

# Artificial Intelligence Foundations

Student AI Notebook



# AI Notebook

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# Question Generator

Type of Question	Definition and Example
Knowledge	<p>Questions based on identifying and recalling information.</p> <p>Asking topic questions about the:</p> <ul style="list-style-type: none"> <li>● Who</li> <li>● What</li> <li>● Where</li> <li>● When</li> <li>● How</li> </ul> <p>Questions that describe what something is.</p> <p><i>Example: How is <u>AI</u> used?</i></p>
Comprehension	<p>Questions based on organizing and selecting facts and ideas.</p> <ul style="list-style-type: none"> <li>● What is the main idea?</li> <li>● What would a brief outline of the topic look like?</li> <li>● What differences exist between ____?</li> </ul> <p><i>Example: What differences exist between <u>AI</u> and <u>robotics</u>?</i></p>
Application	<p>Questions based on using the topic's facts, rules or principles to then apply to something more.</p> <ul style="list-style-type: none"> <li>● How is the topic an example of ____?</li> <li>● How is the topic related to ____?</li> <li>● Why is the topic significant?</li> <li>● Do you know of another instance where ____?</li> <li>● Could this have happened in ____?</li> </ul> <p><i>Example: How is <u>AI</u> an example of <u>computer science</u>?</i></p>
Analysis	<p>Questions based on separating the larger portion of the topic into smaller components.</p> <ul style="list-style-type: none"> <li>● What are the parts or features of ____?</li> <li>● How would you outline/diagram/map this topic?</li> <li>● How does ____ compare/contrast with ____?</li> <li>● What evidence can you present for ____?</li> </ul> <p><i>Example: How does <u>machine learning</u> compare with <u>deep learning</u>.</i></p>

<p>Synthesis</p>	<p>Questions based on combining ideas to form a new whole <i>idea</i>.</p> <ul style="list-style-type: none"> <li>● What would you predict/infer from ____?</li> <li>● What ideas can you add to ____?</li> <li>● How would you create/design a new ____?</li> <li>● What solutions would you suggest from ____?</li> <li>● What might happen if you combined ____ with ____?</li> </ul> <p><i>Example: What might happen if you combined <u>the power of AI</u> with <u>online tutors</u>?</i></p>
<p>Evaluation</p>	<p>Questions based on developing opinions, judgments, or decisions.</p> <ul style="list-style-type: none"> <li>● Do you agree that _____? Explain.</li> <li>● What do you think about _____?</li> <li>● What is most important?</li> <li>● How would you prioritize _____?</li> <li>● What criteria would you use to assess _____?</li> </ul> <p><i>Example: Do you all agree that <u>someday everyone will know how to program AI technologies</u>?</i></p>

# Module 1: What is AI?

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## Lesson 1.1: This is AI

### What Do You Know About AI?

K-W-L Chart

<b>What I <u>K</u>now</b> <i>What do I already know about AI?</i>	<b>What I <u>W</u>ant to Know</b> <i>What do I want to know about AI?</i>	<b>What I <u>L</u>earned</b> <i>What did I learn about AI?</i>

### What is AI?

How would you describe AI?

## What can AI do?

What can AI currently do?

What can AI currently not do?

## Concerns About AI

Skill Builder: What questions do you have about AI?

Type of Question	Questions About AI
Analysis	<i>Example: What are the parts or features of AI?</i>
Knowledge	
Comprehension	
Application	
Synthesis	
Evaluation	

## **Reflect**

Revisit the K-W-L Chart at the start of this lesson. What have you learned today that can be added to the "WHAT I HAVE LEARNED" section of the chart?

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# Lesson 1.2: History of AI

## Evolution of AI

Which events would you consider the greatest in AI advancements for each era?

Era	Significant Historical Events
1900s-1940s	
1950s	
1960s	
1970s-1980s	
1990s-2000s	
2010s	
2020s and Beyond	

## Top Three AI Advancements

List the THREE AI advancements that you consider the most important.

- 1.
- 2.
- 3.

Why did you select these three? What have you learned so far that supports your choices?

What about the future? Think about what technology currently does not use AI. How would adding an AI feature advance that device?

Create a news headline around one of the major advancements or about a future potential advancement. Your headline should capture the significance of the advancement.

Event	News Headline

## Imagining the Future of AI

What if you could interview Futurist Mike Walsh? What questions would you ask him about his career? What else would you ask about the future of AI?

Generate three specific interview questions around the future of AI.

- 1.
- 2.
- 3.

Do you think all futurists would answer your questions the same? Why or why not?

## Reflect

In the first activity, how could you tell whether the conversation was between two humans or a machine and a computer?

In the second activity, which types of questions helped the interrogator determine whether the answers were from a computer?

Think about the purpose of virtual assistants and chatbots. Why do people interact with them? Does it matter if they can pass the Turing Test? In what situations might it matter? In what situations might it not matter?

What was Alan Turing trying to prove with the Turing Test? How might the Turing test be useful for measuring machine intelligence today? In what ways is it not useful?

# Lesson 1.3: AI and HI

## Strengths and Limitations

What are some strengths of AI?

What are some limitations of AI?

## Reflect

How can creating art, music, stories or other forms of creative expression alongside AI expand or limit your creativity? Does the work you produce feel authentic? Are you proud of it in the same way you would be if you created it without the help of AI?

# Module 2: AI and You

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## Lesson 2.1: AI and Humanity

### AI for Good

Use the table to capture the ways that AI is being used to help people and improve their lives in these different industries.

Industry	Benefits of AI
Health	
Safety	
Environment	
Education	
Transportation	
Cities	

## Benefits to Humanity

Think Outside of the Box: What are other ways AI can be used to help humanity?

List two or three "what if" questions below. Don't limit your ideas.

- 1.
- 2.
- 3.

## Human-Centered Design

In your own words, describe what human-centered design is.

## Reflect

As you use explore of the listed tools, either as a **user** or as a **creator**, answer these questions:

1. What problems does this tool solve or what task does it support?

2. Who is it for?

3. What features best meet the user's needs?

4. What features should be included to better meet the user's needs?

## Lesson 2.2: Risks of AI

### Negative Impacts of AI

How can some uses of AI be harmful to humans?

### Types of Bias

Reflect on your personal experience with bias. What are some ways that you have shown bias or experienced bias? How can practicing empathy, which is assuming the perspective of someone else, help prevent bias?

### Bias in AI-Decision-Making

How can biased decision-making happen in machines?

What is one way to avoid algorithmic bias?

# Lesson 2.3: Ethics in AI

## Ethical or Unethical?

Reflect the Ethical or Unethical survey. Were you surprised by the results? If so, what surprised you about the results?

## Ethics Questions

What concerns do you have about AI and its impact on individuals and society? Share 1-2 ethical questions related to a particular use of AI. What are some ideas you have for addressing these issues?

Ethical Question	Ideas for Addressing

## Engage: Evaluate an AI System

Which AI technology did you explore?

1. Does the technology promote well-being?

2. Does the technology protect user's data and privacy?

3. Does the technology give insight into how it works?

# Lesson 2.4: The Design Thinking Method

## Design Thinking and You

How can the design thinking method help to build human-centered AI applications?

## Stages of Design Thinking

What are the five stages of the design-thinking process?

- 1.
- 2.
- 3.
- 4.
- 5.

## Engage: Create an Empathy Map

Practice creating an empathy map by using one of the scenarios.

1. Read each scenario and the related personas.
2. Select a scenario and person to focus on for your empathy map.
3. Think about the perspective of the user and complete the empathy map.
  - a. Write the name of your persona in the middle of the map.
  - b. Use the information from the scenario, add observations to the appropriate section of the map.

## Scenarios and Personas

### Scenario 1: Tutor Me

You've been asked to build a mobile app that will help connect students and tutors.

- **Persona 1:** Jack is a high school student and is focused on maintaining a high GPA to increase his chances of getting into his first-choice college. He is struggling with his Spanish class and wants to find a tutor. He is looking for someone in his neighborhood who he can meet with after school, possibly Saturday mornings.
- **Persona 2:** Samantha is a Spanish-speaking high school student who would like to make a little extra money by helping other students. She hopes to be a teacher one day and thinks being a tutor would help her gain experience and build her resume. She would like to offer her services to students looking for a Spanish tutor.
- **Persona 3:** Mr. Jasminder Smith is a high school teacher and has several students struggling with their Spanish assignments. He would like to be able to direct his students to available tutors to help them improve their grades and catch up with the rest of the class. He also wants to be able to check the progress of his students to ensure they are taking appropriate steps to improve.

### Scenario 2: Rapid Rescue

You've been asked to build a mobile app that will help people find lost pets.

- **Persona 1:** Lisa's small dog got scared by a car during a walk, broke the leash, and ran away. Lisa desperately wants to find her precious dog as quickly as possible. She wants to search a list of found pets or post information about her dog so others can help her find him.
- **Persona 2:** Didi found a lost dog and wants to find the owner. The pet has no tag, so Didi cannot call the owner directly. They don't see any flyers in the neighborhood.
- **Persona 3:** Petra works at a local pet shelter and truly cares for the cats and dogs that end up at the shelter. She wants to keep informed of any lost pets in the area in case any of them arrive at the shelter. She wants to be able to identify lost pets and reunite them with their owners before they get added to the adoption website.

### Scenario 3: Style Me

You've been asked to build a mobile app that kids can use to create new outfits from the clothes and accessories they already own and get advice on what to buy to enhance their wardrobe.

- **Persona 1:** Sam is a middle schooler who is tired of wearing the same outfits every week. He wants some advice or ideas for mixing and matching the clothes he already owns to create new looks.
- **Persona 2:** MaryAnn would like to learn more about style and accessorizing her outfits. She owns a lot of clothes and accessories, but isn't always sure what looks good together. She would like help matching tops, pants/skirts, and jewelry.

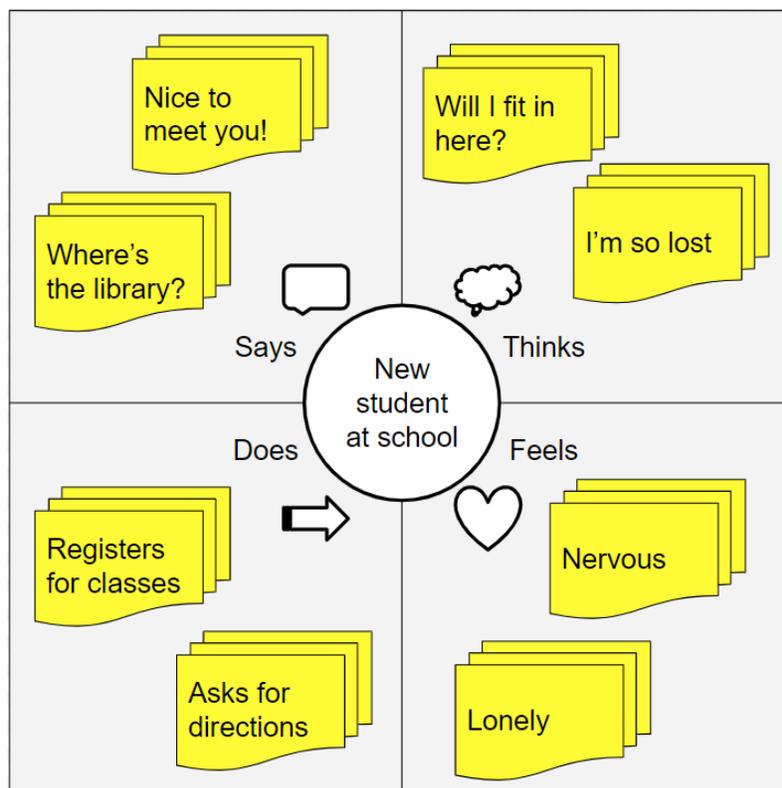
- **Persona 3:** Nicki and Jo would like to enhance their wardrobes. They want to purchase items wisely to match what they already have. They want some advice on pieces they could buy that would work with multiple items they already have.

#### Scenario 4: BullyMeNot

You've been asked to build a mobile app that kids can use to find help when they are being bullied or provide resources to others who want to help prevent bullying.

- **Persona 1:** Claire is a middle schooler who gets teased daily for one reason or another. She doesn't know how to talk to her best friend, her parents, or her big brother about the stressful situation. She wants to get help to learn how to cope.
- **Persona 2:** Nigel has a best friend who gets picked on frequently at school. He would like to help his friend and learn more about preventing bullying behavior with his peers.
- **Persona 3:** Tracy suspects her daughter is being bullied at school, but Sasha denies it when Tracy asks her about her concerns. Tracy would like to find resources for her daughter to help with the stressful situation.

#### Empathy Map Example



**Empathy Map**

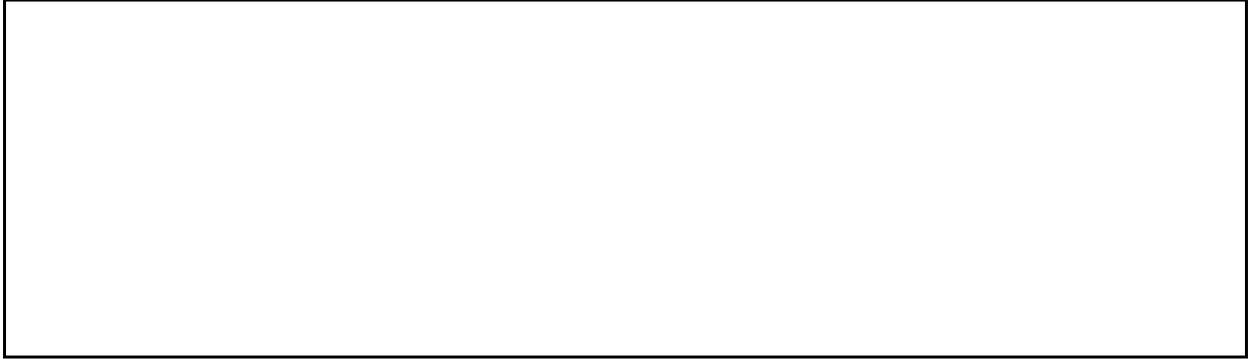
<b>Says</b>	<b>Thinks</b>

<b>Persona</b>

<b>Does</b>	<b>Feels</b>

## Reflect

How might an activity like this empathy map activity help you to understand and get to know your users? If this were a real-life scenario, what questions might you ask your potential users? What might your next steps be?



# Module 3: Machine Learning in AI

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## Lesson 3.1: Machine Learning and AI Challenge

### The Machine Learning Process

Provide a basic overview of how machine learning works.

What are the key components required for a machine to learn?

### Get Inspired

Log information from the tools and applications you explored.

Machine Learning Tool Research Notes
Tool Explored:
URL:
Interesting Solution/Application 1:

<b>URL:</b>
<b>How it Works:</b>
<b>Interesting Solution/Application 2:</b>
<b>URL:</b>
<b>How it Works:</b>

## Getting Started: AI Design Challenge

### Step 1: Empathize – Choose Your User

Who do you want to design your solution for? Who would you like to help increase their knowledge or improve their skills?

Choose someone:

- that you have regular access to
- who is willing to be interviewed
- who is willing to provide feedback on your prototype

You may choose a small group of people if you like.

**Name of your user:**

## Step 2: Empathize – Interview, Observe, Research

Write down 8-10 questions below for your interview that will help you understand your user better. You may not end up using them all. You can use the example questions to start you off.

Interview tips:

- Avoid yes or no questions. Or at least follow up with why and how?
- Use questions that begin with “tell me about the last time you \_\_\_\_\_?”
- Ask open ended questions that lead to stories, as stories often provide insights to designers.
- Ask questions about how the user feels about certain situations.

## Engage: Conduct Your Interview

### Step 3: Empathize - Conduct an Interview

Now conduct your interview! Record notes on your user’s responses. With the person’s permission, you may also want to audio record the interview.

#	Interview Questions	Users Responses
1	<i>What is a topic you'd like to learn more about or a skill that you would like to improve upon?</i>	
2	<i>Why are you interested in that topic or skill?</i>	
3	<i>What is your current level of knowledge about this topic or skill level?</i>	

4	<i>How do you currently practice this skill or gain knowledge on this topic?</i>	
5		
6		
7		
8		
9		
10		

# Lesson 3.2: Machine Learning and AI Challenge

## Deep Learning

Briefly explain the relationship between machine learning and artificial intelligence.

## How Do You Ensure Quality Data?

Complete the checklist for how to evaluate the quality of a data that can be used to teach a machine. What criteria should exist?

**Data should be:**

- Recent (data relevant to what is being investigated)
- Complete (No missing information)
- 
- 
- 
- 
-

## Engage: Train a Machine

Log your information from the activity you selected.

<b>Machine Training Tool Research Notes</b>
<b>Option Selected:</b>
<b>URL:</b>
<b>What project(s) did you work on?</b>
<b>What data sets did you use to train a machine?</b>
<b>Other notes:</b>

## Reflect

What did you find most interesting about machine learning from your explorations today?  
Answer in 2-3 sentences.

# Lesson 3.3: Machine Learning with Algorithms

## Algorithms

Explain how algorithms are used to teach machines in 2-3 sentences.

## Create a Decision Tree

Choose one of the below topics or select your own topic and create a decision tree. You may use an online tool to create your decision tree or you can create your diagram using paper and pencil.

Suggested Topics:

- What will I do today?
- What animal is this?

## Algorithmic Bias

What are two challenges and solutions related to algorithmic bias in AI?

## Reflect

What did you learn about machine learning from your explorations today? Answer in 2-3 sentences.

# Lesson 3.4: Machine Learning with Neural Networks

## What Are Neural Networks?

Explain the basics of how artificial neural networks process information.

## Machine Learning and Deep Learning

What is the relationship between machine learning and deep learning?

# Engage: AI Design Challenge - Empathy Map

Use the information you gathered from your interview, observations, and research to complete an empathy map for your user.

Says	Thinks

Persona

Does	Feels

# Module 4 : Machine Learning in AI

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## Lesson 4.1: Natural Interaction

### What is Natural Interaction?

During this lesson, look for information to fill in this table.

Share three common areas of natural interactions, supporting examples of these areas in everyday AI applications, and the limitations of these natural interactions.

Areas of Natural Interactions	Examples in Everyday AI Applications	Limitations

## Natural Interactions and Human Impact

Can you think of other ways that applications that use natural interactions through speech, gesture, and affective computing impact humans? Jot down one idea here.

## Reflect

Answer the following questions as you reflect on the experience.

1. Which application did you interact with?

2. What area(s) of natural interaction does the program address (speech, gestures, affect)?

3. Was the response to your input expected and accurate? Why do you think that is?

4. How might an application like this be used to help people learn or improve their skills?

These ideas may help you as you plan your AI Design Challenge.

# Lesson 4.2: Computer Vision

## What is Computer Vision?

Use the table to share the basics of how computer vision works.

Forms of Computer Vision	How It Works
<i>Image classification</i>	<i>Sorting images into different categories</i>

## **Applications of Computer Vision**

Share ways computer vision is used in everyday applications.

Can you think of other uses of computer vision that would benefit people? Share one or two ideas.

## **Computer Vision and Human Impact**

How have applications with computer vision impacted humans?

# Lesson 4.3: Recommender Systems

## What are Recommender Systems?

During the course of this lesson, look for information to populate this table.

Identify the two types of recommender systems and explain how each type works. Provide examples of the two types of recommenders.

Recommender System	How It Works	Example

## Recommender System Scavenger Hunt

Pick a different sport from what you previously selected during the Engage activity. (Select one that preferably you are not as interested in.) See if you notice any differences from your initial experience.

Complete the table on the next page as you explore the platform.

You will uncover the ways in which YouTube or Google Play uses AI. For each distinct feature, describe:

1. the data that is being used to influence the recommendation algorithm
2. what the algorithm is trying to learn from that data,
3. what is the algorithm “optimizing” for. In other words, what does the platform want you to do; what are the goals? For example, online shopping platforms may be “optimizing” for items clicked because they want you to buy products.

Feature	Data	What is it trying to "learn"?	What is it optimizing for?
Suggested search (autofill)			
Recommendations			
Comments section			
Search results			
Ads			
Auto play (YouTube only)			

Now scroll to the bottom of the page and select and read the Privacy section of the platform (bottom middle on Google Play, bottom left-hand sidebar YouTube). How is your data being used? How do you feel about that?



# Lesson 4.4: Autonomous Systems

## What are Autonomous Systems?

Describe the basics of how autonomous systems work.

## Autonomous Transportation

Identify the examples of autonomous systems in everyday AI applications.

## Reflect

Why did you make some of the decisions you made during the MIT Moral Machine activity?  
What do you see as some limitations of autonomous vehicles? What are some ethical questions regarding autonomous vehicles?

## AI Design Challenge

Over the past few lessons, you have been exploring different machine learning tools and applications. You have also been spending time with your target user(s) to gain insights about their needs and preferences. Now it is time for you to begin focusing on the specific problem that you are solving for your user. Review any notes from observations, interview responses, and your empathy map. Use insights from those sources to craft your problem statement.

You may use this sentence starter as a guide:

\_\_\_\_\_ [user] needs a way to \_\_\_\_\_ [do what] because \_\_\_\_\_ [why].

**Problem Statement:**

# Module 5: Bringing It All Together

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## Lesson 5.1: Project Build Day 1

### AI Design Challenge Rubric

As you continue to work on your AI Design Challenge, use the [rubric](#) (found at the end of your notebook) to self-assess your project.

### Ideate

**Braindump instructions:**

1. Reread your problem statement from the previous lesson (previous page).
2. As you generate ideas keep your problem statement in mind and respond to the challenge question:  
*How might we use the power of machine learning to help people increase their knowledge or improve their skills?*
3. Set a timer for five minutes and write at least five ideas below.

Idea #1	
Idea #2	
Idea #3	
Idea #4	

Idea #5	
---------	--

**Ideate with Constraints:**

Due to time, toolsets, and expertise, you now should simplify your idea based on your comfort with the tools. At a minimum, the solution must use machine learning to recognize and classify an image, sound, or pose.

Take another five minutes to refine the ideas for your solution. Write up to three ideas for your solution that can be designed within a limited timeframe (about one hour total) and using one of the tools that you are comfortable with.

Idea #1	
Idea #2	
Idea #3	

**Choose an Idea:**

Choose one idea to focus on as you prototype a solution.

Briefly summarize the idea for your solution in a few sentences and be sure to identify the tool that you will use.

*Example*

*My AI solution will help someone learn yoga poses. I will train a ML model using Teachable Machine to recognize different yoga poses. The tool's confidence level at identifying the pose will help the person know if they have done the pose correctly and how they can adjust their position to increase the machine's confidence level. A high confidence level means that the person is doing the pose correctly.*

**Your AI Design Challenge Idea:**

**Plan for Prototyping**

Answer the following questions to plan for designing your prototype:

1. What is the name of your AI solution?

2. What tool will you use to develop your design?

3. What is the goal of your solution?

4. How will it help the user to learn or practice a skill?

5. What ethical considerations are included in your solution? Is there potential for the solution to harm anyone or introduce bias?

6. What data will you use?

7. How many different classes or categories are needed?

8. How will your solution gather or use data to make decisions?

9. What decisions or outputs will your tool generate? Will it take any further action after a decision is made?

10. Map the user's experience with the tool. What key steps will the user complete while interacting with your tool? Describe what the user does first, what happens next, and so on. It is okay if you need to supplement the tool with instructions for the user. For example, you may tell your user to complete a task and the tool will indicate whether they are correct by classifying an image, sound, or pose with a high level of confidence.

<ol style="list-style-type: none"><li>1.</li><li>2.</li><li>3.</li><li>4.</li></ol>
---

*Example*

- 1. The user does a yoga pose in front of the computer webcam.*
- 2. The program indicates the name of the pose and the confidence level that the name of the pose is correct.*
- 3. The user keeps practicing the pose until the confidence level is high and they are satisfied that they have done the pose correctly.*
- 4. The user repeats this process with another pose.*

# Lesson 5.2: Project Build Day 2

## Prototype

This lesson is dedicated to working on your prototype. Your prototype should be complete by the end of today's lesson.

### Instructions for working prototype:

1. Gather the training data you need to train your model. If you are generating data in real-time, for example, posing in front of a webcam, list the actions or items you will show.
2. Follow the instructions for the tool you are using and train your model.
3. Test your model using new data to see how well it recognizes or responds to the information.
4. Add more training data as needed to increase the tool's accuracy.

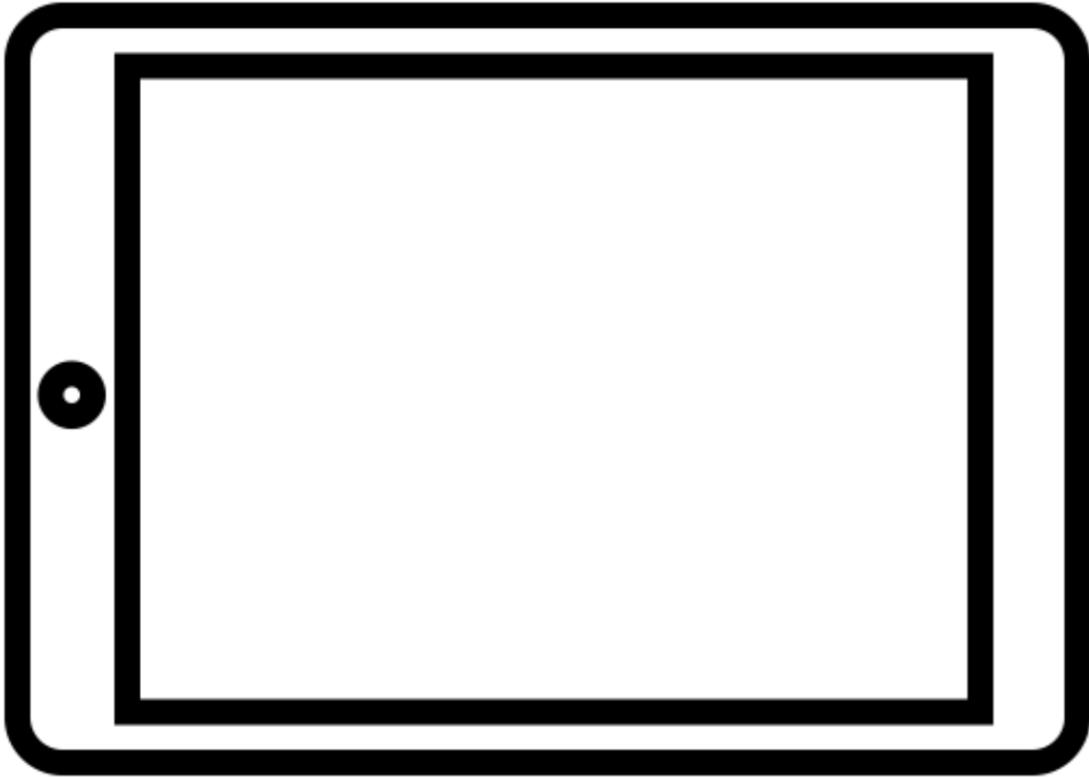
### Instructions for paper prototype\*:

1. Use the storyboard template starting on the next page to sketch the details of each screen the user will encounter as they interact with the tool.
2. Think about how the user will interact with your solution. Show how users will transition from one step to the next and include features of the tool (screens, buttons, overall layout, etc.).
3. Provide a brief explanation that explains each step in the user's experience. Include information about how the solution uses data, makes decisions, and the final output or action.

\*Although it is called a "paper prototype" you may also choose to create a digital prototype using a drawing tool on your device or a presentation tool like PowerPoint or Google Slides.

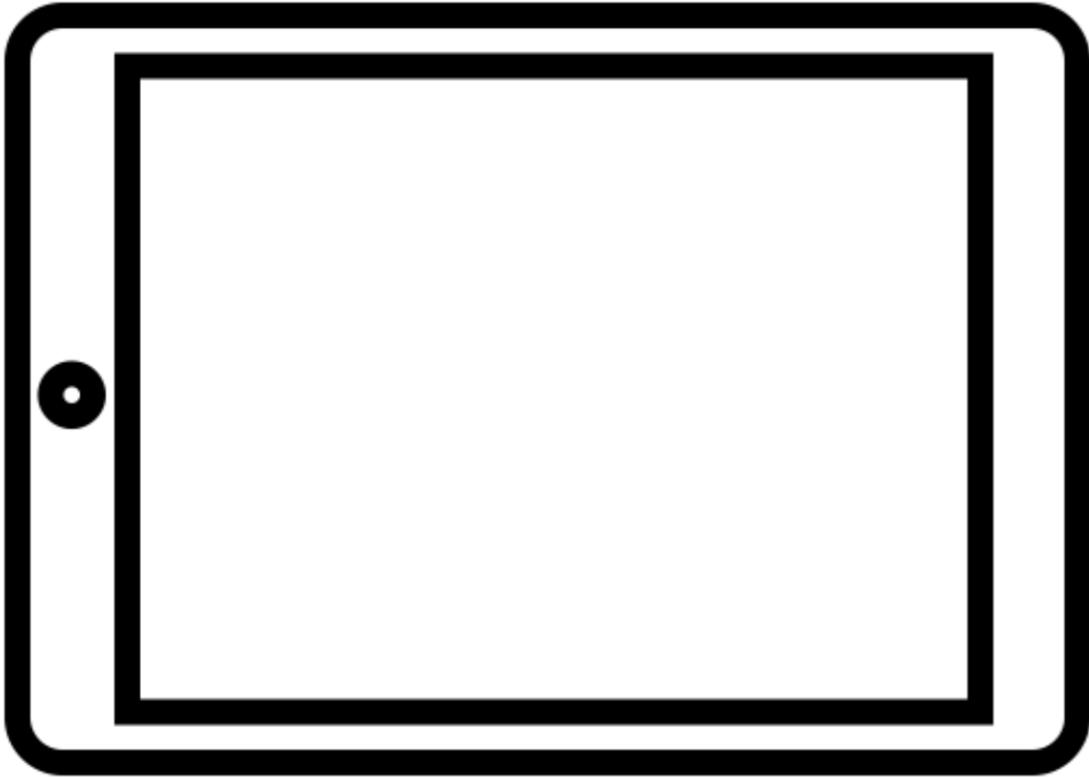
**Paper Prototype – Storyboard Template**











# Lesson 5.3: Project Build Day 3

## Test

Tips for testing with your user(s):

- Take detailed notes in your notebook as you observe and ask questions during testing.
- When you test your prototype, allow your user to experience the solution without explaining it. Give only basic information to get them started, but let them explore how it functions. If you are testing a paper prototype, allow your user to examine the visual representations and read the explanations for each step.
- Ask them about their experience or impressions as they are exploring the prototype. You might ask, “What are you thinking as you explore this tool?”
- During testing of a working prototype, allow them to make mistakes. Don’t correct them right away if they do something wrong. This is valuable information that you can use to determine if something is unclear about your solution or how users might interpret it in a different way.
- Take note of their questions. These questions provide insight into areas that are not clear in your design and can also provide inspiration for new features.
- Once the user has completed the testing, ask them a few follow-up questions. You may come up with your own questions, but here are a few examples:
  - How did this solution make you feel? Why?
  - What confused you?
  - What surprised you?
  - What do you wish the tool would do? Why?

## Testing Notes

## Reflect

Answer the following questions based on your testing:

1. What did you discover about your prototype?

2. What areas might you improve?

3. What did you learn about your user?

# AI Design Challenge Rubric

Element	3 points	2 points	1 point	0 points	Points Given
<b>Empathize</b>	<p>I completed all the steps to empathize with a user:</p> <ul style="list-style-type: none"> <li>• I chose a target user.</li> <li>• I prepared questions.</li> <li>• I conducted an interview.</li> <li>• I completed an empathy map.</li> </ul>	<p>I partially completed the steps to empathize with my user.</p>	<p>I completed one of the steps required to adequately empathize with my user.</p>	<p>I did not complete any of the steps to empathize with my user.</p>	
<b>Define</b>	<p>I crafted a problem statement using insights from my observations, interview responses, and my empathy map.</p>	<p>I crafted a problem statement that used some of the insights I discovered during the empathize stage.</p>	<p>I crafted a problem statement, but I did not rely on insights learned from the empathize stage.</p>	<p>I did not complete a problem statement.</p>	
<b>Ideate</b>	<p>I completed all the ideate steps:</p> <ul style="list-style-type: none"> <li>• I spent time generating and refining my idea.</li> <li>• I considered the constraints I would need to work with to create my solution.</li> <li>• I chose one idea to focus on to prototype a solution.</li> </ul>	<p>I partially completed the ideate stages to select my idea for a solution.</p>	<p>I completed one step during the ideate stage.</p>	<p>I did not complete the ideate stage.</p>	
<b>Prototype</b>	<p>I completed the prototype steps:</p> <ul style="list-style-type: none"> <li>• I answered the questions around my plan for</li> </ul>	<p>I completed a portion of the steps toward prototyping my solution.</p>	<p>I only completed, or partially completed, one of the prototype steps.</p>	<p>I did not build a prototype of my solution to my user needs</p>	

	<p>designing my prototype.</p> <ul style="list-style-type: none"> <li>• I selected the type of prototype I would build (working or paper)</li> <li>• I worked on the prototype of my solution</li> </ul>				
<b>Test</b>	<p>I tested my solution and received feedback. I also reflected and planned how to iterate on my design.</p>	<p>I tested my solution and followed up in some ways to receive a portion of feedback from my users. I completed some reflection and considered the iteration still needed on my design.</p>	<p>I only partially tested my solution and had sought limited feedback from my users.</p> <p>I did not reflect or plan any further iteration on my design.</p>	<p>I did not complete my test.</p>	
<b>Knowledge of AI</b>	<p>I planned a prototype design with a clear AI goal. I identified appropriate data to train and test the AI system. I ensured that the data was organized into appropriate categories.</p>	<p>I planned a prototype design that was mostly based on a clear AI goal. I somewhat identified appropriate data to train and test the AI system. I mostly ensured that the data was organized into appropriate categories.</p>	<p>I planned a prototype design that was limited in an AI goal. I trained and tested the AI system with inappropriate data. I did not ensure the data was organized appropriately.</p>	<p>I did not plan a clear goal or test the system with data.</p>	

<p><b>Critical and Creative Thinking</b></p>	<p>I identified how AI could be a creative solution to a problem. I considered constraints during the design process. Challenges with the solution were anticipated and addressed during the design process. I mapped and considered the user's experience from beginning to end. I reflected on the insights gained and areas of growth from my design experience.</p>	<p>I considered a solution to a problem that used AI. I partially recognized constraints during the process. I addressed challenges as they came up in the design process. I remembered at times the user experience during my design. I answered the reflection questions at the end of the process.</p>	<p>I only partially worked at a solution that could use AI. I did not recognize constraints or address challenges that came up in the process. I mostly forgot about the user during the design process. I only partially answered, or did not complete, the reflection questions at the end of the process.</p>	<p>I did not use critical or creative thinking efforts in my design project.</p>	
<p><b>Total Points</b></p>					