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ENVD 4363: Sustainable Design Practice
Due April 1, 2015

Design Module 1 Report

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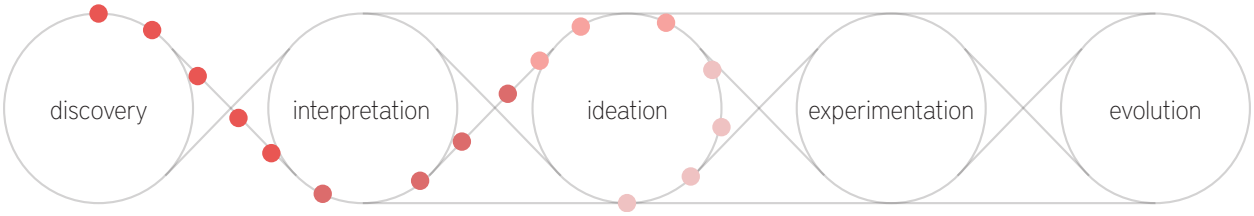
Participatory Design

Our goal of working with the students in the Applied Science class has been to connect the design process we, as designers, use regularly, with the concept of systems they are learning about. By going through the design process to create a growing system, we have all exercised our problem-solving abilities that are critical for creating sustainable solutions in life. We came to realize the effectiveness of delegating tasks that allowed the boys and girls to work on two separate systems, which created the social space they needed to be tolerant of one another. John and Drew focused on the aquaponic sink and Patty and Lucy worked together to create an experimental grate system. They crossed paths throughout the eight class periods and collaborated the most when it came to connecting the two systems. By overlapping systems with the sink as a water source, we created a more productive codependent system. The boys and girls became a team by recognizing their parts as half of a whole. Even though it is not entirely complete, we are happy to have designed and built a complex and unique life-supporting system.

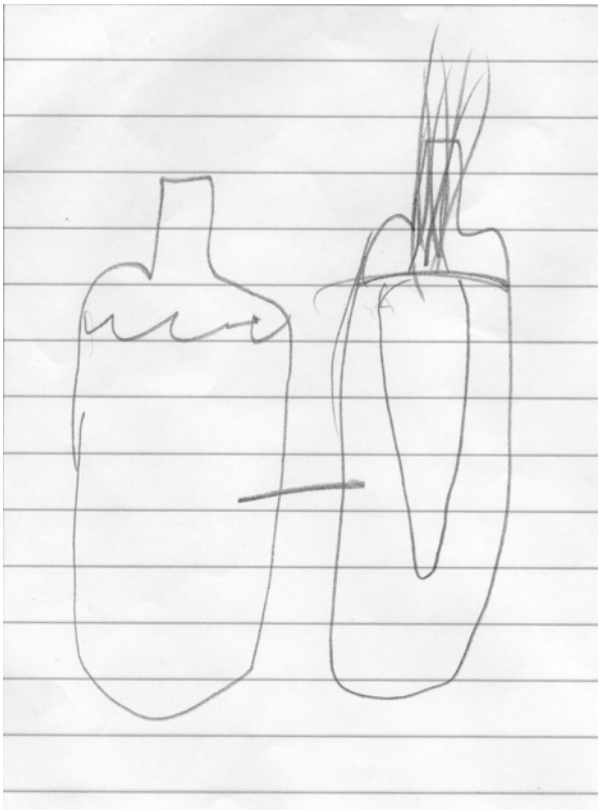
Biggest Obstacles

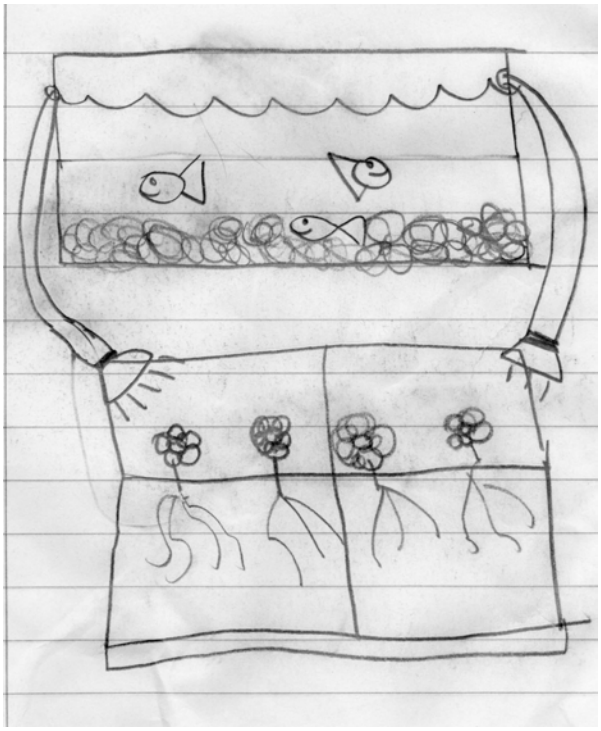
Our biggest obstacles were given to us on a silver platter, as we had two eighth grade boys and two sixth grade girls. This automatically was a challenge because of the difference in the maturity levels and the fact the girls and boys in middle school don't always see eye to eye. We decided to address this issue without forcing the kids to mesh, and let them mesh over time. Once we had a design idea in place and the building process started, the kids semi-forgot about their preconceptions and worked together to create their project. The boys and girls separated, but in the end we brought them together to make one cohesive system. Another obstacle was that we had different personalities within the group that contributed to alienation within the students. Lucy has a dominant personality and lots of complicated ideas so the boys would mostly just roll their eyes at her and not take her seriously. Patty is very shy so sometimes it was hard to get her to explain her ideas. The boys, John and Drew, sometimes thought they were too cool for the girls and got distracted easily because they needed to be doing something constantly. We were able to address these obstacles of different personalities with assigning separate tasks, keeping them busy, and asking them to do things that didn't require words such as sketching or building.

week four: brainstorming & sketching

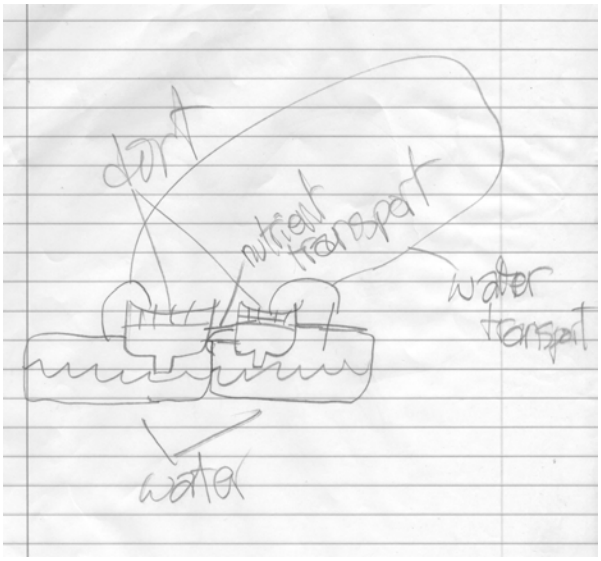


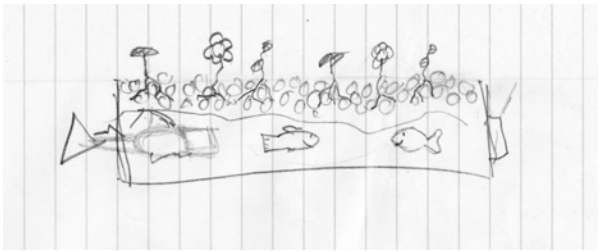
We started off the beginning of class with the design thinking presentation in order to explain to the kids how the design process works and also to give them a framework to work through. Our goals for this day were to describe the process, see how they relate to it, and then use this framework to brainstorm a design. Also, we needed to brainstorm a design idea and make a list of materials we needed to get at ReSource. The post-it exercise started after the presentation and our group got into it at first. They enjoyed breaking up the steps and seeing how what they had done so far applied to each step. However, after too long of doing this they grew restless and eager to design. This was a setback because the boys started goofing off and the girls just grew quiet. One of the boys, John, turned to one of us and asked, “what's the point of this?”. What he was asking was what is the point of designing sustainable things, how does this pertain to him? We gave him a short explanation but it still seemed like we were losing his interest. It clicked in our brains that we had spent too long on a task and we needed to move on, so we told them to take out a piece of paper and sketch the system they would like to construct. It was interesting because although each of the four kids drew a variation of aqua and aeroponic systems, each sketch had something different to offer. John introduced a bubbler machine to oxygenate the water, Drew offered a screen system to hold the plants, Patty showed a drip system to water the plants, and Lucy proposed the concept of a flora/fauna system. It was amazing to see how creative the kids could be. This set the perfect precedent for the next class because we accomplished our goal or brainstorming and coming up with a design because now that we knew what they wanted to do, we just had to combine all four systems into one. We even had time at the end of class to collect the list for ReSource!

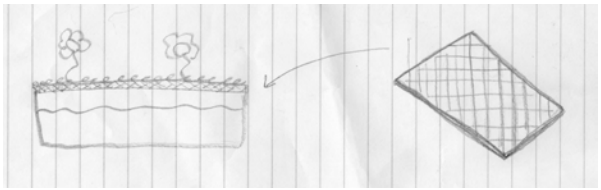





Mint
Flora
Fauna

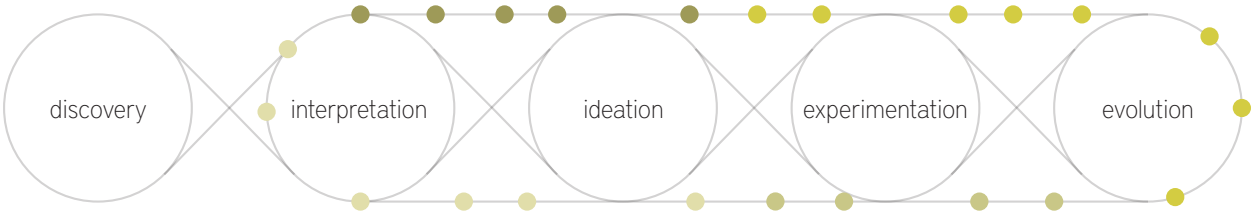

dirt
nutrient transport
water transport
water





week five: trip to ReSource

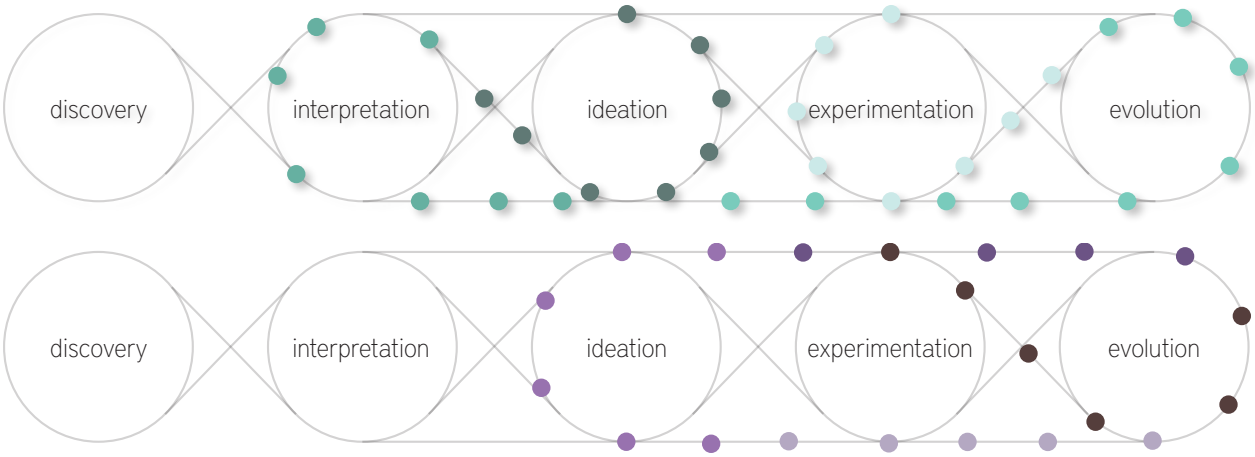
everything but the kitchen sink



The trip to ReSource was a fun and hectic day of class. Since we had to take the bus, our time was limited and there is so much to see at ReSource. When we first arrived, the students were so excited about the field trip that they were running in all directions and hard to keep together. Drew was late that day because of an appointment, but had his dad rushed him down to ReSource because he was so excited to join the rest of the class. This brought us joy to see that the students really cared about the project. Our group typically separates between the 6th grade girls and the 8th grade boys, so we wanted to try and get the group to work together. Once we gave them specific parts and materials to find they became very focused and creative. They were innovative with the reuse of materiality, offering different suggestions such as using a circle saw blade in a pulley system or using a potato sack as a screen. They worked as a team and each contributed ideas and materials. The students would grab different materials and come up with the craziest ways of using it. We were the last ones to leave and we were running, pushing our cart to make the purchase!

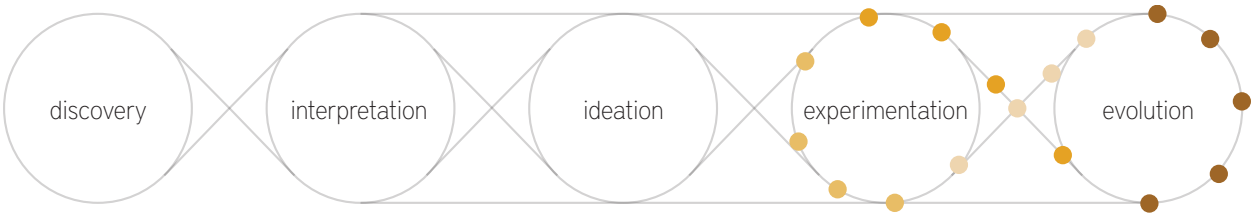
Materials purchased at Resource:
Sink with attachable hose / faucet
Potato sack (2)
Picture frame (with picture still inside)
Grate
Circle saw blade
Rope
Insecticide pump with spray
Wooden flower pot

weeks six & seven: making the two systems

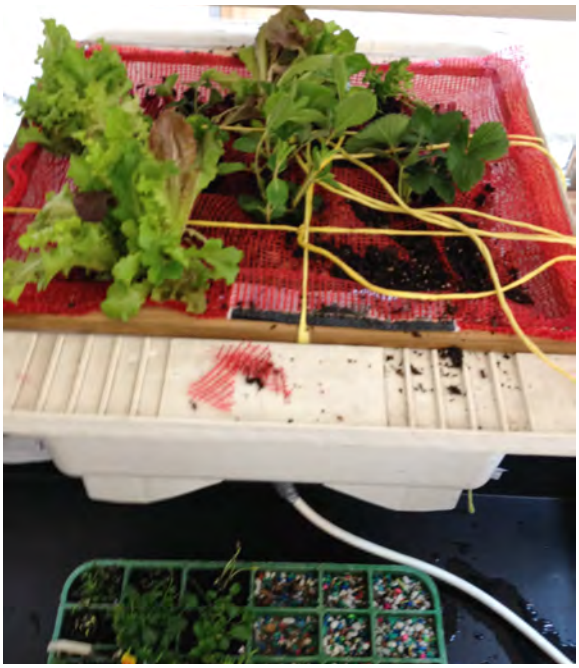


Weeks six and seven were dedicated solely to the building process. During this time we went through the interpretation, ideation, experimentation and evolution phases. This phase included a lot of trial and error. The first build day we considered to be the most productive. The group was so eager to be hands on and start building the system. One of the first big decisions we had to make was between using the grate on top of the sink or somehow using the frame. We ended up deciding to use both to build a codependent system consisting of two parts. The boys fixed the hollowed out frame to the sink for the aquaponic part of the system. We were not sure if our hose would properly seal to the sink. It initially looked like it fit, but when we filed the sink with water, there was leakage. We nailed a potato sack to the frame with carpet nails. The boys then filled the sack with clay balls to act as the growing medium. The girls focused on filling in the grate with a mixture of soil and gravel with a variety of plants as the second and dependent part of the system. It is dependent on the hose from the first system to irrigate it. Lucy was absent the first build day, which really allowed Patty to speak up and get involved. She is normally very quiet, but this day she really started to open up. She was really excited about the gardening and was interested in the using the different soil mediums to discover their impact on the plants.

week eight: connect the systems



This was our last day to finish our growing system. The final product definitely resembled what we were hoping for. The main problem we encountered was in our efforts to connect the water source of both systems through a hose from the sink. Erin had attempted to seal the hose and the drain, but it leaked. This made us nervous to fill the sink high enough with water to reach the planted potato sack on the top and to dedicate this as the fishes' new home. John arrived late on this day, so Drew stepped up and was very determined to stop the leak. Strategic layerings of duct tape and aluminum foil sufficed for the day. When John arrived, he and Drew finished up with the potato mesh frame and then, as a group, we nestled them into the bed of clay balls. We then assembled all of the pieces together. We filled the sink and placed the planted mesh frame on top, and then set the sink on a ledge for gravity to allow water to flow through the hose and water the crate system by its side. This was the final step to bringing our systems together.



Biggest Accomplishments

John, Drew, Patty, and Lucy overcame all of their differences between age and gender and were able to build a functioning system as a team. At the beginning, there was a clear separation between the boys and girls, the boys barely acknowledged their existence. One notable change was that they began to recognize how their teammates were responding to them and adapt to be a better team member. For example, in the beginning stages, the boys were getting annoyed at Lucy's excited ideas. She recognized that and toned it down in order to function better as a group. We are proud of how maturely she handled the situation. Throughout the weeks they went from being clearly separated to working together as a team. After separating them into the two systems that worked with their individual interests they were able to build a cohesive project. John, Drew, Patty, and Lucy were all very flexible when it came to filling roles to make sure that different tasks were finished. Patty and Lucy collaborated with filling, planting, and documenting the grate system, while Drew and John were also very good at going back and forth between finishing the mesh planting bed and preparing the sink.

With the final class presentation, we could tell how the students in our group grew in terms of self confidence and pride in their design. During the first couple of class periods, we often needed to encourage the students to share their ideas with the rest of the group, and especially with classroom presentations when previously they either grew quiet or allowed Lucy to explain the project. All of the students raised their voice to do a good job of explaining the different parts of the project and how they fit together. Moving forward we hope they can apply these skills of innovation and collaboration in various parts of their life, and maybe even this experience will show up on one of their education timelines.