Unit 1 Lesson 1

Intro to Problem Solving

Resources
Activity Guide - Aluminum Boats

Goal
Build a boat that holds the most possible pennies, using a piece of aluminum foil. You will build two boats and will try to improve your design between the first and the second.

Rules
● You may only use a single piece of foil to build your boat
● You may not touch or adjust your boat once it is in the water
● You must add pennies one at a time

Develop a Plan
● What kind of boat does your group plan to make? Write a description or draw a picture below.

● What are the strengths of this design? What possible weaknesses might this design have?

Test Your Boat
● How many pennies did your boat hold?

● Why did your boat eventually sink? What needs to be improved?

Evaluate and Improve
● What are the most common kinds of problems you see among the boats tested?

● What ideas seem to be working well?
Develop a Plan
- What kind of boat does your group plan on making? Write a description or draw a picture below.

- What are the strengths of this design? What possible weaknesses might this design have?

Test Your Boat
- How many pennies did your group’s new design hold?

- Why did your boat eventually sink? What needs to be improved?

Reflect
- What was your favorite part of this activity? What was the most challenging for you? Were they the same?

- Why do you think we’re doing this activity in a computer science class?
Unit 1 Lesson 2
The Problem Solving Process
Resources
The Problem Solving Process
Having a strategy for approaching problems can help you develop new insights and come up with new and better solutions. This process is generally useful for solving all kinds of problems.

- **Define**
  - What problem are you trying to solve?
  - What are your constraints?
  - What does success look like?

- **Prepare**
  - Brainstorm / research possible solutions
  - Compare pros and cons
  - Make a plan

- **Try**
  - Put your plan into action

- **Reflect**
  - How do your results compare to the goals you set while defining the problem?
  - What can you learn from this or do better next time?
  - What new problems have you discovered?

What it Looks Like
You’re going to list the strategies and processes you and your classmates already use for each step in this process. Fill out the tables below for each of the three problems.

**Building Challenge**
For each step in the Problem Solving Process list the parts of this activity you believe fall within that step.

- **Define**

- **Prepare**

- **Try**

- **Reflect**

What strategies did you use in solving this problem that could help you solve other problems?
A Problem You Are Good at Solving
You should have brainstormed a type of problem that you’re good at solving. Write down the steps of your process that you believe fall into each step of the Problem Solving Process.

Type of Problem: ____________________________________________________________

- Define
- Prepare
- Try
- Reflect

What strategies do you use in solving this problem that could help you solve other problems?

A Problem You and a Classmate Want to Get Better at Solving
Find a classmate and talk to figure out a type of problem you both could get better at solving. Fill out the questions below with strategies or steps you would want to use to try to solve this problem using the problem solving process.

Type of Problem: ____________________________________________________________

- Define
- Prepare
- Try
- Reflect

What strategies could you use in solving this problem that could help you solve other problems?
Unit 1 Lesson 3
Exploring Problem Solving

Resources
Activity Guide - Using the Problem Solving Process

Word Search

Overview
Working with a team find the following words in the grid. They may be horizontal, vertical, or diagonal in any direction.
DEFINE, PREPARE, TRY, REFLECT, PROBLEM, SOLVE, COMPUTER, SCIENCE

Objective
Find and circle all 8 words as quickly as you can!

Once You’re Done
Head to the last page of the activity guide and fill in the row there for the “Word Search” in the table.
Birthday Guests

Overview
A big group of 15 guests is getting together at a restaurant for a birthday. The restaurant has 3 tables that can each seat only 5 people. Below you can find some information about the people who are attending the party.

Aysha, Ben, Carla, Damien, Eric, Fan, Genaro, Hannah, Isaias, Jessica, Kyla, Laila, Max, Nazek, Owen

<table>
<thead>
<tr>
<th>Close Friends (Try to put them together)</th>
<th>In a Fight (Try to keep them apart)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aysha and Damien</td>
<td>Aysha and Genaro</td>
</tr>
<tr>
<td>Max and Isaias</td>
<td>Ben and Hannah</td>
</tr>
<tr>
<td>Nazek and Laila</td>
<td>Fan and Max</td>
</tr>
<tr>
<td>Owen and Genaro</td>
<td>Damien and Laila</td>
</tr>
<tr>
<td>Ben and Jessica</td>
<td>Isaias and Owen</td>
</tr>
<tr>
<td>Genaro and Eric</td>
<td>Kyla and Jessica</td>
</tr>
</tbody>
</table>

Objective
Find the best possible arrangement of guests at the party. Draw your solution in the space below. To help you can cross out the letters of the names you’ve assigned in the row below.

Once You’re Done
Head to the last page of the activity guide and fill in the row there for the “Birthday Guests” in the table.
Plan a Trip

Overview
You and your friends will be going on a trip. You’ve got the entire school day to travel, and you need to get back to school by the end of the trip, but otherwise how your trip goes it up to you. Plan the best trip that you can!

Explore the Tool
Head to https://www.google.com/maps and search for your school. Look at the different options for finding directions to other locations. Don’t worry about making a plan yet, but make sure you understand what kinds of information are available.

Develop Criteria
Talk with your group for a few minutes. What matters when assessing different possible trips? Do you care what you see? How you get there? How long it takes? What it costs? Write down the criteria you’ll use to assess different possible plans.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Goals</th>
<th>How My Plan Accounts for It</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Time for the Trip</td>
<td>One school day</td>
<td></td>
</tr>
<tr>
<td>Total Travel Time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Types of Things We Want To Do</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Make a Route
Every member of your group should separately start planning your trip. You should select what places you want to go and what activities you want to do along the way. Try to make it the best possible trip based on the criteria you and your group agreed upon. For each criteria your group chose, list how your trip accounts for it in the right column. In the space below record all the stops along your trip.

Stops on My Trip

Things We'll See

Share Your Route and Get Feedback
Share the route you developed with your teammates and explain why you think it is the best possible route given the criteria you chose. Afterwards record their feedback and reactions to your route in the space below. Is there anything that needs to change? How could your route improve?

Improve and Finalize
Using the feedback from your teammates update your route. In the space below write any changes to how your new route addresses the criteria you selected.

Once You’re Done
Head to the last page of the activity guide and fill in the row there for the “Plan a Trip” in the table.
Problem Solving Process Notes

Reflecting on Using the Process
How did you use each step of the problem solving process to solve this problem? Give examples of what each step looked like as you were solving that problem.

<table>
<thead>
<tr>
<th>Define</th>
<th>Prepare</th>
<th>Try</th>
<th>Reflect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Word Search</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Birthday Guests</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plan a Trip</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The Purpose of Each Step
For each step in the problem solving process write one sentence explaining its purpose. Why is it included in the problem solving process?

Define:________________________________________________________________________________________
______________________________________________________________________________________________
Prepare: ______________________________________________________________________________________
______________________________________________________________________________________________
Try: _______________________________________________________________________________________
______________________________________________________________________________________________
Reflect: ______________________________________________________________________________________

Defining Problems with Questions
Before starting to solve a problem it’s important that you have defined it well. What questions or strategies can you use to better define or understand a problem? Record them in the space below.
Unit 1 Lesson 4

What is a Computer?

Resources
Activity Guide - What Is A Computer? [Set 1]

Cut out the following pictures and attach them to your poster:

<table>
<thead>
<tr>
<th><img src="image1.png" alt="Computer" /></th>
<th><img src="image2.png" alt="Smartphone" /></th>
<th><img src="image3.png" alt="Headphones" /></th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image4.png" alt="Tablet" /></td>
<td><img src="image5.png" alt="Printer" /></td>
<td><img src="image6.png" alt="Telephone" /></td>
</tr>
<tr>
<td><img src="image7.png" alt="Abacus" /></td>
<td><img src="image8.png" alt="Deskphone" /></td>
<td><img src="image9.png" alt="Dishwasher" /></td>
</tr>
</tbody>
</table>
Activity Guide - What Is A Computer? [Set 2]

Cut out the following pictures and attach them to your poster

![Laptop](image1.png)  ![Smartphone](image2.png)  ![Headphones](image3.png)
![Tablet](image4.png)  ![Printer](image5.png)  ![Telephone](image6.png)
![Abacus](image7.png)  ![Desk Phone](image8.png)  ![Dishwasher](image9.png)
Unit 1 Lesson 5

Input and Output

Resources
Activity Guide - Inputs and Outputs

**Vocabulary**
- **Input:** A device or component that allows information to be given to a computer
- **Output:** Any device or component that receives information from a computer

**Inputs and Outputs**
For each category of computer brainstorm as many inputs and outputs as you can.

<table>
<thead>
<tr>
<th>Computer</th>
<th>Inputs</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desktop</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tablet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smartphone</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Activity Guide - Inputs and Outputs

**Vocabulary**
- **Input**: A device or component that allows information to be given to a computer
- **Output**: Any device or component that receives information from a computer

**Inputs and Outputs**
For each category of computer brainstorm as many inputs and outputs as you can.

<table>
<thead>
<tr>
<th>Computer</th>
<th>Inputs</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desktop</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tablet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fitness Tracker</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Activity Guide - Inputs and Outputs

Vocabulary
- **Input**: A device or component that allows information to be given to a computer
- **Output**: Any device or component that receives information from a computer

**Inputs and Outputs**
For each category of computer brainstorm as many inputs and outputs as you can.

<table>
<thead>
<tr>
<th>Computer</th>
<th>Inputs</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desktop</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tablet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital Assistant</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Activity Guide - Inputs and Outputs

Vocabulary
- **Input**: A device or component that allows information to be given to a computer
- **Output**: Any device or component that receives information from a computer

Inputs and Outputs
For each category of computer brainstorm as many inputs and outputs as you can.

<table>
<thead>
<tr>
<th>Computer</th>
<th>Inputs</th>
<th>Outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Desktop</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Tablet</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Game System</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Unit 1 Lesson 6

Processing

Resources
Objective
Develop steps to sort a row of cards, using the rules below.

Tips
- Start with only 3 or 4 cards and work up to 8.
- Switch roles frequently.
- Practice with the cards face up first.
- Test your work and even try to "break" your solution.
- Stick with it! There are many possible solutions. The point is to find yours!

Rules

Sorter
1. Can pick up, put down, and swap cards in any order they wish.
2. Shows cards to pointer without looking at them.
3. Only one card in each hand at a time.
4. Cards go back into empty spots on the table.

Pointer
1. When shown two cards can point to the bigger one.
2. For a tie point to either.
3. No other communication is allowed.

Your Steps
Once you've developed your steps for processing cards, write the steps of your way of processing the cards in the space below. Feel free to draw pictures, number steps, or do anything else you think would be helpful.

Share and Test
Present your steps to another group. Make sure both groups get a chance to share and test their ideas. Here's some tests to consider:
- Use different numbers of cards
- Cards are in reverse order
- Cards are already in order
- Cards are nearly in order
Iterate
Based on your tests or ideas from another group, update your steps.

Processing Uses Algorithms
Processing is anything a computer does to turn input information into output information. Humans can process information, but usually they’re making lots of assumptions or mental leaps to do it. When computers process information, they use algorithms, or sets of instructions, that will always turn an input into a desired output. The steps you just created are an algorithm to sort cards.

Reflection
1. What step of the problem-solving process did you think was most important in this activity? ____________________
2. Why?
   ______________________________________________________
   ______________________________________________________
3. Why would someone create an algorithm if they already know how to solve a problem by hand?
   ______________________________________________________
   ______________________________________________________
   ______________________________________________________
## Processing - Number Cards

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>11</td>
<td>12</td>
<td>13</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>16</td>
<td>17</td>
<td>18</td>
<td>19</td>
<td>20</td>
</tr>
<tr>
<td>21</td>
<td>22</td>
<td>23</td>
<td>24</td>
<td>25</td>
</tr>
</tbody>
</table>
Unit 1 Lesson 7

Storage

Resources
Activity Guide - Storage and Processing

Storage and Processing
Computers use algorithms to process information. Algorithms are steps or instructions the computer follows to turn input into output. Computers don’t process information exactly like humans, and so their steps might look slightly different from a human’s. Even still, the more steps an algorithm takes, the longer it’ll take to run.

When designing an algorithm you don’t just think about the steps of the algorithm. You need to think about the space it will take for a computer to process that information. This activity will help you think about the importance of storage in processing information a little more clearly.

Setup
1. Shuffle a deck of cards
2. Pick up about 10 cards and put them in a stack face down
3. Have a stack of post-its or similarly sized pieces of paper on hand

Rules
1. You can only use one hand through the entire challenge
2. Your hand can hold at most one card
3. You can pull a new card off the deck and look at it whenever you like
4. Once a card leaves your hand it is removed
5. You may not remember anything about cards removed from the game
6. At any time you may make a “safe spot” on the table by placing a post it
7. A safe spot can hold at most one card, face up, preventing it from being removed from play

Challenge 1: Smallest Card
Create an algorithm that always finds the smallest card in your pile.

Input: _______________ Output: ___________ Storage: (How many safe spots did you use?) ___________

Processing: Write your algorithm in the space below
Challenge 2: Largest Card
Create an algorithm that always finds the largest card in your pile.

Input: ________  Output: __________  Storage: (How many safe spots did you use?) __________

Processing: Write your algorithm in the space below

Challenge 3: Second Largest Card
Create an algorithm that always finds the second largest card in your pile.

Input: ________  Output: __________  Storage: (How many safe spots did you use?) __________

Processing: Write your algorithm in the space below

Challenge 4: Middle Card
Create an algorithm that always finds the middle or median card in your pile (the one that would be in the middle if you lined up all your cards in number order). You can assume you have an odd number of cards.

Input: ________  Output: __________  Storage: (How many safe spots did you use?) __________

Processing: Write your algorithm in the space below
Unit 1 Lesson 8

Apps and Problem Solving

Resources
Data Sheet

Use the information from this data sheet to try out your algorithm.

<table>
<thead>
<tr>
<th>Type of Information</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Today's Date</td>
<td>September 5</td>
</tr>
<tr>
<td>Sound</td>
<td>There's a lot of sound in the environment</td>
</tr>
<tr>
<td>Movement</td>
<td>The phone is moving quickly</td>
</tr>
</tbody>
</table>

User's Location

Locations of Area Schools

[Map showing user's location and area schools: City High School, Edison Middle School, Third Street Elementary]
<table>
<thead>
<tr>
<th>Type of Information</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weather Report</td>
<td>Today: Sunny, 45° F</td>
</tr>
<tr>
<td></td>
<td>Tomorrow: Rainy, 42° F</td>
</tr>
<tr>
<td>Movie Reviews</td>
<td>Since Then: 4/5 &quot;Hilarious!&quot;</td>
</tr>
<tr>
<td></td>
<td>Mills: 5/5 &quot;Even better than the book!&quot;</td>
</tr>
<tr>
<td></td>
<td>The Wait: 2/5 &quot;Boring and predictable.&quot;</td>
</tr>
<tr>
<td></td>
<td>Cargo: 3/5 &quot;Exciting, but not much more.&quot;</td>
</tr>
<tr>
<td></td>
<td>The Watch 2: 3/5 &quot;If you loved the first one, you'll want to see this.&quot;</td>
</tr>
<tr>
<td>Movie Showings</td>
<td>Central Cinemas:</td>
</tr>
<tr>
<td></td>
<td>● <em>Since Then</em> (PG - Comedy)</td>
</tr>
<tr>
<td></td>
<td>● <em>Mills</em> (R - Drama)</td>
</tr>
<tr>
<td></td>
<td>● <em>The Wait</em> (PG - Mystery)</td>
</tr>
<tr>
<td></td>
<td>● <em>Cargo</em> (Action)</td>
</tr>
<tr>
<td>Midtown 5:</td>
<td>● <em>The Watch 2</em> (PG - Action)</td>
</tr>
<tr>
<td></td>
<td>● <em>Since Then</em> (PG - Comedy)</td>
</tr>
<tr>
<td></td>
<td>● <em>Mills</em> (R - Drama)</td>
</tr>
<tr>
<td>Highlights 8:</td>
<td>● <em>The Wait</em> (PG - Mystery)</td>
</tr>
<tr>
<td></td>
<td>● <em>Cargo</em> (Action)</td>
</tr>
<tr>
<td></td>
<td>● <em>Since Then</em> (PG - Comedy)</td>
</tr>
<tr>
<td></td>
<td>● <em>Mills</em> (R - Drama)</td>
</tr>
<tr>
<td>User's Favorite TV Shows</td>
<td><em>The Secret Town</em> (Mystery)</td>
</tr>
<tr>
<td></td>
<td>100 Years (Drama)</td>
</tr>
<tr>
<td>User's Favorite Books</td>
<td><em>Whistler</em> (Mystery)</td>
</tr>
<tr>
<td></td>
<td><em>Mills</em> (Drama)</td>
</tr>
<tr>
<td>User's Favorite Movies</td>
<td><em>The Watch</em> (Action)</td>
</tr>
<tr>
<td></td>
<td><em>Further</em> (Mystery)</td>
</tr>
<tr>
<td></td>
<td><em>The Last Night</em> (Drama)</td>
</tr>
<tr>
<td>Cinema Locations</td>
<td><img src="image" alt="Map of Cinema Locations" /></td>
</tr>
</tbody>
</table>
Activity Guide - App Exploration

In this activity, you’ll figure out what inputs a computer (in this case, a smartphone) would need in order to solve various problems, and what processing should be done on the information.

Ring Silencer App

Define
This app solves the problem of the user’s phone ringing in class. It figures out when the phone is at a school and turns off the ringer. It turns the ringer back on when the user leaves school.

What type of output should the app produce? ________________________________________________________

Prepare
Fill out the following table with information that the app needs and whether you will find the information from a phone sensor or the Internet. Decide whether you want to store the information for later.

<table>
<thead>
<tr>
<th>What type of information do you need?</th>
<th>Where will you find the information?</th>
<th>Store for later?</th>
</tr>
</thead>
<tbody>
<tr>
<td>My location</td>
<td>Phone Sensor (GPS)</td>
<td>No</td>
</tr>
</tbody>
</table>

How will you process the information to get the output?

Try
Use the method you created above to process the information on the Data Sheet.

What is the output? ________________________________________________________

Reflect
This app turns off the ringer even when the user is not in class. An advanced version would only turn off the ringer at school when the user is quiet and not moving. If the user is moving around or making a lot of noise, it would assume that it is not class time and keep the ringer on.

Fill out the table below with the new inputs you will need for this advanced version.

<table>
<thead>
<tr>
<th>What do you need to know?</th>
<th>Where will you find the information?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Movie Recommendation Challenge

Define
This app addresses the problem of not knowing what movies to watch. Look through the information available to you, and decide what will help to choose a movie for the user.

What type of output should the app produce? _____________________________________________________

Prepare
Fill out the following table with information that the app needs and whether you will find the information from a **phone sensor**, the **Internet**, or **user input**. Decide whether you want to store the information for later.

<table>
<thead>
<tr>
<th>What type of information do you need?</th>
<th>Where will you find the information?</th>
<th>Store for later?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Favorite movies</td>
<td>User input</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

How will you process the information to get the output?

Try
Use the method you created above to process the information on the Data Sheet.

What is the output? ____________________________________________________________

Reflect
Compare your method, and the inputs it needed, to another group’s method.

What is one advantage of the other group’s method?

__________________________________________

__________________________________________

__________________________________________

How might you combine your ideas to make a better app?

__________________________________________

__________________________________________

__________________________________________
Unit 1 Lesson 9

Project - Propose an App

Resources
Overview
Computer science is an extremely powerful tool for solving real world problems. For this project you will combine what you’ve learned about the problem solving process and the way computers work in order to propose an app that could help solve a real world problem of your choosing.

You will...
- Work with a partner
- Define a real world problem
- Brainstorm ways an app could be used to help solve that problem
- Identify the inputs / outputs / storage / processing used by your app
- Share your ideas with another group for peer feedback
- Incorporate feedback to create a final version of the app
- Create a poster of your app to share with the class

You will submit...
- This completed Project Guide
- Completed Peer Review
- A poster of your app

Project Steps

Step 1: Find Your Partner
This project will be completed in pairs. List your partner’s name here: ________________________________

Step 2: Brainstorm Problems
Brainstorm interesting and personally relevant problems. Nothing is off limits, and don’t worry yet about how computer science can help solve the problem. You might think about

- Things you’d like to improve in your school, neighborhood, or community
- A task in your everyday life that you wish could be completed more easily
- A cause that you feel strongly about
- Something that is currently inconvenient or annoying to do

Record your brainstorm of problems in the space below.
Step 3: Choose Your Problem
Work with your partner to decide on which problem you would like to work on. As you discuss, make sure you consider the following criteria.

- **Interesting**: Both group members are interested in the problem
- **Well-Defined**: You can explain who specifically the problem affects, what needs to change, and how you’ll be able to tell that the problem had been solved
- **Computing is Relevant**: The problem is an “information problem” that can be solved with “thinking work.”

Step 4: Define Your Problem

1. **What is the problem?** Be as specific as possible. What needs to change or improve? Why does the problem exist? You may need to narrow your problem’s focus. Making big changes begins with small steps!

2. **Who does the problem affect?** Be as specific as possible. Think about the age, location, life conditions, interests, background, etc. of your audience.

3. **How will you be able to tell that a solution to this problem has worked?** Be as specific as possible. What would you need to measure or observe to know the problem was solved?
**Step 5: Your App**
From a high level think about how an app could be used to solve a part of the problem you identified. What features would it need to have? How would someone use it? If you need to update your problem definition above then do so.

**Name Your App:** ________________________________________________________________

**What does your app do?** Write a short description of your app as though you were describing it to someone you’d want to use it. What does it do? Why would someone want to use it? How does it help solve the problem?

____________________________________________________
____________________________________________________
____________________________________________________

**Step 6: Input, Output, Store, Process**
You will sketch a version of your app and indicate what all the different outputs are. A classmate should be able to tell how the app works based on the sketch and labels.

**App Sketch:** Sketch what a screen of your app will look like based on your description above.

**Output Information:** Label the different outputs generated by your app by writing what they are and drawing an arrow to where they are located on the screen. (E.g. “List of nearby parks” or “Days until friends’ birthdays”)
**Inputs:** What kind of information does your app need as input to work? Will this input come from the user, phone sensors, or an external source (e.g. a database online)? List every piece of information your app will need to work. Your app may have more or less than 6 inputs. Feel free to add extra sheets of paper if you need them.

<table>
<thead>
<tr>
<th>Type of Information</th>
<th>Source</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example: User age</td>
<td>User / Sensor / External</td>
<td>Example: 13 years old</td>
</tr>
</tbody>
</table>

**Process:** What sort of processing will your app use?

**Store:** What information will your app store permanently?
Step 7: Peer Review
Your teacher will provide you with a Peer Review sheet. Trade projects with another group and complete the peer review. As part of this process you should develop new ideas for how you can improve your app.

Step 8: Finalize App and Make Poster
Based on the results of your peer feedback, make any additions or changes you need to make to how you defined your problem or how you describe your app. Then make a poster that presents the final version of your app. Your poster needs to include the following information.

- The name of your app
- The target audience
- The problem the app is designed to solve
- The input information the app uses
- A drawing of the output the app produces
- A description of how the app processes and stores information

To create your poster you can and should use your work from this project guide.

Step 9: Present Your App
The last step of this process is to present your app to your classmates. This may be done as a gallery walk or a class presentation. As you present your app make sure you’re ready to talk to your classmates about the following points.

- How you defined the problem your app is designed to solve and why you decided on this specific set of people, problems, and ways of measuring success.
- How your app is designed to work and how it aims to solve the problem.
- An overview of the information your app uses as input and output.
- An overview of how information would need to be stored or processed by your app.
- One change you made to your project based on the feedback you received
Peer Review - App Design Project

Pre-Review
Creator’s Name: __________________________________

One thing I want feedback on is...______________________________________________________________
______________________________________________________________________________________________

Reviewer Section
Reviewer's Name: ____________________________________________

<table>
<thead>
<tr>
<th>Questions</th>
<th>Rating</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>The problem is well-defined. I can easily tell who the audience of this app is, what specific problem it is trying to solve, and how I would know if the problem had been solved.</td>
<td>✔️ ✗</td>
<td></td>
</tr>
<tr>
<td>The app addresses the problem. I can understand what the app does from the description and it could help solve the problem.</td>
<td>✔️ ✗</td>
<td></td>
</tr>
<tr>
<td>All necessary input / output is listed. The app could work as intended based on the input/output information listed.</td>
<td>✔️ ✗</td>
<td></td>
</tr>
<tr>
<td>Storage / Processing accounted for. The app could run by storing and processing information in the way described.</td>
<td>✔️ ✗</td>
<td></td>
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</tbody>
</table>

Free Response Feedback

I like... ________________________________________________________________
________________________________________________________________________
________________________________________________________________________
I wish... ________________________________________________________________
________________________________________________________________________
________________________________________________________________________
What if... ______________________________________________________________
________________________________________________________________________
Creator's Reflection

1. What piece of feedback was most helpful to you? Why?

2. What piece of feedback surprised you the most? Why?

3. Based on feedback, what changes will you make to your app proposal?
## Project-Specific Rubric

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Yes/No</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>The problem is well-defined, including a target audience, details of the problem, and how to tell it has been solved.</td>
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<tr>
<td>The app is clearly described including what it does and why someone would use it.</td>
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<tr>
<td>The outputs of the app are clearly described and could be used to address the problem.</td>
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<tr>
<td>The inputs of the app could be used to produce the outputs.</td>
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<tr>
<td>The way that the information is processed to produce the output is clearly described.</td>
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<tr>
<td>Stored information is listed and is appropriate for the functionality of the app.</td>
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<tr>
<td>The peer review provides useful and constructive feedback.</td>
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<tr>
<td>Peer review feedback has clearly been incorporated into the final version of the project.</td>
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<tr>
<td>The final presentation includes all information required by the project guide.</td>
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</table>
## Practices Reflection

<table>
<thead>
<tr>
<th>Practice</th>
<th>Things to Celebrate</th>
<th>Things to Work On</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem Solving</td>
<td></td>
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<tr>
<td>Persistence</td>
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<td>Creativity</td>
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<td>Collaboration</td>
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<tr>
<td>Communication</td>
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