

# LION STALKING DEVICE

---

Rachel Bilski, Quinn Kern Allely, Josh Wong  
Group 22

# Overview

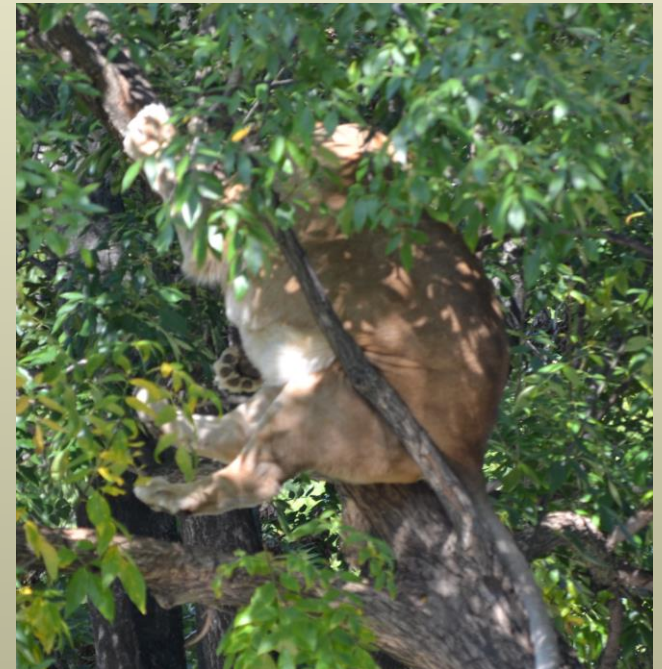
- Need and Project Scope
- Design Specifications
- Possible Solutions
- Chosen Solution

# NEED AND PROJECT SCOPE

---

# Need

- Stalking is an important activity in the wild
- Difficult to encourage in captivity
- Leads to boredom and health problems



# Project Scope

“The objective of this project is to design a device that provokes the stalking behavior in lions in captivity without requiring human interaction. When interacting with the device, the goal is to encourage lions to chase, pounce, or bite, which are typical stalking actions.”

# DESIGN SPECIFICATIONS

---

# Design Specifications

- Size: bigger than 1ft x 1ft x 1ft  
smaller than 2ft x 2ft x 4ft
- Cost: under \$500
- Materials: must be approved
- Durability: Last at least a day
- Must work without human intervention
- SAFETY

# POSSIBLE SOLUTIONS

---

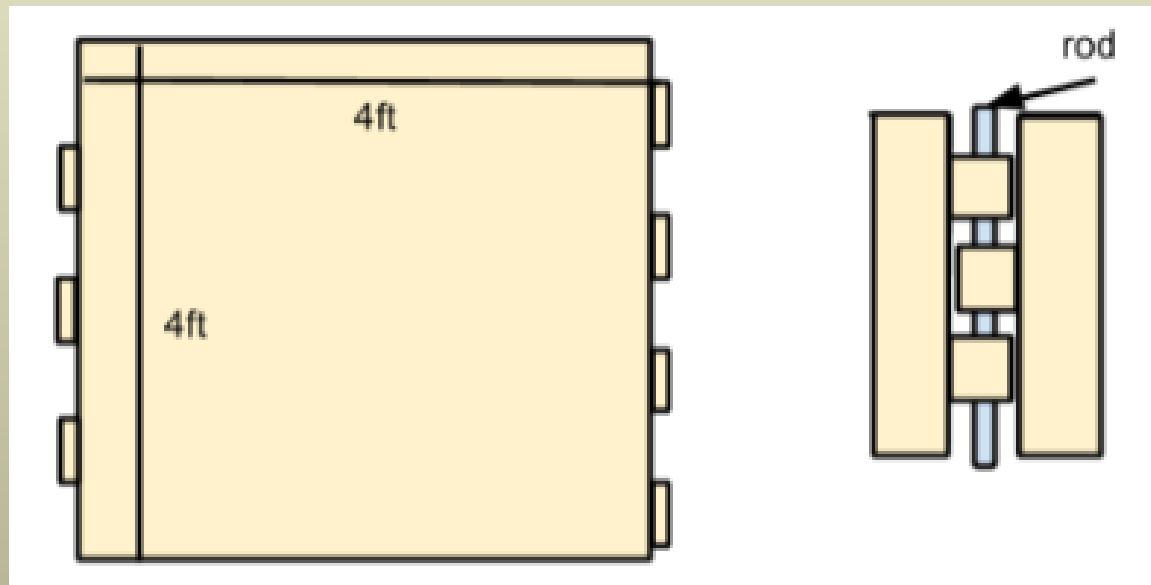


# Options

- ~~Lion harness~~
- ~~Remote-controlled land vehicle~~
- ~~Manual reel device~~
- ~~Peripheral prey sound system~~
- Maze
- Suspended device
- Feeding ball
- Moving ball
- Zip line
- Scent

# Maze

- Made of dense plastic
- Multiple interlocking pieces
- Could be set up many novel ways with a food reward at the end



# Maze

## Pros

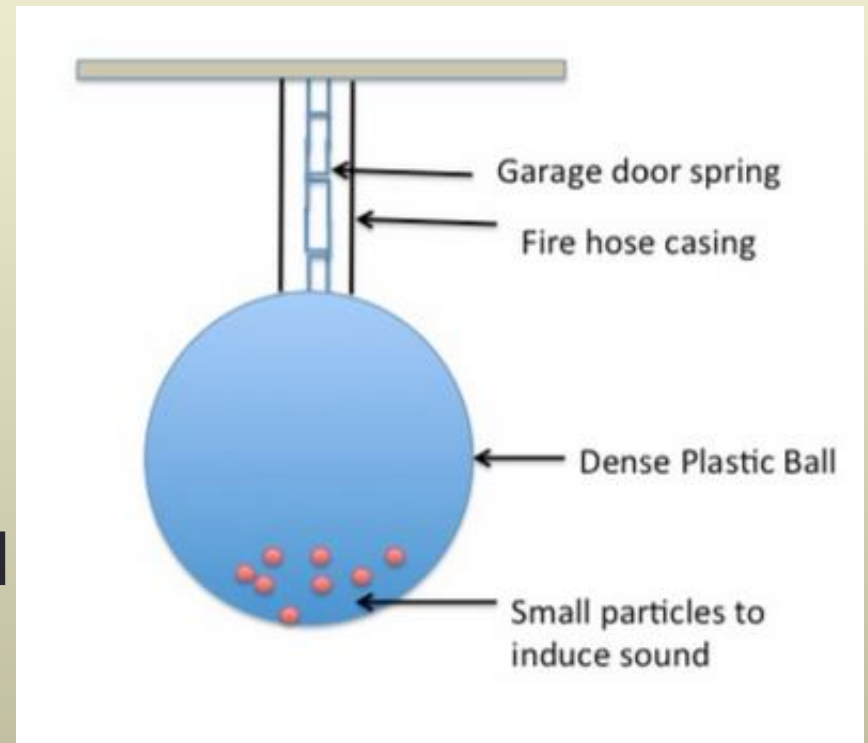
- A lot of mental stimulation
- Some physical activity
- Food reward

## Cons

- A lot of work to set up and take down with each use
- Doesn't encourage stalking

# Suspended Device

- Radius = 1 ft
- Dense plastic ( $E = 3.40$  Gpa)
- Garage door spring covered by fire hose
- Objects to generate sound



# Suspended Device

## Pros

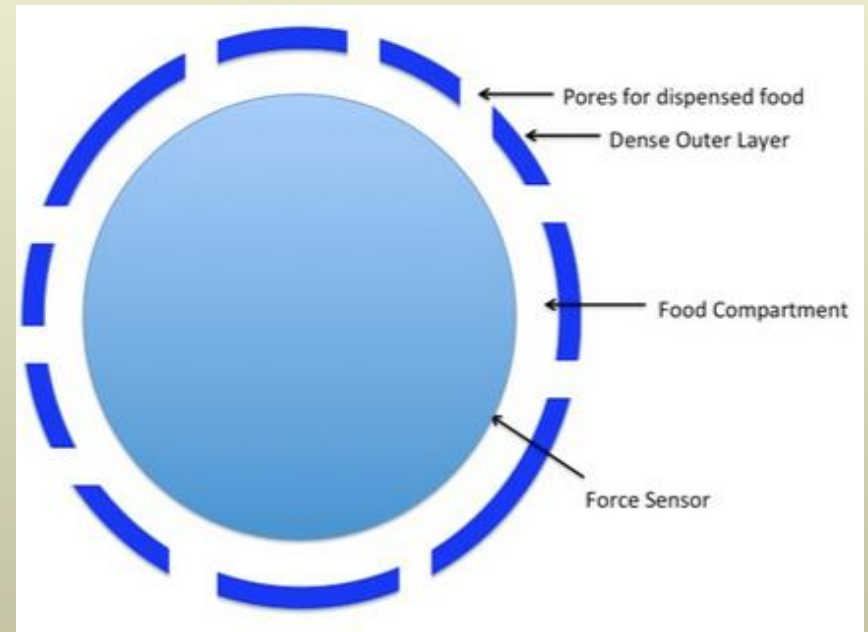
- Cheap
- Easy to make
- Durable
- No human interaction while in use

## Cons

- Similar to a device that has been used
- Very small range of motion
- Quickly loses novelty
- Not much physical activity
- Not much mental stimulation
- No reward

# Feeding Ball

- Outer Layer
  - Dense plastic with closeable pores
- Inner Layer
  - Food compartment
  - Force sensor



# Feeding Ball

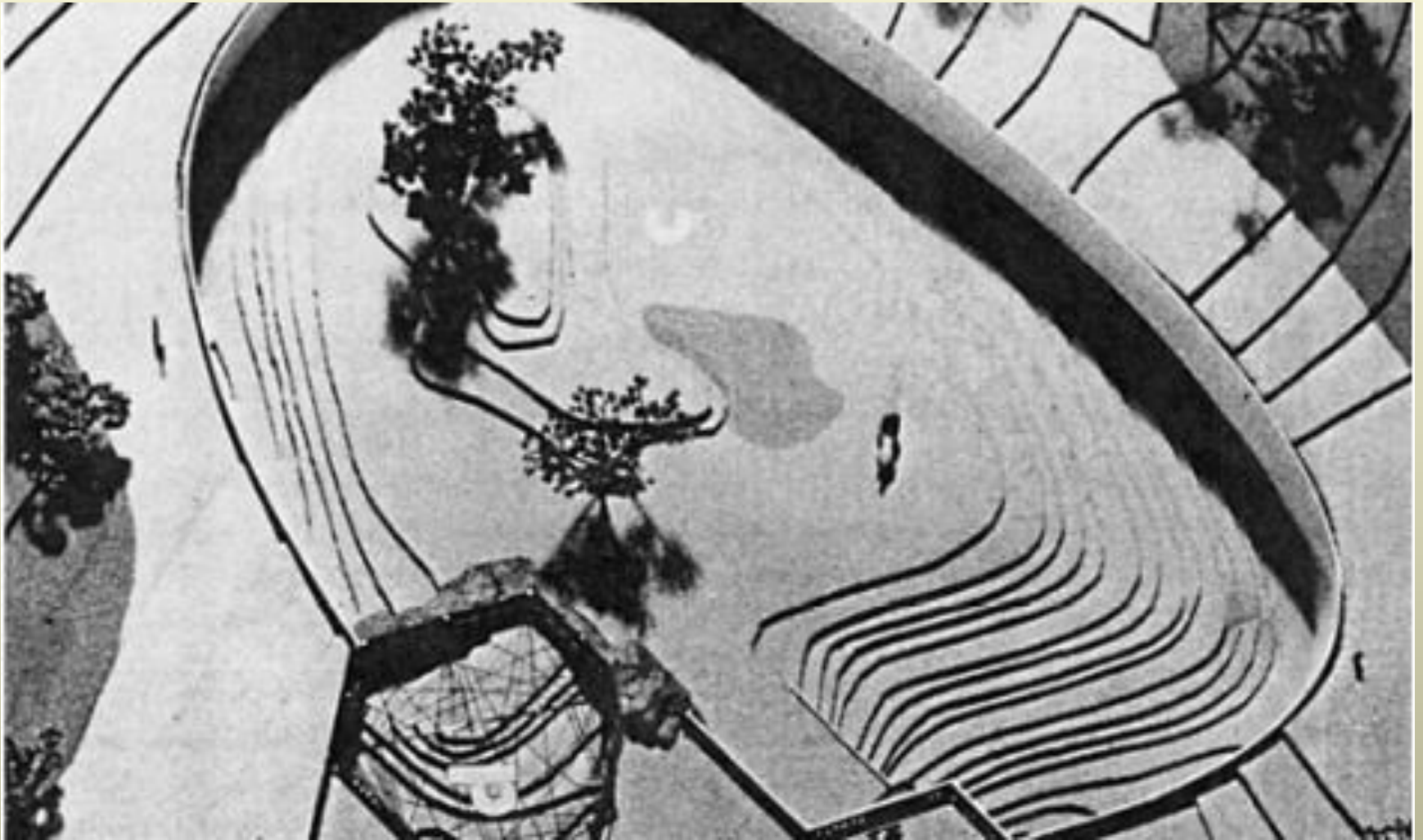
## Pros

- Food reward
- No human interaction while in use
- Free to move through enclosure

## Cons

- Will only move if the lions make it
- The opening and closing pores could be dangerous to lion
- Pores provide a weak area for the lions to tear at
- Force sensor adds cost
- Could get stuck in enclosure

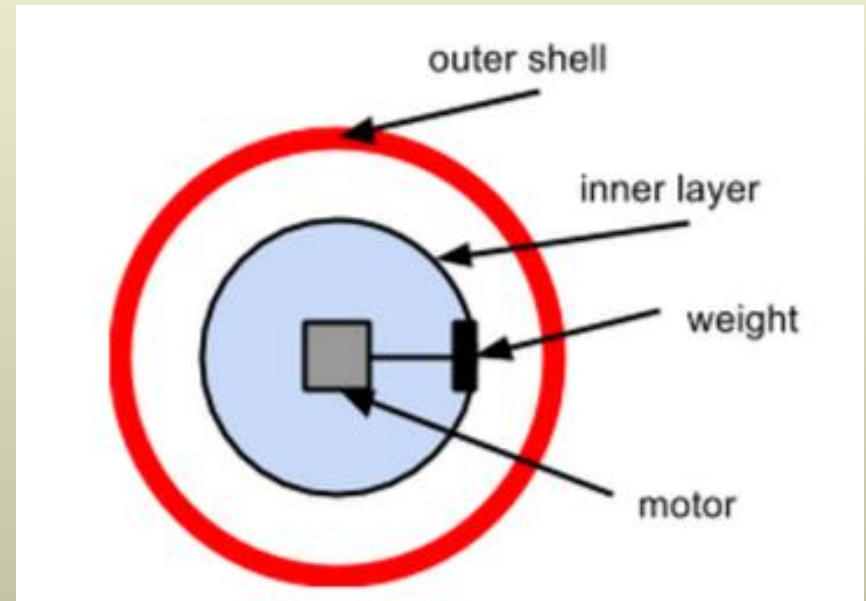
# Enclosure Layout





# Moving Ball

- Outer Layer
  - Dense plastic
- Inner Compartment
  - Metal
  - Motor
  - weight



# Moving Ball

## Pros

- Moves away from the lion
  - Encourages chasing
- Novel experience each use
- Easy for employees to use
- No human interaction while in use

## Cons

- No reward
- More expensive
- Difficult to build
- Possible lion exposure to unsafe components

# Zip Line

- Similar to a recreational zip line
- Galvanized steel cable across the enclosure
- Motorized pulley
- Remote controller
- Reward or another device attached at the bottom



# Zip Line

## Pros

- Moves away from the lion
  - Causes chasing
- Limited human interaction while in use
- Novel experience each use
- Unsafe components are out of reach

## Cons

- Difficult initial installation
- Reward/device needs to be reattached each time
- More expensive option

# Pugh Chart

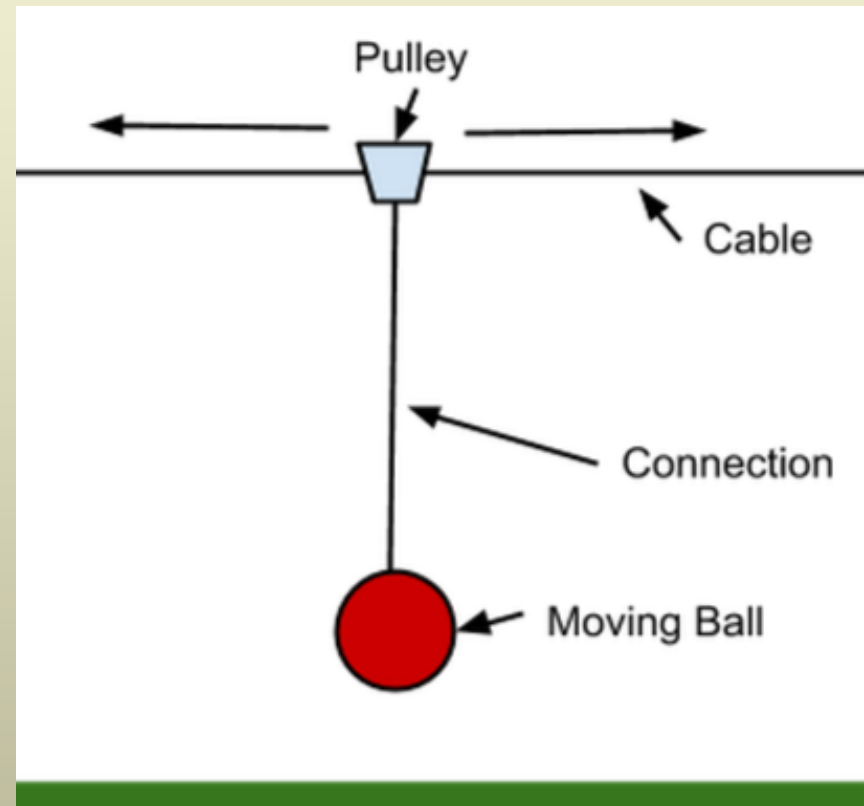
	Weight	Maze	Suspended Device	Feeding Ball	Moving Ball	Zip Line
Safety	5	4	5	4	4	5
Independent of Keeper	5	1	5	4	4	4
Physical Reward	4	4	3	3	5	4
Movement	4	1	3	2	5	5
Durability for Lions	4	5	5	4	4	5
Edible Reward	3	5	1	5	1	5
Price	3	4	4	3	2	2
Installation	2	1	3	5	5	3
Easy to Make	2	4	4	2	2	5
Durability for Weather	2	5	5	4	4	4
Total	30	112	133	122	127	146

# CHOSEN DESIGN

---

# Zip Line and Moving Ball Combo

- Remote-controlled zip line
- Connection made of cable covered in fire hose
- Moving ball which detaches from connection



# Added Benefits

- Zip line
  - Remote controlled
  - Added range of motion
  - Simulates stalking birds
- Moving Ball
  - Closer simulation to small ground prey than stationary ball
- Combination
  - Accommodates different lion preferences
  - Increases the novelty
  - Increases the time the lion spends using the device



QUESTIONS?

---

# References

- **Bircher S**, St. Louis Zoo. Personal Communication, 2014 Oct 15.
- **Boomerball** - Boomer Ball - 10 inch heavy duty challenger [Internet]. c2013. [cited 2014 Oct 23]. Available from: <http://boomerball.com/boomerballs/33-boomer-ball-10-inch-heavy-duty-challenger.html>
- **E-Rigging.com** - Galvanized Cables [Internet]. c2014. [cited 2014 Oct 23]. Available from: [http://www.e-rigging.com/Galvanized-Cable\\_c\\_72.html?gclid=CjwKEAjwzqKiBRCAydTZzOLi9CISJACm3irWizgrrrgJeiX6Husjv3AgbFc8LW-ayaojrpjK0py3hoC697w\\_wcB](http://www.e-rigging.com/Galvanized-Cable_c_72.html?gclid=CjwKEAjwzqKiBRCAydTZzOLi9CISJACm3irWizgrrrgJeiX6Husjv3AgbFc8LW-ayaojrpjK0py3hoC697w_wcB)
- **RFcontrolsystem** - DC RF momentary motor remote control kit forward and reverse [Internet]. c2009. [cited 2014 Oct 23]. Available from: [http://www.rfcontrolsystem.com/index.php?main\\_page=product\\_info&cPath=255&products\\_id=384&zenid=m16krmln0h998irdt2rckek2](http://www.rfcontrolsystem.com/index.php?main_page=product_info&cPath=255&products_id=384&zenid=m16krmln0h998irdt2rckek2)
- **Schuett EB and Frase BA**. Making scents: using the olfactory senses for lion enrichment. The Shape of Enrichment. 2001. 10:1-3
- **Treehouse supplies** - Galvanized Aircraft Cable [Internet]. c2014. [cited 2014 Oct 23]. Available from: [http://www.treehousesupplies.com/3\\_8\\_7X19\\_Galvanized\\_Aircraft\\_Cable\\_p/gac\\_3\\_8\\_7x19.htm](http://www.treehousesupplies.com/3_8_7X19_Galvanized_Aircraft_Cable_p/gac_3_8_7x19.htm)