

# Creative Problem Solving Curriculum

## Lesson 2

### Design Thinking

#### Lesson Overview:

Students will continue exploring ways to approach creative problem solving in their lives and in the lives of others by learning about Design Thinking. They will complete the following steps: 1) screening the Design Thinking video and considering how this approach to creative problem solving might be useful 2) reviewing and sharing examples of Design Thinking in action 3) trying out Design Thinking to solve a problem for a classmate.

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## Creative Problem Solving

### Lesson 2 – Design Thinking

#### Lesson Overview

During this lesson, you will guide students to consider Design Thinking as an approach to creative problem solving for messy global problems and to give the approach a try for solving a problem for a classmate.

#### Time Frame:

2¾ - 3½ hours (adjustable for longer/shorter discussion times and prototyping time)

#### Core Concepts:

- Design Thinking is a framework for using creative problem solving skills to design solutions to a variety of challenges.
- The Design Thinking approach to problem solving has five steps: *empathize* with stakeholders, *define* the problem, *ideation* (brainstorming), *prototyping*, and *testing*.

#### Lesson Objectives:

In this lesson students will:

- Explore the components and value of Design Thinking/Human-Centered Design.
- Consider how Design Thinking might be utilized to solve a real world challenge or problem.
- Practice using design thinking to identify and solve a simple challenge.

#### Materials Needed:

- [Lesson 2 Video: Design Thinking](#)
- [Lesson 2 Video: The 5 Steps to Designing Your Life](#)
- Poster board or chart paper (one per group of 3 or 4 students for Gallery Walk)
- Office supplies/craft supplies/recyclable materials for creating prototypes (paper, cardboard, scissors, markers, rubber bands, staples, glue, paperclips, thread, yarn, fabric, needles, whatever is handy)
- Computers with access to the following links or printouts of the text at these links:
  - o <https://dschool.stanford.edu/shadow-a-student-k12/>
  - o <https://dschool.stanford.edu/hacktivation-nation/>
  - o <https://www.ideo.org/project/gates-foundation>
  - o <https://www.ideo.org/project/tigo-cash>
  - o <https://www.ideo.org/project/vroom>
  - o <https://www.ideo.org/project/drones-for-good>

- o <https://www.ideo.org/project/the-only-solar-lantern-youll-ever-need>
- o <https://www.ideo.org/project/clean-team>  
*The following links include themes such as contraception and transactional sex in the context of problems faced by adolescents in the communities where the design projects are helping. Teacher discretion may be advisable depending upon the school community, student maturity, or class makeup.*
- o [https://www.ideo.org/project/academie\\_de\\_lartisanat](https://www.ideo.org/project/academie_de_lartisanat)
- o <https://www.fastcompany.com/40573830/how-better-branding-is-pushing-kenyan-teens-to-use-contraception>
- o <https://www.ideo.org/project/diva-centres>

## **Part 1: Introduction of Design Thinking**

### **Step 1: Introduce the Lesson**

**(1 minute)**

Explain to students that they will be learning about a structured approach to creative problems solving, known as Design Thinking (and sometimes Human-Centered Design). During the lessons, they will learn and practice the steps of Design Thinking to design a solution to a simple problem.

### **Step 2: Activate Prior Knowledge**

**(5-10 minutes)**

Ask students if anyone is familiar with Design Thinking. Invite students to jot down a few notes about what they know about it or what they think it might be like. Ask students to briefly share what they know about this approach to problem solving and if they have had any experience using it. Ask students to share any questions they have about Design Thinking, as well. Capture these questions on a board for reference later.

### **Step 3: Present the Design Thinking and 5 Steps to Designing Your Life video**

**(15-20 minutes)**

Show the video and then facilitate a discussion after the viewing. You may wish to solicit questions and comments from the students first. You can use these suggested discussion points to deepen the conversation and student thinking:

- What is your initial reaction to the concept of Design Thinking?
- Can you think of problems in your own life, family or community that could be addressed using Design Thinking?
- What kind of skills or mindsets do you think might be necessary for Design Thinking to be successful?
- How is Design Thinking different from other ways of addressing problems or designing that you are familiar with?
- What do you find interesting about Design Thinking?
- What questions do you have about Design Thinking?

#### Step 4: Students read and discuss examples of Design Thinking

(30 minutes)

Explain to students that IDEO is a nonprofit organization that uses Design Thinking to improve the lives of people in poor and vulnerable communities around the globe. Divide the class into groups of two or three students and provide an internet link or hard copies of an example of an IDEO.org design thinking project. The individuals in each group should have the same project to read about. More than one group may be assigned to the same project.

Ask students to begin by conducting a close reading of the project. If possible, students should annotate the text by underlining or highlighting key words and phrases and writing notes in the margins to indicate any ideas that strike them as significant, surprising, or that bring up questions.

Post the following questions for students to reflect upon after finishing their reading. Once everyone in the group has completed the reading, students should discuss the projects in their small groups. Groups should identify the steps and discuss how design thinking was used. Students should record their responses to these questions on chart paper or poster board.

- How did the designers *empathize* with the people they were hoping to help?
- What was the *defined* problem the designers hoped to solve?
- What details are shared about the *ideation* step?
- What *prototypes* were highlighted in the reading?

- How are the designers *testing* their solution(s)?
- What is the current solution that the designers have developed? How do they know that it is working?
- What do you find interesting or significant about this project?
- What questions do you have about the project?
- What questions do you still have about Design Thinking?

### **Step 5: Gallery Walk**

**(15 minutes)**

Prep for the gallery walk by asking students to post their chart papers around the room. Encourage students to walk around the room reading about the other IDEO projects.

Wrap up the gallery walk with a Think-Pair-Share. Ask partners to discuss the following question:

*What do you know about Design Thinking now, and what questions do you still have?*

Wrap up by assuring students that many of their questions will be answered as they go through the process in the second part of the Design Thinking lesson.

## **Part 2: Try Design Thinking**

### **Step 1: Partner Up!**

**(5 minutes)**

Explain to students that now it's their turn to test out the Design Thinking process. Encourage them not to worry about doing each of the steps perfectly the first time around. This process may feel like it is going very fast and as if they do not have time to fully complete each step. That's okay. These activities are designed to give them a taste of the process and to get them thinking about how they could apply the steps to a real world problem. They should have fun with it!

Ask students to think of one or two problems in their lives. Problems can be simple or challenging. Perhaps they need a way to get home from basketball practice without

having to rely on their parents. Or maybe they would like to be able to get to school on time. Perhaps they are looking for a way to improve their grades or pass the midterm test. Give students a minute to think about a problem, or problems, they might have. Then let them know that someone else in the class is going to help them find a solution!

Help students form partners. If necessary, a group of three can work together. Explain that each student will design a solution for their partner's problem. Distribute the Design Thinking packets (one per student) and make sure that everyone has a writing utensil.

### **Step 2: Interview and *Empathize***

**(16 minutes +2 minutes for optional video intro)**

Optional intro to empathy: Show this video - [www.designkit.org/mindsets/4](http://www.designkit.org/mindsets/4)

Students should sit somewhere comfortable where they can have a conversation with their partner. Partners will take turns interviewing each other. Students should use the questions and suggestions in the Design Thinking packet to help them conduct the interviews and take notes.

For eight minutes Partner A will ask Partner B about their problem. The person being interviewed can share one or both of their problems, but Partner A may choose to focus on one of the problems for the interview, if they wish. After 8 minutes, tell the students that it is time to switch roles. Partner B should now interview Partner A about their problem(s). A group of three may need to shorten their interviews so that each person is interviewed by the other two for a little more than 5 minutes each.

### **Step 3: *Define* the Problem**

**(5 minutes + 2 minutes for optional "Frame Your Design Challenge" video)**

Optional intro: Show video <http://www.designkit.org/methods/60>

Working on their own, each student should review their interview notes and begin to define the actual problem they would like to solve for their partner. The problem that is

identified may be a little different from the problem their partner identified. For example, if Partner A said that their problem was that they were late to school every day, the interviewer may have uncovered a possible root of the problem to be that Partner A was tired and disorganized in the morning and had a hard time focusing on getting everything ready efficiently. Or perhaps their interview uncovered that Partner A's real problem was that the city bus always runs 10 minutes behind schedule. These are very different problems that could lead to the same result (arriving late to school), so they would probably require different solutions.

In order to define the problem, students should identify any needs that came up in their interviews and note any helpful insights that they found interesting. These insights might help define the problem or may help when designing a solution. Students can reframe a need to define the problem. If there are several needs, they should choose the one they are most excited to address. In the examples above, it is possible that Partner A needs a way to be more efficient in the morning AND needs a more reliable form of transportation. Partner B should choose *one* need to address and write it as a design challenge. The Design Thinking packet can help guide the students through this step.

#### **Step 4: Ideation/Brainstorming**

**(10 minutes +2 minutes to show optional "Creative Confidence" video)**

Optional Intro: Show video - <http://www.designkit.org/mindsets/3>

Using the Design Thinking packet, students should sketch at least 5 interesting or radical ways to meet their partner's. Remind them that solutions may be invented objects or technology or may be new ways of doing things such as a routine or a process or even a life choice or direction! What will solve this person's problem? Encourage them to be creative and bold! If they have time, they should sketch as many ideas as possible. It is good to include silly ideas as well as practical ones.

**Step 5: Break for Feedback****(10 minutes)**

Remind students that Design Thinking is user-centered. Before they move too far along in the process, it is a good idea to get some initial feedback from their partner. The feedback will help them to know if they are on the right track and may give them even more ideas.

Have students share out their brainstorm sketches with their partner and ask for feedback. Suggested questions are included in the Design Thinking Packet. Give students about 5 minutes per partner to complete this step.

**Step 6: Reflect and Choose/Generate a Solution****(5 minutes)**

Give students a minute or two to reflect on the feedback they just received. What are they excited about. What details do they still need to add to their ideas? Then ask students to sketch out in detail a solution that they would like to try. This solution could be a more detailed version of one of their brainstorm ideas, it could be a combination of two or more of their brainstorm ideas, or it could be something completely new based on the feedback. They should choose something that they are excited to try.

*\*\*\*At this point, you may find that some students develop prototypes very quickly and others need more time. You may wish to explain Steps 7, 8 and 9 to the class all at once and then let them work at their own pace. Students who prototype and test more quickly should repeat the iteration step until everyone has built and tested at least two prototypes. \*\*\**

**Step 7: Rapid Prototyping****(10-20 minutes +2 minutes for optional “Make It” video)**

Optional intro: Show video - <http://www.designkit.org/mindsets/2>

Offer students the materials that you have pulled together for the prototyping phase (office and craft supplies, recyclables, etc.) and give them time to build/create their prototype. Remind them that their prototype may not be 3 dimensional and does not



have to work perfectly.

- If they are designing a cell phone shape that is easier to hold or manipulate, then their prototype does not actually have to function as a phone. They only need to create a prototype that allows the user to pretend they are using it.
- If they are prototyping an app or website, they can sketch out what the computer, tablet, or phone screen would look like for different features in the app or pages in the website. Later prototypes could be designed using online websites that would allow the user to click through the features/pages.
- If their prototype is a process, they may just need to develop a list of steps that can be acted out while pretending to enact the solution.

The most important aspect of the prototype is that it is testable. Their partner must be able to put it to the test in the next step. Prototyping can be challenging for students. Be sure to make yourself available for questions and helpful conversation.

### **Step 8: Testing – Share and get feedback**

**(10 minutes +2-4 minutes for optional “Learn from Failure and Iterate, Iterate, Iterate videos)**

Optional intro: Show 1 or both videos –

<http://www.designkit.org/mindsets/1>

<http://www.designkit.org/mindsets/7>

Have students reconvene with their partners and take turns trying out the prototype solutions. Users should try the solution by handling it, pretending to walk through the steps, asking questions, or any other way that they can imagine themselves relying upon the solution to solve their problem.

Partners should ask questions of their users to find out how well the solution works and what potential problems exist. The users should give as much information about what works, what doesn't work, and why.

**Step 9: Iteration – back to the drawing board!****(10-20 minutes)**

Remind students that design thinking is an iterative process.

Ask students to take the feedback from their partner to help them tweak, redesign, or start over with a second prototype. It is okay if they just need to make a few small changes and it is also okay if they need to go back to their brainstorm ideas and pick a completely new idea. *Students should continue iterating between prototyping and testing until all students have created and tested at least two prototypes.*

**Step 10: Clean up****(10 minutes)**

Prototyping can be messy. Set aside time for students to clean up the classroom. Be clear about what they should do with their prototypes. If it is okay for them to take prototypes home, let them know what expectations are for the materials during the rest of the class time. If materials need to be taken apart and repurposed for the next class, let them know how to organize the materials.

**Step 11: Reflection****(15 minutes)**

Remind the students that the purpose of the lesson was to better understand and gain experience with Design Thinking. Therefore, the final solutions – while fun and possibly useful – are a bonus.

Post the following questions for students to read (and read them aloud). Have students reflect for a few minutes silently or in writing about the questions. Then break into small groups or discuss as a class each of the questions.

Reflection Questions:

- What would you do next if you wanted to try a new prototype?
- How did the quick iteration pace feel? What did you like about it? What did you not like?
- How did asking for feedback from a real person affect the direction of your

prototype?

- What was it like to share unfinished work with another person?
- What do you think about the Design Thinking process?
- How might this process be different if you were working as a team with others?
- Can you think of other issues and problems in your life, family or community that could be addressed using Design Thinking?
- What questions do you still have about Design Thinking?