

Lesson 5.3 and 5.4: Design Thinking Process

Objectives

In this lesson, students will:

- ❖ Use the Design Thinking Process to design a program
- ❖ Gain an understanding of the design thinking phases
- ❖ Design a program that will meet another person’s needs and wishes.
- ❖ Practice the 5 stages of the design thinking process: interviewing a subject, capturing essential ideas, presenting ideas, creating a prototype , giving and receiving feedback and incorporate feedback

Agenda

Two Lesson Agenda:

1. The Design Thinking Process	10 mins
2. Empathize Phase: Interview Process	20 mins
3. Define Phase	15 mins
4. Ideate Phase	15 mins
5. Prototype Phase	15 mins
6. Test Phase	15 mins
7. Wrap Up and Reflections	10 mins

Preparation

- Read the lesson material, particularly the notes and tips.
- Become familiar with the Design Thinking Process
- Projector to display the design thinking stages and instructions
- Print student activity worksheet, one per team

Resources & Links

- Link to reference material: <https://www.interaction-design.org/literature/article/5-stages-in-the-design-thinking-process>
- Sample program for Sophia example in define phase:



Note About The Design Thinking Project:

This project introduces students to the full lifecycle of a software development cycle. The project will span 5 lessons: Design Thinking Process, implementation from a prototype, preparing presentations and project demonstration and presentations to an audience. Students work in teams of 3-4 for the duration of the entire lesson sequence.

The Design Thinking Process spans 2 lessons. The agenda presents suggested times for each phase which will vary from class to class, however in order to complete the design phase in two lessons, you will want to adhere to the times as closely as possible.

During this process it might be helpful to set student's expectations so that they come up with prototypes of programs that they can realistically code. Remind them to think about what they know how to code using Scratch when coming up with program ideas. They must also be aware that they will have 50 minutes of coding time, so encourage them to come up with strategies on how to divide the work at every single stage. This is very realistic in the programming environment as all projects have time and resource limitations.

It can be used to evaluate students' progress. Here is a non exhaustive list of criteria students can be evaluated on:

- Design cycle, empathy phase (did the student capture relevant information about his/her target audience)
- Design cycle, ideation phase (did the student come up with different ideas that can be later on discussed to gather feedback)
- Design cycle: prototype phase (was the prototype sketchy enough to invite feedback)
- Iteration process: have the student explain how many times he/she went back to the drawing board to crystalize ideas
- Programming: does the program show an understanding and good utilization of the following concepts where applicable:
 - Initialization
 - Loops
 - Control
 - Conditional
 - Broadcast
 - Moving object in the Cartesian plane
 - Commenting code (bonus)

- Variables
- Project page (clarity, captures the essence)
- Debugging: how did the student test his/her program, what did he/she do when stuck on a problem?
- Presentation: preparation, content

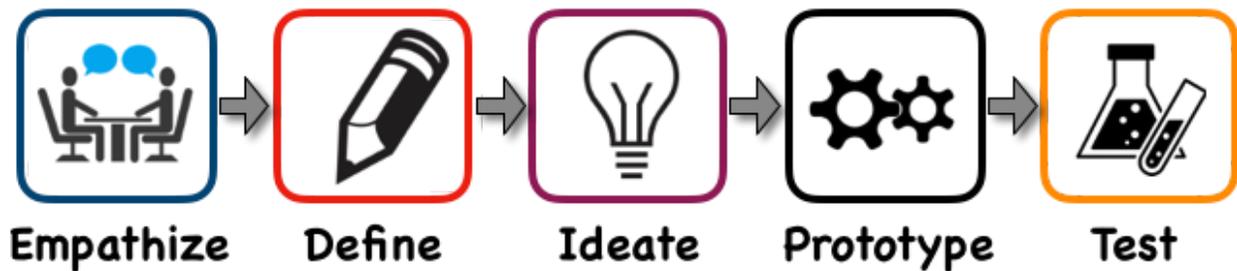
1. The Design Thinking Process

In this lesson, student teams will pick a person for whom they will create a program, they will interview that person to understand their needs and preferences in order to tailor the product to them. They will then design a program on paper using the Design Thinking tool kit in the students activity worksheet.



Display your screen with the image below (available in Appendix A) and engage your students in a discussion and instruction of the design thinking process:

What is design thinking?



Design thinking is a tool we can use to solve problems. Today, we are going to use it to design a Scratch program for another student in the class.

Here are the 5 main phases:

1. **Empathize:** it is the process of getting to know the other person to better understand their needs and desires. So we can try to solve problems, design products for them (as opposed to for us)
2. **Define:** Go through the different items we collected in the Empathize and start defining a big idea.
3. **Ideate:** think about different ways the big idea could be addressed. How could we solve the problem in the simplest or the most crazy way

4. **Prototype:** We sketch what the product would be
5. **Test:** We go back to the person in the empathize step and test the idea using the prototype and collect feedback.

This process of designing is not linear. There are times when a designer has to go back a step or several and ask more questions or change the prototype and re-review it. During the activity, students should be at times going back to a prior step to get clarification or to change something. Explain this to students and encourage them to use this process iteratively.

 **Note:** Each of the design phases will be conducted as a student activity. Students work in teams of 3-4 for the duration of the entire lesson sequence for the complete development process. Distribute all worksheets, one set of worksheets per team. Teams must hold on to their worksheets for the duration of the lesson sequence or you may choose to collect the handouts at the end of each lesson for safekeeping.

Team Work

When students work on teams for the duration of the software development cycle, they will practice assuming various roles on the team. They will also reflect on what it was like taking on different roles.

The various roles that students should practice are:

- Driver
- Navigator
- Notetaker
- Debugger

Work out a system with your students on how and when to switch roles during the lesson sequence.

1. EMPATHIZE PHASE: Interview Process

After teams have come up with their interview questions, pair up each team with another team. A volunteer from the first team is interviewed by the second team. This is then repeated by switching roles. Not every student will be able to be interviewed. Alternatively, you can pre-arrange students from another class to be available as the target audience.

Students use the Empathize worksheet for this activity.



Instructions to give to students:

Each one of you is a designer and wants to make stuff. Because you care about others, you want to make stuff that people will like and use.

How will you know your audience? Think of the questions you want to ask.

Hint: Think big! In this process, the goal is to know the person you're interviewing: their lives, their hopes and desires.

Using the Empathize worksheet:

1. Create your interview questions. Write down the questions you will ask the person you will be designing a program for.
2. Conduct your Interview and write down the answers.
Swap interviewers after 5 minutes each.

Instructions for the Next Phases (Design, Ideation, Prototype, and Test):



Explain each phase to students using the instructions and examples below. Instruct students to use each of the subsequent named sections of the Design Thinking worksheet to complete their project. It is recommended that you do one phase at a time.

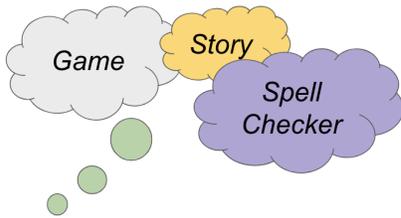
2. DEFINE PHASE:

Summarize your ideas: define your target audience.

Example:

Sophia is a 10 year old girl who loves playing soccer. She got into soccer after seeing her older brother win a tournament with his team. She also likes fashion and likes to spend time drawing sports outfits. She has a twin sister who also likes design but is not very fond of soccer. Sophia wants to talk her sister into joining her soccer team.

3. IDEATION PHASE:



Write several ideas for your Scratch program in your Design Thinking handout. **Be mindful of what you are able to realistically code in an hour or less.**

4. PROTOTYPE PHASE:

Select one or two ideas from your ideation phase. Work as a team to decide which idea to use that would best fit the target audience’s definition.

Do a rough drawing to show what the program would look like.

5. TEST PHASE:

Go back to your target audience and show your prototype

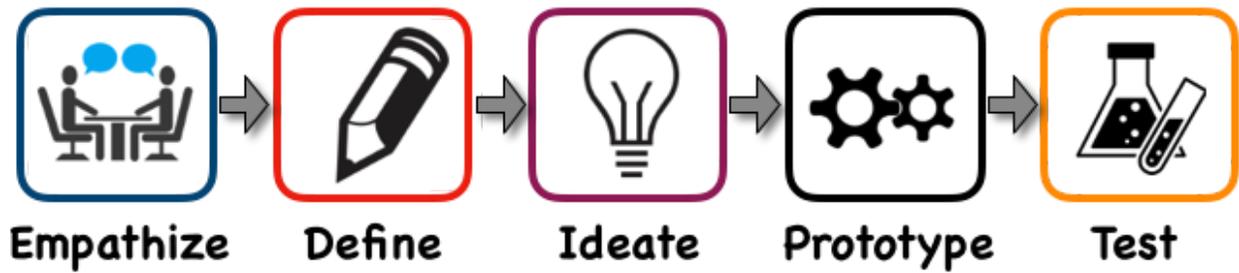
Request feedback:

- Does it fit what we know about you?
- What would you like to change?
- What do you want to keep?
- What could make it better?

2. Wrap Up and Reflections

 Reflection Points:	
	<ul style="list-style-type: none"> ● What did you learn today? ● Why do you think having a design process is important? ● How does the design process help create a program a user really wants? ● Why do we care about what the user wants? ● What was challenging about today’s activity?

Appendix A.



EMPATHIZE PHASE: Interview Process

Your name: _____ Your target audience is _____

Write down questions you would like to ask your target audience. Some ideas of questions are: what do you like to do on the weekend? Do you have pets? What interests do you have?, do you play sports, which ones?, Come up with your own and use follow up questions.



Empathize

Write down notes from your interview:

DEFINE PHASE:

Your name: _____ Your target audience is _____

Write some facts about your target audience:



Define

IDEATION PHASE:

Write a few ideas for a program:

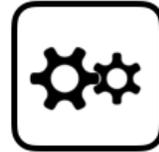


Ideate

PROTOTYPE PHASE:

Your name: _____ Your target audience is _____

Choose one of your ideas and sketch what the program would look like:



Prototype

Large empty rectangular box for sketching a program prototype.

TEST PHASE:

Present your sketch to your target audience and explain your idea
Write down their feedback



Test

What are you going to do based on the feedback?

- Find another idea (go back to ideation phase)
- Modify my prototype

Notes:
