

Lesson 12: Making Decisions with Data

Overview

Question of the Day - how can patterns in data help make a decision?

In this lesson students get practice making decisions with data based on problems designed to be familiar to middle school students. Students work in groups discussing how they would use the data presented to make a decision before the class discusses their final choices. Not all questions have right answers and in some cases students can and should decide that they should collect more data. The lesson concludes with a discussion of how different people could draw different conclusions from the same data, or how collecting different data might have affected the decisions they made.

Purpose

Students begin exploring the data problem solving process, making decisions with data that has already been collected and interpreted. Students likely do not come into this course with a lot of experience making decisions based on data in this way. This lesson intends to contextualize this step of the process inside of decisions that may be familiar to their daily lives.

Making decisions with data is not a formulaic process. Different people might draw different conclusions with the same data. It's important that students ground their decisions in the data collected, but there's usually not a "right answer". This lesson is an opportunity to introduce the nuances of making decisions in a controlled and shared context before students go off to start collecting more information of their own.

Assessment Opportunities

1. Use tables and visualizations summarizing data to support a decision

Activity Guide: The decision recorded on each page should be logically connected to the given data. You may also use the discussion to have students further explain or justify their decisions.

2. Identify additional data that could be collected to improve a decision

Objectives

Students will be able to:

- Identify additional data that could be collected to improve a decision
- Use tables and visualizations summarizing data to support a decision

Preparation

- Print copies of the activity guide
- Print copies of the Problem Solving Process with Data - one per group

Links

Heads Up! Please make a copy of any documents you plan to share with students.

For the teachers

- **CSD Unit 5 - Data & Society** - Slides

For the students

- **Making Decisions with Data** - Activity Guide
- **Problem Solving Process with Data** - Resource

Activity Guide: The extra data should be relevant to the given problem. The final discussion can also be used for insight into how students might use the data to improve their decisions.

Standards

Full Course Alignment

CSTA K-12 Computer Science Standards (2017)

► **DA** - Data & Analysis

Agenda

Warm Up (5 minutes)

Journal

Activity (35 minutes)

Wrap Up (5 minutes)

Journal

Teaching Guide

Warm Up (5 minutes)

Journal

Prompt: What decisions in your life are you already collecting data to help make? Are there any decisions you think data could help you make better?

Discuss: Invite a few students to share some of what they wrote with the class. There's no need to explore this question in great detail since you'll be able to return to it at the end of the class.

 Discussion Goal ▲

Goal: This should be a really quick opening conversation and it's entirely fine if students don't have any decisions they're currently making using data. You might point out a couple of examples (e.g. looking at weather to decide what to wear or review data about a product online) but it's fine to just use this to open the class and return to the question later.

Remarks

We make decisions every day but we're not always making decisions using data. Today we're going to start exploring the Problem Solving Process with Data and how this process can help us make a decision.

Question of the Day - how can patterns in data help make a decision?

Activity (35 minutes)

Group: Have students sit in groups of 3-4

Distribute Pass out one copy of the Problem Solving Process for Data to each group.

Prompt: Which steps have we taken while solving problems over the last few lessons? Ask one person in each group to circle the answers they discuss.

Circulate: Check in with groups as they circle different answers on the paper. As you finish checking in with each group, pass out a copy of the Making Decisions with Data activity guide.

Activity Guide - Making Decisions with Data

Problem 1 - When to Post: Read the Define and Prepare sections of the problem as a class. Give groups a chance to look at the data presented to them and reflect on the questions at the bottom of the activity guide.

💡 Teaching Tip

Assign Roles: Have groups assign someone responsible for sharing out the results of their discussion before looking at each decision. Alternate roles between problems.

Thought Partners: Even though students are working in groups, there's no need for groups to come to shared decisions.

Do This: Students should start by making a personal decision without writing it down. Then give groups a chance to discuss their decision with the group.

Once groups have had a chance to discuss they should record their decisions, even if they are different from one another. Let students know that one person from each group will share out a summary of their group discussion.

Share Out: Have a member of each group share a summary of their group discussion. It's okay if the group didn't all agree

💡 Teaching Tip

Focus on the Data: Early on reinforce the importance of students referring to the data as the source of their decision. If students think there's reasons not represented by the data that they'd want to make their decision ask them if there's other data they'd want to collect. For example:

- Data from the weekend
- Data from more than just one week
- Data about what people are posting about (here there's no way to tell)

Problem 2 - Making Meals: Have students repeat the process for this second problem. They should review the problem, make a personal decision without writing it, discuss with a group, record their final decision, and then be prepared to share out as a group.

Share Out: Again have one member of each group share out a summary of their discussion.

Problem 3 - Locker Selection: Repeat the process a final time with this problem.

💡 Teaching Tip

Interpreting the Chart: The second and third problems have more complex tables of information that may be challenging for students to understand without some guidance. You may want to model how to read the charts in these two activities before asking students to use them for decision

making. For example, ask students what a particular cell in a table means.

Where are my friends?: Students often react to problem 3 by saying they care about other data, like where their friends' lockers are. Don't be afraid to say that for now they need to decide with the data they have. One of the goals of the lesson is to reflect on how data shapes the way we make decisions.

Share Out: Have students share the results of their conversation with the class.

Wrap Up (5 minutes)

Discuss: Do two people need to make the same decision from the same data? Have students reflect and share their responses with the class

 Discussion Goal 

Goal: This is a fairly nuanced question masquerading as a simple yes / no. Ask students to reflect on moments in today's activities where they think the data was more open to interpretation (e.g. locker decisions) and when it might be more cut and dried (e.g. when to post). While the goal of this discussion is to highlight the fact that two people shouldn't need to come to same conclusion from the same data, follow-ups are necessary to make this conversation most effective.

Journal

Prompt: For the problems we looked at today is there different data you would have wanted to collect to make your decision?

Discuss: Have students share their responses

 Discussion Goal 

Goal: This conversation can look back at moments when students wanted more or different data to help make their decisions. For example you might want to know where your friend's lockers are before deciding which one you want. This discussion leads into the concluding remarks of the lesson.

Remarks

We just looked at ways that data can help us to make a decision. We saw that different decisions might come from the same data. We also know that we're in the last step of the data problem solving process here. Depending on what data that we had collected we might have approached these decisions very differently. Going forward we're going to explore those earlier steps in more detail and look at how they affect our decisions.