Wizards of Wright

Lesson: Design Thinking for Elementary Students

Use WOW! Lesson Intro to begin.

Background Info for Wizards:	Design Thinking is a process used by engineers and designers to help them solve complex problems and create solutions & products that meet people's needs. It's solution-based thinking that starts with a general goal, not just a specific problem. Design Thinking focuses on empathy, students trying to solve problems that affect people. Those people might be fictional characters in a novel, or they might be their community's very real homeless adults. The process requires students to ask themselves what it's like to be that person, the client or "end user." It's the idea that students are attempting to solve problems—real problems—and serve the needs of others. *This lesson is written for younger students,* **K-3rd grade students**.
Materials:	- Philippines map - Guatemala map - *Plastic Bottle Schools* packets - Items to build with… Bunch-ems, Legos, STEM Master Building Toys, Magnetic Sticks, Connectagons, Picasso Bristle Tiles, clay, popsicle sticks, straws, aluminum foil, pipe cleaners, toothpicks - Challenge Prompts
Lesson Time: 40-50 minutes	Introduction: 5 minutes Guided Lesson: 10 minutes Student Activity: 20-30 minutes Conclusion: 5 minutes
Learning Targets:	Students will understand the importance of considering who the user is when they solve a specific problem.
Introduction for Students: 5 minutes	When solving a problem, Engineers have to think about who needs the solution, and does it actually meet their needs. - If the problem was "What should we have for dinner?" and the solution was "Cheese Pizza", but you are allergic to dairy products…then that's not a good solution. - If the problem is "How will our clients and customers get to our office on the third floor?" and the solution is "We'll put in several flights of stairs" ….that's not a good solution if any of your customers have health issues that makes climbing stairs difficult.

	The solution has to work for the end user. Today our job is to be an engineer and we will think about making a solution to solve somebody's problem. We'll have to figure out who we are helping and what to make to help them.
Guided Lesson: 10 minutes	We need to consider if different people will use our creation differently, or will different people need different solutions; *and we need to remember that our ultimate goal is to create something that solves a problem, by helping others*. Let's practice by talking about a special example – a creative and original design for a school. Schools are some of the most important buildings ever put up around the world, but they often aren't built because of a lack of materials or lack of money. What material do we not lack around the world? Plastic bottles. There was a shortage of schools in the Philippines (show map) and in seeing a need, people looked for a solution. Pepsi partnered with the My Shelter Foundation to build a school house made of 9,000 plastic bottles in San Pablo, Philippines. Thousands of volunteers recruited by Pepsi collected the used bottles, helped to raise awareness of the Philippines classroom shortage and participated in building the structure. Students in Guatemala (show map) got a plastic bottle school too. (show pictures) Designing and building a solution like this, with an end-user or group of users in mind, encourages us to ask "Who will use this?" and "What do we need to know about how they will use it?' It was important to start with the same question: What is the problem? (But maybe the problem or need was different in the two countries since the solutions seemed to be a little different.) When the groups began to propose solutions, they needed to acknowledge the different requirements and restraints that would affect the build. (Was it just a school or was it for community groups as well? Did temperature/climate, area, and sustainability affect the design?)
Student Activity: 20-30 minutes	Students will use prompt cards for this challenge. Each prompt is what the customer is looking for. *Discuss with the teacher if students are best to work on their own, or in a small group of 2 or 3.* 1. Give each student or group a challenge card, or you can decide to pick one for the whole class to work on. *Engage with students and lead them through the steps instead of trying to teach them each step.*

	2. <u>Empathize. We need to know our user/customer</u>. Empathizing is difficult for our younger students. In order to help them think about their end user, as you move around the room ask them who they are designing for. Ask questions about who their customer might be. 3. <u>Define. What do they really need?</u> Ask students what their customer needs, and why might they need it. <u>Learn. Learn about requirements and constraints</u>. We won't put any special requirements or constraints on students of this age. They need to design for the specific need of their customer, using the materials you have provided. 4. <u>Think. Brainstorm potential solutions</u>. Ask students (or groups) to come up with at least 3 ideas before deciding on one. If they are working in groups, they can share a card, but build their own thing. If you're working as a class, list ideas on the board, again, they can individually build their own thing. (Remember, some students will do best on their own, and some will feel more comfortable letting a partner take the lead.) 5. <u>Build. Make a prototype</u>. Give students time to build a prototype. 6. <u>Test</u>. Have students (or groups) present their prototypes to the whole class, or to small groups. There won't be time to redesign, but please give them time to show the class what they made.
Conclusion: 5 minutes	Ask students: What is an end user? Why is it important to think about the needs of users when designing a solution to a problem?

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