

RESOURCE

Dear Data

Learning Level: Second (P5 – P7)

PPDAC Framework: Problem | Plan | Data | Analysis | Conclusions

Theme:

- Data Analysis
- Finding & Using Information

Curricular Area: Numeracy | Technologies | Literacy

Duration: 6 x 1 hour sessions

Materials:

- Pen/pencil & paper
- Slides for each lesson
- Data Collection & Tally Chart worksheets
- Sample data (optional)
- Sample visualisations (optional)



Introduction

This resource encompasses 6 lessons as follows:

1. An Introduction to Data
2. What's the Story?
3. What is it going to look like?
4. The Key to Data
5. The Visualisation Comes Together
6. Evaluation

Curriculum Links

MNU 2-20a: Having discussed the variety of ways and range of media used to present data, I can interpret and draw conclusions from the information displayed, recognising that the presentation may be misleading.

MNU 2-20b: I have carried out investigations and surveys, devising and using a variety of methods to gather information and have worked with others to collate, organise and communicate the results in an appropriate way.

MTH 2-21a: I can display data in a clear way using a suitable scale, by choosing appropriately from an extended range of tables, charts, diagrams and graphs, making effective use of technology.

LIT 2-09a: When listening and talking with others for different purposes, I can: share information, experiences and opinions; explain processes and ideas; identify issues raised and summarise main points or findings; and clarify points by asking questions or by asking others to say more.

TCH 2-11a: I can use a range of graphic techniques, manually and digitally, to communicate ideas, concepts or products, experimenting with the use of shape, colour and texture to enhance my work.

Learning Intentions [Set of 6 lessons]

1. How to ask questions to allow more depth to data collected
2. How to uncover the story within the collected data
3. Using a visualisation to present the data so that others can discover information

Success criteria [Set of 6 lessons]

Have created a data self portrait using:

1. Adding depth questions to a data gathering task
2. Collecting data to match these questions
3. Interpreted the collected data to find the new information
4. Created a visualisation to allow fellow students and teachers to discover the information within your data

Lesson 1 – An Introduction to Data

Learning Intentions [This Lesson]

1. What is Data Science
2. What is data science used for in the real world
3. Why do we look for more depth in our data
4. How do we get more depth to our data collection

Main Activity

The main activity is split into 2 sections:

Asking Questions: This aligns to the Problem step of [PPDAC the data problem solving framework](#).

Collecting Data: This aligns to the Plan step of [PPDAC the data problem solving framework](#).

The slides contain several pair/group activities including:

Slide 12: Developing in depth questions

Slide 14: Develop the main question and extra depth questions on the topic of media use

Slide 16: Develop the main question and extra depth questions about a book

This lesson explains why collecting more data can allow us to spot patterns and make better decisions.

0-8 minutes: What is data science (vocabulary questions of definition collection, interrogation, and presentation) and What is it used for

8-20 minutes: Water example (Q can you tell me something with the data on the board? Is the person getting enough to drink, can they be more environmentally friendly ...)

20-40 minutes: Writing Qs in a group come up with as many questions as possible on the task on the board, the first task follows on from the previous discussions

40-50 minutes: Explain homework task and start on writing depth questions on homework sheet, check students understand task

Homework activity

The final slide details homework to be completed before the next lesson. The data the learners will collect is needed as part of lesson 2. The final part of lesson 1 is helping learners define their questions and complete the template question table in the Data Collection Worksheet.

Lesson 2 – What's the Story

Note: if the students have two lessons a week swap lesson 2 and 3)*

Learning Intentions [This Lesson]

1. To find a story in the data collected
2. To complete a more complex tally chart
3. Use a more complex tally chart to explore your data for unusual patterns

Success Criteria [This Lesson]

1. Found a story in your data
2. Worked on (hopefully completed) your complex tally chart
3. Identified any unusual data in your collection

Main Activity

This lesson focuses on investigating the data the students collected in their homework task.

Students count the number of unique answers to each of their questions, then fill in a tally chart to identify common/rare answers, in order to help them find their data question.

The main activity is split into 2 sections:

- A simple visualisation that helps us understand how much data was collected and how many unique answers were obtained.
- A more complex visualisation that shows all the data collected and helps us find a story or patterns in the data.

Both sections aligns to the Analysis step of [PPDAC the data problem solving framework](#).

The Simple Visualisation section requires learners to go through the data they collected since lesson 1 and count up the number of unique answers for each question.

The more complex visualisation extracts the collected data into a matrix style tally chart. All instructions are in the slides. Tally chart template as well as example data are available at the end of this file.

Students should note any reasons for data voids, collecting media and a full day of games on a Monday because there was a school holiday etc

Hold a plenary to discuss the findings. What patterns can they see in their own data.

Lesson 3 - What is it going to look like?

Learning Intentions [This Lesson]

- How to find your interesting data within the tally chart

Success Criteria [This Lesson]

- Identified the interesting data in your tally chart
- Designed three concepts to represent your data
- Designed to layouts on how to divide your final visualisation

Main Activity

The slides explore different and novel ways data can be visualised.

Visualisation is part of the analysis step of [PPDAC the data problem solving framework](#).

Learners should complete two tasks:

- Slide 3: identify interesting data in their tally chart from lesson 2.
- Slide 16: Create your own visualisation

Students should draw one of the items for their theme in the corner of the box, they should then make one change and draw a series of that change (they will need this for choosing which change should represent each questions – if they have five answers and can only think of two changes they will not be able to use that change) size, shape, colour, thickness, angle etc. and repeat this through as many changes as they can.

0-10 minutes: introduce the changes using leaves and lines examples

10- 35 minutes: Three themes expanded on design sheet to show the changes that could form the key (8 min a theme)

35-40 minutes: The layout how to match the topic to the positioning in the final visualisation

40-50 minutes: sketch layouts for two of the three themes.

Lesson 4 - The Key to the Data

Learning Intentions

- Be able to extract relevant information from my data
- Design a theme/key for my visualisation

Success Criteria

- Designed the key for my visualisation
- Started to work on my visualisation using my key

Main Activity

The slides explore different and novel ways data can be visualised.

Visualisation is part of the analysis step of [PPDAC the data problem solving framework](#).

Learners should complete two tasks:

- Slide 3: identify what the example visualisation is about.
- Slide 11: Create a key to their visualisation about their tally chart data.

Working through the tally chart form lesson two, choose one of the changes for the theme and a question and show the answer that a particular version of a change represents (red – tv, blue – radio, green – cinema etc)

Lesson 5 - The Visualisation Comes Together

Learning Intentions [This Lesson]

- I will learn how to create a visualisation from my data

Success Criteria [This Lesson]

- Created my own visualisation about my own data

Main Activity

The slides remind learners of the activities from lesson 4 and then encourage them to complete their visualisation.

Turning the data into a visualisation, using the key from lesson five and the data from the homework turn every box in the homework into a graphic using the key and layout to correctly encode the results.

Visualisation is part of the analysis step of [PPDAC the data problem solving framework](#).

Learners should use the key they developed in lesson 4 to complete their visualisation.

Examples are shown in the annex at the end of this document.

Lesson 6 – Evaluation

Learning Intentions [This Lesson]

- I will learn how to create a visualisation from my data

Success Criteria [This Lesson]

- Created my own visualisation about my own data

Main Activity

The slides take learners through a peer evaluation activity where they ask questions of each other's data and visualisation.

In this lesson students will test another student's key to make sure that they create a data box that looks the same as in the homework.

Then students will look to see if they can find an interesting cluster, grouping, or spread of data in their visualisation. Is there an interesting answer to the question that they created in lesson 2.

Appendix 1: Example Data

Your Questions						
Lvl 1	How I consumed the media					
Lvl 2	What from			How long		
Lvl 3	Day		Time		Where	
Lvl 4	Location	Type	Why			

Answers to your questions						
Lvl 1	Watching					
Lvl 2	Desktop Computer			0.5 Hours		
Lvl 3	Tuesday		20:00		Study	
Lvl 4	Desk Chair	Youtube	Work			

Answers to your questions						
Lvl 1	Listening					
Lvl 2	Phone			0.5 Hours		
Lvl 3	Tuesday		22:15		Bedroom	
Lvl 4	Bed	Fiction	Entertainment			

Answers to your questions						
Lvl 1	Watching					
Lvl 2	TV			2 Hours		
Lvl 3	Wednesday		20:00		Living Room	
Lvl 4	Sofa	Amazon Prime	Entertainment			

Answers to your questions						
Lvl 1	Reading					
Lvl 2	Printed Paper			1 Hour		
Lvl 3	Tuesday		19:00		Living Room	
Lvl 4	Arm Chair	Non-Fiction	Work			

Answers to your questions						
Lvl 1	Playing					
Lvl 2	Desktop Computer			1.5 Hours		
Lvl 3	Tuesday		20:30		Study	
Lvl 4	Desk Chair	Game	Entertainment			

Answers to your questions						
Lvl 1	Watching					
Lvl 2	TV			1 hour		
Lvl 3	Wednesday		19:00		Living Room	
Lvl 4	Sofa	Recorded Show	Entertainment			

Answers to your questions						
Lvl 1	Listening					
Lvl 2	Phone			2 Hours		
Lvl 3	Wednesday		17:00		Study	
Lvl 4	Desk Chair	Podcast App	Entertainment			

Answers to your questions						
Lvl 1	Listening					
Lvl 2	Phone			0.5 Hours		
Lvl 3	Wednesday		22:10		Bedroom	
Lvl 4	Bed	Fiction	Entertainment			

Answers to your questions						
Lvl 1	Watching					
Lvl 2	TV			1.5 Hours		
Lvl 3	Thursday		18:00		Living Room	
Lvl 4	Sofa	Netflix	Entertainment			

Answers to your questions						
Lvl 1	Reading					
Lvl 2	Real Book			0.33 Hours		
Lvl 3	Thursday		21:40		Bedroom	
Lvl 4	Bed	Non-fiction	Work			

Answers to your questions						
Lvl 1	Watching					
Lvl 2	Cinema Screen			3 hours		
Lvl 3	Friday		15:30		Cinema	
Lvl 4	Seat	Movie	Entertainment			

Answers to your questions						
Lvl 1	Watching					
Lvl 2	TV			1 Hour		
Lvl 3	Thursday		17:00		Kitchen	
Lvl 4	Standing	Recorded Show	Background			

Answers to your questions						
Lvl 1	Listening					
Lvl 2	Phone			1.5 Hours		
Lvl 3	Thursday		20:00		Study	
Lvl 4	Desk Chair	Podcast	Background			

Answers to your questions						
Lvl 1	Listening					
Lvl 2	Phone			0.5 Hours		
Lvl 3	Thursday		22:00		Bedroom	
Lvl 4	Bed	Fiction	Entertainment			

Answers to your questions						
Lvl 1	Watching					
Lvl 2	TV			0.75 Hours		
Lvl 3	Friday		20:45		Kitchen	
Lvl 4	Standing	TV show	Background			

Lvl 1	Listening					
Lvl 2	Phone			.5 Hours		
Lvl 3	Saturday		23:00		Bedroom	
Lvl 4	Bed	Podcast	Entertainment			

Lvl 1	Watching					
Lvl 2	TV			1.5 Hours		
Lvl 3	Sunday		07:00		Living Room	
Lvl 4	Arm Chair	TV show	Entertainment			

Answers to your questions						
Lvl 1	Reading					
Lvl 2	Real book			1 Hour		
Lvl 3	Sunday		09:00		Balcony	
Lvl 4	Bench	Non-fiction	Entertainment			

Answers to your questions						
Lvl 1	Listening					
Lvl 2	Record			1 Hour		
Lvl 3	Sunday		10:00		Living Room	
Lvl 4	Dinning Table	Music	Entertainment			

Answers to your questions						
Lvl 1	Listening					
Lvl 2	Phone			1 Hour		
Lvl 3	Sunday		11:15		Outside	
Lvl 4	Walking	Non-fiction	Entertainment			

Answers to your questions						
Lvl 1	Listening					
Lvl 2	Phone			1.5 Hours		
Lvl 3	Sunday		12:45		Kitchen	
Lvl 4	Standing	Music	Entertainment			

Answers to your questions						
Lvl 1	Playing					
Lvl 2	Desktop Computer			8 Hours		
Lvl 3	Sunday		14:30		Study	

Answers to your questions						
Lvl 1	Watching					
Lvl 2	TV			0.5 Hours		
Lvl 3	Monday		06:15		Living Room	

Lvl 4	Desk Chair	Game	Entertainment			
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Lvl 4	Dinning Table	Netflix	Background			
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Appendix 2: Data Collection Template

Student name:

Student class:

Collection start date:

Collection end date:

Your Task:

1. Choose one of the following data categories:
 - What media did you consume this week? (Tv, film, books, comics, radio, music, etc)
 - What did you drink this week?
 - What books do you have at home?
 - What clothes do you own?
 - What mobile apps did you used this week
2. Using what we have learned collect data over the course of the next week [starting today]
3. Remember to use questions to get more depth to your data

Example: Questions						
Lvl 1	How I consumed the media					
Lvl 2	What from			How long		
Lvl 3	Day		Time		Where	
Lvl 4	Location	Type	Why			

Example: Answers						
Lvl 1	Film I was watching					
Lvl 2	Alone			15:00		
Lvl 3	Home		Sunday		Living Room	
Lvl 4	Loud	Sitting	Entertainment			

Your questions						
Lvl 1						
Lvl 2						
Lvl 3						
Lvl 4						

Answers to your questions						
Lvl 1						
Lvl 2						
Lvl 3						
Lvl 4						

Answers to your questions						
Lvl 1						
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Lvl 4						

Appendix 3: Tally Chart Template

Name: _____

Topic: _____

Class: _____

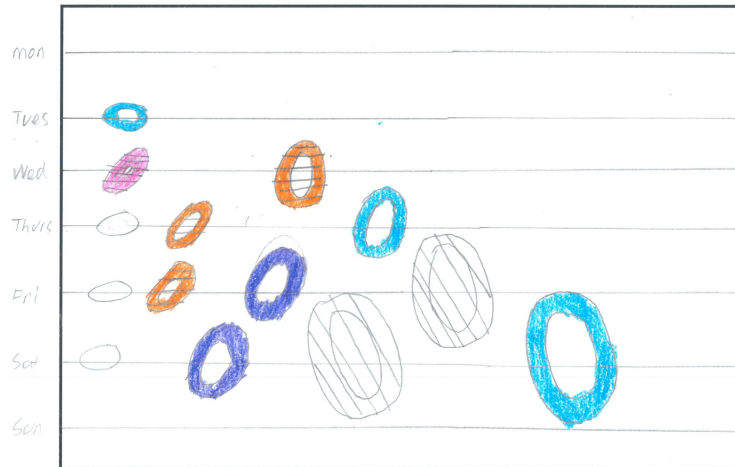
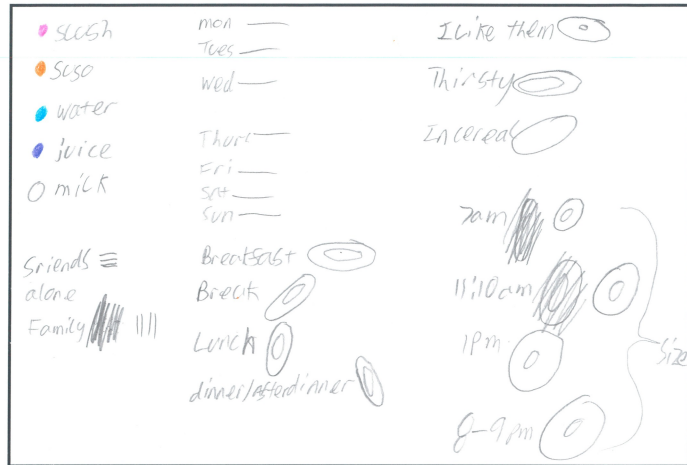
Main Question: _____

Data Science: Number of Unique Answers at Each Level						
Lvl1						
Lvl2						
Lvl3						
Lvl4						

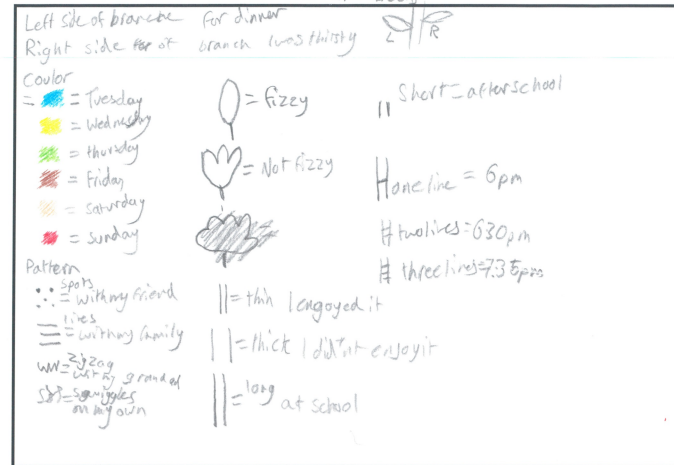
[illegible]

Appendix 4: Example Visualisations

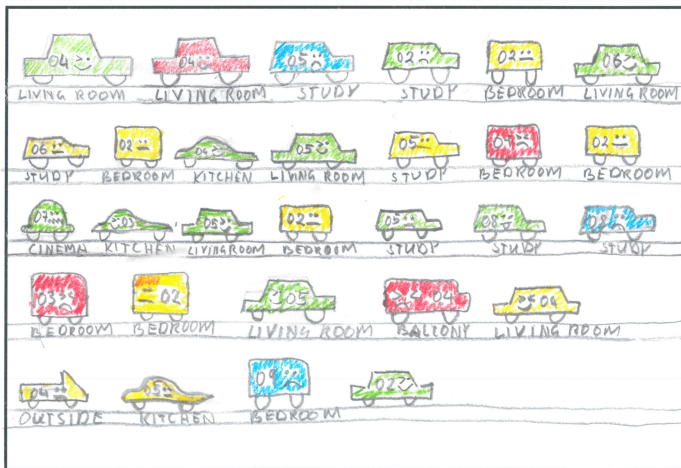
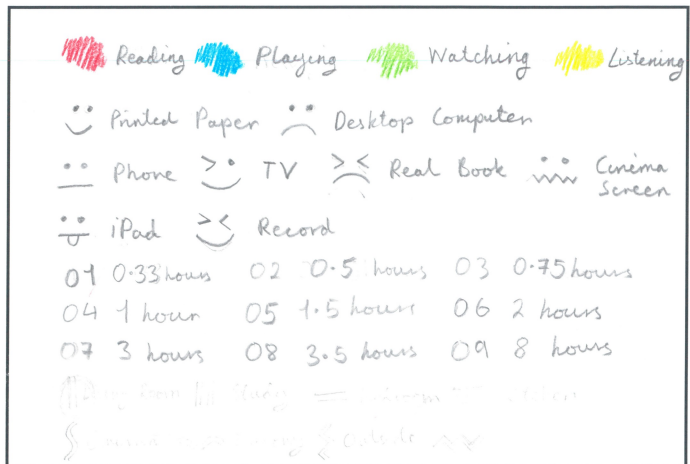
Visualisation Title:



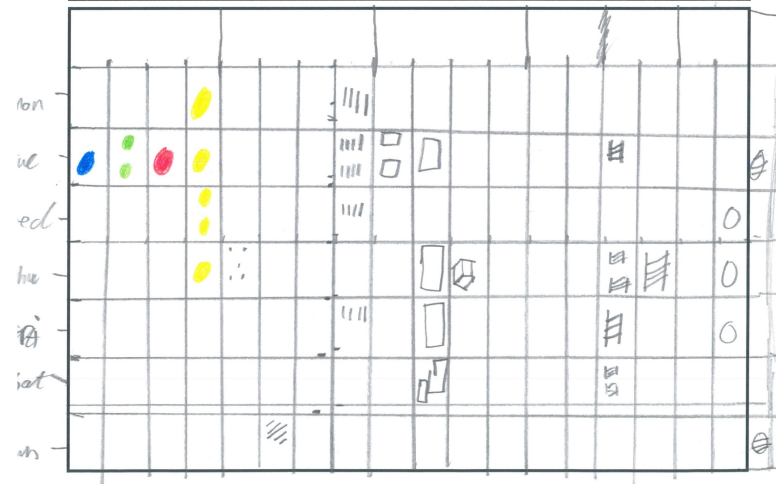
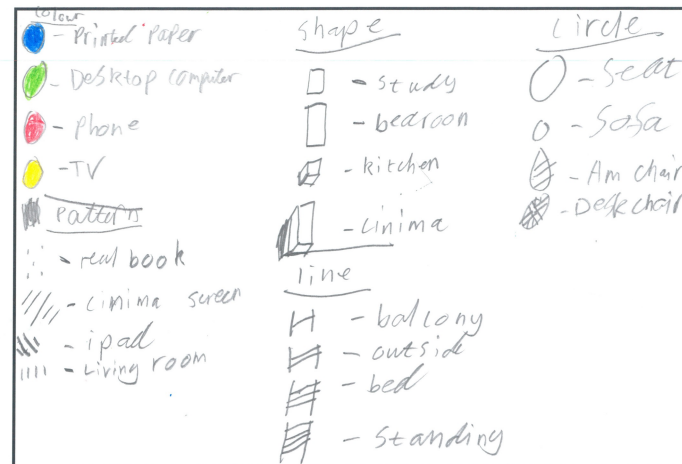
Visualisation Title: I Like to drink Acedy



Visualisation Title:



Visualisation Title:



Visualisation Title: Clothes on a washing line

Colour

black navy blue green red purple white brown

Sleeve length

none short long na

What for

spats casual xmas other

Leg length

short short cropped 7/8 full length na

Patterned?

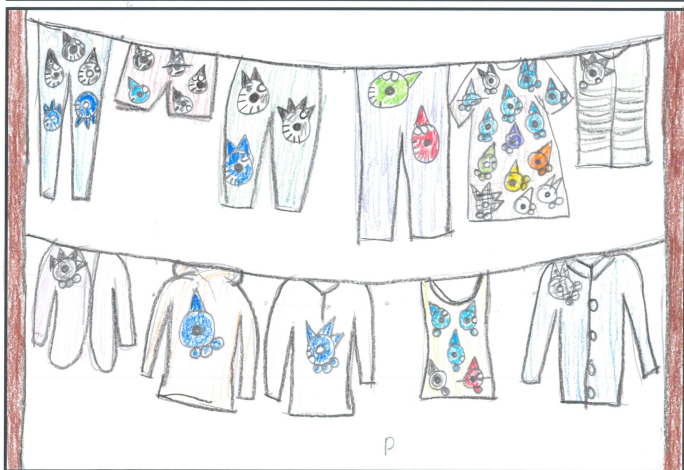
yes no

Worn?

worn not worn

Brand

sport outdoor shop na?



Ran out of room to collect
and some were in the wash

Visualisation Title: Clothes

- thicker the line, more expensive

- thinner the line, less expensive

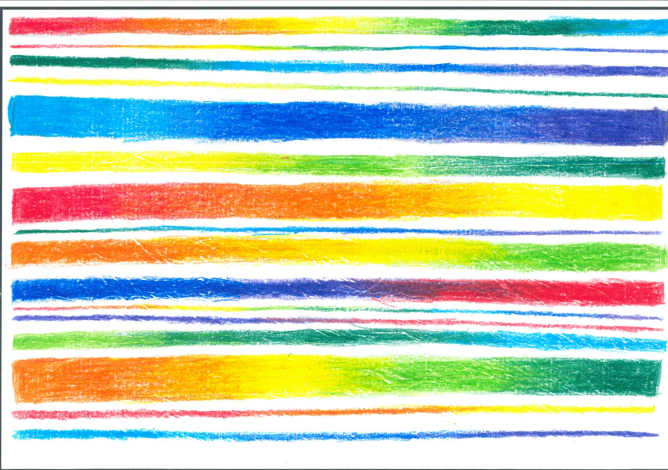
Monday

Sunday

Monday - Red

Sunday - Purple

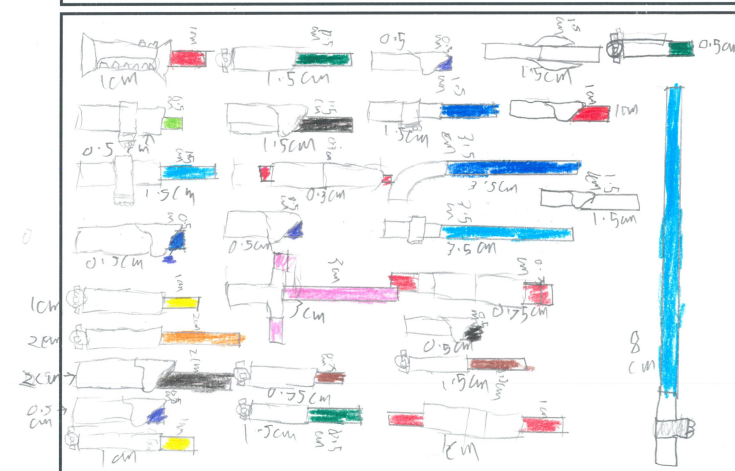
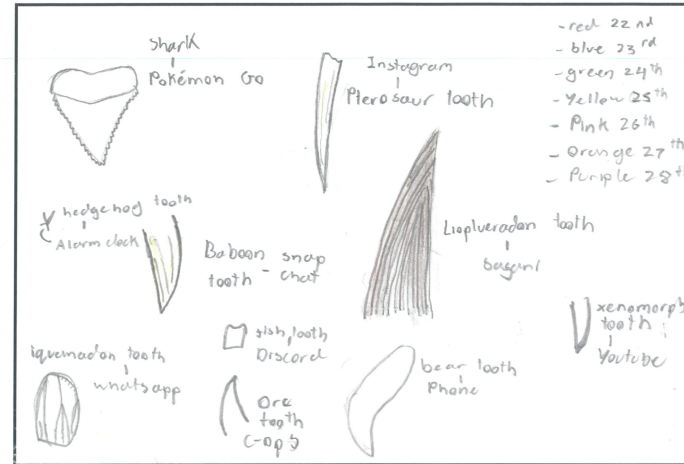
you go, the time of the week I wear it.



Visualisation Title: Light cables



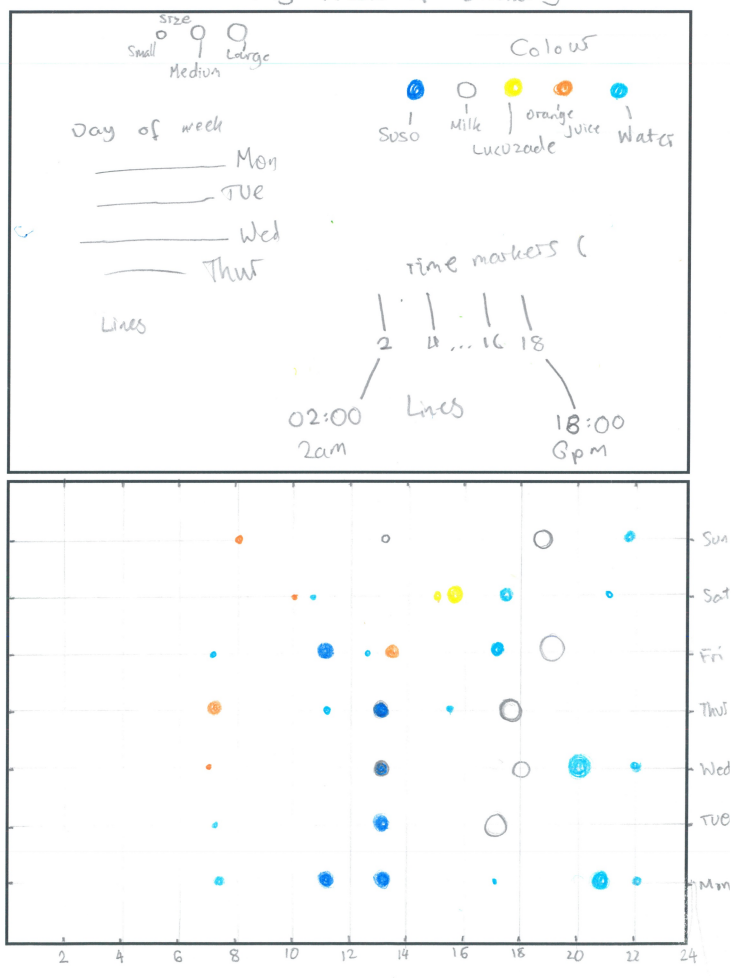
Visualisation Title: Apps used - Teeth



Visualisation Title:



Visualisation Title: My Week of Drinking



Visualisation Title: Faces

<u>Mouth</u>	<u>Eyes</u>	<u>Colour</u>
Reading - —	< 12:00 - Δ Δ	Non fiction - ■
Watching - ∪	12:00 - 18:00 - □ □	Youtube / twitch - ■
Listening - ∪	18:00 - 21:00 - Δ Δ	Music - ■
Playing - ∪	21:00 - 00:00 - —	Netflix / amazon - ■
<u>Head</u>	<u>Hair</u>	<u>Pattern</u>
Phone - □	Living room - ∪	Fiction - ■
Paper / book - ∪	Study - ∪	Podcast - ■
Tv / Cinema - Δ	Bedroom - ∪	TV - ■
Computing - ∪	Kitchen - ∪	Film - ■
<u>Nose</u>	Cinema - ∪	Game - ■
Entertainment - ∪	Balcony - ∪	<u>ears</u>
Work - ∪	Outside - ∪	0-2 hrs - < >
Background - ∪		2-4 hrs - < >
Killing time - ∪		4+ hrs - < >

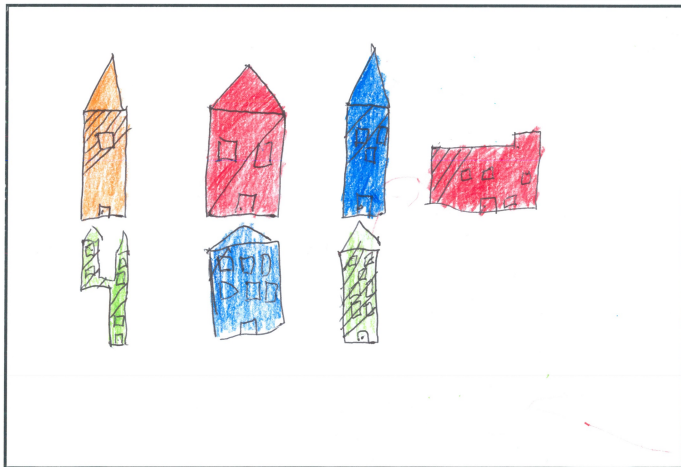
Mon	
Tue	
Wed	
Thu	
Fri	
Sat	
Sun	

Visualisation Title:

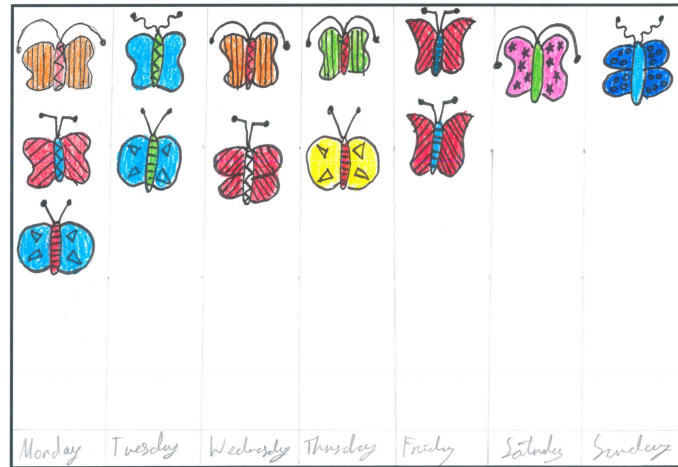
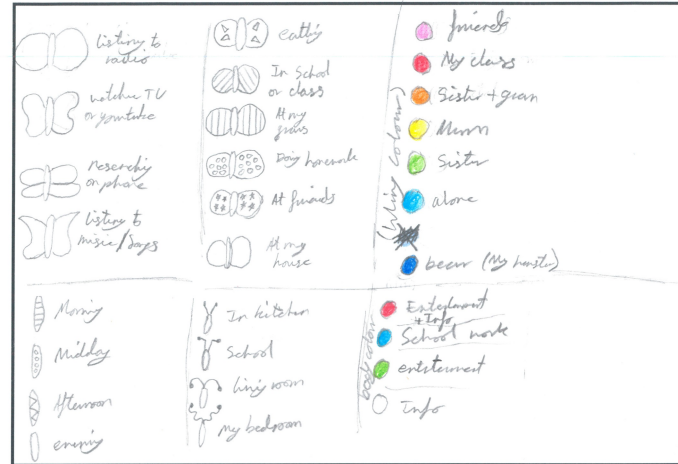
						— Eye Shape = Day
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
						— Pupil Shape = What in
Cup	Bottle	Glass	Can			— Colour = who with
Milk	My Family	My Family	My Family			Eyelid / No eyelid = Where
Home	School					— Pattern = Time
Morning	Afternoon	Evening				

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Visualisation Title: Towers



Visualisation Title:



Appendix 5: Visualisation Template

Visualisation Title

If you require this document in an alternative format, such as large print or a coloured background, please contact

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CITY REGION DEAL
Edinburgh & South East Scotland

