learning outcome for Data and Chance - Stage 1 Strand Unit - Data.
- Note the language of the sentence stem- e.g. 'playful', 'engaging', 'variety of ways'
- Learning Outcomes are broad in nature. When working with Learning Outcomes it is useful to break down the Learning Outcome into areas of focus.

Learning Outcome

Maths Concepts



NCCA Maths Toolkit
curriculumonline.ie

Data	
Stage 1 (Junior & Senior Infants)	
Learning Outcomes	explore, interpret and explain data in a variety of ways for a range of purposes
Mathematical concepts	Data is all around us and helps us interpret the world. A data set is a collection of information that can provide answers to questions we ask. Data can be collected and represented in many ways. Data can be collected and represented in many ways. Data displays (e.g., tables, picture graphs, block graphs) are a useful way of conveying information. Objects and sets can be sorted according to one or more attributes.



Purpose of slide:

To draw attention to the maths concepts for Stage 1 Money and develop an awareness of the NCCA Mathematics Toolkit

Notes for teachers:

- Maths concepts are the key mathematical ideas that underpin each learning outcome.
- Maths concepts are useful when preparing for teaching and learning
- Open the NCCA Mathematics Toolkit on a separate tab (via QR code or link on slide)
- Take some time to find and read Learning Outcomes and Maths Concepts

Sorting

Sorting Data in Various Ways



Aidan likes collecting leaves during his nature walk. These are all the leaves he collected one afternoon. Can you help him display them so that he can tell his friends what he found on his walk?



How could we sort the leaves?

Is there another way you could sort them?

Purpose of slide:

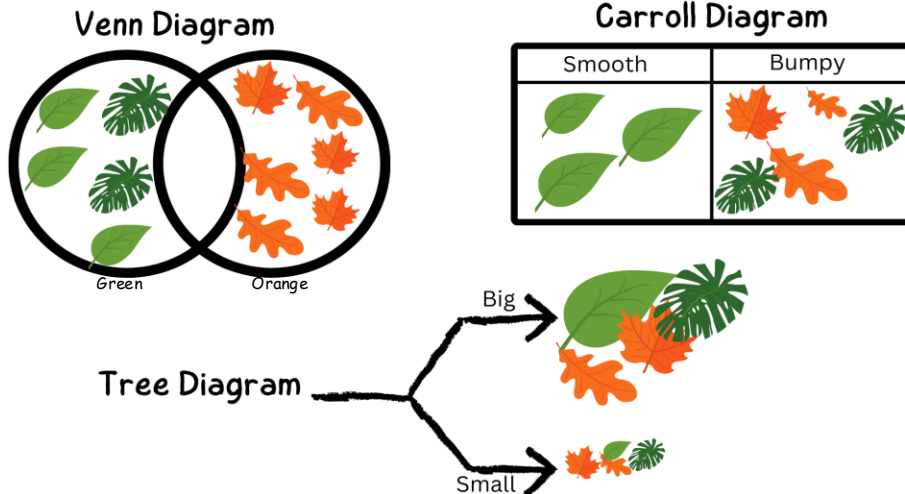
To demonstrate how data can be explored and collected in various ways using a real life context

Notes for teachers:

- Read the scenario on the slide
- Think of as many ways as possible to sort the leaves (e.g. colour/ size/ type/ texture)
- How would your pupils sort them?

Sorting

Sorting Data in Various Ways



Purpose of slide:

To highlight that objects can be sorted using a variety of representations

Notes for teachers:

- Data can be sorted in various ways: Venn diagrams, Carroll diagrams and tree diagrams to represent data by sorting objects into sets
- These sorting activities set the foundation for data investigations
- These images were sourced from the [PDST Data and Chance Manual.pdf](#) (Venn Diagram: pg. 14 & 15, Carroll Diagram: pg. 17, Tree diagram: pg. 18 for teacher reference)

Sort the Street

There are 9 houses on my street...



How many ways can you sort the houses?



<https://nrich.maths.org/problems/sort-street>

Purpose of slide:

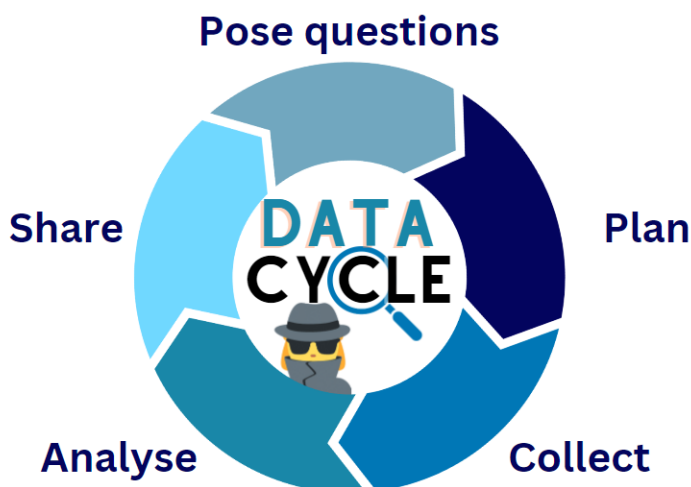
To engage in a digital sorting activity

Notes for teachers:

- Using the link or QR code above teachers you may try out an online sorting game from Nrich
- Take time to see how many ways to sort the houses on the street

Resources:

<https://nrich.maths.org/problems/sort-street>



Purpose of slide:

To introduce the data cycle

Notes for teachers:

The data cycle shows children the cyclical nature of data investigations.

Pose questions – Pupils should be encouraged to wonder and be curious about the world around them. Allowing children to pose their own questions generates curiosity and motivates students to want to collect data. Working collaboratively, children can generate their own questions, form predictions and hypothesise about the outcome.

Teachers may need to support children to generate their own questions; this might be through the use of a stimulus such as: a data talk, story, media, science topic etc.

Plan – The children need to decide how to answer the question they have posed. They will need to consider how they will collect the data e.g. in person, digitally or by analysing third-party information. They will then need to determine how they will record the data.

Teachers need to demonstrate data collection methods e.g. using concrete materials, tally charts, tables etc.

Collect – Support the children to collect data in a methodical and a logical way. Encourage the children to check for accuracy and produce suitable graph(s) which are most appropriate for their data

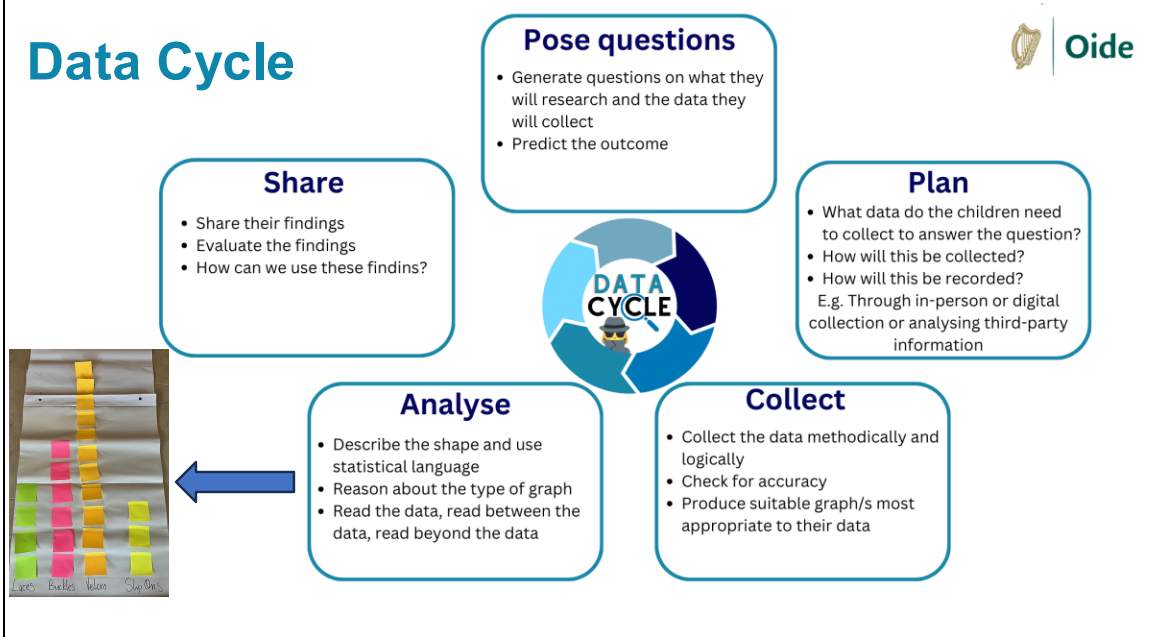
Children should be aware of different types of data representations e.g. pictogram, line graph, bar chart, pie chart, histogram, dot plots etc.

Analyse – In the context of the problem they are trying to solve, children make sense of the data by:

- Describing the shape and use statical language: initially children describe the shape of the data informally, slowly developing to more sophisticated statistical language; this may begin with data described as a ‘clump’ or ‘bump’ and later as ‘bell shaped’, ‘symmetric’ or ‘skewed’. The teacher might demonstrate the use of statistical language like:
 - *Where is the bump? What does that mean? Where does most of the data lie? Is the mode falling inside the bump/cluster?*
 - *Is there a larger spread/variability?*
 - *Is the data skewed to the left/right?*
 - *Is there one outlier?*
- Reasoning about the type of graph – Is this the most suitable type of graph, why? Why not?
- Identify statistical measures on graphs: mode, median, mean and look focus on the landmarks e.g. look for clusters, outliers, gap, mode etc.
- Interpreting the data:
 - Read the data: these types of questions are often the simplest to answer; children answer questions by taking the information directly from the graph e.g. which is the most popular?
 - Read between the data: these types of questions are usually more challenging; children need to analyse the data to find the answer. These usually involve the children performing an operation e.g. how many more people like x than y, or comparative questions e.g. how many children like x and y altogether.
 - Reading beyond the data: these questions require the children to infer from the data. It encourages children to think about the sample and the bias they may hold e.g. if we asked another group the same question, would we get the same result?

Share –Data is collected for a purpose; children should be encouraged to share the information they have discovered with others. Children should decide how to share the data e.g. online, poster, oral report etc. Other children should be encouraged to question and evaluate findings through discussion; this may generate new questions.

Data Cycle



Purpose of slide:

To highlight the data cycle explainer sheet

Notes for teachers:

The data cycle shows children the cyclical nature of data investigations

1.Pose questions – Pupils should be encouraged to wonder and be curious about the world around them. Allowing children to pose their own questions generates curiosity and motivates students to want to collect data. Working collaboratively, children can generate their own questions, form predictions and hypothesise about the outcome.

Teachers may need to support children to generate their own questions; this might be through a stimulus such as: a data talk, story, media, science topic, life experiences (e.g. how many children have lost teeth), favourite sports, allergies; favourite popstars; golden time etc.

2. Plan – The children need to decide how to answer the question they have posed. They will need to consider how they will collect the data e.g. in person (show of hands, sticky notes, lego blocks), digitally or by analysing third-party information. They will then need to determine how they will record the data.

Teachers need to demonstrate data collection methods e.g. using concrete materials, tally charts, tables etc. This may be done informally already in a class with reward chart; lunch menu etc.

3. Collect –Put the plan into action! Support the children to collect data in a methodical and a logical way. (In Stage 1 this might be to sort the data in a particular way physically- by sorting, using stickers, show of hands and then choose a way to represent it). Encourage the children to check for accuracy and produce suitable

graph(s) which are most appropriate for their data.

Children should be aware of different types of data representations e.g. pictogram, line graph, bar chart, pie chart, histogram, dot plots etc.

4. Analyse – In the context of the problem they are trying to solve, children make sense of the data by:

- Describing the shape and use statistical language: initially children describe the shape of the data informally, slowly developing to more sophisticated statistical language in later stages; this may begin with data described as a ‘clump’ or ‘bump’ and later as ‘bell shaped’, ‘symmetric’ or ‘skewed’.
- In later stages the teacher might demonstrate the use of statistical language like below but we can introduce these concepts to Stage 1 children using more informal language.
 - *Where is the bump? What does that mean?*
Where is the highest point? What does that tell us?
 - *Where does most of the data lie?* Where do most of the numbers/data sit?
 - *Is the mode falling inside the bump/cluster?* Is the most common number part of the highest point?
 - *Is there a larger spread/variability?* Are the numbers spread out a lot?
 - *Is the data skewed to the left/right?* Are the numbers leaning more to one side?
 - *Is there one outlier?* Is there one number that’s very different from the others?
- Reasoning about the type of graph – Is this the most suitable type of graph, why? Why not?
- Identify statistical measures on graphs: mode, median, mean and look focus on the landmarks e.g. look for clusters, outliers, gap, mode etc. In stage 1 language this might sound like . *Look at the graphs and find important numbers: the most common one (mode), the middle number (median), and the average (mean). Pay attention to things like groups of numbers, unusual numbers, and any gaps*
- Interpreting the data:
 - Read the data: these types of questions are often

the simplest to answer; children answer questions by taking the information directly from the graph e.g. which is the most popular

- Read between the data: these types of questions are usually more challenging; children need to analyze the data to find the answer. These usually involve the children performing an operation e.g. how many more people like x than y, or comparative questions e.g. how many children like x and y altogether.
- Reading beyond the data: these questions require the children to infer from the data. It encourages children to think about the sample and the bias they may hold e.g. if we asked another group the same question, would we get the same result?

5. Share –Data is collected for a purpose; children should be encouraged to share the information they have discovered with others. Children should decide how to share the data e.g. online, poster, oral report etc. Other children should be encouraged to question and evaluate findings through discussion; this may generate new questions.

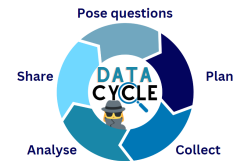
Home/School connection: Take a photo of the data to be shared and examined at home- give parents a list of questions they can ask the children

Data Cycle

Pose a Question

Some teachers like students to take their shoes off at the door, to keep mud out of the classroom. Find out about what you could expect to see piled up at the classroom door if teacher asked you all to take your shoes off there.

Adapted from NZMaths



Purpose of slide: Pose a Question

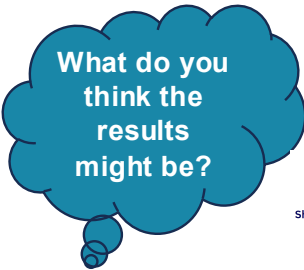
To demonstrate how an everyday scenario could be used as inspiration for the data cycle

Notes for teachers:

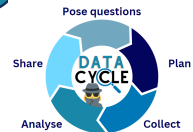
- Read the extract
- Consider questions that stage 1 pupils might pose
- When teachers have taken time to consider, move to the next slide
- Sample response :
 - 24 children in class
 - 4 types of footwear:
 - Velcro: 11
 - Buckle: 6
 - Laces: 4
 - Slip on: 3



What types of footwear is our class wearing today?



What do you think the results might be?



Purpose of slide: Pose a Question

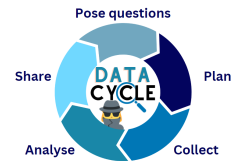
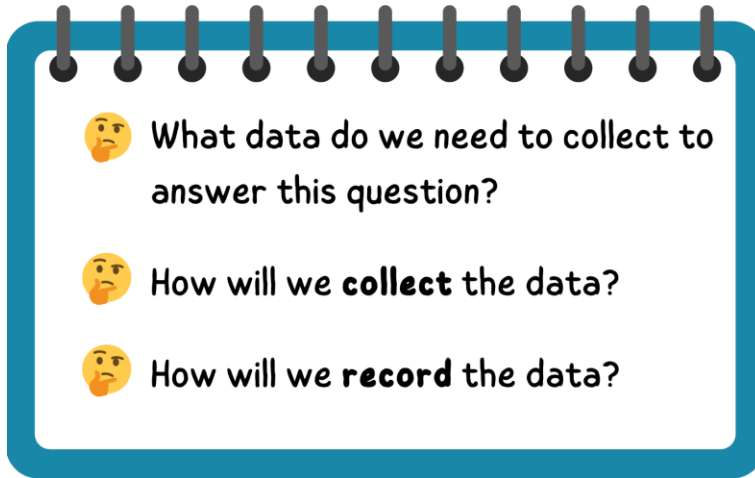
To provide a sample question for teachers

Notes for teachers:

- 'What types of footwear is our class wearing today' is the question to be investigated using the data cycle
- 'What do you think the results might be?' encourages critical thinking e.g. 'I think everyone will be wearing runners because we have P.E. today'

Data Cycle

Planning



Purpose of slide: Planning

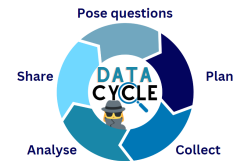
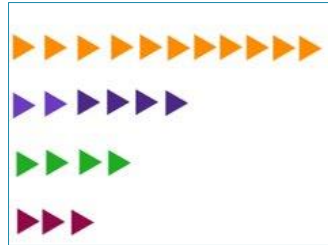
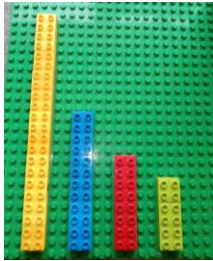
To discuss how a data investigation could be planned for using pupil input

Notes for teachers:

- NOTE: Will children understand the term DATA? What other words will help them understand this?
- Instead of telling the class how they will collect and record the data, ask pupils to think about and suggest answers to the questions on the slide.
 - What data do we need to collect?
 - How will we do this?
 - How will we show this?

Data Cycle

Data Collection



Purpose of slide:

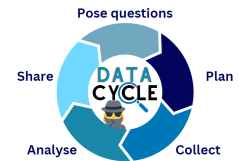
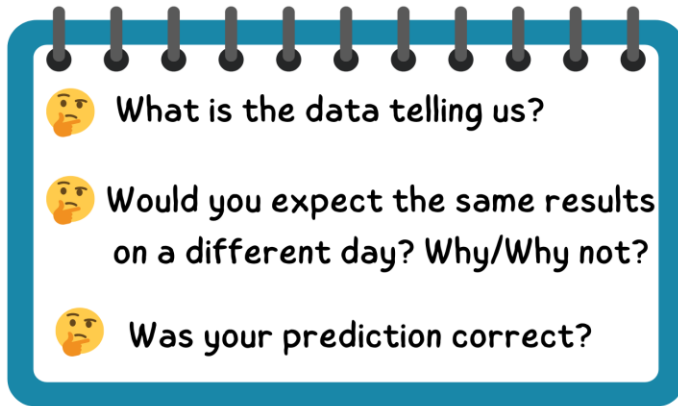
To show examples of how data could be collected/ represented based on the question posed

Notes for teachers:

- Sample response :
 - 24 children in class
 - 4 types of footwear:
 - Velcro: 11
 - Buckle: 6
 - Laces: 4
 - Slip on: 3

Data Cycle

Analyse Data



Purpose of slide: Analyse Data

To demonstrate some prompt questions that encourage pupils to analyse data

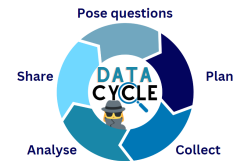
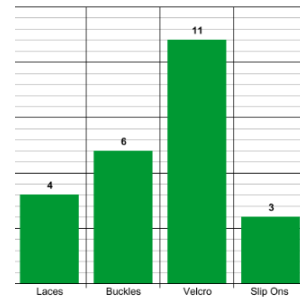
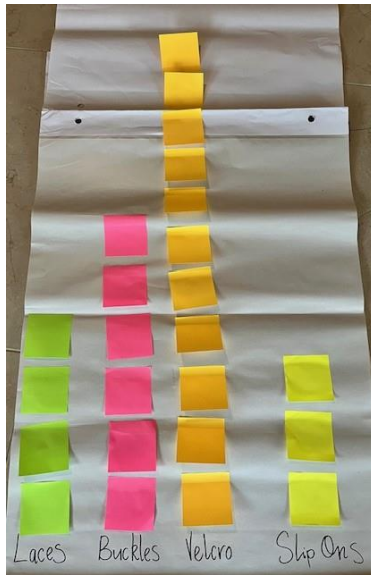
Notes for teachers:

In the context of the problem they are trying to solve, children make sense of the data by answering the questions above with encouragement and prompting.

Data Cycle

Analyse Data

Looking at the shape of the graph



Purpose of Slide:

To demonstrate how the data can be analysed

Notes for teachers:

- In the context of the problem they are trying to solve, children make sense of the data by:
 - Describing the shape and using statistical language: initially children describe the shape of the data informally, slowly developing to more sophisticated statistical language; this may begin with data described as a 'clump' or 'bump' and later as 'bell shaped', 'symmetric' or 'skewed'. The teacher might demonstrate the use of statistical language like: *Where is the bump? What does that mean?*
- For yourself, consider the following questions:
 - Look at the shape of the graph
 - Where is the 'bump'?
 - What does the bump mean on this graph?
 - Is there a dip on the graph?
 - What does the dip mean?
- Examples of other questions teacher might ask to enable children to read between the data? Total shoes; difference between; how many more ____ than ____; total of ____ and ____

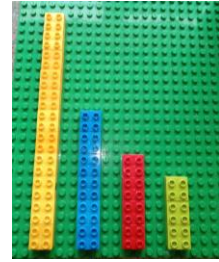
Data Cycle

Share Data

Pupils share their findings

Pupils evaluate their findings

Pupils discuss how they could use these findings



Purpose of slide: Share Data

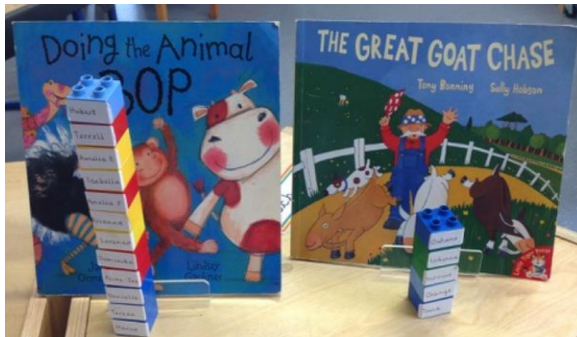
To highlight the share stage of the data cycle.

Notes for teachers:

- Data is collected for a purpose
- Children should be encouraged to share the information they have discovered with others.
- Children should decide how to share the data e.g. online, poster, oral report etc.
- Children should be encouraged to question and evaluate findings through discussion; this may generate new questions.

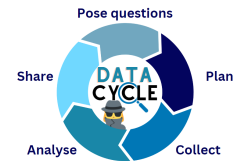
Task

The Voting Station



Providing purposeful opportunities for collecting & interpreting data

Which story should we choose for storytime?



Purpose of the slide:

To engage in a Data task

Notes for teachers:

- Children often enjoy having their say and helping to decide events by choosing between options, such as which book to share in story time.
- This provides purposeful opportunities for collecting and interpreting data. Teachers could set up a 'voting station', displaying options such as books, and provide 'voting bricks' with each child's name on to be placed next to their choice and number cards to label the results
- The Activity:
 - Ask children which of the two books displayed they would like at story time and give each child a brick with their name on, to place next to the book of their choice.
 - Make towers of the bricks and discuss which option has the most votes, by comparing the numbers of bricks.
 - Sample questions:
 - Which tower has more bricks?
 - How many do they each have?
 - Which book do most people want? How do you know?
 - Can you put something on paper to show which one most people wanted?
- Moving from concrete to pictorial and later to abstract

Task

What's in a Name?



Pam and Peg were having a chat about their names.
Pam said her name began with P and Peg said hers did too.
Pam said her name had three letters and Peg said hers did too.
Pam said her name had one vowel and Peg said hers did too.
Pam said hers was 714 Peg said hers was 757.

Can you see why?

1	2	3	4	5	6	7	8	9
A	B	C	D	E	F	G	H	I
J	K	L	M	N	O	P	Q	R
S	T	U	V	W	X	Y	Z	

Adapted from: <https://nrich.maths.org/7952>

Purpose
To solve

Notes for teachers.

- An open-ended task is one where there is a range of 'correct' solutions and/or a range of ways to achieve one or more solutions.
- Using open-ended tasks is one way to encourage playfulness in mathematics.
- Open-ended tasks, like this task, provide opportunities for exploration, investigation, challenge, creativity, choice and independence.
- Other examples of open-ended tasks. Exemplar Three Block Towers <https://pmc.oide.ie/resources/exemplars/stage-1/> and Micro Maths tasks 'How could you represent the students that have lace-up shoes and those that don't' <https://pmc.oide.ie/resources/micro-maths/>.
- A key aspect of children engaging in open-ended tasks is the follow-up discussions that take place either in a small group or a whole class setting.
- If the emphasis is placed on the generation of different ideas, all children

feel that they have something to contribute, and, moreover, learn from the ideas and strategies of their peers.

- Open-ended tasks are also one way of providing for cognitively challenging tasks in maths.
- When selecting an open-ended task, as with selecting any task, it is important to keep in mind the mathematical point.

Assessment Maths Journal

Reflect on what they have learned and put it in their own words

Discuss maths with others (pupil and teacher)

Identify areas of strength and weakness

Evaluate what they have learned

What is the data telling us?
11 have runners

What is the data telling us?
runners = 11
shoes = 2



How did you sort the leaves?

What is the data telling me?

Purpose
To p

Notes for teachers:

- Maths journals could also be used as an assessment tool to identify Maths misconceptions in the classroom.
- The practice of keeping a Maths Journal helps children to learn Maths. Children can keep track of their thinking and understanding in the journal. Journals can contain general observations about Maths or can be more specific and focus on a particular concept. Depending on how the Maths journal is used it can incorporate many assessment strategies such as teacher questioning, teacher observation, teacher designed tasks and tests and peer and self assessment.
- A Maths Journal encourages a child to
 - Reflect on what they have learned and put it in their own words
 - Discuss maths with others (pupil and teacher and parents {use it as a link between school and home})
 - Identify areas of strength and weakness

- Evaluate what they have learned
- If journal writing is done on a regular basis it will help promote mathematical understanding.
- Writing about Maths can have a positive effect that on reducing pupil's Maths anxiety.
- All maths journals will be different because all pupils are different.