

Repurpose Engineering Design Challenge

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Plastic “Paper” Chains

Overview of Product:

Plastic “Paper” Chains are a new twist on the age old paper chain that kids have made for years. My idea is to use smooth sided plastic bottles as the repurposed item cut into rings. This would be packaged in bags of 100 rings or maybe more so that kids could link and build many formations to fill hours of creative time while trying to repurpose plastic bottles and keep them out of the landfill. Kids can link them into linear chains or use one link as a central build and link several links from that central link to create spider web-like formations and such.

Additional Materials Needed:

Packaging

Manufacturer Instructions:

A smooth plastic bottle would need the label taken off, and then the bottle would need to be washed. The top curved part of the bottle needs to be cut off as well as the bottom of the bottom of the bottle so that all that is left is the uniform cylinder. (I chose to use Meijer brand 17 Fl Oz, a 6 cm diameter bottle for my prototype.)

The manufacturer needs to cut 2 cm wide rings for the plastic chain links. They then need to cut the link in my special way so that the link is able to hold weight. Cut a gradual diagonal that lasts 12 cm from the left side to the right side of the link so that you get a separated ring. This cut will allow for the ring to curl up more and become naturally “linkable”. See the diagram, diagonal cut last 12 cm.

The manufacturer would need to cut the bottle in a very smooth manner or if he couldn't, he would need to lay each side of the link on a hot surface to melt the rough edges to smooth them.

Target Audience:

My target audience would be children for a creative activity or teachers for their classrooms.

Why this Target Audience?:

Paper chains have always been a stable craft activity for kids of all ages, and building activities have always been an activity that children have loved. With these linkable rings, kids can build all sorts of formations. They can make the traditional “paper chains”, but with them already formed and easily linkable, they can create all sorts of other formations with trial and error. They can make forms like spiderwebs to chainmail clothing. They are easily linkable and deconstructed. Creative products are always welcome on the market. Parents and teachers are always looking for something new to spark their children’s creative side, and open-ended play always seems to be one that resonates with parents and teachers alike. Both groups are willing to pay for simple and easy fixes for creative play, and I feel that this could fill both of these requirements. As support for this statement, people are buying white puffy balls packaged in a bag and being sold as snowballs so that kids can have an indoor snowball fight. People buy things for convenience and ease because life is busy. If this is sold as a creative STEM toy with a twist for keeping bottles out of the landfill and thus out of the ocean longer, I think it is an idea that is viable. Plus, extension sets are always an option to make it more fun and more advanced.

Removal From the Waste Stream:

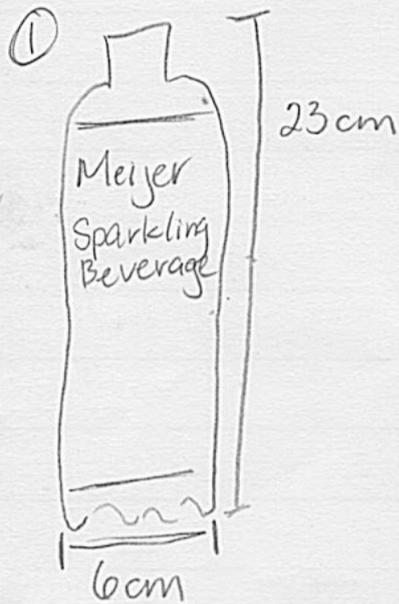
This idea removes smooth sided plastic water bottles. I am thinking this idea could be extended to 2 liter and 3 liter soda bottles, as well, for creating a variety of sizes, but I am just starting with the 6 cm diameter smooth sided bottles for now. This takes many bottles out of the waste stream because to make one single set, one would need a lot of these bottles.

I just guessed that a bag of 100 links would be enough to make a fun set, but I am really not sure about that. I only cut up two bottles and linked them together. They linked great, held the weight, and linked multiple links on one ring as I described. If I were manufacturing this to sell for a profit, I would have to look at a physical amount of 100 links and play with them and see if 100 links would actually make anything. This might actually be too few.

Finding these bottles and transforming them into them into a new toy would be great, and a large number of plastic bottles would be needed to make one set. Finally, it is a simple idea. A few strategic cuts, and we have a creative STEM set that people might be convinced to buy. If it could delay a large number of bottles ending up in the landfill, then that would be great! This is why this would be a very good idea for removing from the waste stream.

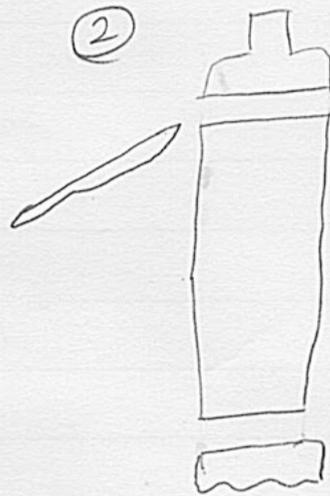
Plastic "Paper" Chains

My Prototype



Important Features

- Thicker Plastic
- Smooth Sides



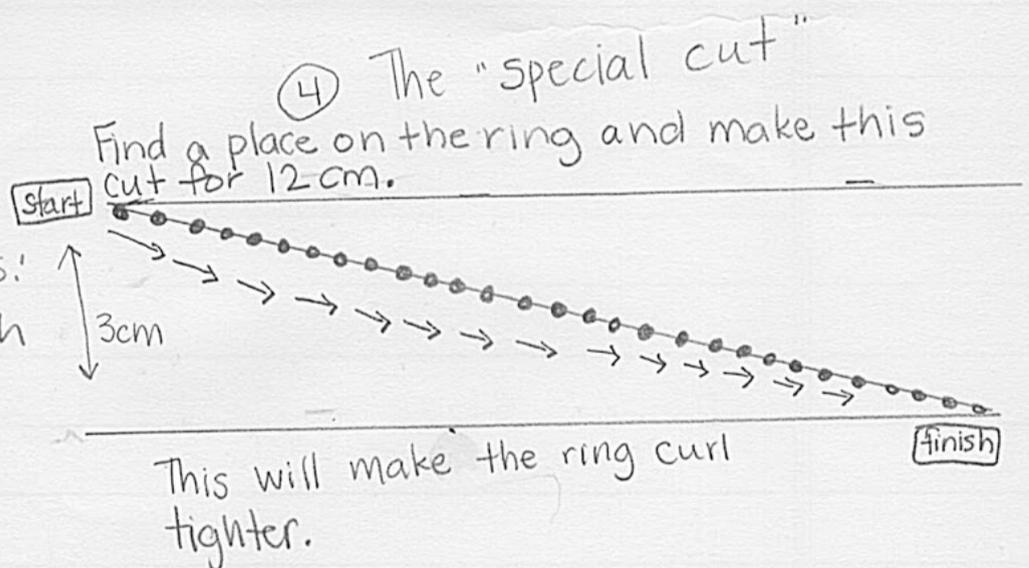
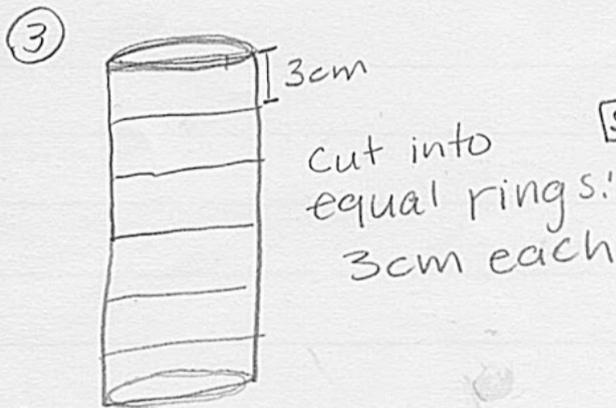
* Wash Bottle

* Remove Wrapper

* Cut off:

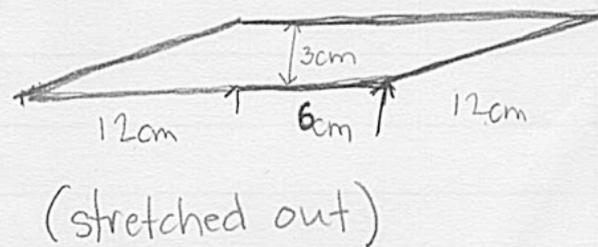
- top wrapper
- bottom

* Keep cylinder



once cut, it looks like this'

⑤ Link rings together



DIY Minnow Catcher Kit

Overview of Product:

DIY Minnow Catcher Kit is an idea that I had invented out of being a fisher girl and a nature camp instructor. This is an adaptation of the real wire minnow catcher that is used to catch large amounts of bait for a fishing excursion. I saw that a two liter bottle had potential for possibly catching minnows for me, so I designed this contraption after several trials. This model is my best version. My idea is to have all the supplies in one box with the directions enclosed as a fun STEM set so kids can make a minnow observation instrument. The repurposed item is the 2 liter plastic soda bottle.

Additional Materials Needed:

String, staples, packaging

Manufacturer Instructions:

First, wash and remove the label of the two liter bottle. Then, cut the top of the bottle off, making sure to leave at least 1 inch of the straight side past the curved top. This is very important. Both pieces will be used: the top and bottom. Cut an eight foot length piece of string. Print instruction sheet.

Box the bottle pieces, string, and instruction sheet into an attractive box.

Target Audience:

This is meant for students as a STEM crafting activity. It allows students to make an instrument to observe wildlife up close.

Why this Target Audience?:

Kids are always curious about animals and learning as much about them. I know I always was. My mom and dad always took me camping and fishing. We were taught to respect wildlife, and we learned so much about it while we were actually touching nature. This tool is easy to make, but it allows any school age child the ability to get close to aquatic life and make quality observations in its natural habitat without much effort. It will allow kids to pursue their interest in the outdoors, and successfully capture what is normally a difficult organism to obtain without more advanced equipment. If I can help bring curiosities to children, I will. This is why I want to target this audience. They will appreciate it. I have shared it with my day camp kids at a nature camp I

created, and they were crazy in love with it. I taught my own daughters how to make them when we went to a lake in Michigan, and they were capturing fish all weekend. Anytime I have kids, a lake, and a bottle, I show them. There is pure awe, and it is because kids love to capture wildlife and observe fish. There is excitement in observing nature, and I want to instill this in our youth.

Removal From the Waste Stream:

This removes two liter bottles from the waste stream. Each kit would require one, 2-liter bottle. This would delay one bottle per kit from entering the landfill while exciting a child about aquatic life.

BUILDING INSTRUCTIONS:

TIE A KNOT AT ONE END OF THE STRING.

PLACE THIS END INSIDE THE BOTTOM PIECE OF THE BOTTLE.

TURN OVER THE TOP PART OF THE BOTTLE AND LAY IT INSIDE OF THE BOTTOM OF THE BOTTLE.

STAPLE THE INSERTED UPPER TOP TO THE BOTTOM PART. MAKE SURE TO STAPLE THE STRING IN PLACE.

USE INSTRUCTIONS:

PLACE A PIECE OF BREAD INSIDE THE CATCHER.

SINK THE CATCHER INTO A POND, STREAM, OR LAKE.

CHECK EVERY COUPLE HOURS SO THAT YOU DO NOT KEEP A LIVE ANIMAL IN THE CATCHER TRAPPED FOR TOO LONG.

OBSERVE YOUR ANIMAL AND RELEASE.

Minnow Catcher

①



2-liter bottle

- take off label



②



1 inch

- cut the top off so that you have about 1 inch straight side to work with.

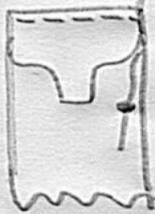
③



- Place a knotted string in the bottle, knot inside the bottle - at least 6 feet
- Turn over the part (top) you just cut off and lay it inside the bottom part.

- staple

④



- staple the inserted upper top to the bottom part. Make sure you staple the string in place. This will be the retrieval string.

⑤ Finished Product:



① Place bread in catcher.
② Lower in lake.
③ Check daily.

