Cat Deterrent Tank Lid

Research Slides

Functionality

Primary-

- Keeps cat off
- Safe for snake
- Allows airflow and light in

Secondary-

- Easy to open
- Doesn’t take too much space
- Looks nice

Thoughts

- Scent solution will be harder to find
- Barrier might look ugly
- Spikes could be dangerous for opening the tank

CARDBOARD

Functionality: Blocks the cat

Pros:

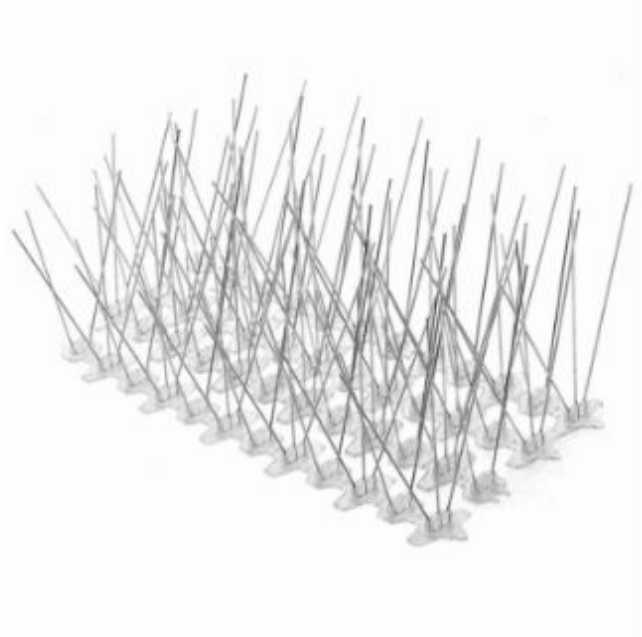
- Easy to build
- Cheap

Cons:

- Possibly obstructive to other activities in the environment
- Looks messy
- Requires careful measuring and planning

Takeaways: Do some build testing before going with this one

SPIKES



Functionality: Harsh environment dissuades cat

Pros:

- Most likely to be effective
- Pigeon spikes are already purchasable

Cons:

- Commercial pigeon spikes cost money
- Could be dangerous to open lid

Takeaways: Need to either purchase pigeon spikes or craft from toothpicks/wires,

JALAPENOS

Functionality: Harsh smell deters cat

Pros:

- A very easy and simple solution
- Ingredients are readily available

Cons:

- NOT CONFIRMED- suggested by a Reddit user, needs more research
- Needs to be re-applied regularly

Takeaways: Do some more research, test with cat, ask snake experts, etc.

TAKEAWAYS

- More Research needed
- Look up good DIY recipes for spikes
- Probably going to use the spikes

Constraints Research Slides

Cat Repellent Lid Spikes

Primary Functionality

-Deters cat from sitting on it

- Lid is able to be opened

- Air and light can pass through

Constraints

Size: Has to fit on top of the tank lid and under the cabinets above the tank, about 7-11 inches of room

Weight: Can't be heavy enough to break the lid itself, should not be a problem

Durability: Should last as long as the tank lasts

Safety: Can't be able to harm the cat

Open: Can't restrict the lid opening or airflow

Detachable: Not specific to the tank or the lid

Key Features

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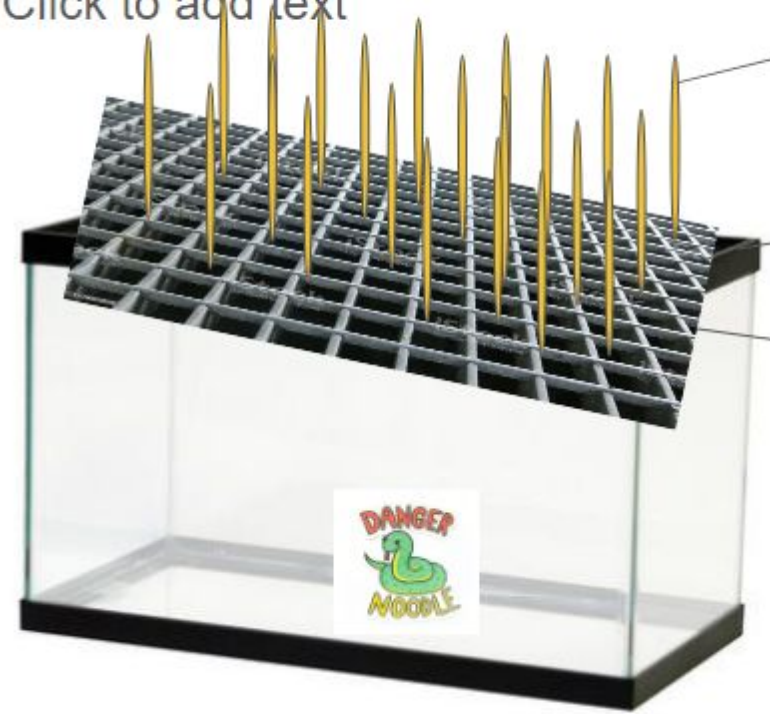


Wooden dowels (Hot-glued to intersections)

Cheap wire grid (Garden fencing type)

Grid extends past the dimensions of the lid and is taped to the tank

Requirements: Points too high to hurt the cat, tank fits within the shelving space

PROTOTYPE 1

- Underestimated amount of spikes needed, so only glued them around the edges
- Cat (extremely treat-motivated) investigated for openings but didn't make any actual attempt, signifying she doesn't consider it pregnable
- Cat was eventually rewarded for her efforts
- Meant to be a prototype, but worked well enough to be final product
- Lid is able to be opened without removing the cover, but with some hiccups
- Only other addition would be to pad/bead the sharp edges where the wire is cut, for safety

Purpose

This prototype was meant to test if a simple spike barrier with only one line of defence would successfully carry out all three key features: Safety, Breathability, and cat-deterrent. The size and shape had to be on the same scale as the real product to be able to fit on the tank to test the results accurately. The aesthetics are not very refined, though I doubt the final product will be much more refined.

Testing

User testing: Tank was placed with the back part against a wall and treats were placed in the center of the lid. Cat was enticed to make attempts on the treats, to see if she was able to permeate the barrier. Tank was also opened and closed with the contraption on it to test if the contraption hindered the lid. Treat is being left there for an extended period of time to see if cat makes another attempt

Results

Cat did not attempt to break the barrier after some sniffing and poking.

A few spikes have broken off over the weeks

Nobody has been hurt by the jagged ends, but can't hurt to be careful

Lid had some difficulties opening due to regularly protruding dips in the wire, but was able to be done

Evidence

Evaluation

Liked:

-Simplicity

-Requires few spikes

-Not obtrusive

-Effective

-Lightweight

-Adaptable

Will change:

- Bead the jagged edges with glue or something safe
- Reinforce the spikes with more support, maybe a different kind of sealing?
- Hmmer down/twist/cut the pits in the wire that hamper lid openings
- Decorate/paint

Disliked:

-Protruding safety hazard

-Wear and tear

-Difficulty opening lid

-Looks unpleasant

BUILDING

Hammered down the bends in the wire so they don't interrupt the cage from opening

Glued beams at the top and bottom of the wall to connect and support the individual spikes

Coated ends in hot glue and bent them down to keep them safe and secure the cage

LEARNED: Stronger together than they are alone. Connecting the spikes made the whole thing more resistant

LIKED: I was glad that the hammering did not affect the dimensions of the cage too much. I was afraid it would elongate the distance between spikes

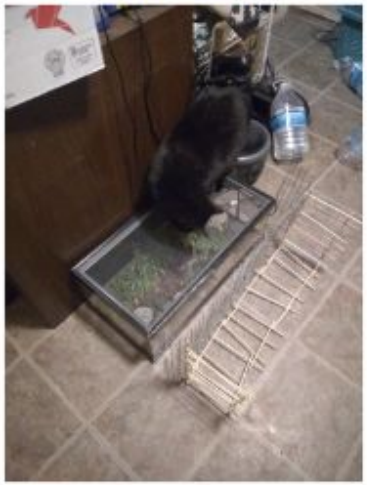
WILL NOT DO: Bead the spikes again. The glue tips fell off very easily and bending them inwards proved much more effective

TESTING

I user tested the main function of blocking the cat by tempting her in with the treats. I am also currently testing safety by waiting for somebody complain that they walked by and scratched their legs on the tips

I had to test twice because I forgot to press go as I attempted to record the event. However, the cat was able to remove the wire device from the cage entirely and get to the treats. After a minor adjustment of bending the spikes to fit the cage better, the second test turned out successful

TEST 1

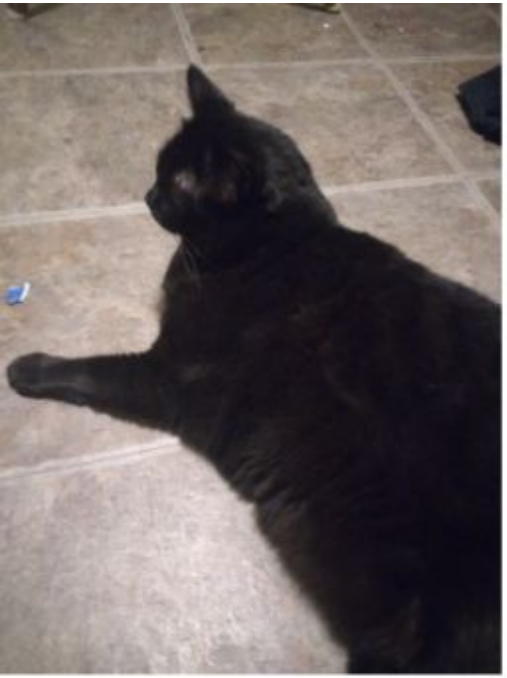


Enjoying her reward after completely dominating my attempt at a blockade

I also attempted to open the lid with a lot of trouble, as the ends of the tips and hot glue sticking through the wire blocked it. n the end, it was easier to just lift the cage up before opening the lid

TEST 2

Even though she was able to poke her head through and consider jumping over, she didn't actually get in. The treats were still there when I came in the next morning



Here is a picture of her giving me the cold shoulder because she did not get her treats

EVALUATION

LIKE: The design is safe to be around, sturdy, lightweight, and adaptable

DISLIKE: The cage now needs to be taken off to open the lid properly. Taking down the dips was taking 1 step forward 2 steps back

WILL IMPROVE: I need to find a way to trim the glue and protruding sticks at the front of the lid so that it can be opened

Final Iteration

Iteration 1 - *Construction*

I chose to focus on this area because

- The project went through several drafts using only the one prototype to save materials, making it interesting to improvise additions instead of building a whole new prototype

My approach

- I started by building the project as I envisioned it, expecting everything to work as I made it to. When things started to go wrong, I built fortifications, foolproofing, and other enhancements and attached them to the prototype with ideas from my peers

The results

- I was able to fulfill all primary and most secondary functionalities while only using one sheet of wire and one prototype's worth of chopsticks and hot glue

Iteration 2 - *Testing*

I chose to focus on this area because

- My testing process was a very effective tool that helped me determine what needed to be fixed and where there were weak points

My approach

- I initiated the circumstances by which my project would be put under duress by enticing my cat to break in with treats and filming result, watching for how she opened it. I also opened and closed the lid whenever I finished a new draft to see if it would open properly

The results

- There are no functionality issues with the final project because I was able to know what I needed to fix. I also ended up with some nice videos of my cat

Iteration 3 - *Research & Inspiration*

I chose to focus on this area because

- I got ideas from many different sources, from my classmates and teacher, to scientific articles, to internet users and objects you see in daily life

My approach

- I was inspired by the pigeon spikes used to keep birds off of buildings and poles, and I googled how to make pigeon spikes at home. I also asked on an internet forum if there were any chemicals that repelled cats but were safe for snakes, and when it came to making the spikes safe, I got the idea to bead them with glue from a video I had seen of the production of thumbtacks. Not to mention ideas gotten from peer critique with my classmates

The results

- I didn't end up using all of the ideas I got from researching, and some of them weren't that effective, but they helped me along the way to making a complete product

This cardboard square was a suggestion from critique

Project Functionalities

Primary Functionalities

Cat Blocking

- I addressed this primary issue with the spikes on the top, and tested and fortified it when they were thwarted

Safety

- I made sure to bend any sticking out metal spikes inwards so they would not scrape anyone passing by, and none of the spikes reached into the cage as a danger to the snake

Breathability

- I built the construct base out of thin wire so that the airflow and light entry weren't blocked in the slightest

Secondary Functionalities

Easy to Open

- I flattened out the wires and added a cardboard leveler to even out the space so it doesn't dip down onto the tank lid

Doesn't take too much space

- I made sure to check that the chopsticks were short enough to fit under the counter, and even if they were, I left enough room at the top to be able to trim them

Looks nice

- I couldn't come up with any ideas other than painting it or completely redoing the spikes with a different adhesive, but I at least think it's not too much of an eyesore

Concluding Thought

Project Reflection

Aspects of my project that I like

- I like the simplicity with which I was able to complete all of my main goal with this project. I didn't need complex mechanics, or even precise measurements most of the time

Aspects of my project that were difficult

- Fixing the lid's opening project was was difficult, as was getting the wires to bend the right way when I wanted them to

What I would do differently next time

- I would try to make the sticks look better as I was glueing them with a different alignment and adhesive, but not much else