Bucket mouse trap

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Problem Definition: hands free rodent catcher

Primary Functionality:

- Easy to operate
- Keep my room clean
- Prevent spread of disease

Secondary Functionality:

- Easy to clean
- Easy to release the mice
- Strong enough to hold 2-3 mice

Thoughts:

- Will the mice even fall for the trap
- Will the mice help each other out of the trap

Research of existing solutions

Mouse glue trap

Functionality

- Have a flat surface that is covered in glue that traps the mouse so it can't get away

Pros

- Very effective at keeping the mouse trapped

Cons

- Once the mouse is on there they might as well be dead

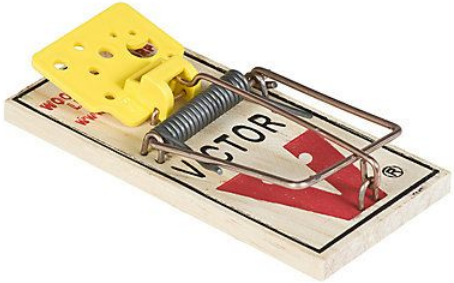
Takeaways

- After research its too cruel and i can't make the glue for it myself

Old school mouse trap

Functionality

- Luers the mouse with fake cheese to snap its neck with a spring loaded metal rod



Pros

- It kills the mouse fast so its relatively painless

Cons

- It kills the mouse and can attract other rodents if not cleaned fast

Takeaways

- Good option but there are better ones

Bucket mouse trap

Functionality

- Has ramps on the sides that lead to the center pipe that can spin freely

Pros

- The mice don't die and are trapped for only a few hours

Cons

- It needs to be very heavy so the mice can't knock it over

Takeaways

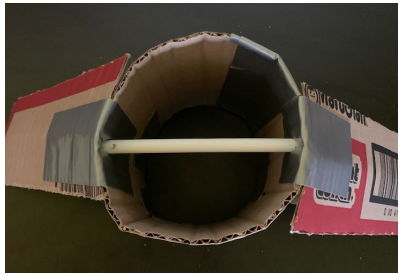
- Most humane method, easy to make, easy to let the mice go after capture

Takeaway Summary

- The bucket method is the most attractive because it is easy and wont kill the mouse
- Lots of methods kill but I want to keep them alive
- How can I get the center pipe to rotate with little to no friction
  - Metal pipe or plastic pipe?

Designing

Ideate and Design



Primary functionality

1. Trap mice that fall into the hole
2. Keeps the mice trapped in the hole/ bucket
3. Made out of a durable but light material

Constraints

1. It can't be too light so the mice can knock it over
2. Hold at least 3 mice before getting too crowded

Key features

1. Holds mice until I can deal with them
2. Easy to grab and dump mice
3. Look good or at least decent

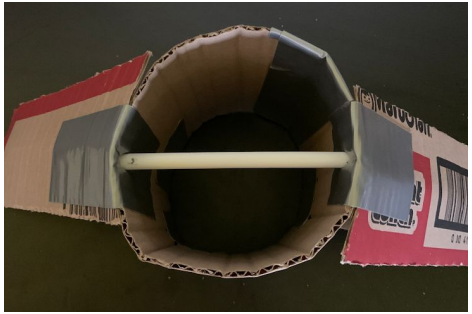
Prototyping

Phase 1 Prototype Build

Something that I learned is that if I use duct tape then having the spinning part spin is very difficult because of the amount of friction.

Something that I liked about my prototype is that it gave me a better understanding of what the final product should/will look like.

Something that i'll try and not do is have the spinning part touch the duct tape so it can spin freely also have something on the ends of it so it won't slide in one one side or another



Phase 1 Prototype Evaluation

Issues to address

1. Ramps too steep I need to make them longer or add rungs or make the trap shorter.
2. No bottom I need to find a way to add a bottom.
3. Very light It has to be heavier so mice can't knock it over
4. Mk.1 was easy to climb out of I need to make it smoother or slippery.
5. The center pipe wont spin since the duct tape is to grippy I need to add something smoother to the hole.

Pros:

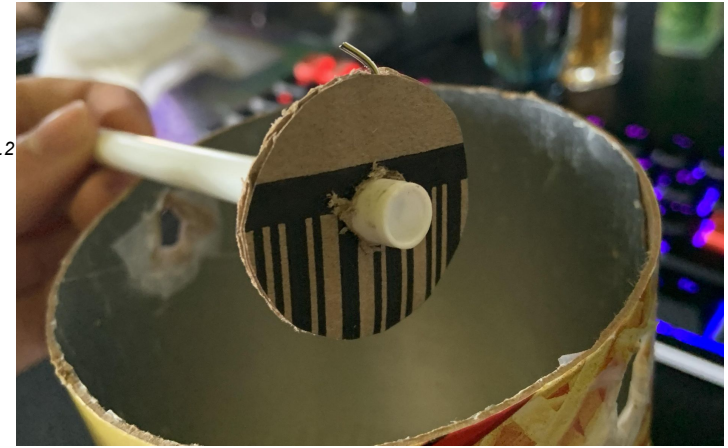
1. Easy access i.e rungs and not as steep.
2. Stronger attachment points
3. Spinning center pipe / non slip pipe ends
4. Has a bottom and better reinforced bottom walls
5. Slippery inside walls

Cons:

1. Not very heavy/ easy to knock over
2. Might be too short
3. Center pipe not spinny enough

Rough Draft

Rough Draft Build-*center pipe* *Mk.2*



Added: duct tape to center as spot for bait,

Scotch tape to hold and pipe for ease of spin,

Cardboard circles on end to prevent the pipe from slipping off

Rough Draft Build - *ramps* *Mk.2*

Added: Rungs, not as steep, paper clip attachment

Rough Draft Build - “bucket” main part of trap Mk.2

Added: Shorter, has a metal bottom, better reinforced bottom,

Inside is more slippery/ harder to climb

Rough Draft Build

Something I learned was

- Having paper clips stick out of the center pipe add a stopping force.

Something I like was

- I really liked how the ramps came out with the divit for the center pipe to cut down on friction
- Another thing that stood out as a major improvement was the bottom of the trap since its made of metal and hard to get out of

Something I will not do again

- Have the trap be so light it was good but it needed weight so the mice couldn't knock it over and escape

Rough Draft Evaluation

Aspects of my design that I like were:

- Having a bottom to keep the mice in the trap is nice

Aspects of my design and/or build I did not like:

- The center pipe doesn't spin as freely as I would like it too

For my final design I plan to improve:

- I want to add weight, add less friction, and harder to get out of

Final Iteration

Iteration 1 - reduce the friction of the center pipe

I chose to focus on this area because

- When the pipe spins it has too much friction and cant spin almost at all

My approach

- Add some material like scotch tape that is smooth

The results

- The tape helps reduce the friction from what it was

Iteration 2 - easy to climb ramps

chose to focus on this area because

- The easier it is for the mice to climb the ramps the more attractive it would be for them

My approach

- Add a type of ladder rung on the ramps so it was easier for them to climb up
- Add hot glue to the cardboard approximately 1-2 inches from each other

The results

- The ramps are easier to climb up

Iteration 3 - the center pipe

I chose to focus on this area because

- For the final iteration the spin was the last thing that I needed to perfect because that part is instrumental in getting the whole project to work properly

My approach

- I chose an old water bottle to use as the bucket replacement and drilled some holes so the center pipe could move feely

The results

- The pipe spins with almost no friction which is what what I wanted to achieve

Project Functionalities

Primary Functionalities

Mechanical and human operated

- Yes the trap only needs the prey to walk on the center pipe for the trap to work and needs to get unfilled by a human for proper operation

Stores the mice(securely)

- Yes it should but it has yet to capture a mouse

Made of found / improvised materials

- Yes everything that it is made from was from my room

Max mouse capacity

- I am approximating but it should be able to hold around 3-5 mice without them getting out unless they work together

Concluding Thought

Project Reflection

Aspects of my project that I like

- It looks good
- The final product (Mk.3) is the heaviest version yet
- Mk.3 is clear so I can see if there are any mice trapped in there from a distance

Aspects of my project that were difficult

- Getting the centre pipe to spin with little to no friction was very troublesome

What I would do differently next time

- I would make the bucket area taller and heavier so it is harder for the mice to get out of