CS-LISTEN

Equitable Computer Science in your School

Meeting 4

Weekly CPR Check In

Sharing Prompt of the Day:

Do you have any siblings? How old are they?

And if you don’t have siblings, do you wish you had siblings? If so how many? Older or younger?

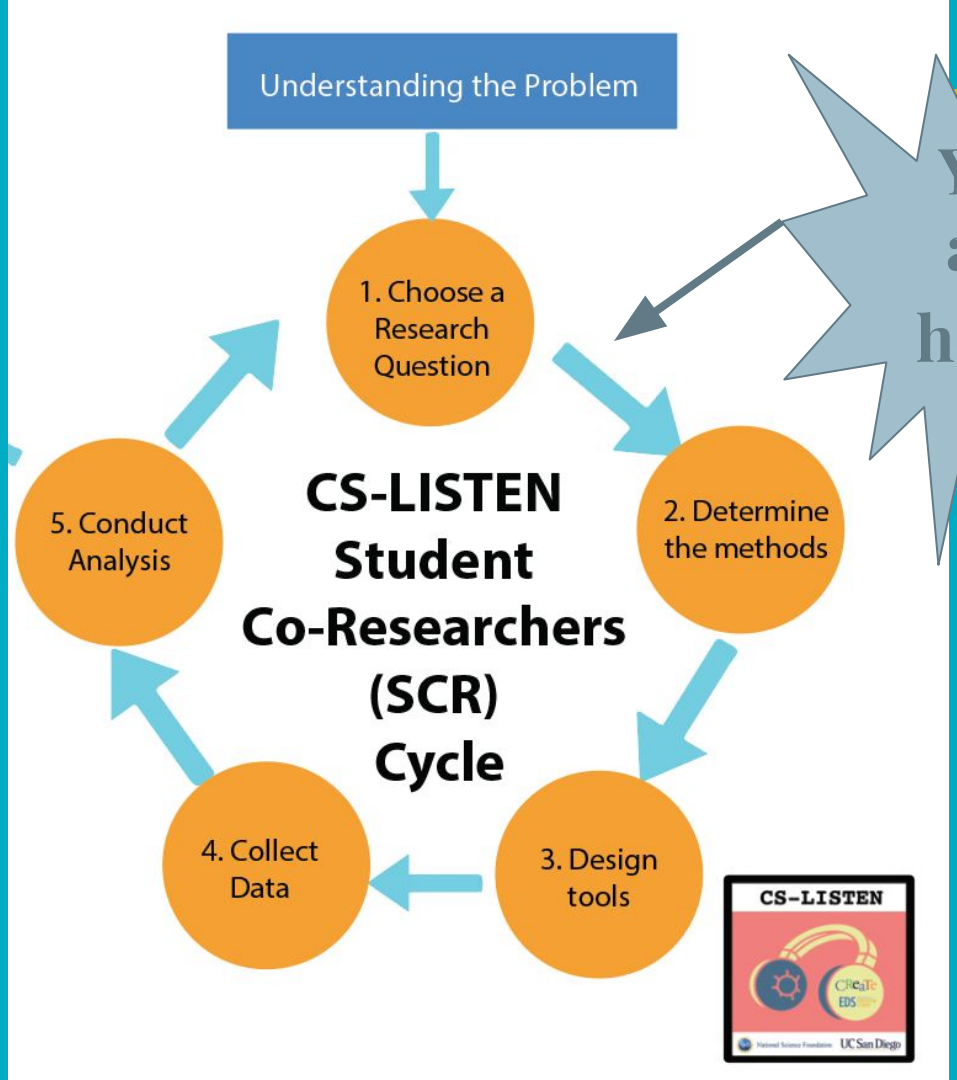
UC San Diego's Consent & Assent forms

Teachers pass out **two forms**: Students turn BOTH signed into your teacher(s) -- Next week

1. **Parent Consent form** -- Turn it into your teacher
2. **Student Assent form** -- Students can sign now and turn it into teacher.

If you don't get the forms signed, you CAN still participate in the project.

But we can't learn from you, so we would LOVE it if you provide the forms back to us.


Understanding the Problem
You are here!
1. Choose a Research Question
2. Determine the methods
3. Design tools
4. Collect Data
5. Conduct Analysis
CS-LISTEN Student Co-Researchers (SCR) Cycle
CS-LISTEN
UC San Diego

GOAL:
Pick a research question

Week 3 Recap - 20 min

- Pick a couple research questions that you would like to present to UCSD folks next week

- Be prepared to describe why your team is interested in this/these question(s)

Operational

How do you define your variable?
How can you measure it?

If you still need to discuss/choose a research question as a team...

Spend 5-7 minutes in a breakout room considering:

Individually give each topic/question an individual score on a scale of 1-10 – then compare notes:

1. **Interest** – Yours? Your team's?
2. **Relevance** – Could it potentially make a difference in CS equity?
3. **Feasibility** – Can you accomplish it in 6 weeks?
4. **Novelty** – Will it provide NEW information, not studied last year?

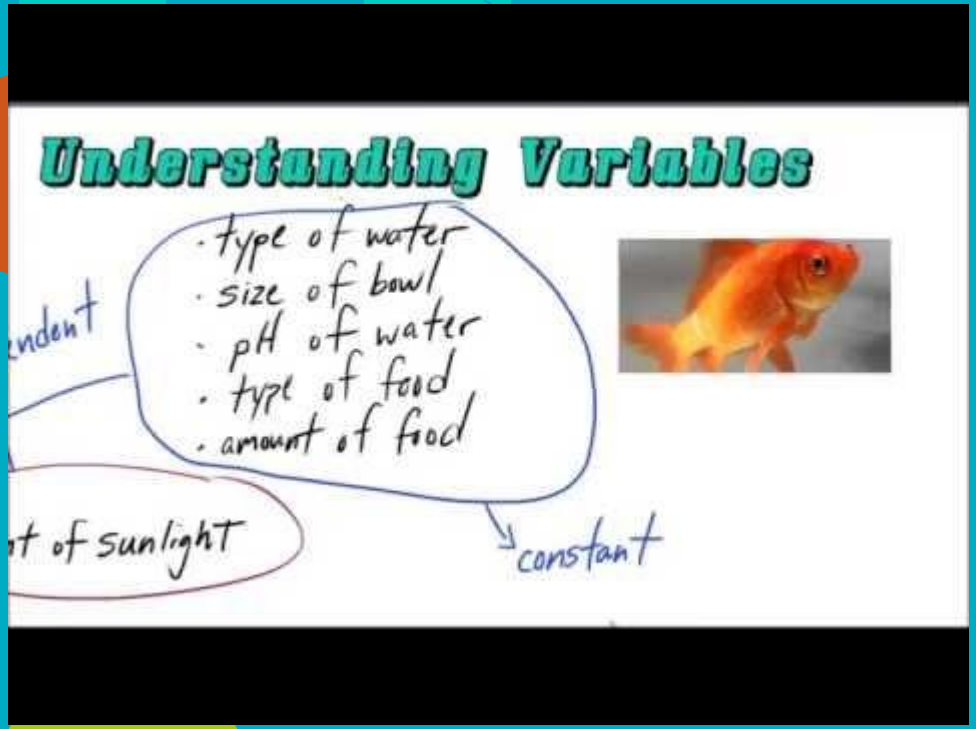
Designing a Study

If the team already has an RQ selected…

Have you done work to **operationally define** the concepts you will study? (see slides 12-20)

Have you done work to think about an appropriate **methodology**?

(see slides 13-16)



If you are doing a quantitative study -- Variables might come with labels like:

- Independent (things you are trying to change on purpose),
- Dependent (things you are measuring as outcomes),
- Constants (things you are trying to “control”)

Social Science Examples of quantitative studies:

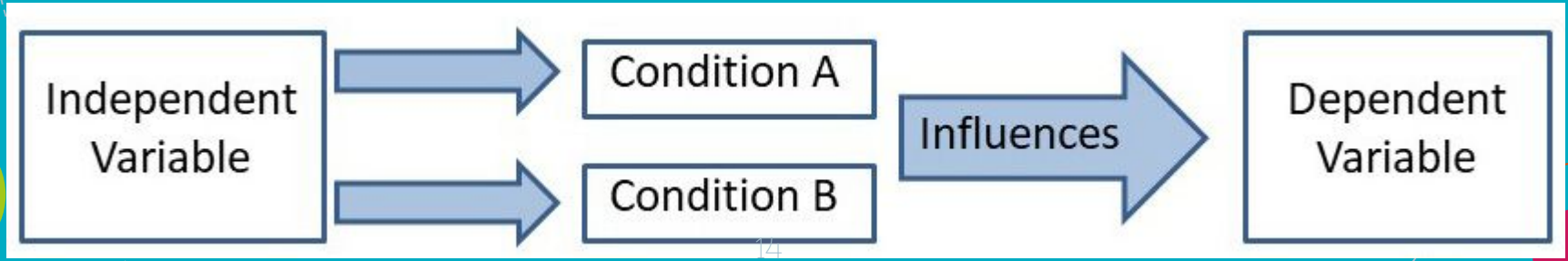
Independent Variable(s)	Dependent Variable(s)	(Possible) Controlled Variables/Constants
Stress	Mental State of Human Beings	
Work Promotion	Employee Motivation	Job Title
Good night sleep	Test score	
Education, Income, Age, Weight	# of cigarettes smoked per day	Gender
Grade Level	Cafeteria Food Rating	Lunch Period

Revisit your research question. What are the variables for your question?

Remember: Variables are the things you think matter/have influence on the problem or outcome.

Variables are also the things you want to:

- hold constant/control,
- vary on purpose, and/or
- measure/try to change.



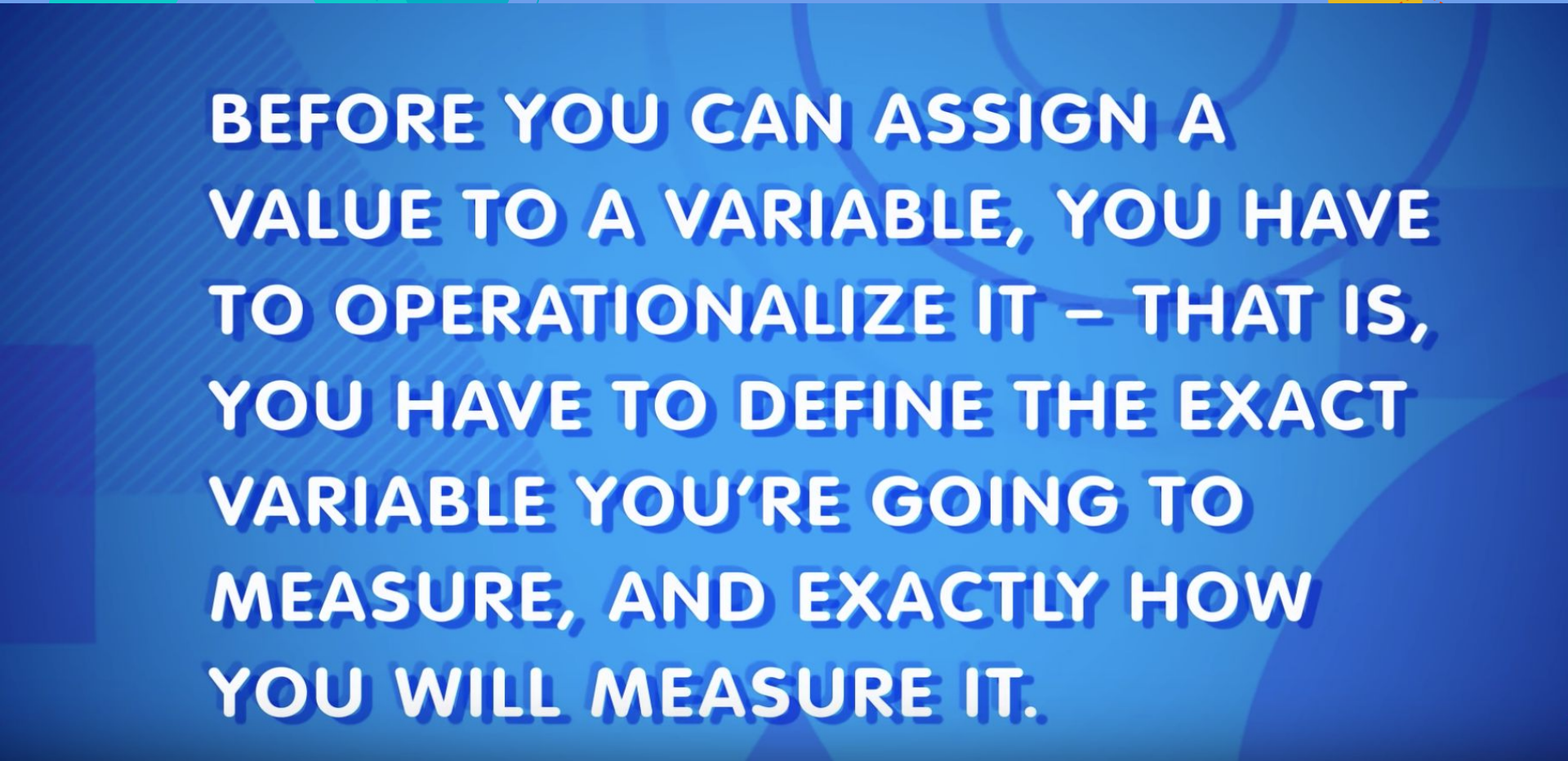
Social Scientists also try to make sense of the naturalistic world around them, and the people in it:

Qualitative research methods help ask and answer questions about HOW, WHY and in what ways something occurs or doesn't occur.

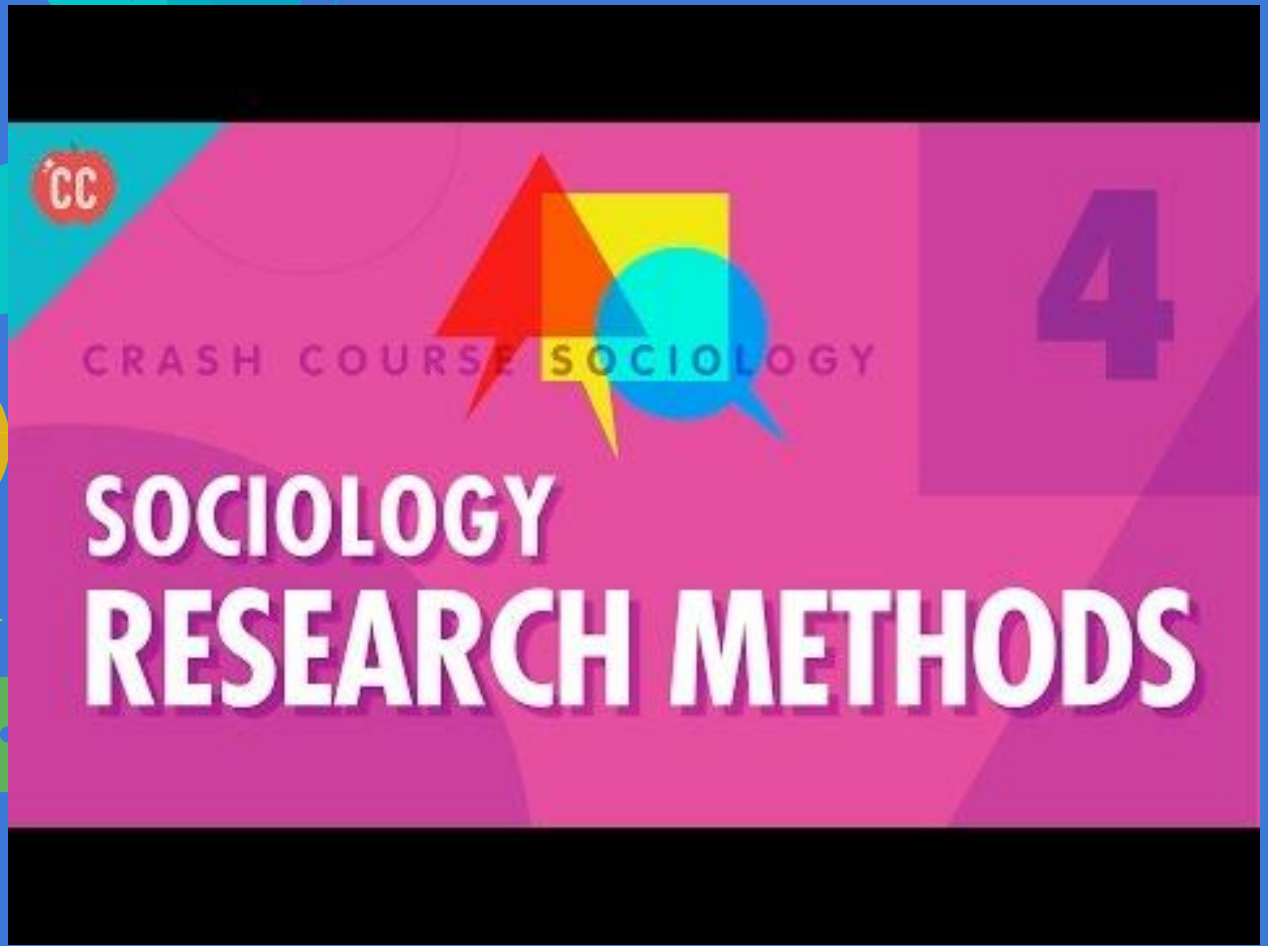
-- In these types of studies, researchers do not always have variables controlled or manipulated.

-- **But they DO still try to define what they mean by the variables or concepts being studied in their research question(s).**

Operational Definition: What is it? Why should we care?



Operational Definition: What is it? Why should we care?



To summarize…

When asking a question, keep in mind that you'll need a research method, which is a plan on **how** you'll be gathering and analyzing your data.

To summarize…

It's important to define the concepts you are discussing in ways that are **measurable**, **reliable** and **valid** so that everyone starts on the same page. This is called operationalizing the variable.

- **Measurable**: Can you gather data about your variable?
- **Reliable**: Can you be consistent in your measurement of your variable?
- **Valid**: Is the measurement directly tied to or reflective of the variable you are studying?

To summarize…

After you and everyone in your group comes into consensus on how to define the concepts and variables you are discussing, form a hypothesis which will state a possible relationship between your variables.

RESEARCH METHODS ARTICLE

Two main types:

Quantitative

Qualitative

Mixed Methods

Research approaches
Action research
Case studies
Ethnographic
Field experiments
Focus groups
Forecasting research
Futures research
Game or role playing
In-depth surveys
Laboratory experiments
Large-scale surveys
Participant-observer
Scenario research
Simulation and stochastic modelling

Quantitative Research:

Quantitative Research produces data that is expressed numerically.

Examples of quantitative data:

- Height in inches
- # of minutes
- # of votes

Quantitative Research:

- Focuses on testing theories and hypotheses
- Is analyzed through math and statistical analysis
- Mainly expressed in numbers, graphs, and tables
- Requires many respondents
- Closed (multiple choice) questions

info from: https://www.editage.com/insights/how-to-choose-the-research-methodology-best-suited-for-your-study

Quantitative Research:

There are many types of quantitative research methods!

Here are a few…

Surveys:

- Contains Many Questions
- Questions are multiple choice or rated
  - on a scale of 1-5…
  - rank the following…
  - multiple choice makes for cleaner data!
- On average, parents rated _____, x
- [This many] # of people answered _____

Observations:

- Observes people in their natural environment
- Most naturalistic of research methods
  - high accuracy, less room for biases in the making of research method
- However there might be personal biases
- Some things may not be observable
- During _____ we saw x # of teachers _____

Qualitative Research

This method is used to understand:

- Thoughts
- Concepts
- experiences of people

It makes use of:

- Interviews
- focus groups
- case studies
- discourse analysis
- literature review

Interviews

Ask open-ended questions verbally to respondents. Describe when, where, and how the interviews were conducted. Include information on:

a. how you found and selected participants
b. how many people took part?
c. what form the conversations took (structured, semi-structured, unstructured)
d. how long the interviews took
e. how they were recorded (e.g. audiovisual recordings and note-taking)
f. what group or community you observed?
g. how you gained access to the participants

Research Method Selection Protocol: 10 minutes

Interview Questions:

What type of research methods are most interested in for your RQ?

What appeals to you about that type of method?

Two minutes: In pairs, spend two minutes discussing what you've learned about quantitative vs qualitative methods:

Choose one person to ask questions first. Have the other partner answer.

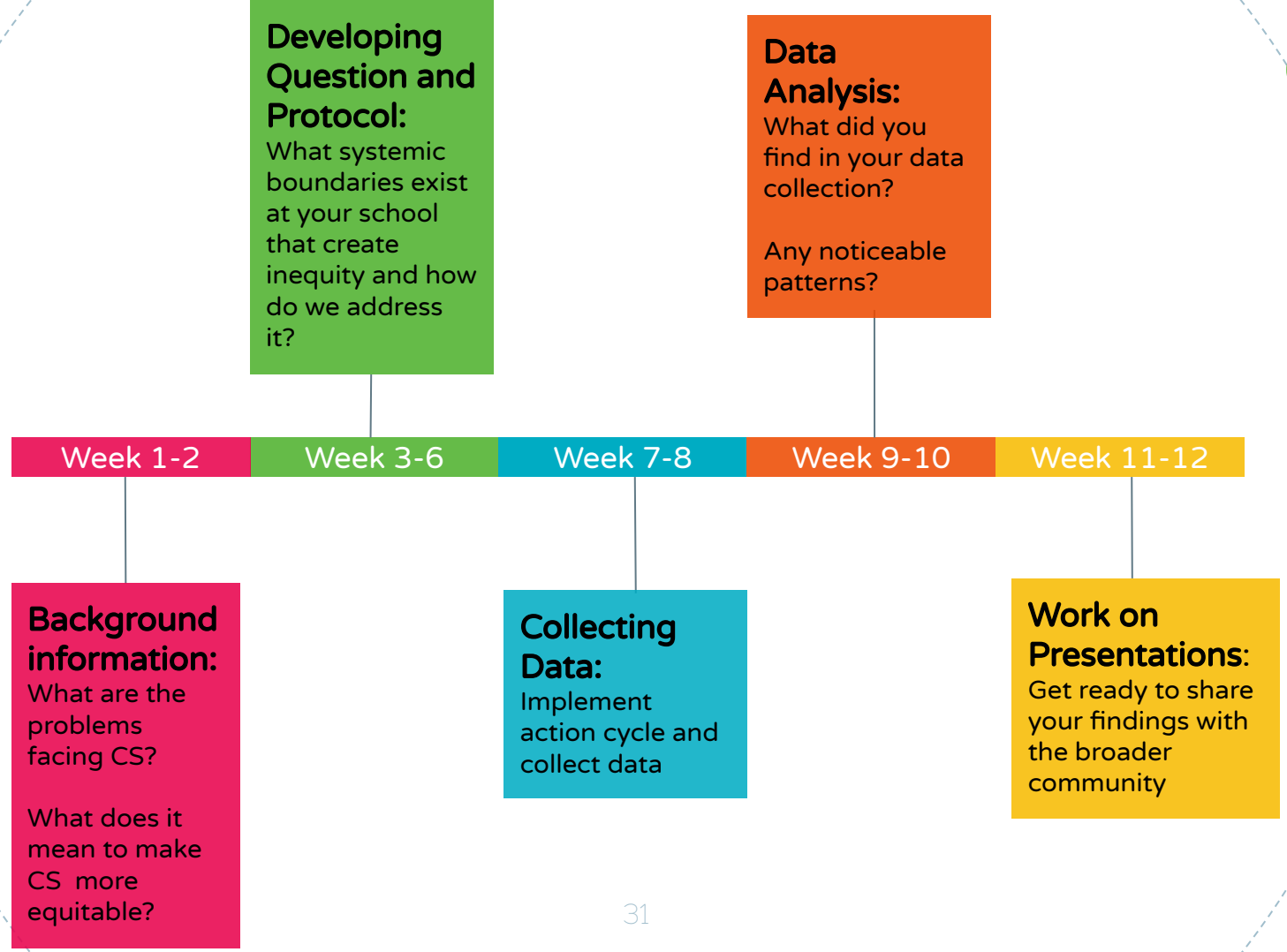
Three minutes: Partner 1 interviews Partner 2 about the type of methods he/she/they think might work best for your team's RQs. Partner 1 does NOT offer opinions, only asks questions.

Three minutes: Partner 2 interviews Partner 1 about the type of methods he/she/they think might work best. Partner 2 does NOT offer opinions, only asks questions.

One minute: Prepare what you want to share to the whole team.

Preview for next week!

- Pick a couple research questions that you would like to present to us next week
- The presentation does not need to be anything fancy just come prepared to answer the who, what, and how questions we discussed today


Developing Question and Protocol:
What systemic boundaries exist at your school that create inequity and how do we address it?
Data Analysis:
What did you find in your data collection?
Any noticeable patterns?
Week 1-2
Week 3-6
Week 7-8
Week 9-10
Week 11-12
Background information:
What are the problems facing CS?
What does it mean to make CS more equitable?
Collecting Data:
Implement action cycle and collect data
Work on Presentations:
Get ready to share your findings with the broader community