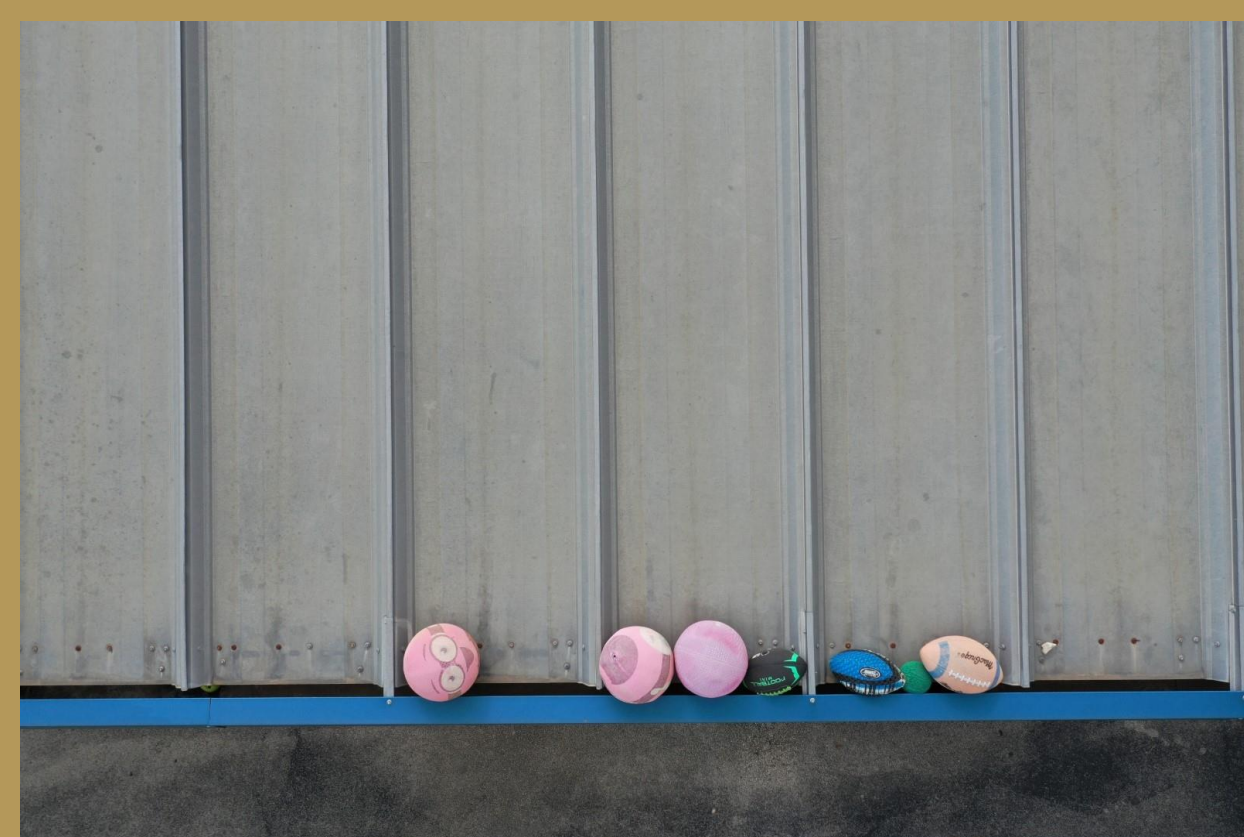# M1 - Low-Cost Ball Retrieval

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Hoffmann Lane Elementary School

HOFFMANN LANE ELEMENTARY SCHOOL
Tradition · Performance · Opportunity

Problem

- ❖ Balls get stuck in the gutter system on the roof of the gymnasium which is 20 feet in the air and located next to an outdoor blacktop where students at the school have either kicked or thrown balls onto the roof.
- ❖ Balls that are left on the roof after a long time are sun damaged and ruined.
- ❖ Use of ladder and scissor lifts are shared amongst the entire school district therefore it takes time to retrieve the balls through maintenance.

Concept of Solution

- ❖ Design and Manufacture a device that can retrieval the balls from the gutter system and is operated from the ground.
- ❖ A team of no more than two adults will be required to operate the device.
- ❖ Be able to produce the product under $100 so that the device can be replicated and used at other schools.
- ❖ Design the device to be compact and able to be stored in an easily accessible manner.
- ❖ The device will be lightweight where any adult can operate and use it to retrieve the balls.
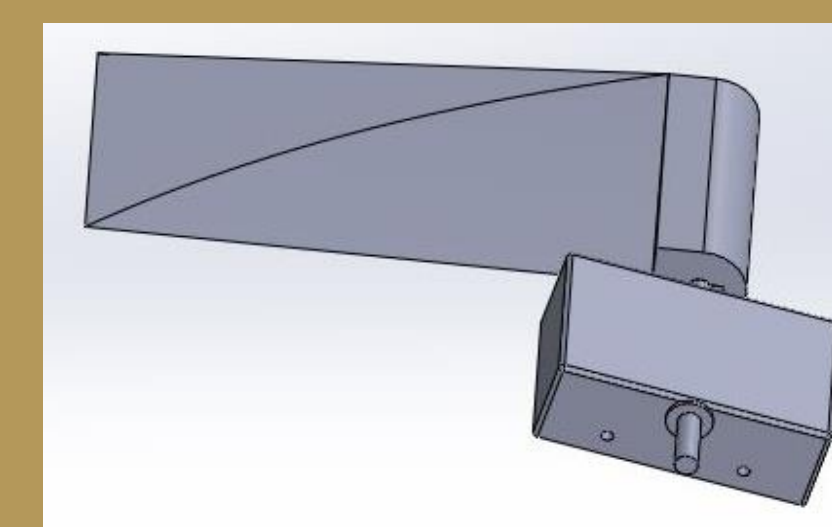
1st Design

Features-
- Telescopic Pole
- Pool Hook

2nd Design

Features-
- Telescopic Pole
- Ball Claw
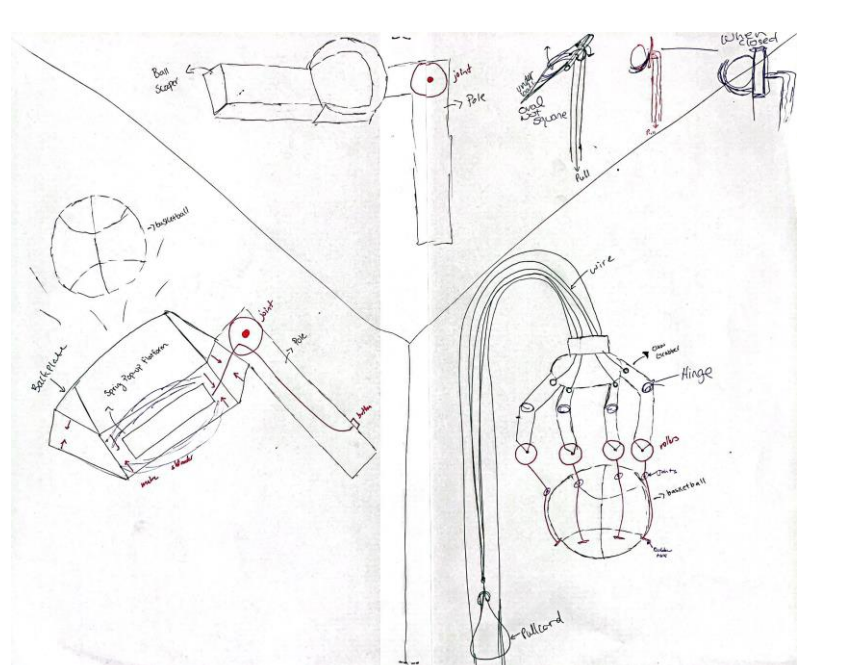- Adjustable Elbow

Other Designs
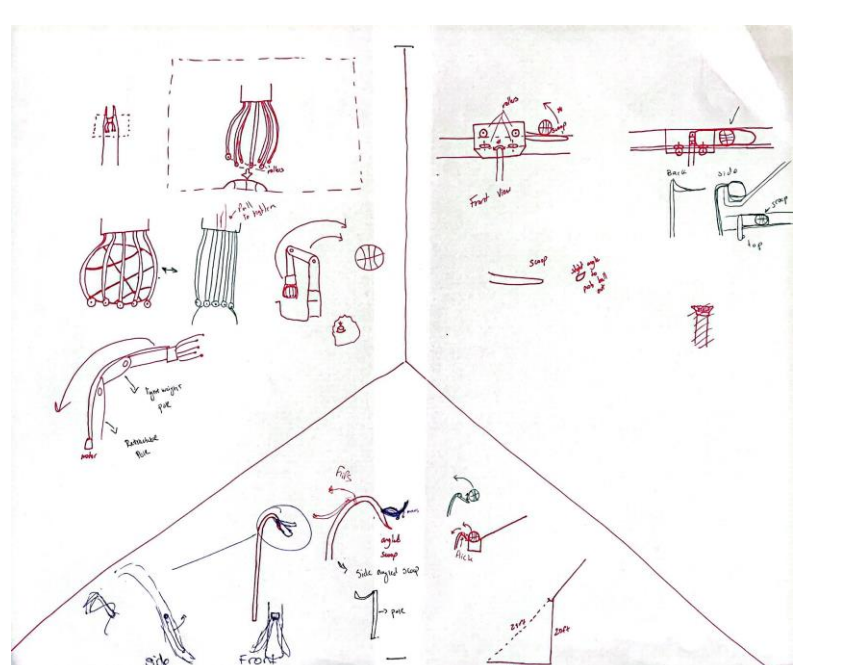

Procedure

Concept Generation
Customer Needs-
- Safe to use
- Easy to use
- Retrieve balls
- Can be stored near the gym

Original Ideas-
- Scoop (actuated)
- Basket
- Claw (actuated)

Testing Criteria
- Weight of device
- Time needed to retrieve ball from roof
- Deflection of pole
- People required to operate pole

Future Design(s)
- Stronger pole to counteract deflection of pole and make device easier to use.
- Device with have some form of actuation to possibly increase of using device.
- We will manufacture a rack to hold
- the device on the wall and will be secured properly so students can't pull down the pole and cause injury.
- Instructions will be included on pole with a QR code that takes user to a video that gives a visual demonstration on how to operate the device.