BYF Construction Club Curriculum

Session 1

Concrete Pouring and Civil Construction

Materials:

* Safety glasses
* Computers/tablets
* Concrete mix
* Cup for each student
* Stirring stick for each student
* Three concrete molds
* Magnet strip
* Shape set for every group
* Catapult kit for every group
* Marshmallows to test with

Objectives:

* Students will be able to describe the process of mixing, pouring, and setting cement.
* Students will be able to identify a variety of careers in civil construction.

Potential Prep:

* Put concrete mix in a cup for each student so it is ready for them to take.

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| Greeting Activity – 10min  Connections with solid fill | Categories Game - Getting to know each other:   * Divide students into teams of six. (Slide 2) * Round 1:   + Tell the teams: **Put yourself in alphabetical order of your first name. But you cannot talk to each other! The first team done wins!**      - At the end of the round give the groups time to know each other's names. * Round 2:   + Tell the teams: **Put yourself in alphabetical order according to your last name. Again, no talking and the first team done wins!**      - At the end of the round give the groups time to know each other's names. * Round 3:   + Tell the teams: **Put yourself in order according to your birth date. Again, no talking and the first team done wins!**   At the end of all three rounds, gather students into a circle and ask them to recite their names so that the other teams can learn them as well. Then have students take their seats. |
| Objective Preview – 10min  Presentation with media with solid fill | Open the PowerPoint provided and share with students the skills and objectives they’ll accomplish this session.  Life Skill: (Slide 3)   * Patience   + Ability to wait for something without getting angry or upset.   + **Concrete takes time to dry. You can’t decorate or move on until you have allowed that time. We must learn to be patient.** * Integrity   + Doing what you are supposed to do when no one is looking.   + **There will be a lot of waiting time when we use concrete. How will you choose to spend that time?**   Construction Skill:   * Concrete pouring (Slide 4-5)   + Say:     - **We are going to learn about civil construction today. These are the careers that help us build roads.**     - **Watch this video and notice what kind of work you see the people doing to pour the concrete.**   + Show the video to students:     - <https://www.youtube.com/watch?v=v-aqazCa4So>   + Call on a few student volunteers to share what they saw. * Awareness of careers in civil construction (Slide 6-7)   + **Good observations! Today we’re going to learn about five different cement careers, four of them you saw in that video!**   + Briefly give students an overview of the following careers using the PowerPoint slides provided   + Cement Mason     - Build structures from concrete   + Cement pourer     - Drives cement truck and oversees cement leaving the truck.   + Cement laborer     - In charge of distributing cement from the truck into the area of space.   + Concrete finishers     - Levels concrete   + Operator Engineer     - Operates heavy equipment needed to construct roads |
| Pre-Teach – 10 min  Presentation with media with solid fill | Talk the students through how to handle their materials and the expectations to help keep everyone safe.  Materials/Tool Handling:   * Concrete (Slide 8-9)   + **Cement is to concrete as flour is to bread. So cement is the powder we are going to mix with water to get our concrete magnets.**   + Put 2 Tbsp. powdered concrete into your cup.   + Mix it with 1 Tbsp. water.   + Stir the concrete mix and water together until you get a thick substance about the consistency of sour cream or a thick milkshake.   + Pour your wet concrete into one of the spaces on the mold at your table.   + Make sure the back is smooth.   + Label your piece and place your magnet.     - Label by placing a piece of paper underneath the mold like a map. Each child should write their name on the paper in a similar spot to where their piece is.   + **Concrete takes a long time to dry, so we are going to start our activity and then move to something else while it dries.**      - In a later session you will take your magnets out of their molds and decorate with two colors of paint.   Safety Expectation: (Slide 10)   * Everyone “on site” wears goggles   + “On-site” refers to anyone working on completing the project * Everyone is responsible for their own part of the project.   + **Today that means that you are responsible for your magnet, but not anyone else's.**   + **Keep your hands to yourself and your project.**   Pass out molds, evenly distributing them to groups around the room.  Give every student a cup with some mix in it and stirring rod.  Put a glass of water on each table. |
| Focus Activity – 1hour  Hammer with solid fill | Display direction slides (Slides 11-13)  Allow students to work on mixing and pouring their concrete. (10 minutes)   * Stir concrete * Pour into the molds * Initial your mold * Place your magnet so that you can see your initials.   After all concrete is poured and while it sets:   * Take the career test on BYF Indiana (Slide 14) (5 min)   + <https://indiana.byf.org/>     - Navigate to Menu, then Career Quiz   + *Note: At the end, students can skip putting in their contact information to see the results* * Results Discussion (5 minutes)   + Put students in groups of three (Slide 15)   + Ask students to discuss these questions in their group:     - **Share your results with your group.**     - **Do any of you have jobs in common?**     - **Were you surprised by any of your results? Why or why not?**     - **Which job result are you most excited about? Why****?**   + Bring the discussion back to the whole class and ask groups to share out (Slide 16)     - **What were your three most exciting jobs?**     - **Why were they exciting?** * Overview the coming weeks (Slide 17) * Introduce the groups of three (Slide 18)   + In each group there will be one project manager and two laborers.     - Project Manager       * Timekeeper       * Read directions       * Manages team       * Get materials       * Give final report       * Head of “teamwork”         + Choosing paint colors       * Takes the project home     - Laborers       * Check personal safety equipment       * Monitor area       * Monitor appropriate use of tools       * Use tools       * Paint * Project Manager Game (slide 19) (15 minutes)   + **We are going to play three rounds of this game so that everyone gets a chance to practice being the project manager. Choose now who gets to go first, second, and third.**   + Game instructions:     - The project manager goes to get the vision from the club facilitator. They get to see the arrangement of colored shapes.     - The project manager then returns to the group and must communicate that vision to their group without touching the materials. The group must build that arrangement of colored shapes, based on their project manager’s communication.          * + - *Note: If you need more time at the end, have students again take turns being project manager and create their own vision to communicate to their group.* * Choose who will be the project manager for each upcoming project: Birdhouse, Car, and Catapult   Build the catapult (Slides 20-24) (30 minutes)   * Distribute catapult kits to each group. * Show direction slides to help students assemble their catapult. * Allow students to experiment with where their fulcrum is placed.   + **In the final session we will be using your catapults to knock down some of the structures we create! Do your best to create the strongest and farthest throwing catapult you can.**   + Provide each group with small marshmallows with which to test their catapult.   + *Note: Designate a direction or area in which students are shooting their catapults so that groups changing their design can do so out of the line of fire.* * When groups like their design have them store their catapults for the final session. |
| Job Exploration – 20min  Presentation with media with solid fill | Slides 25-31  Civil Construction Focus   * **Civil construction is all about building roads and bridges. There are many good jobs and careers that are part of civil construction. We talked about cement masons, cement pourers, cement laborers, concrete finishers, and operator engineers briefly at the beginning of class.** * **Does anyone remember what those jobs are?**   + If students need refresher, play the video again and reidentify the roles. * Have students turn and talk: **Can anyone think of how our activity today could connect to those jobs?**    + Have a few partners share out.   **Now, let's hear from a real industry professional who can tell us about their career in civil construction!**   * + Introduce a community partner if applicable.   + If no community partner can attend introduce the video. * Show slide with general salary information on it. * Open the floor for students to ask their own questions of the industry professional.   + Note: If no industry professional is available ask students what their questions would be and make a list. Send this list to your Coordinator and they will try to get those questions answered.   Questions for industry professionals:   * What soft skills are important in your job? * What does your “office” look like? Work Environment? * What education did you need to get this job? * What is your favorite part of your job? * What is some good advice to someone who wants to go into your field? |
| Wrap-Up – 10 min  Customer review with solid fill | (Slide 32-33)  As a review activity, have students complete the google form below.  <https://forms.gle/vRuEZwgYAr7hiMAS8>  Why did you join construction club? (Open ended answer)  What was your favorite career opportunity on your career quiz?  How much fun did you have today? (Scale of 1-10)  Leave the catapults for demolition in session 6. |