

Accessible Playground Unit Plan

Overview

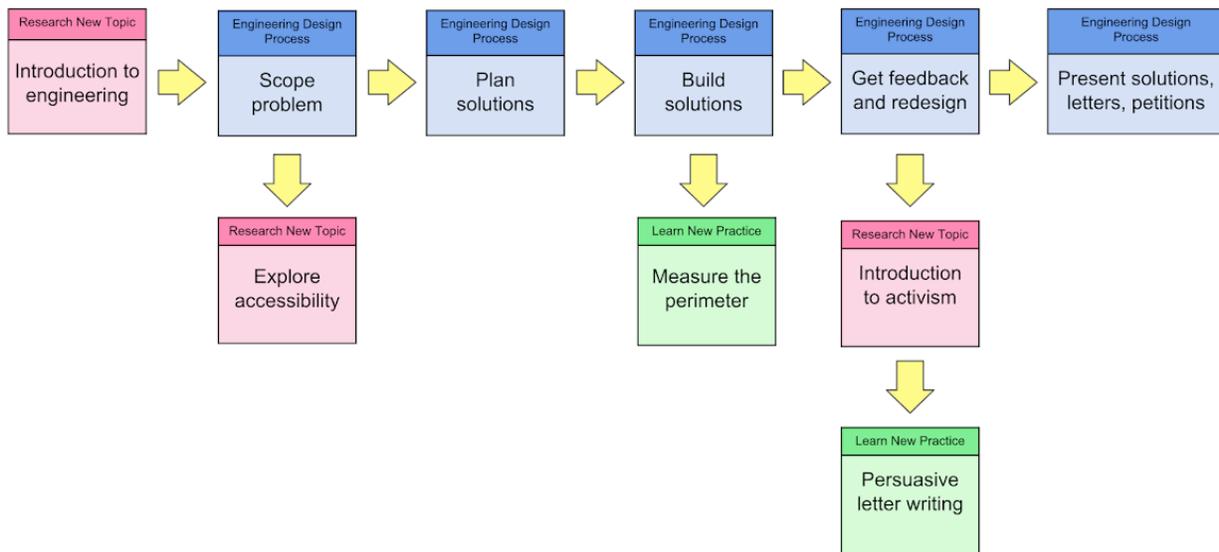
Skills and connections: effective communication, persuasive and explanatory writing, measurements, drawing diagrams, engineering design process

Age: 2nd grade

Community problem: Students noticed that typical playgrounds are only designed for physically abled students, and decided that it would be so much for fair if there were a playground where all students of all physical capabilities could play together. This involved the recognition that students with special needs have the same rights, needs, and wants as other community members, including participation and integration, and feeling as if they belong to a community.

Student design goals: The students set out to design playground equipment that is accessible for children with disabilities, tying together concepts of problem scoping, planning designs, building prototypes, and explaining designs through drawings and persuasive writing.

Unit flow:



Lesson Outlines

Lesson 1: Introduction to Engineering

Estimated Time: 60 minutes

Key Questions:

1. How do people solve problems?
2. How can I use engineering to solve problems in the community?

Assessment (Exit Ticket): What does an engineer do? What is technology? What problems do you see around you that might be solved by an engineer?

Advice for the Educator:

- Allow students to sketch their ideas before sharing
- Provide opportunities to share with a partner before sharing with the whole class
- Give the students time to think (20-30 seconds of wait time before giving a second prompt and the same amount of time after the student voiced an idea).

Tools: The posters for EDP and the Norms for Engineering Work (see below)

Activity 1: Turn and Talk

Tell your partner about a time when you fixed something or solved a problem. Allow several students to share with a whole class. Provide a sentence frame: *I fixed something when _____*. Elicit prior knowledge of an engineer and technology. The students might make connections to what they have learned in science class.

Activity 2: Mystery Bag

Introduce the Mystery bag activity: "In this bag, I have 3 pieces of technology. I want you to guess what it might be." Take several guesses, then show the first piece - bandage. What problem does it solve? Repeat the process with the next two pieces of technology. As a whole class, create a working definition of technology.

Activity 3: Videos

Watch 2 videos of engineers in action and discuss as a whole class what the students have noticed in the work of engineers and how did they fix the problem.

<http://pbskids.org/designsquad/video/cardboard-playhouse>

<http://pbskids.org/designsquad/video/roller-coasters>

Activity 4: Engineering Design Process (EDP)

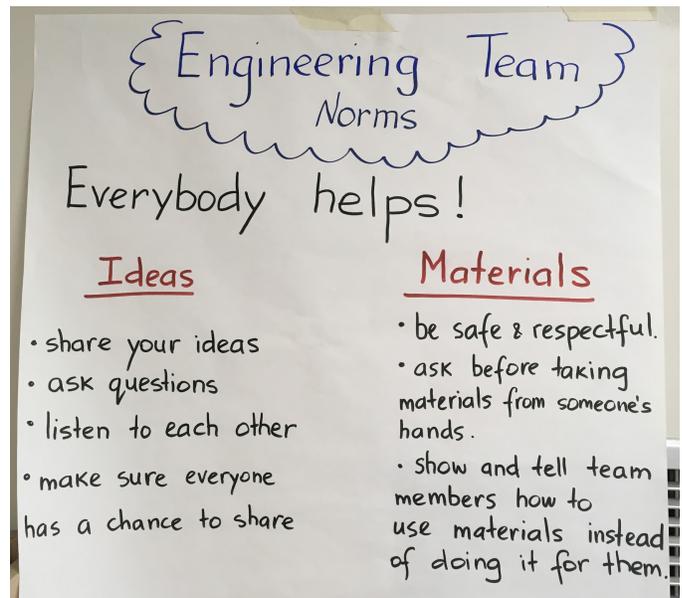
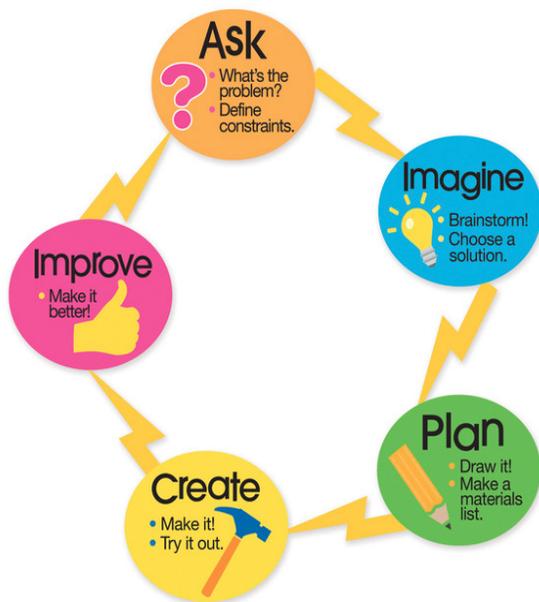
Present the visual for engineering design process and explain that these are the steps that the engineers take in order to solve problems.

Activity 5: Norms of Engineering

As a whole class, discuss and create the poster for Norms of Engineering work. As an option, if the students lack experience fixing things, you can present something broken and ask the students to think about how they as a class could fix it.

More Resources:

- What is technology? https://www.youtube.com/watch?v=Giiz81_uzK8
- Engineering Design Process - <https://www.youtube.com/watch?v=D9I35Rqo04E>



Lesson 2: Introduction to the Problem

Estimated Time: 60 minutes

Key Questions: How do we use language to communicate and gain knowledge?

Assessment (Checklist for Group Work):

- We used the Clarify an Idea Discourse Move
- Everyone had a chance to share
- We listen and asked questions about each other ideas

Activity 1: Introduction to Clarify an Idea

Explicitly teach the Clarify an Idea Discourse Move in group discussion. Provide an example of a time when you didn't understand someone, then using the sentence stems, model how to clarify a misunderstanding: "Can you please say that again? What did you mean when you said ___?"

Provide another example/situation and have the students practice with partners clarifying move. Clarifying can include:

Lower English proficiency—short, simple expressions with common vocabulary and some simple connectors (because, so, then, etc.)

Higher English proficiency—more complex sentences that contain more than one idea, with a broader range of logical connectors used to create additional types of logical relationships between ideas.

Activity 2: Practice Clarifying and Identifying Improvements

Provide students with big pieces of paper. Draw 3 columns: Observations (We see ___), Positives (I like that our playground has ___), and Improvements (Our playground needs ___). While students look at the pictures of the playground and talk in small groups, be listening for how the students practice clarifying each other's ideas.

Activity 3: Group Discussion of Improvements

Bring the class together to share their observations. Then discuss the playground users, and who will benefit from a better playground. After the discussion, the students will work in their teams on ideas for improvement. End the lesson by debriefing, sharing out ideas, and reinforcing the Clarify an Idea model.

Resources: Pictures of the playground, visual with playground vocabulary, chart paper and markers

Lesson 3: Introduction to Accessibility

Estimated Time: 120 minutes

Key Questions:

1. How do we use language to communicate and gain knowledge?
2. How do we use the engineering design process to solve a community problem?

Assessment (Checklist):

- We used the discourse move of paraphrasing and/or clarifying
- EVERYONE had a chance to share
- We listen and asked questions about each other's ideas

Advice for the Educator: Help students listen carefully to and think about others' ideas, asking questions like...

- "Who can rephrase or repeat?"
- "How can you show (gesture, act out) their idea or identify the model or big idea that the student is using in his explanation?"
- "How can you draw a picture/sketch of what they are saying?"
- "Whose idea/thinking is most different from your own?"
- "How can you show or tell us a way their idea changed your questions or your thinking?"

Day 1

Activity 1: Question Formation

Display a grammatical structure of question formation. Present an anchor chart for question words. Model forming a question using question words as well as a yes or no question. Create a KWL chart (3 columns: what I know, what I want to know, and what I learned) and record some prior knowledge and questions from the whole group discussion.

Activity 2: Understanding Disabilities

Read some picture books about kids with different kinds of disabilities. Focus on finding the similar interests and similar preferences of all children. Ask about what all children need and some needs of daily tasks that are different for the children with disabilities.

Activity 3: Questions and Debrief

Allow the students to write down their questions individually. In a whole class discussion, generate a class list of questions and record it on a large chart paper. Refer to the question words and grammatical structure of the question anchor charts.

Day 2

Activity 1: Questions for the Expert

Visit or invite someone who has first-hand knowledge about the children with special needs. Ask the students to introduce themselves and explain the playground problem briefly. Students will read the questions generated by the whole class as well as get an opportunity to ask follow up questions. Practice paraphrasing during the ask-and-tell time.

Activity 2: Update and Summarize

After the visit, the students will revisit the KWL chart and record the new information in small groups. In a whole class discussion, the students will summarize what they have learned about the needs of the students with disabilities and revise their playground improvement goal to include usability for all students.

Lesson 4: Planning Solutions

Estimated Time: 60 minutes

Key Questions:

1. Why are we building an accessible playground?
2. How do we use the Engineering Design Process (EDP) to solve a community problem?
3. How do we use language to communicate and gain knowledge?

Assessment (Checklist):

- We compared ideas
- Everyone had a chance to share
- We listened and asked questions about each other's ideas

Advice for the Educator: Help students apply their thinking to others' ideas; prompt peer-to-peer talk:

- "Who will re-tell that idea for us? Please check back with X to see if you told it correctly."
- "Who is ready to tell us the connection between those two ideas?"
- "You look uncertain. What can you ask X to find out more?"
- "How does that idea build on the last?"
- "What comparisons might one make between ___ and ___?"
- What makes ___ the same/different?"

Activity 1: Brainstorming and Comparison

Individually, the students will have a chance to sketch their ideas based on a design brief that contains requirements and constraints of the design. They will each contemplate solutions for a more inclusive playground based on the knowledge of the needs of all the children.

The students will then compare ideas using stems such as "Your idea is the same because ___," "Your idea is different because ___," "This idea is better because ___" in a respectful way. Revisit the norms for engineering: everybody gets to share an idea. Prompt the students to clarify, paraphrase, and summarize while comparing ideas and choose the most viable solution to prototype.

Once the students decide on one solution per group, provide big pieces of paper to the groups in order to make one final, more elaborate sketch of their design.

Activity 2: Share and Discuss

Let the students share and describe their planned solutions to other groups (in whole group or rotating stations). Facilitate a discussion where students identify common and unique features of presented solutions.

Lesson 5: Building Solutions

Estimated Time: 60 minutes

Key Questions:

1. Why are we building an inclusive playground?
2. How do we use the EDP to solve a community problem?
3. How do we use language to communicate and gain knowledge?

Assessment (Checklist):

- We practiced explaining and telling according to the language model
- We used other discourse moves that were discussed in previous lessons
- Everyone had a chance to share
- We listened and asked questions about each other's ideas

Advice for the Educator: To make ideas and thinking public and available for discussion, analysis, and agreement or disagreement:

- “Tell us more about what you’re thinking.”
- Clarify/repair how idea is expressed, without overriding student’s ownership. “Did I say your idea correctly?”
- Re-voice to connect everyday expression to more precise academic language. “So, you’re saying...”
- While the students are developing their prototypes, provide following language cue for making internal thoughts understood.
- Which thing in the design is the most important?
- Do you think that causes __, or is it happening because of __?
- How does your design show __?
- Does your design show everything we need?
- Could you explain this part of the design?
- What is happening here?
- What is missing from your design? What did you not include?

Activity 1: Design with Materials

Introduce the available materials and allow the students to explore the materials, deciding what they need for their design and why. They can use the sheet included below to help them think about the materials. The students also should make a list of materials they need for their design. After the students produce a list, provide them with the materials requested.

Activity 2: Working with Strong Structures

Offer a mini-lesson on building sturdy structures, in which you let the students explore the strength of different shapes. While the students are working in small groups, help make ideas and thinking public and available for discussion, analysis, and agreement or disagreement. Press for additional information and ask students to provide reasons and support their ideas.

Activity 3: Wrap Up

Let the students share and describe their prototypes solutions to other groups (whole group or rotating stations). Allow other students to ask questions and give feedback.

Building Materials: craft sticks, straws, cardboard, pipe cleaners, foam, index cards, paper plates, paper clips, string, tape

Material	It looks like ___	It feels ___	We can use it for ___
The _____ is a good material to build _____ with because it is _____.			

Lesson 6: Measurement of the Perimeter

Estimated Time: 60 minutes

Key Questions:

1. How do we use the EDP to solve a community problem?
2. How do we use language to communicate and gain knowledge?

Assessment (Checklist):

- We explained and told in an articulate way
- We used other previously discussed discourse moves
- Everyone had a chance to share
- We listened and asked questions about each other's ideas

Advice for the Educator: Help students deepen their reasoning:

- Ask for rationale
- Ask how students would test their idea
- Engage students in a phenomenon that is inconsistent with the explanation or model. "How can we revise the model/explanation to account for this new evidence?"
- Compare two student-generated models or explanations and analyze how the class' collective thinking has changed based on the evidence collected (this can also be done individually)
- "What new questions occur to you now after the experience and discussion?"
- "What do you need to know more about now?"
- Mark/emphasize/"rebroadcast" an idea by re-voicing, or ask a student to re-voice or paraphrase to give an idea more exposure so everyone can hear and think about it again.

Activity 1: Learning About Measurements

Teach a mini-lesson on units of measurement and the perimeter and provide a worksheet for finding perimeter for every student.

Activity 2: Perimeter Practice

Take a small group of students with clipboards and measuring tools to the playgrounds. Ask them to measure and record their findings on paper. When they come back into the classroom, provide the real measure estimates for a swing set. Ask students to compare and explain their thinking about whether our playground has enough space for the swings. While the students are working, take the next group of students to the playground to measure.

Activity 3: Wrap Up

When all of the students had an opportunity to measure and compare measurements, ask the groups to share their explanations, compare two student-generated explanations, and analyze how the class's collective thinking has changed based on the evidence collected.

Lesson 7: Getting Feedback and Redesigning

Estimated Time: 60 minutes

Assessment: Small group and whole group discussion observations, written design explanation

Advice for the Educator: Help students listen carefully to and think about others' ideas:

- “Who can rephrase or repeat?”
- “How can you show (gesture, act out) their idea or identify the model or big idea that the student is using in their demonstration?”
- “How can you draw a picture/sketch of what they're saying?”
- “Whose idea/thinking is most different from your own?”
- “How can you show or tell us a way that their idea changed your ideas or your thinking?”

Activity 1: Peer Feedback

While the students are sharing their design explanations, allow the other students to comment, question, and/or offer suggestions for improvements. Then, in whole group discussion, the students will compare and identify similar designs and features that satisfy the needs of children with disabilities.

Activity 2: Improve Designs

After the share out, the students redesign their prototypes, based on the feedback provided. Then the students will write their design explanations using templates.

Activity 3: Wrap Up.

Let the students share and describe their prototype solutions to other groups highlighting the features and added improvements (in whole group or rotating stations).

Name: _____

Design Explanation

Our design is _____.

This is how it works. First, _____

Next, _____

Last, _____.

The students with disabilities can use it because it has ____

It will help our playground to be more inclusive because ____

Names of the teammates: _____

Our Idea of the design

Lesson 8: Introduction to Activism

Estimated Time: 60 minutes

Key Questions: How can we advocate for change in our community?

Advice for the Educator: Make ideas and thinking public and available for discussion:

- “Tell us more what you’re thinking”
- Clarify/repair how an idea is expressed, without overriding student’s ownership. “Did I say your idea correctly?”
- Re-voice to connect everyday expression to more academic language. “So, you’re saying...”

Activity 1: Persuasive Inspiration

Let’s get some ideas from the cows in the book “Click, Clack, Moo: Cows That Type.” Read the book and then ask, “How do the cows persuade Farmer Brown?”

Activity 2: Taking Action

Create a class list of strategies and persuasive words. Decide which strategies and words the students can use to persuade others to help us.

Lesson 9: Persuasive Letter Writing and Fundraising

Estimated Time: 60-120 minutes (or more if needed)

Advice for the Educator: Help students listen carefully to and think about others' ideas:

- “Who can rephrase or repeat?”
- “How can you show (gesture, act out) their idea or identify the model or big idea that the student is using in his explanation?”
- “How can you draw a picture/sketch of what they are saying?”
- “Whose idea/thinking is most different from your own?”
- “How can you show or tell us a way their idea changed your questions or your thinking?”

Day 1

Activity 1: Understanding the Audience

Brainstorm a list of ideas for the audience of the persuasive letter. Gather information about the potential audience and why it's important to understand this in the first place.

Activity 2: Brainstorming Strategies

Consider the idea of *pathos*: how do the audience feel about this issue? Generate ideas for using facts, visual images, and ways of representing your perspective that would appeal to this audience.

Consider the idea of *ethos*: you must position yourself as credible. What do we know and how do we know it? We should tell a compelling story from our experience.

Review the list of persuasive arguments generated with the class during the previous lesson. Which strategies might we use in our persuasive-letter writing?

Activity 3: Writing the Letter

Display a mentor persuasive letter or engage in shared writing activity. Identify 3-4 main elements (state the problem, explain the solution, provide at least 3 reasons, and include the ask/concluding sentence). Ask students to begin the first draft of their persuasive letters. They should highlight each main element in a different color.

Activity 4: Sharing

Ask one or two volunteers to share their drafts. Identify the elements of persuasive writing that they used in their letters.

Day 2

Activity: Sharing and Improving

Prior to this lesson, look over the students' letters, make notes, and decide on your conferencing groups. Have the students work on their letters with partners, making sure that each element is included, and making suggestions where necessary.

Then ask one or two volunteers for their letters. In the whole group, read the letters and identify each part referring to a persuasive structure. Ask students about strengths and necessary improvements of letters.

Lesson 10: Presentation

Estimated Time: 60 minutes or more

Advice for the Educator: Be aware of varying language abilities in the class, and differing cultural norms:

- Students may not adhere to American standards for effective presentation skills (eye contact, voice level) due to cultural norms that may contradict those in American schools. When explaining presentation skills, mention how these are expectations in the United States and not only the only way to present information effectively
- In determining what scaffolds may be needed to help students access the curriculum, consider the following: native language supports, working with partners, using gestures and/or sentence frames
- Consider creating a visual presentation anchor chart with information about effective presentation skills for each point. Post it in the classroom as an additional support for students

Day 1

Activity 1: Presentation Demonstration

Tell the class you are going to present a persuasive letter explaining the problem, providing reasons, and asking for support from the mayor. First, model an ineffective presentation (e.g. without eye contact, poor body language such as fidgeting or slumping, and a low, monotone voice). Students should take notes on what they noticed did/did not work well in the presentation.

Students should share their notes in pairs and then debrief as a whole class: “Why do you think my presentation was ineffective? Why do you think it did not do a good job of explaining the problem and providing the reasons for our need to solve it?” Make connections between the poor presentation skills and good presentation skills by changing the statements shared by students with a solution or alternative to make the presentation better.

Redo the initial presentation, applying students’ suggestions. Ask students to reflect on the changes you made with questions such as “What made this presentation better? Why?” Then, have them rate this presentation using the rubric (see below).

Activity 2: Presentation Practice and Debrief

In pairs, the students will practice reading/presenting their letters and offer feedback using the rubric. Debrief the presentation process by asking a couple of questions such as “Why is

it important to have good presentation skills when you are reading your letters? What things might you need to prepare to strengthen your presentation?"

Day 2

Activity: Present to the class using everything we've learned.

	Always	Sometimes	Never
Eye Contact: looks at the audience and makes eye contact.			
Volume: not too loud, not too soft. Just right!			
Body language: stands up straight and does not slump or fidget.			
Register: does not present like a robot!			
Speaks clearly: all words are clear and easy to understand.			