In this activity, students become playground designers tasked with designing and drawing a playground for themselves and a fictional friend using a persona. After sketching out their playground, they will pitch their design to get feedback.

Outline

Frame the Challenge	6 min
Introduce Playground Design	3 min
Introduce Innovator Mindsets and Scenario	3 min
Challenge	**54 min**
Introduce the Design Challenge	2 min
Brainstorm	5-7 min
Introduce New Criteria: Personas	5 min
Consolidate Ideas	5-7 min
Create a Concept Sketch	10-15 min
Share Solutions	10 min
Debrief	8 min
Total Time	**60 min**

Grade Levels: 3-5

Duration: 60 min

Concepts/Skills

User-centered design, empathy, inclusion, brainstorming, problem-solving, design thinking

Objectives

Students will:
- Determine the likes, dislikes, and needs of a fictional persona.
- Design a play space suitable for themselves and a fictional friend using a persona.

Materials and Preparation

Materials	
□ Persona Cards (1 per pair of students)	□ Sticky notes (2 colors/sets of 10 per student)
□ Playground Design Brainstorm (1 per student)	□ Poster paper (1 per pair)
□ Paper (1 per student)	□ (*Optional*) Ruler/Straight Edge
□ Pencil (1 per student)	□ (*Optional*) Colored Pencils or Markers

Preparation

1. Try the activity yourself, with other educators or kids you know. This will enable you to anticipate student questions.

2. Collect, organize and set up materials.

3. Assign students to pairs in advance, if necessary.

Adaptations for Distance Learning

If teaching remotely, consider a combination of asynchronous and synchronous options.

- **Introduction**: Share The Tech Interactive at Home guide asynchronously with students.

- **Brainstorming**: Have students begin synchronously via a video call with break-out rooms.

- **Sharing**: Have students use asynchronous collaborative tools and platforms (Google Slides, Jamboard, Padlet, Flipgrid, etc.) to share their designs and get feedback from others.

For more tips on adapting STEM activities to a virtual setting, see our Educator Tips for Remote STEM Learning.

Background Information

This lesson is part of our Design for All series, which explores concepts around empathy and inclusion while developing design thinking skills. This activity encourages youth to think about the environments around them and envision ways to make local spaces more inclusive.

Empathy and User-Centered Design

The value and importance of empathy and social-emotional learning (SEL) are no surprise to many educators. Empathetic students collaborate, listen, advocate and communicate. They have a strong sense of their own emotions as well as concern for others. Research shows that although innate, empathy is also a skill that can be built-up or improved through training and practice. By exposing children to many different types of individuals and their stories, they can move from simply understanding another's situation to actively offering aid and support.

Empathy is also central to many real-world engineering and design practices. Designers rely on empathy and the ability to understand a user's perspective in order to make the best possible products. This is called **user-centered design**. Designers try to understand how a user wants to, needs to, and will use a product. Their goal is to create a more useful

and innovative product. "Designing for the margins", a type of user-centered design, often results in products and solutions that work better for everyone. *For example*, musical playground features can provide important sensory input for some children and fun for others of all ages.

Accessibility & Playground Design

The ADA (American with Disabilities Act) guidelines are another example of how expanding access for individuals with differing needs can improve the experience for all. *For example*, when city planners started adding curb cuts to make public streets more accessible to wheelchair users, they also found it created a better experience for people pushing strollers, moving heavy items, and riding skateboards or bikes. These guidelines are also an example of how empathy and perspective-taking can result in concrete action towards bettering society.

In this activity, students will be asked to apply user-centered design practices to the challenge of playground design. They will have a chance to consider many different "personas" whose needs and situations may differ from their own. This activity does not require you to review the ADA guidelines, but understanding the reason designers adhere to them in their work and why that matters may be an interesting topic of discussion for more advanced students. ADA standards for play areas ensure that playgrounds and other play spaces are accessible for individuals with varied ability. This includes the height of steps in play structures, materials used for flooring, and other regulations to ensure that a public space is not inherently inaccessible to an individual with a disability.

Some notes on Inclusive Language:

- Sometimes students will talk about assistive devices or devices before people when thinking about inclusion. Due to the time available for your lesson and some students' lack of familiarity with this topic it works well to rephrase their statements back to them. Keep it simple, positive, and moving forward.
  - Example student statement: This ramp is for wheelchair people.
  - Example facilitator responses:

    Oh, you made the ramp so people can move up easier and maneuver wheelchairs up it as well.
    You made this ramp to make the castle more accessible to Sofia. What do you think Sofia and her friends might do when they reach the castle?
- People-first vs identity-first language: People-first language is a potential tool you can use in this lesson. It emphasizes referring to a person before a disability, focusing on the individual as opposed to defining someone by their disability. *Ex: Adult with epilepsy instead of epileptic adult, child with dyslexia instead of dyslexic child.* The intent behind this approach is that everyone wants to be thought of and discussed positively without being reduced to a tool they use or one aspect of their lives.
  - It is important to note that the preference for person-first language is not universal. For some communities, often those whose conditions relate to different ways of perceiving or interacting with the world, identity-first language is preferred. One example of this is the Deaf community where person-first language has been rejected as well as terms like "hearing impaired."
- Terms such as "the disabled," "differently abled," or "handicapped" are less widely used due to negative connotations and should be avoided.
- The most important thing is to respect the identity of the individual. Ask the person directly what their preferred language is if possible. If this is not possible, there are often more widely accepted terms within each community that you can fall back on. (See the style guide from National Center on Disability and Journalism for more information.)

Frame the Activity

Introduce Playground Design *(5 min)*

1. Ask students to describe a playground they have been to before. Have them list some examples of different playground features and components that they have seen.
   - Prompt students to think about more than just the equipment for a varied list.
     - *For example: Slides, jungle gyms, basketball court, sandbox, trees, water fountain, benches*

2. Ask students what they think a playground designer does.
   - Explain that playground designers are the people who decide what the playground looks like and how everything is constructed and placed.
   - *It is a playground designer's job to understand who they are building for (a school, a neighborhood, kids, grandparents, etc.) and understand the needs of those users. This is where empathy is an important skill to have.*
   - *Designers use empathy to look at their designs from the perspective of the people who will use it. Would this person be able to use what the designer has built? Would they enjoy it?*

Introduce Innovator Mindsets & Scenario *(3 min)*

1. Make a connection between playground designers and innovators.

2. Share the innovation design process graphic and the list of innovator mindsets around the outside: curious, perseverant, empathetic, collaborative, bold.

3. Ask volunteers to help give an example of a situation where you might need to use each of these mindsets.

4. Let students know that they are going to have a chance to practice these mindsets in a design challenge.

5. Introduce the scenario:

   > *Scenario: Today you are all going to be innovators and playground designers. You will have the opportunity to brainstorm your IDEAL playground, then work in pairs to bring your ideas together in an amazing final design.*
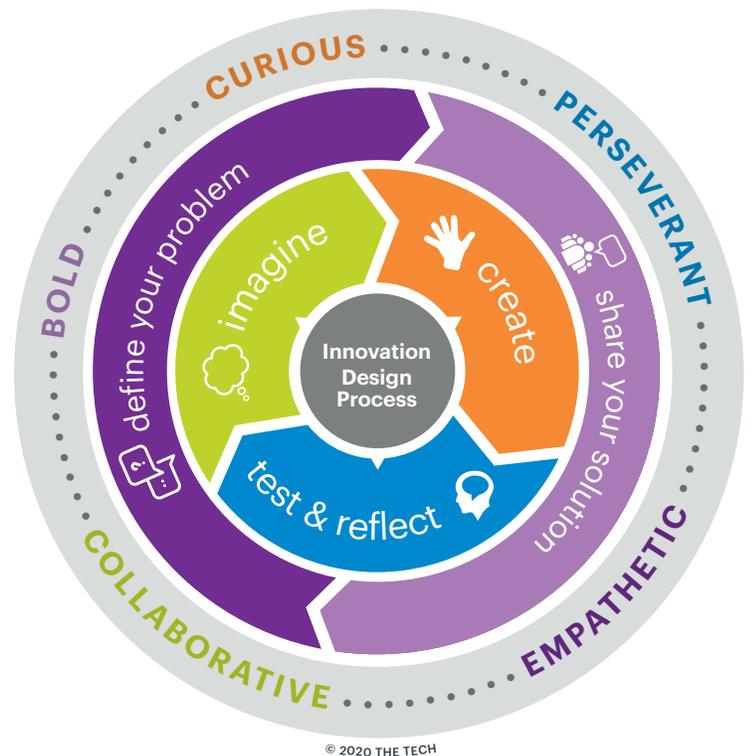
© 2020 THE TECH

Tech Tips

See our educator guides and videos for more design challenge facilitation techniques.
For this lesson check out:
- Innovator Mindsets
- Brainstorming

Challenge

Introduce the Challenge *(2 min)*

1. Introduce the challenge, criteria and constraints.

Design Problem	Make a concept sketch of the ideal playground.	
Criteria	• Brainstorm your likes, dislikes and needs before sketching. • Decide on 3 final design ideas to include in your playground.	
Constraints	There's a time limit!	

2. Group students in pairs if you have not already done so.
3. Address any questions students have before moving on.

Brainstorm *(5-7 min)*

1. If this is a new technique for your students, introduce them to the concept of brainstorming.
   - **Brainstorming** is a process used to creatively expand your thinking and generate a lot of ideas.
2. Inform students that they will be doing a sticky-note brainstorm before designing their playgrounds.
3. Give each pair a Playground Design Brainstorm sheet, piece of poster paper and 10 sticky notes per student. Each student in the pair should use a different color.
4. The pairs should divide their poster paper into 4 quadrants similar to the Playground Design Brainstorm sheet and label them Likes, Dislikes, Needs and Final Design Ideas.
5. **Idea Generation**: Next, have students think about what they would want in a playground. Have them write at least 8-10 things they like, dislike, or need. One idea per sticky note.
   - You can model this process by showing them how you would add your own likes, dislikes and needs.
   - If they are stuck, they can refer to the categories at the top of the brainstorm sheet and consider things they have seen and experienced before.
   - They should place their sticky notes on the poster paper, putting likes, dislikes and needs in the specific quadrants.
   - ***Note***: The Final Design Ideas quadrant will be reserved for later when students decide on ideas they will incorporate into their designs.
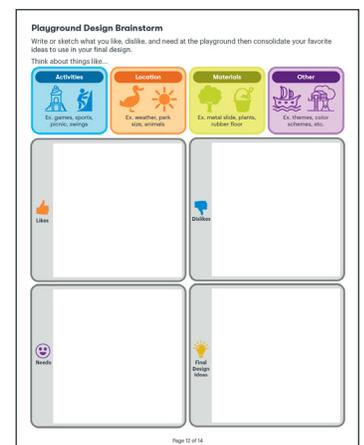
6. **Sharing Ideas:** Once students have a few ideas on the poster, they should begin to discuss, share and build off each other's ideas.

   • They can add more ideas, group similar ideas together, and begin to notice patterns, similarities and differences.

   • Encourage students to take turns sharing their ideas and respecting others' ideas.

   • Remind them that they do not need to agree fully on their likes, dislikes and needs. These differences are part of what they are going to look at later in the lesson.

7. If time allows, have volunteers share one or two things they noticed on their team's poster.

> **Adaptations for Distance Learning**
> • **Asynchronous:** Have students brainstorm individually using the My Playground Design sheet from the Tech at Home activity guide.
> • **Synchronous:** Host breakout rooms on a video call and have students brainstorm on Google Slides, Jamboard or another online collaborative tool.

Introduce New Criteria - Personas *(5 min)*

1. Ask students: *Who do designers design for? Themselves? Other people? As many people as possible?*

2. Introduce the concepts of **user-centered design** and the roles of **empathy and personas** in design thinking.

   • *Any playground you design won't be for just you — other people will want to play there as well. How can you be sure that the playground you design works and is fun for different kinds of people?*

   • *Why is empathizing with your user important for design?*

      – People are all different and have different interests, needs, and abilities that need to be met by things and places in the world.

      – Real World Connections: Designers (of devices and places) need to think about a wide range of needs and abilities when designing their devices and places to make the best designs. No one should feel unable or unwelcome because of who they are.

3. Let students know that there has been a change in the design challenge! They will practice user-centered design by incorporating the needs of a fictional friend/persona.

4. Introduce the new scenario and criteria.

> **New scenario:** *Congratulations on your work so far, playground designers! It's time to think about some of the other people who might come to your playground. You have been given a persona, a fictional friend, to design for as well. You need to learn about this new friend and try to empathize with them, find out what they need, like and dislike. Brainstorm some more ideas and create a concept sketch of the ideal playground that meets the needs of ALL of you!*

| **New Criteria** | Consider the needs, likes, and dislikes of the "persona" in your design. | |

5. Give each pair a persona card to represent their fictional friend.
6. Review one of the persona cards with the class as an example.
   - *This is <u>blank</u>. They are <u>blank</u> years old.*
   - *Who did they come to the playground with?*
   - *What do they need at the playground?*
   - *What do they like to do? What do they dislike?*
   - *This scale shows you what activities they want to do at the top and which activities they don't like at the bottom.*
7. Give each pair an additional set of 10 sticky notes in a new color to add their information to the poster.

Personas are fictional characters that help designers empathize with people who use their products. They include information about who the person is and what they want and/or need. Designers will often develop multiple user personas, based on interviews with real people, to ensure that they are creating a product that works for any user.

Empathy is caring about how others are feeling and understanding why they might feel that way.
- *For example*: If someone drops their ice cream on the ground, you might empathize with them because you understand that they are feeling sad about it. You might feel sad too because you know that they are upset. Then you might take the action of sharing your ice cream.

Consolidate Ideas *(5-7 min)*

1. Have pairs begin by making sticky notes that represent the likes, dislikes and needs of their persona. One idea per sticky note. They should add these to their poster in a new color.
2. Next, have students organize and analyze the information they have collected. They should do this by noticing patterns in the things they and their persona like, dislike, and need.
3. Have them ask themselves: *How can we use this information to design a playground that **everyone** will enjoy?*
4. Students may want to move sticky notes around and group similar ideas together. Some combinations of ideas may spark new concepts or inspiration. They can add these new ideas to their chart.
5. With 3 minutes remaining, encourage students to select 3-5 ideas which they will put in their concept sketch.
   - Students can write these new ideas on new sticky notes and add them to the Final Design Ideas quadrant of their poster.
   - If students need more structure or are struggling with this section, have each team member vote for their top three ideas with a dot. Then teams can use the highest rated ideas in their concept sketch.
6. If time allows, have a couple volunteers share one or two ideas that their team plans to use in their playground.

Adaptation for Advanced Engineers
- Have students draw their playgrounds in different orientations. *For example*: a street view and a birds-eye view. In this way they can illustrate some of the specific decisions around the layout: where does the sidewalk go, how big are the mulched areas, etc.

Create a concept sketch *(10-15 min)*

1. Once pairs have narrowed down their ideas, they should begin sketching out how those ideas fit into their playground design layout. These initial sketches will be **concept sketches**.
   - **Concept sketches** are labeled drawings used as a quick and simple way to initially explore a design, like a first draft. Architects, engineers and other kinds of designers all use concept sketches to think over their initial designs.

2. There are two options for creating the concept sketches:
   - *Option 1*: Each student can create a different concept sketch for their playground based on the same brainstorm.
   - *Option 2*: The pair can work together to create one concept sketch of their playground using poster paper or a combination of smaller sketches.

3. Emphasize that a concept sketch is not a final design or a piece of art. This is a way for them to figure out what will work best for their playground design.
   - *Don't worry about what it looks like, or how well you draw, these quick sketches are just another way for you to figure things out!*

4. While your students sketch, encourage them to consider things like:
   - *How close together is all of your playground equipment?*
   - *Where does the path or sidewalk to get to the playground go?*
   - *If the floor of your playground is tanbark, sand, or rubber chips, how much space does it take up and what shape does it make?*

5. Help students manage their time and use open-ended questions to support their process.
   - *What ideas do you have for your design so far?*
   - *What else could you try?*
   - *How did you consider the needs of your persona?*
   - *What else could you do to improve your design?*

Adaptations for Distance Learning

In a virtual setting, students can use online tools like Jamboard or Google Slides to collaborate on their playground designs. For a totally asynchronous option, students can sketch their designs on scratch paper and share via a photo or video.

Real-life Inclusive Playgrounds/Theme Parks

If students are having a hard time imagining how they might meet the needs of their personas, share some of these examples with them:

- Magical Bridge playgrounds: The Magical Bridge playgrounds in the San Francisco Bay Area, are fully inclusive and feature multiple experiences for youth (and adults) of all ages and abilities. Their play areas are multi-sensory, multi-use, and open to everyone.

- Morgan's Wonderland and Inspiration Island: Morgan's Wonderland is the first fully inclusive theme park in the United States. All rides and the water-park area are accessible to people of all abilities.

Both Magical Bridge and Morgan's Wonderland were designed and conceptualized by parents. These parents saw something that was missing for their children and sought to change that so that their children could have the same or similar experiences as other children.

Share Solutions *(10 min)*

1. Next, have students share their sketches with their classmates. Remind them that their designs do not need to be finalized. The goal is that they have a chance to share their process and how they met the criteria to meet the needs of their persona.
2. **Sharing Questions** can include:
   - *How did you consider the needs of your persona?*
   - *What would you add/change if you had more time?*
3. Options for sharing include:
   - *Gallery Walk*: Have students post their playgrounds around the classroom. Pairs will walk around and look at each other's designs. Have students leave each other comments and questions using sticky notes.
   - *Pair Share*: Have two teams pair up and share their designs and how it meets the needs of their group including the persona they were designing for.
4. Have students give each other positive feedback on their designs. Encourage them to tell the other team member one thing they liked or noticed.

Extensions

Pitch and Advertisement: Playground designers have to pitch their designs before they can be built. Have students present their designs to each other with an advertisement to showcase their playground during the class share-out. This could be a skit, poster, or filmed commercial trying to convince the audience to visit the playground. Option: assign designated roles to group members that are connected to careers, such as artist, equipment designer, landscape architect, supervisor.

VR Playgrounds: Use a platform like Panoform to have students create virtual reality versions of their playgrounds. Panoform is a free web-based platform for creating low-fidelity virtual reality content. With Panoform, photographs of students' drawings are converted into a 360° image for a three-dimensional experience.

Story and Journey Map: Have students write a story and/or draw a journey map of their persona's experience in the new playground. What would they do when they get to the playground? What are some of the activities that they would participate in? Have them consider the feelings and emotions of their persona as well as their interactions with others.

Debrief *(8 min)*

1. After students share their work, bring the conversation back to the concepts of empathy and user-centered design to reflect on what they learned.
2. Have students consider the innovator mindsets from the introduction. Ask them to do a quick self-assessment of how well they used empathy in this activity. (*Option*: Use the Self Reflection on pg 3 in the Innovator Mindset Tech Tip.)

3. Lead a short debrief with some of these questions.
    - **Reflections on Sharing**
        - *What were your favorite ideas from all the playgrounds?*
        - *How did you notice others meeting the needs of their personas?*
        - *What other changes would you want to make if you had more time?*
    - **Reflections on Empathy**
        - *How did using empathy change your playground design?*
        - *Was it difficult to design with others' interests/well-being in mind? Why or why not?*
        - *What was one thing you changed or added to make it more inclusive or meet everyone's needs?*
    - **Real World Applications**
        - *Do you think that places in your community or school are inclusive? What could be done to make them more accessible and/or welcoming to diverse groups?*
        - *What is one place you would want to make more inclusive? What is one tool/thing you would want to make more usable for more people?*
4. As they debrief, students may realize that their design was not as inclusive as they hoped.
    - Perhaps they included something in their design that someone didn't really like or there were things that could make the playground better.
    - They may realize that someone's needs or likes were ignored during the collaboration process.
5. Remind them that the collaborative process is iterative, which means they can always improve on their designs. Understanding and empathizing with others is a long-term process, not a quick fix.

Next Generation Science Standards

Grades	Standard	Description
3-5	ETS1-1	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

Common Core State Standards English Language Arts
Speaking and Listening

Grade	Standard	Description
3	SL.3.1.D	Explain their own ideas and understanding in light of the discussion.
4	SL.4.1.D	Review the key ideas expressed and explain their own ideas and understanding in light of the discussion.
5	SL.5.1.D	Review the key ideas expressed and draw conclusions in light of information and knowledge gained from the discussions.

National Core Arts Standards
Visual Arts: Creating

Grades	Standard	Description
3-5	VA:Cr 2.3	People create and interact with objects, places, and design that define, shape, enhance, and empower their lives.

Vocabulary

For more tips on vocabulary and common engineering terms, see our Tech Tip: The Language of Engineering.

- **Brainstorming:** A process used to creatively expand your thinking and generate a lot of ideas.
- **Concept Sketch:** Labeled drawings used as a quick and simple way to explore a first try of a design, like a first draft. Architects, engineers and other kinds of designers all use concept sketches to think over their initial designs.
- **Empathy:** The understanding of or the ability to identify with another person's feelings or experiences.
- **Persona:** Fictional characters that help designers empathize with people who use their products. They include information about who the person is and what they want and/or need. They are based on research and interviews with real people, so they also include details about their lives that could help a designer decide what is most important to include in their product.

Resources and References

1. Design for All: Playground Project on The Tech Interactive at Home
2. Educator Tips for Remote STEM Learning
3. 2010 ADA Standards Chapter 10: Recreational Facilities
4. Disability Language Style Guide, National Center on Disability and Journalism
5. Magical Bridge Playgrounds
6. Morgan's Wonderland and Inspiration Island
7. Panoform Virtual Reality platform

Student Handouts

Title	Page
Playground Design Brainstorm	12
Persona Cards	13-14

Playground Design Brainstorm

Write or sketch what you like, dislike, and need at the playground then consolidate your favorite ideas to use in your final design.

Think about things like...

| Activities	Location	Materials	Other
Ex. games, sports, picnic, swings	Ex. weather, park size, animals	Ex. metal slide, plants, rubber floor	Ex. themes, color schemes, etc.
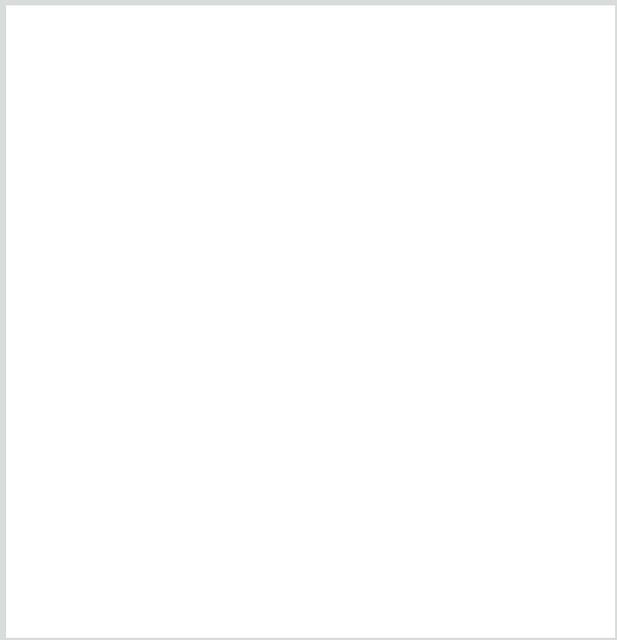
Likes
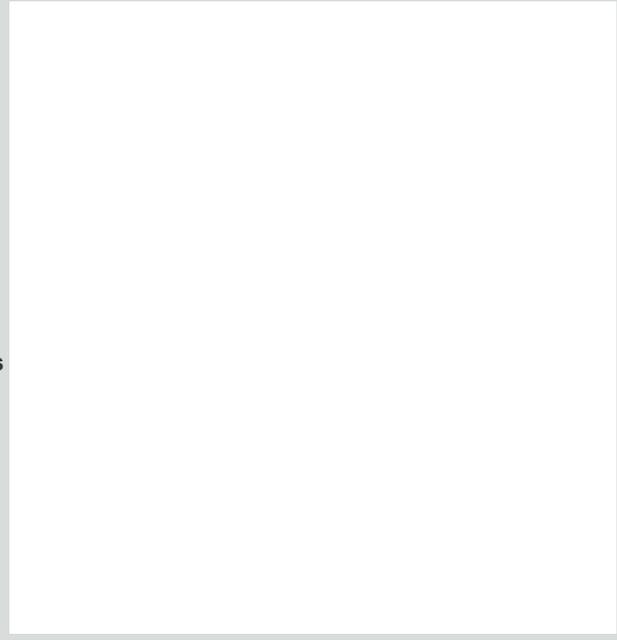
Dislikes
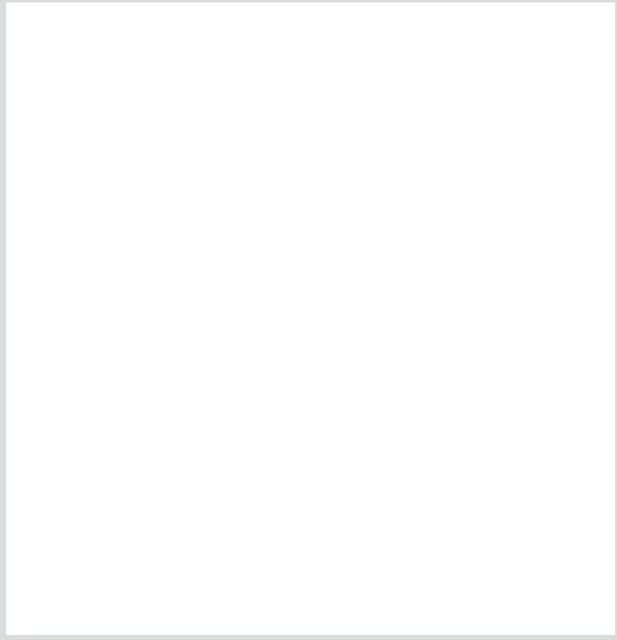
Needs
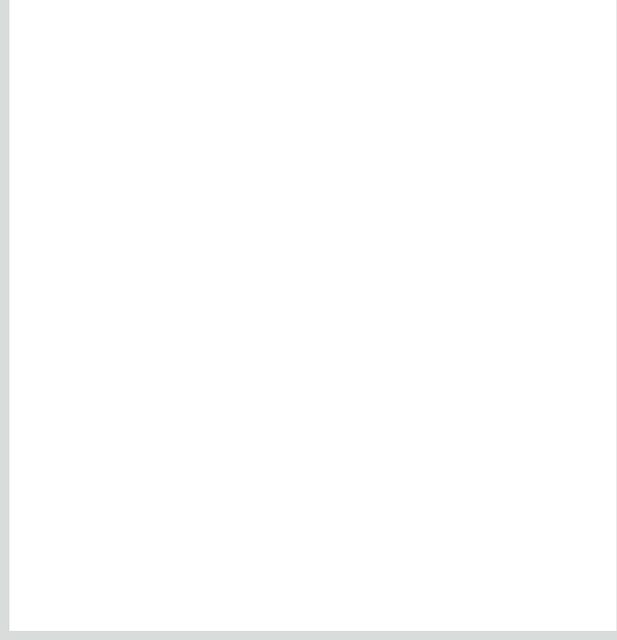
Final Design Ideas

Persona Cards

Dai — Age 11
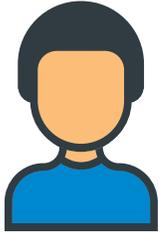
Today, I came to the playground with my dad and my 8-year-old brother.

> When I'm at the playground, I need a quiet place to rest.

> I like to run around and spin really fast.

> I don't like crowds and noisy places.

Dai likes Minecraft and the color red.

👍
- SWINGS
- RUNNING
- CROWDS
- NOISE

👎

Sofia — Age 7

Today, I came to the playground with my mom and my grandmother.

> When I'm at the playground, I need the ground to be flat so I can use my wheelchair.

> I like to play on the jungle gym and watch the birds.

> I don't like when I have to sit and rest but it's too far from everything to keep playing.

Sofia likes music and playing make believe.

👍
- FRIENDS
- JUNGLE GYM
- MONKEY BARS
- CLIMBING

👎

Fernando — Age 8
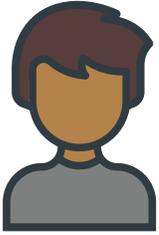
Today, I came to the playground with my mom, dad, and two brothers.

> When I'm at the playground, I need snacks when I get tired and a place to wash my hands after.

> I like to draw the things I see in the park and swing super high on the swings.

> I don't like getting dirty or wet.

Fernando likes making up new games.

👍
- DRAWING
- SWINGS
- BUGS
- DIRT

👎

Phuong — Age 12

Today, I came to the playground with my dad and my step-mom.

> When I'm at the playground, I need shade and water when I take breaks from playing.

> I like to look for bugs and climb up high.

> I don't like missing out on playing when I have to stay in the shade to protect my sensitive skin from the sun.

Phuong likes gymnastics and monkey bars.

👍
- CLIMBING
- BUGS
- FRIENDS
- SUN

👎

Persona Cards

Maalik — Age 9
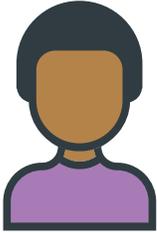
Today, I came to the playground with my dads and 2-year-old sister.

When I'm at the playground, I need a place to play with my baby sister safely.

I like to go down the slide really fast and play with building blocks with my sister.

I don't like getting sand in my shoes and when grass makes you itchy.

Maalik likes hide & seek and building things.

👍
- SLIDE
- HIDE & SEEK
- SISTER
- SAND
👎

Niha — Age 9

Today, I came to the playground with my mom and my dog.

When I'm at the playground, I need to be able to bring my dog, Rover, with me.

I like to dig in the dirt with my dog, but I don't like playing with kids I haven't met before and crowds make me unhappy.

Niha likes playing in the woods by her house.

👍
- DOG
- RUNNING
- PLAY FETCH
- CROWDS
👎

Jessie — Age 10

Today, I came to the playground with my grandma and grandpa.

When I'm at the playground, I need to be able to practice with my soccer ball.

I like reading and playing sports with my friends but I don't like climbing up high on the jungle gym.

Jessie likes swimming and basketball.

👍
- SOCCER
- READING
- JUNGLE GYM
- CLIMBING
👎

___ — Age ___

👍
👎