

Lesson 17: Survey Planning

45 minutes

Overview

This is the second in a five-day sequence of lessons that prepare students for the final project. In this lesson, students learn that the other team of students would like to create a club recommender app based on the clubs at their school. Students imagine what questions would be most useful to help make this recommendation, then they learn how to use a Google Form template to create a survey. 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 I create a survey to gather data for a machine learning app?

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
- ▶ **IC** - Impacts of Computing

Agenda

Warm Up (5 minutes)

Journal

Activity (35 minutes)

Designing Questions

Creating a Form

Wrap Up (5 minutes)

Objectives

Students will be able to:

- Develop survey questions that can be used to create a machine learning app
- Use a template to create a Google Form survey

Preparation

- Print copies of the activity guide for each student
- Review the video on how to use a template to create a Google Form
- 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

- **Survey Planning** - Slides

▼ Make a Copy

For the students

- **Creating a Survey** - Resource
 - **Creating a Survey in Google Forms** - Video
 - **Survey Planning - Activity Guide**
- ▼ Make a Copy
- **Survey Template [Google Form]**

Teaching Guide

Warm Up (5 minutes)

Journal

 **Display:** Show the description for Hawa's app from yesterday, the Club Recommender.

 **Prompt:** *The team has decided to go with the Club Recommender app. The next step is to gather the data they need to create their model. They plan to interview different people to determine what kind of club their app should recommend. What kind of questions do you think they should ask to help recommend a club to join?*

Discussion Goal: Answers will vary, but could include:

- Demographic information, like age or gender
- Interests or Hobbies, like if they prefer a certain sport
- Media preferences, like what kind of books or movies or music someone likes
- Personality type, like introvert or extrovert or types of moods

One important question to make sure they ask is about what club someone is in, which will eventually be the label in our model. This is an important point that students may forget when designing their own surveys for their project.

Remarks

This is a great list of possible questions! The larger goal here is to make sure we ask questions that help group the data so AI Bot can find patterns in the data and use those patterns to make a recommendation. If we ask a bunch of unrelated questions, AI Bot won't be able to make a clear decision. Today, we'll pick the questions for our survey and create an example survey using a Google Form.

 **Question of the Day:** How can I create a survey to gather data for a machine learning app?

Activity (35 minutes)

Designing Questions (15 minutes)

 **Distribute:** Pass out a copy of the [Survey Planning - Activity Guide](#) to each student. Part of the activity guide has already been filled in.

Remarks

After yesterday's brainstorm, the team started to develop questions they will ask people to help gather the data they need for their machine learning app. The first page shows all of the questions they've decided to include so far.

 **Display:** Show the slide that has the label question, including the club choices for the school: Hiking Club, Band Club, Art Club, Science and Technology Club, World Cultures Club.

 **Discuss:** *What is a question that you think will have a strong relationship with the label question?*

Have students share with a neighbor first before sharing full group

Discussion Goal: Students may predict that Kim's question about activities appears highly related to the choice of clubs, and may even be able to compare certain answers to the clubs themselves. Students may also predict that Nico's question about free time may help separate the clubs, since some clubs may require more time than others.

Discuss: *What is a question that you don't think will have a strong relationship with the label question?*

Have students share with a neighbor first before sharing full group.

Discussion Goal: Students may predict Zoey's question about the elements doesn't appear related to the label question. This is a valid observation, but be careful not to completely discount the question - sometimes unexpected patterns appear in the data that AI Bot can find, even if we aren't able to see them ourselves.

Remarks

Asking the right questions and gathering the right features is an important part of designing a machine learning app. Even though we might not know ahead of time what patterns are out there, if we design good questions, it can help separate the data and make it easier for AI Bot to identify patterns. Let's add a few questions of our own that we think will help AI Bot determine a pattern in the data.

 **Do This:** Have students create 3 questions of their own to include in the survey. They should mark the questions as categorical or numerical, then list the possible choices or expected range of values for the responses.

Teaching Tip

Scientist Mentality: You can encourage students to think like scientists in this part of the process - they are designing questions that they think are related to their label question, then giving the survey to help investigate that relationship.

Circulate: Monitor students as they come up with their own questions. You can prompt students and ask "Why did you choose this question?" to gauge how intentional they're being with their question selection. Students may explain that they expect certain answers to match with certain clubs, or they may have a vague hypothesis that the question is related to the choice of clubs but not be able to fully articulate it - this is also fine.

Creating a Form (20 minutes)

Remarks

Now that we have our questions, it's time to create our survey. We're going to use a Google Form and follow a template. This is important so we make sure our data follows the plan we made on this activity guide - we want categorical data to have certain choices, and we want numerical data to only be numbers.

 **Code Studio:** Send students to Code Studio. In the first level, they will click a link to make a copy of a Google Form. Students will need their own Google Account to create a copy of the form.

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Create a Google Form

Teaching Tip

Creating a Copy: Students need to create a copy of this form. Unlike other Google documents, students cannot make a copy while viewing the form directly and requesting access to the form won't allow them to make a copy. Instead, students need to click the specific link on the Code Studio page to be prompted to make

their own copy of the form.

 **Video:** Show the video on how to create a Google Form from the provided template. Students will need to be careful about using the template questions so they can make sure their data is usable in AI Lab.

 Teaching Tip

To encourage active engagement and reflection, use one or more of the strategies discussed in the [**Guide to Curriculum Videos**](#).

 **Do This:** Have students create their survey using Google Forms. They can use the checklist on their activity guide to help keep track of their progress.

Circulate: Monitor students as they complete their forms. There are a lot of new skills to manage in Google Forms, especially if students have never used it before. Students may be tempted to create their own questions, but encourage them to use the template questions instead since they already have the proper settings to help make sure their survey data can be used in AI Lab in the next lesson.

 Assessment Opportunity

Completing a Google Form using the template is an important skill for next week when students will be collecting their own data. Even though it may appear tedious to add 9 questions to the survey, this practice is important so students don't get frustrated at this step when completing their own projects.

 **Collect Data:** As students finish creating their forms, they should begin collecting data by filling out the form themselves and having other classmates fill out the form. Even though the first six questions are the same, the final three questions will be different for each student. You may decide to have students pull up the form on their computer, then invite other classmates over to fill it out. Or, students can interview each other and fill out the survey on their behalf.

 Teaching Tip

Where Does This Data Go? Even though students are collecting data now, the actual data that will be used the rest of the week will be pre-supplied by [team name]. It's valuable to have students take the data collection seriously and not try to "mess up" a classmates data, but it also will not interrupt the rest of the week of the data from these surveys becomes unreliable

 Assessment Opportunity

You can fill out a student's google form as a way to check that they used the template correctly and generated their questions in a way that won't cause problems for AI Lab later. Some key items to look for are:

- All questions should be required (with the red asterisk)
- Categorical questions shouldn't have an "Other" option where you can type in a custom response
- Numerical questions should only accept numbers - if you try to type a letter, it will generate an error

Wrap Up (5 minutes)

 **Prompt:** *Today in class, only the people in this room filled out the survey. Who are the other people in your community you would want to fill out this survey? What strategies can you use to try and get them to participate?*

Discussion Goal: This question ties into an exercise students will do as part of their final project - design a plan for making sure a diverse group of their community is represented in their survey. Students should consider which types of students are represented in their classroom, especially if a certain demographic group is over-represented (such as by age or gender or race). They should consider how they can get a more diverse group of people participating in the survey, such as reaching out beyond their classroom or interviewing other members of their community. As students come up with a variety of answers, consider recording these on a poster to refer back to later when students consider this question in their own project.



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