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Dear Data
Inspired by
Georgia Lupi & Stefanie Posavec

Introduction:

This activity provides students an opportunity to go through the data cycle process focusing on a statistical investigative question based on something students would like to learn about themselves. In our day-to-day experiences we are surrounded by variability and this activity provides students an opportunity to formulate a question that can be answered with data, as they collect, consider, and analyze the data and then interpret and communicate their findings. We are thankful for Giorgia Lupi and Stefanie Posavec who shared their Dear Data journey with the world. You can find out more about their year of Dear Data postcards at http://www.dear-data.com/theproject.

Agenda:

Activity	Time	Description/Prompt	Materials
Data Talk	10 min	Show one or more of the data visuals from pages 6 - 13. We have included 8 so you might want to print and give groups of students one of them to interpret and present. Share with students that these data visuals were made by students who wanted to answer a question about their own life. Ask students, What do you notice? What do you wonder? As a class discuss what students noticed and wondered about.	Dear Data Visuals pages 6 - 13
Introduction to the data cycle	10 min	Introduce the data cycle image to students and share the data cycle process 1. Formulate statistical investigative questions (SIQs) 2. Collect/consider data 3. Analyze data 4. Interpret and communicate data	Data Cycle image page 5
Formulate your statistical investigative question	20 min	• Students work in small groups to discuss and develop their own individual SIQ for the project. • Discuss as a class the different SIQs students have developed to determine whether the question can be answered by data	Paper & markes or technology

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Collect and consider data	24+ hours	• Students work in small groups on their individual SIQ to consider what data they need to collect and how they are going to collect the data over a 24-hour or more period. • Students should consider how they will collect and record the data paying attention to ways to organize the data so they can see patterns.	Graph paper and/or technology
Analyze data	20 min	Students work in groups to analyze the data they collected.	Graph paper and/or technology
Interpret and communicate data	30+ min	Students develop a visual or poster that tells the story of the data they collected and communicate what they have learned from studying their own data.	Poster paper, markers and/or technology
Share	15 min	Display the Dear Data visuals or posters and ask students to move around the room reading and discussing what they are learning about other students.	

Data Talk:

The purpose of this data talk is to introduce students to unique data visuals created by students who completed a Dear Data lesson. We have included a few options so you can pick one or more that will work for your students. You might choose to make your own data visual to use for this introduction.

Share a Dear Data visual and ask students, "What do you notice? What do you wonder?". As students share their ideas record a summary of their statements for class discussion. Make sure students notice the key components of the data talks like the meaning of colors, images and icons and the different ways the author of the Dear Data visual chose to communicate their findings. You might want to print the 8 Dear Data visuals and give each small group a different one to read and interpret. The groups can then share their findings with the class.

Introduction to the data cycle:

Share the data cycle visual with students and explain the importance of each of the four phases. Students will engage in these four phases as they develop their own statistical investigative question and move through the cycle. Introduce the term variability by referring to the variability in the data shared in the Data Talk. For example, Kira's data shows variability in the way she interreacted with her dog Daisy throughout the day. Kira chose to study the different ways she typically interacts with Daisy on a given day.

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Ask students to work in groups to determine the ways Kira moved through the process. What was her SIQ? What data did she collect and over what time period? How did she organize her data in the data visual to communicate her story and answer her SIQ? What details did she include that are important to you understanding the data and being able to read and comprehend the results? What conclusions and statements did Kira make after her data collection?
1. Formulate statistical investigative questions
2. Collect/consider data
3. Analyze data
4. Interpret and communicate data

Formulate your statistical investigative question:

Ask students to work in pairs or small groups to develop their own statistical investigative question. Students should be encouraged to think about something they wonder about in their daily lives that is something they would like to know more about. For example, we have seen students study their phone usage throughout the day, how much water they drink and when, who they interact with on a given day and what do those interactions consist of and what are their emotions throughout the day. In previous student work we have seen students express how shocked they are at the data and how much they are going to focus on changing. For example, one student realized he did not eat enough throughout the day and realized he should eat and make better food choices when he does. At the end of his data cycle he reflected about how better eating might make his school performance better.

Students are working in groups during this process, so they have thought partners to discuss their ideas. Depending on the age and familiarity with the data process, some students may need support in determining a question and phrasing a question so it is a SIQ. For example, students may say their question is, "How many calories did I eat today?" This question can be answered with a number. Adjusting/editing to make it an SIQ is, "how many calories do I typically eat in a day?". This level of question recognizes variability.

Collect and consider data:

Once students have determined the SIQ they should plan how they will collect and organize the data. This is a very important step and students often do not experience this type of activity and planning enough.Students will inevitably be faced with the need to deal with uncertainty in their data collection with questions like what criterion will I use to decide what "counts" in my data? How will I structure my records so they are easy to read and easy to use in the next step?

In one Dear Data project we recently saw a student wondered what her pet hamster did all day. She collected data by putting a video camera on him for 24 hours. She certainly leaned a lot about her hamster as well as how to retrieve, organize and record data from video footage. She also had

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to define which of her hamsters activities she would "count" and/or what time interval to use when analyzing her video.

We ask students to not work in isolation during this time and encourage them to share ideas and questions they have with thought partners. Opening questions and ideas up for whole class discussion is a wonderful way to build a mathematics learning community and support students in seeing mathematics as a collaborative subject where creativity and ideas are valued.

Analyze data:
After students have collected their data they begin to look for patterns and meaning. Organizing data into a form where they can see patterns and find meaning is something that they will build on with practice. During the process you may want to pause and have class discussions about ways students are organizing their data. If there are students who have found ways to organize their data ask them to share how what they are doing and the organizational decisions they have made.

Interpret and communicate data:
After students have their data analyzed the creative fun can begin. Students may appreciate time to work in groups in discuss how they are thinking of illustrating their data. Encourage students to think about which pattern(s) from their data they wish to highlight, and how they can do so visually, through icons, color, connections, and more! Make sure that each student's data visual includes a key for how to read it!

Share:
We recommend students display their data visuals and the whole class does a carousel where they move around the room reading the data visuals. We prefer to ask students to read the Dear Data visuals on their own or in groups so they can work together to understand what data story the visual is sharing. Students may leave comments and questions on notes or there can be a whole class discussion. We have received great feedback from students who have gone through the data cycle and created a Dear Data story. This is a powerful activity and one we know your students will enjoy.

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Data Cycle

Formulate statistical investigative questions	Collect/ consider the data	Analyze	Interpret and communicate
• Formulate statistical investigative questions • Students generate ideas and ask questions – creating and refining statistical investigation questions	• Students learn what counts as data (eg visuals, sounds, numbers, categories) and understand that people collect data to answer questions • Students develop strategies to collect and organize data of various types and from various sources • Students design studies to answer statistical investigative questions	• Students develop ways to represent and interrogate data to notice, describe and analyze patterns • Students recognize variability and use technology to develop models that incorporate statistical measures measuresinvestigation questions	• Students decide key results to include in a data report that answers the statistical investigative question • Students communicate their results through, for example, a data visual, a poster, a video, a data story • Students explore and share explanations, paying careful attention to what conclusions the data supports. They consider which alternatives are reasonable given the variability in findings

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From Kira: How I interact with my dog, Daisy
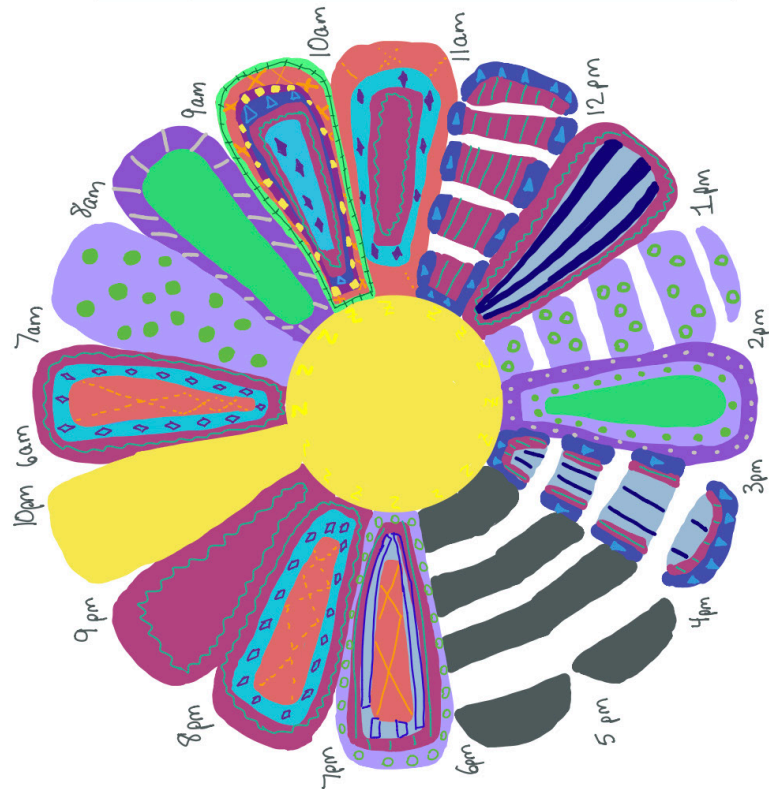
My Actions	# of Occurrences	Daisy's Response	# of Occurrences
• Physical Pet ∧∧∧ = belly rub ▮ = Pat	7	• Roll over △ = from sitting ▲ = from standing	4
• Show a Treat ∷ = cheese /// = Cookie	2	• Walk away ■ = I annoyed her ▢ = distraction	4
• Call name O = actual name (Daisy) ● = nick name (Daisy Doodle, etc.)	4	• Come Solid fill = when called	2
• Talk to Daisy X = Scolding ✕ = Positive	6	• Paw (beg) ▲ = unprompted △ = Prompted	3
• No interaction	2	• Sleep Z = herbed ≋ = other	16
• Give Daisy a shower ▢ = Paws ▮ = full	1	• Muddy # = digging ≋ = rain	1

Not in class = Solid   While in class = dashed

From Cathy: How I use water in a day

Drink water

Pet water

Toilet flush

Hand washing

Shower

Brush teeth

Wash dishes
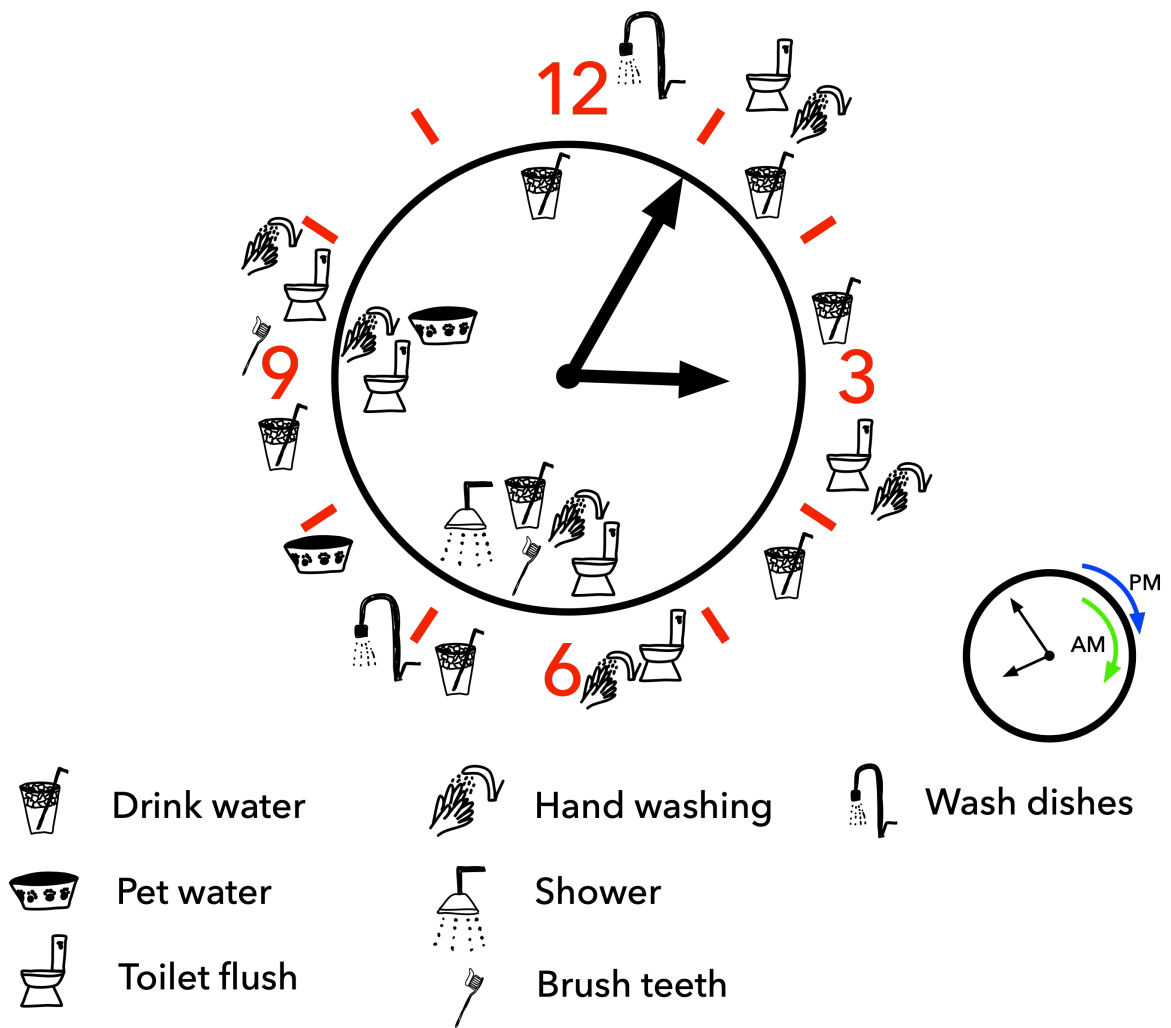
Taylor!

Bikers Passed at Stanford
July 30th, 2021

Bikers passed during PM

Bikers passed during AM

Spokes on the Wheel

wearing a helmet

not wearing a helmet
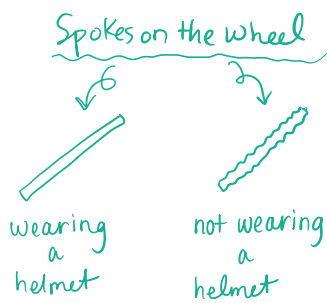
Biker said hi back to me

Biker acknowledged me but did not talk

Biker ignored me

How the Biker responded to me saying "Hi"

From Fiona: My Spotify Consumption
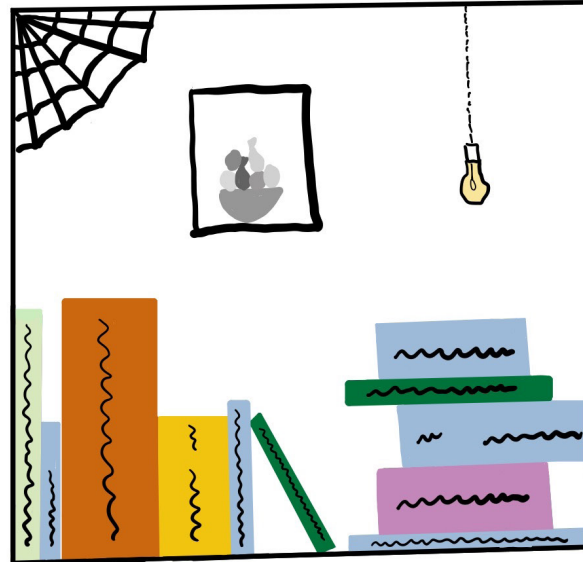
Spotify Consumption
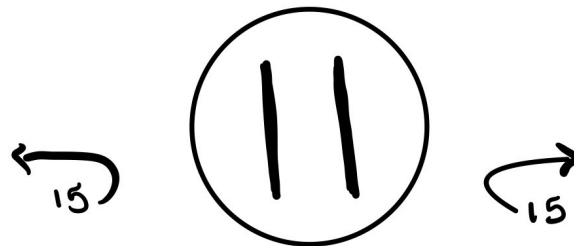
action while listening
- chores
- driving
- reading
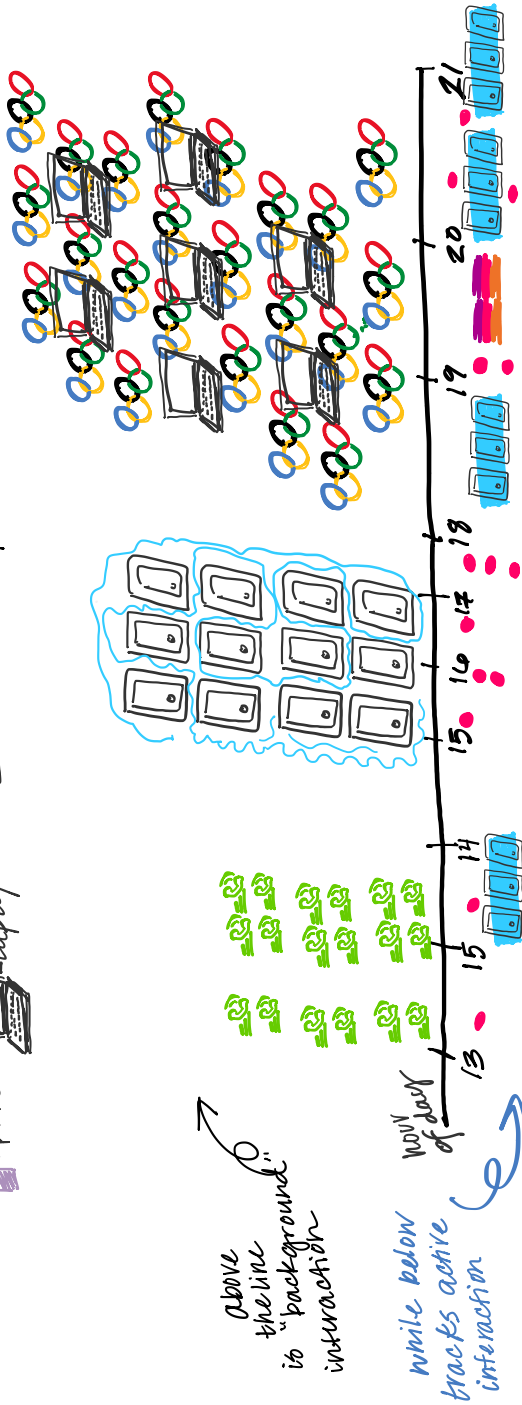- getting ready for bed
- eating
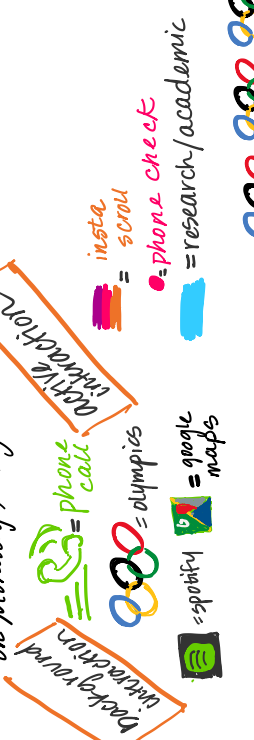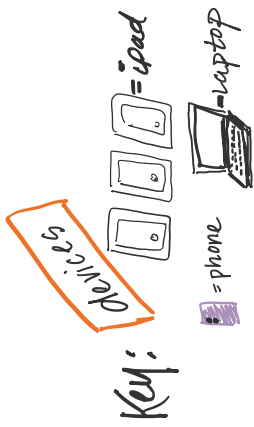- working out

time of day while listening
- long stack — night
- tall stack — afternoon

what I listened to
- tall, skinny book — edm music
- short, skinny book — pop music
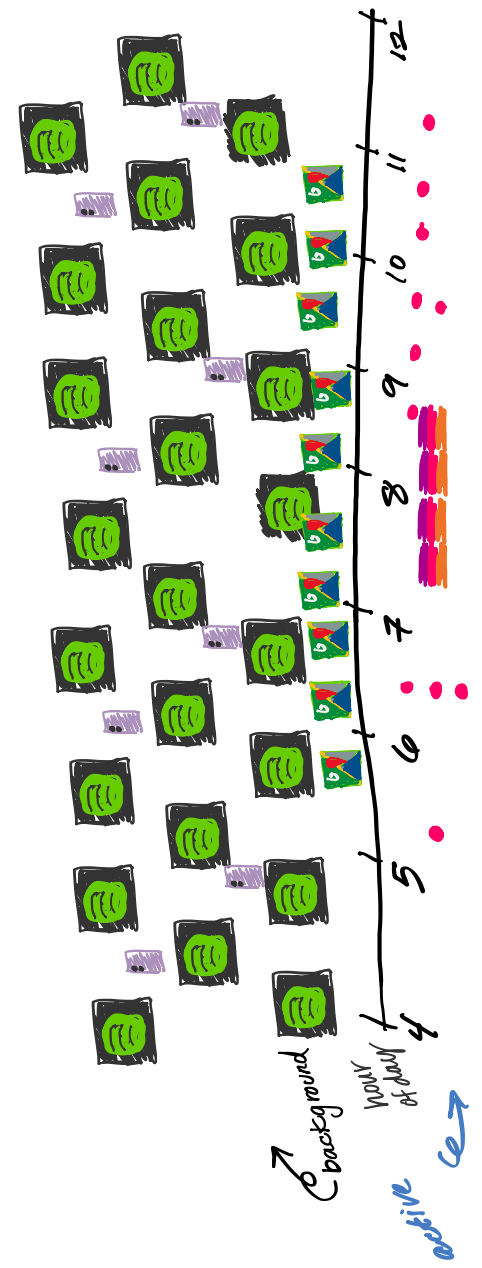- tall, large book — rain sounds
- short, large book — podcast

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From Ellye: Personal Electronic Interaction on Monday

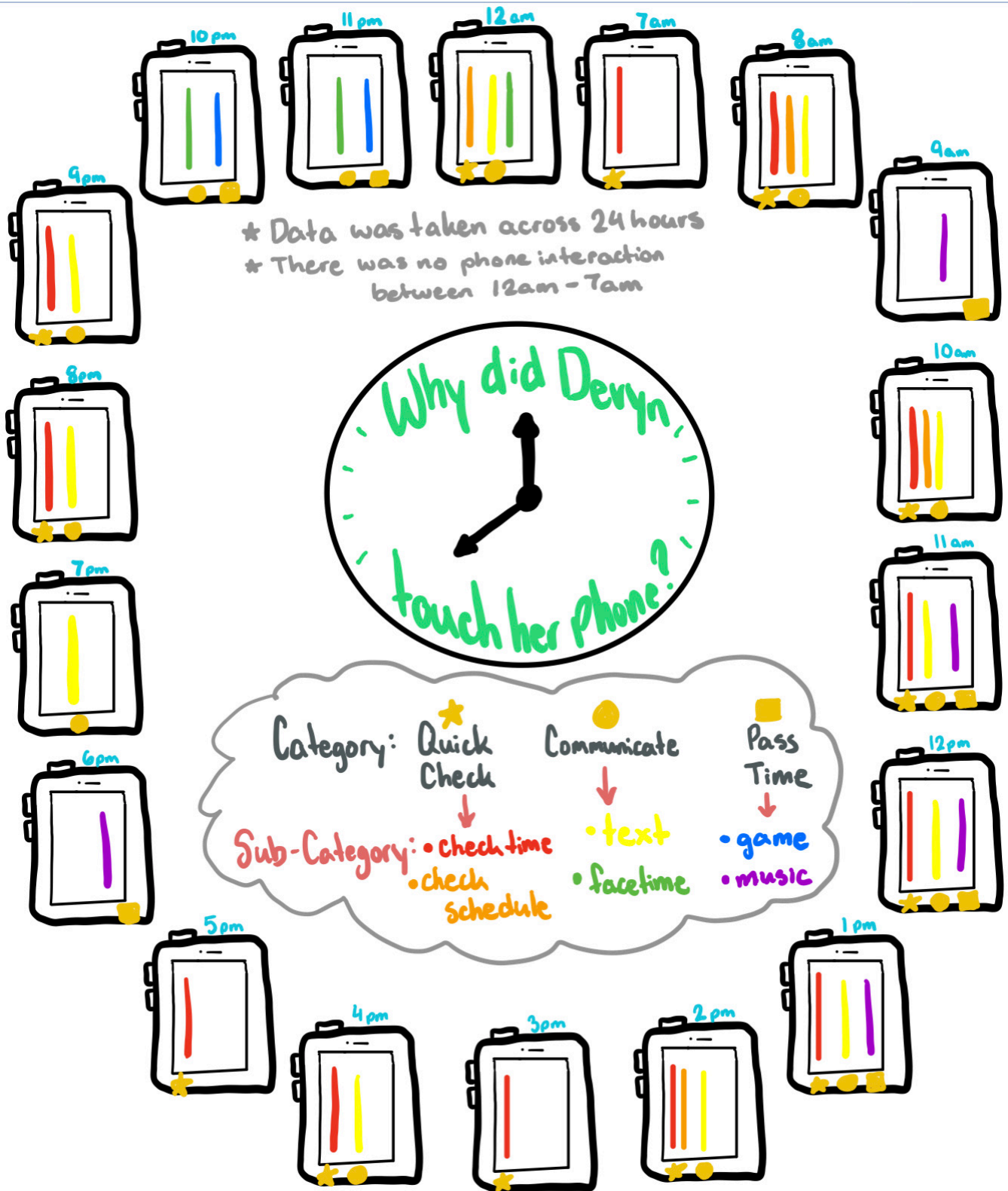Data of *Personal Electronic Interaction* on Monday, August 2nd

Key:

devices
- = phone
- = ipad
- = laptop

background interaction

active interaction

- = phone call
- = olympics
- = spotify
- = google maps
- insta scroll
- = phone check
- = research/academic

above the line is "background" interaction

while below tracks active interaction

hour of day

background

hour of day

active

* Data was taken across 24 hours
* There was no phone interaction between 12am - 7am

Why did Devyn touch her phone?

Category: Quick Check ⭐   Communicate 🟠   Pass Time 🟧

Sub-Category: • check time   • text   • game
             • check schedule   • facetime   • music

About the Words I Paused to Look Up Over a 2-Hour Period of Reading…
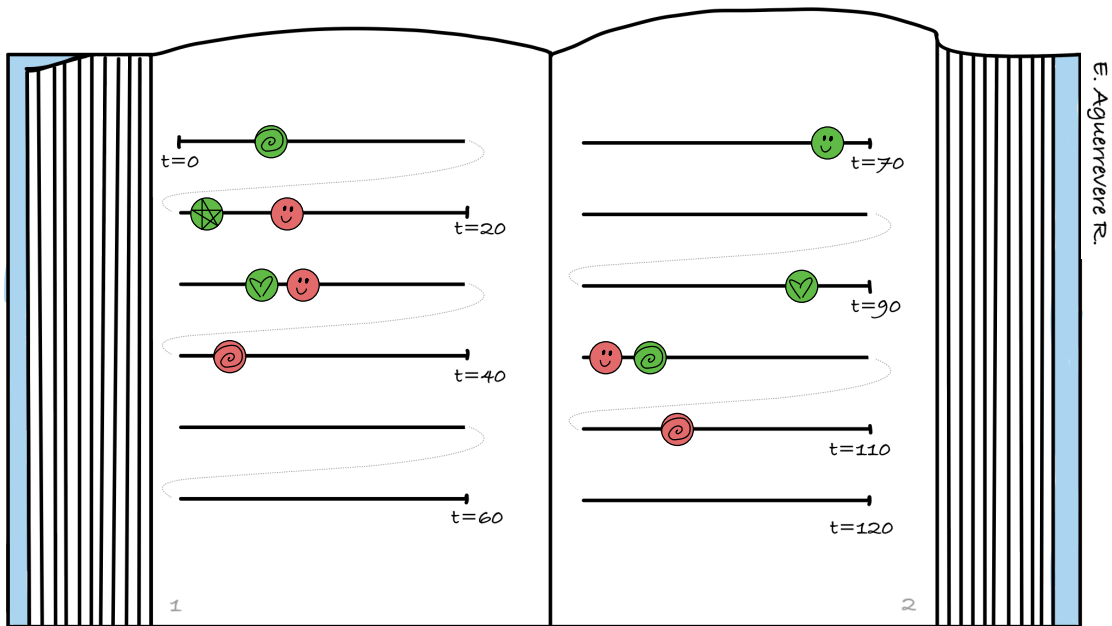
t = time elapsed (in minutes)

◯ = stopped to look up the definition of a word I read

= I was able to guess the meaning before looking it up

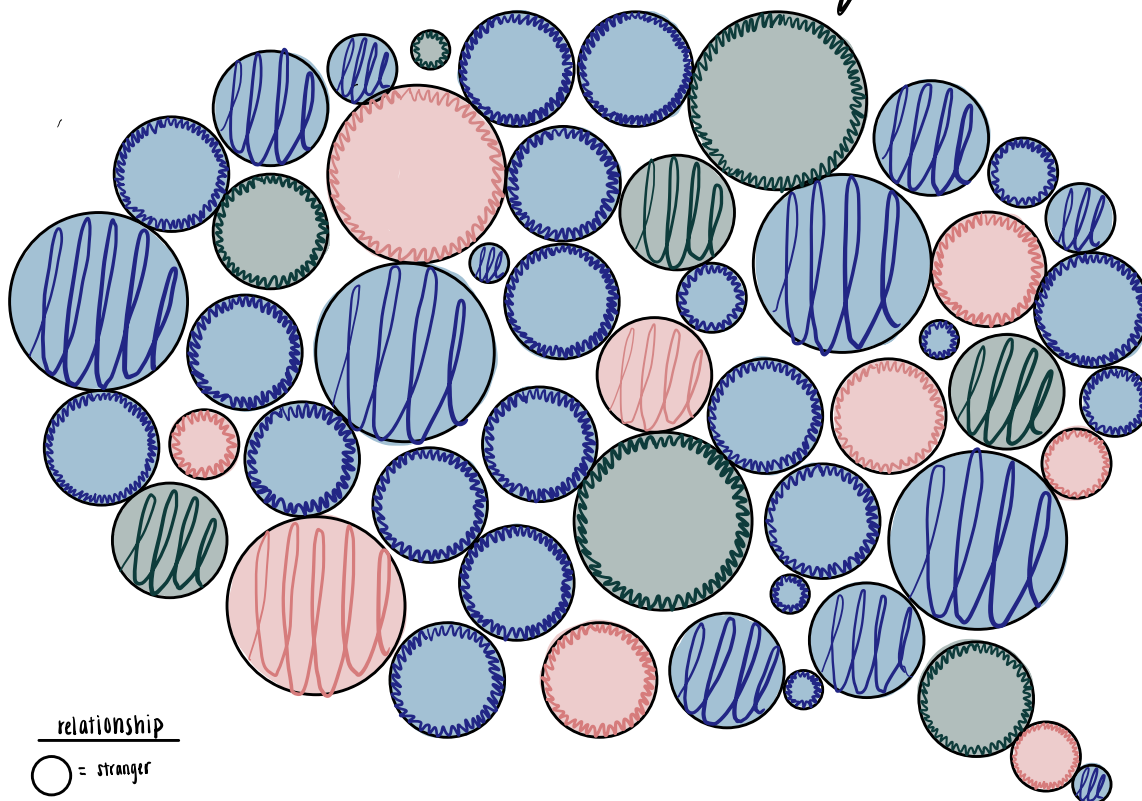= I was unable to guess the meaning before looking it up

word was….

◎ an adjective

✦ an adverb

∵ a noun

♡ a verb

E. Aguerrevere R.

48 hours of thank you's

relationship

○ = stranger

○ = boyfriend

○ = friend

○ = family member

thank you via

= in person

= text

= phone call

who said thank you

ⅿⅿⅿ = me

ℓℓℓℓ = other person