

Lesson 16: Issue Statements

45 minutes

Overview

This is the first of a five-day sequence of lessons that prepare students for the final project. In this lesson, students meet a team of fictional students who want to use machine learning to address an issue in their community. Students participate in an issue brainstorm using the 5 Why's strategy, then they help evaluate the ideas that the other student team came up with. The steps students take in this lesson are identical to the steps students will take in their final project.

Question of the Day: How can machine learning be used to address an issue in your community?

Standards

Full Course Alignment

AI4K12 National Guidelines 2021

- **BI-3** - Computers can learn from data

CSTA K-12 Computer Science Standards (2017)

- **AP** - Algorithms & Programming

Agenda

Preparing for the Week

Warm Up (5 minutes)

Journal

Activity (35 minutes)

Issue Statement

App Brainstorm

Wrap Up (5 minutes)

Journal

Objectives

Students will be able to:

- Develop a problem observation into a core issue using brainstorming strategies

Preparation

- Check the "**Teacher's Lounge**" forum for verified teachers to find additional strategies or resources shared by fellow teachers

Links

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

For the teachers

- **Issue Statements** - Slides

▼ Make a Copy

For the students

- **5 Why's - Activity Guide**

▼ Make a Copy

- **App Brainstorm - Activity Guide**

▼ Make a Copy

Teaching Guide

Preparing for the Week

This lesson is the first in a series of five that helps prepare students to complete the final project in this unit. The tasks that students complete this week are identical to the tasks they will complete for their project. As such, it may be helpful to read the project guide for the final project so you can see how each lesson connects to the final project - [click here to access the lesson plan for the final project](#)

Students will also be creating their own surveys during this week using Google Forms. This requires students to have a Google account. If your students do not have a Google account, consider incorporating that into part of your lesson today or tomorrow.

Warm Up (5 minutes)

Journal

 **Prompt:** *What is something you see regularly in your community that you wish you could improve?*

Have students journal individually first, then ask an additional prompt:

 **Prompt:** *Who are the people affected by this?*

Have students write in their journal, then invite students to share their observations with the group. It's okay if no one shares what they wrote down.

Discussion Goal: This discussion foreshadows the activity that students will do today, where they help brainstorm issues to address in a community. As students share, focus on the observation that students are making that influences their desire to improve their community. Some examples might be:

- Observing trash on the street or dead greenery next to a highway
- Observing that some buildings or streets are difficult to navigate for people with wheelchairs or mothers with strollers
- Observing stray animals or other wildlife that struggle in busy areas

 **Display:** Show the slide with the Problem Solving Process, including the central Empathy component

Remarks

This exercise emphasizes a key part of the problem solving process: empathy. In the next few weeks, you're going to have a chance to design a machine learning app that can address an issue in our community. This requires taking an issue we see in the world and finding a way that data and machine learning can help solve it. This week, we're going to help another team of students create an app to solve a problem in their community.

 **Question of the Day:** How can machine learning be used to address an issue in your community?

Activity (35 minutes)

Issue Statement (15 minutes)

 **Display:** Show the slide with the student team introductions. These are imaginary students that the class will be working with all week to help develop a machine learning app.

 Teaching Tip 

Real or Fake Students? If students ask, you can tell students that this is a fictional group of students as part of this exercise. This can be important because the outcomes from this week are scripted and ultimately the class will be following along with what these students decide and help them solve specific problems along the way.

Remarks

This is Kim, Nico, Isaac, Zoey, and Hawa. They'd like our help creating an app that uses machine learning to help solve a problem in their community. The first step is to identify an issue that we'd like to help with. This starts with a specific observation, then broadens out to something we can use machine learning to help solve

Go through the next three slides together, indicating that these students are progressing from an initial observation to a deeper issue by asking "Why?" over and over.

 **Display:** When we sit together at lunch, we spend most of the time on our phones and don't really talk to other people"

 **Display:** Show slide with the next Why: "It's easier to just be on our phones, especially when we don't know other people very well yet"

 **Display:** Show slide with the list of 5 Why's.

Remarks

In order to get to larger issues, we sometimes need to ask "Why". This is a strategy called the 5 Why's. The goal is to keep asking why until we get to a core issue that might be causing this problem. Once we've discovered the core issue, we can try to create a machine learning app to help solve it

 **Distribute:** Pass out copies of **5 Why's - Activity Guide**. The first two boxes are filled out to match the slides. The remaining three boxes should be filled in by students.

Assessment Opportunity ▲

The responses in the activity guide can be used to formatively assess how well students have met the objectives of the lesson.

 **Do This:** Fill out the answers to the remaining "Why" questions. Try to get to the core of why this problem may be happening.

Circulate: Have students continue to fill in the remaining 5 Why's. As students progress down the chart, their answers may start to diverge from each other as they focus on different aspects of the problem. Some students may focus on the phones as a core issue, while others may focus on the difficulty of talking to new people.

As you notice students finishing up with the 5 Why's, regroup so you can show them how to construct an issue statement.

 **Display:** Show students the definition of Issue Statement. Continue to the next slide and offer students tips for how to write an issue statement.

Teaching Tip ▲

Issue Statements are a component of Design Thinking, which is a larger framework for creatively addressing community issues. For more tips and background on Issue Statements, consider reading these articles [here](#) and [here](#)

 **Do This:** Have students identify a core issue that they discovered from the 5 Why's exercise, then have them write their own issue statement on the bottom of their 5 Why's worksheet.

 **Share Out:** Invite 2-3 students to share out the issue statements they came up with.

 **Display:** Show students the 5 Why's example that was filled out by the other team of students.

Remarks

You all shared some really great examples of how this one observation can lead to a variety of different issues we could address. Let's take a look at the issue statement that our other team of students came up with, and let's see if we can brainstorm some app ideas that can help address this issue.

App Brainstorm (20 minutes)

Distribute: Pass out copies of the **App Brainstorm - Activity Guide**. The issue statement at the top has already been filled in.

Display: Show students the slide describing that machine learning apps use data to do one of three things: make a decision, a recommendation, or a prediction. Offer some examples of these from previous lessons in the course, such as:

- The Driver Assistance app which **decided** how safe it was to drive based on road conditions.
- The Class Book app which **recommended** a book based on personal interests.
- The Safari app which **predicted** how many animals you would see based on other factors in the park.

Do This: Brainstorm different types of apps that could be created to address this issue.

Circulate: Monitor students as they complete this task. Prompt students to consider how their app would use data. Students don't need to think of the specific datasets they would use or how they would collect their data, but they should be able to articulate that the app would require data somehow.

Teaching Tip

Brainstorm, Not Perfection: This part of the lesson is still a brainstorm, so it's okay for students to struggle coming up with ideas. Encourage students to share with each other, but it's also okay for them to not have a ton of ideas yet. The next part of the activity provides some example apps for students to discuss so they can see examples.

Display: The next five slides show suggestions from the team of other students. As a class, discuss whether or not the app uses data to make a decision. If so, what data would it need?

Discussion Goal: Even though all of these apps address the core issue of isolation, not all of these apps would make a good machine learning app. Here are some of the expected discussion points:

- Nico, Isaac, and Hawa's apps all require the user to answer questions in order to get a recommendation. These three apps could all use machine learning.
- Kim's App requires users to interact, but it doesn't use any of their data to make decisions. This isn't a good machine learning app.
- Zoey's app might require some data to create the app and generate the icebreakers, but it doesn't require any information from the user once it's being used. This means it would not require machine learning to create.

Remarks

When creating our own apps, it's important to know the issue we're trying to address, and it's important to know that the solution we come up with actually requires machine learning. We'll see which one of these apps the team decides to make and tomorrow we'll help them plan how they want to collect data.

Wrap Up (5 minutes)

Journal

 **Prompt:** Why is it useful to brainstorm a core issue rather than just using an initial problem observation?

Have students journal individually, then either share in a class discussion or share as a ticket out the door.

Discussion Goal: Students should realize that focusing on a broader core issue means you're more likely to develop a solution that uses machine learning. If you just focus on your own observations, machine learning may not be the best way to solve that problem. Students may also realize that it's easier to brainstorm app ideas around a broader problem rather than a narrower observation.



This work is available under a **Creative Commons License (CC BY-NC-SA 4.0)**.

If you are interested in licensing Code.org materials for commercial purposes **contact us**.