

#### What is enrichment?

Anything that increases the quality or value of the environment to the animal.

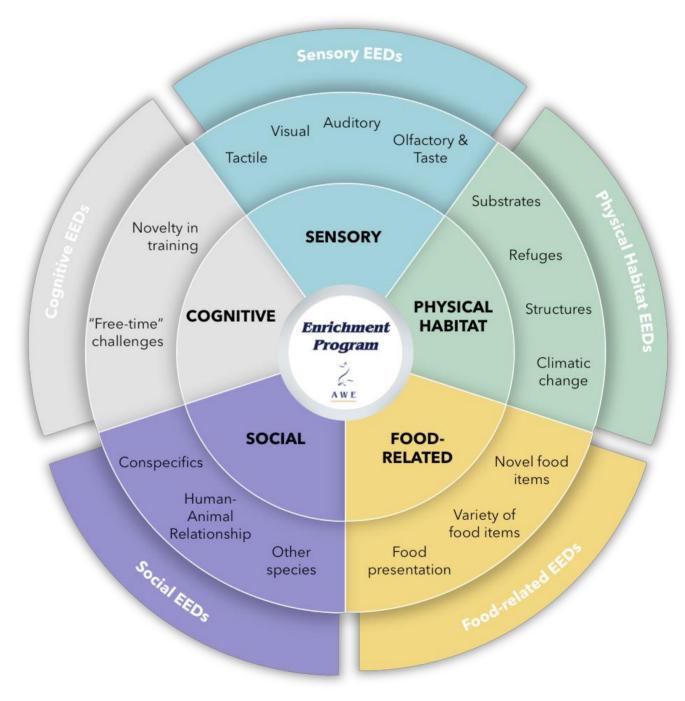
# How do we know what increases the quality of the environment?

Always start by asking: what behaviours do we want to stimulate? For wild animals in captivity, you can use the enrichment wheel to consider what the animal experiences in the wild in each of the categories, and think about how you can stimulate the same behaviours in captivity. However, you don't have to just stick to wild behaviours: think outside the box about how to challenge the animals, whilst giving them choice and control over their environment.

# What should an enrichment program consist of?

Programs need to be evidence-based, simple to follow and effective. There are four key elements to manage: frequency, variability, novelty, and impact. There should be a catalogue of many Environmental Enrichment Devices (EEDs) which are applied variably on a schedule. Usually it's best to have an enrichment officer at each facility, and for that person to organise which staff are responsible for enrichment each day. Novel items should also be regularly devised and applied, and staff should monitor impact through the animals' interactions with the EEDs, and feed that data back into the program.

#### <u>Environmental Enrichment Device (EED) wheel for</u> <u>animals under human care</u>





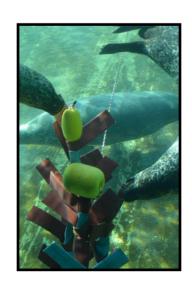
Adapted from The Shape of Enrichment, Inc & ZooSnippets

## **Primary Categories of EEDs**

Social	Cognitive	Physical Habitat	Sensory	Food-related
<ul><li>★ Cooperative Feeder</li><li>★ Hanging Piñata</li></ul>	<ul> <li>★ Soccer Ball Canon</li> <li>★ Ice Floe Feeder</li> <li>★ Cone games</li> <li>★ Underwater maze</li> <li>★ Detachable multi-tube tug forager</li> </ul>	<ul> <li>★ Kelp Forest</li> <li>★ Inflatable Fender</li> <li>★ Sandbox Forager</li> <li>★Walrus foraging box</li> </ul>	★ Underwater Bubble Shooter ★ Astroturf Roller	<ul> <li>★ Washing Line Feeder</li> <li>★ Sinking Mat Feeder</li> <li>★ Fishy Sea Grass</li> <li>★ Feeder Loop</li> <li>★ Suspended Hoop</li> <li>Feeder</li> <li>★ Bungee tub feeder</li> <li>★ Spin-the-bottle</li> <li>★Ice Fishing Pole</li> </ul>

Please note: neither Animal Welfare Expertise nor those submitting the IdeaBox ideas are liable for any type of damages incurred by IdeaBox users as a result of making or using IdeaBox items: all responsibility rests with the user.











# Washing Line Feeder

Fenders and fish-filled disks suspended on rope.

#### Types of enrichment:



Food-related



Cognitive



Physical Habitat

#### Time taken to make: Budget:

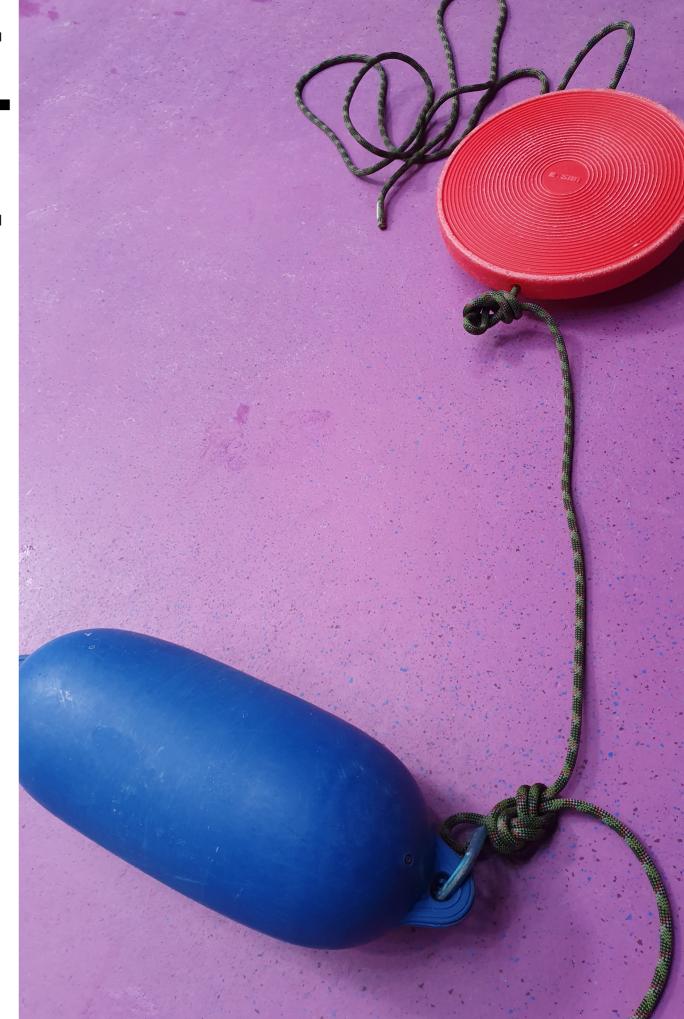


5 minutes



€50

- 1. Test all objects before use
- 2 Make sure carabiners can't come undone
- 3. Tie the rope 1.5m+ high, supervise closely if you feel the animals may try to jump near it.



# Washing Line Feeder

1.



### Instructions:

- Tie a figure eight knot in the middle of a rope to hook a carabiner on.
- 2. Hook carabiner onto the buoy.
- Tie two more figure eight knots further along the rope (either side of the buoy) to prevent the disks from sliding towards the middle.
- 4. Fill the disks with fish and slide them onto the rope
- Tie the ends of the rope to a high point above the pool.

2.



3.



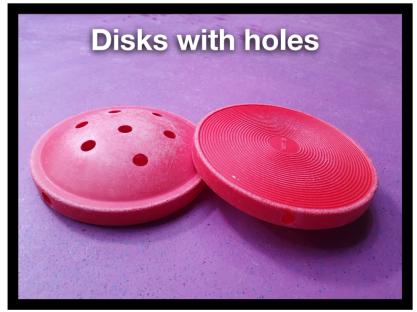
# **Washing Line Feeder**

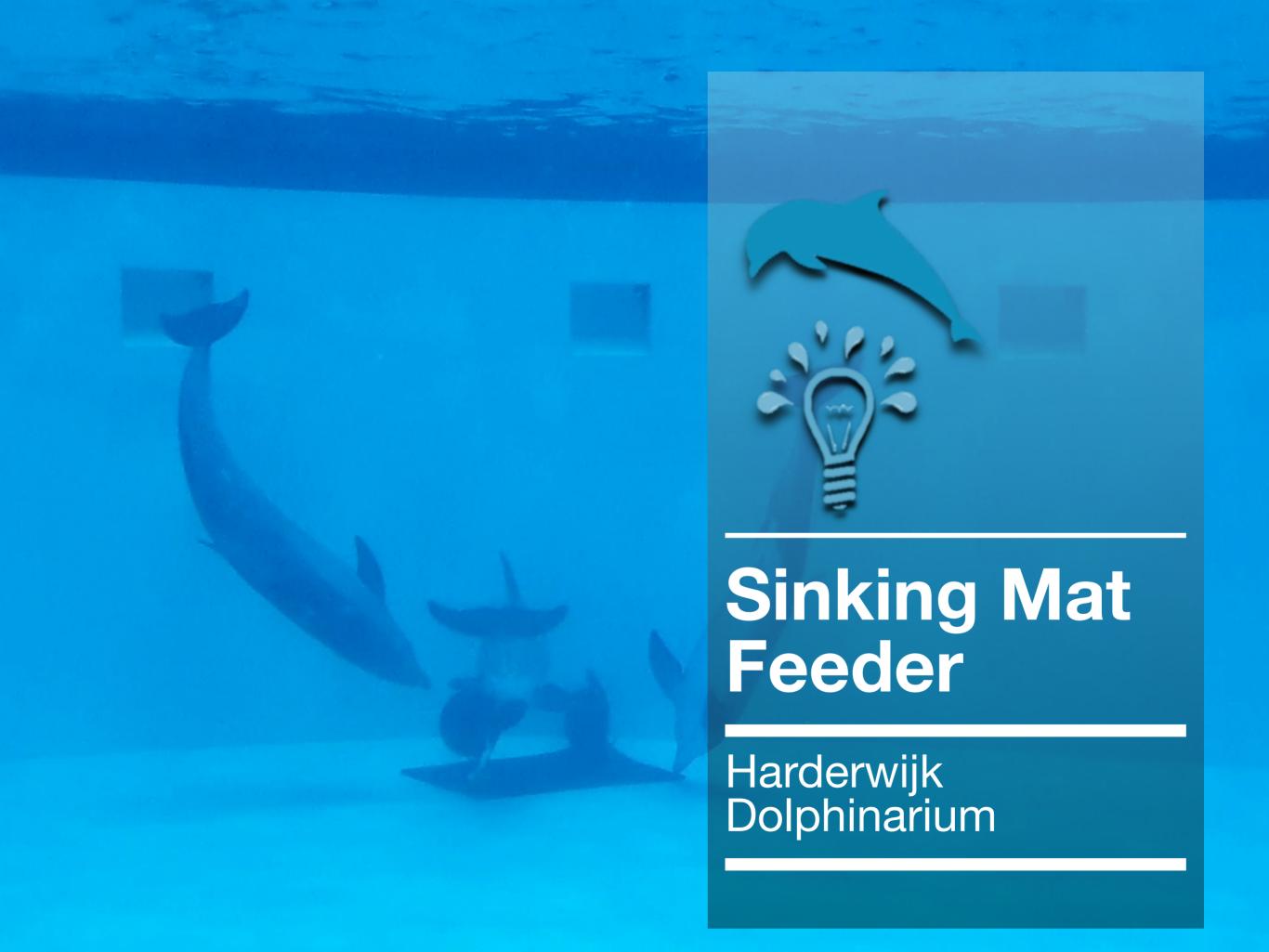
### **Components**











# Sinking Mat Feeder

Rubber weighted mat with plastic balls and disks filled with food attached

#### **Types of enrichment:**



**Food-related** 



Cognitive



Physical Habitat

#### Time to make:



15 minutes

#### **Budget:**



€45

- 1. Test all objects before use
- 2. Ensure the balls used are durable and don't break



# Sinking Mat Feeder

#### 1.

5.



Instructions:

- 1 Drill holes in plastic balls / disks
- 2. Pull the rope through the object and tie it together in a strong knot.
- Cauterise the end of the rope to close it to make sure the knot won't come undone.
- 4 Attach the knot to a carabiner
- 5. Attach the carabiner to submerged hook or sinking mat.
- 6. Put reinforcement in the balls.





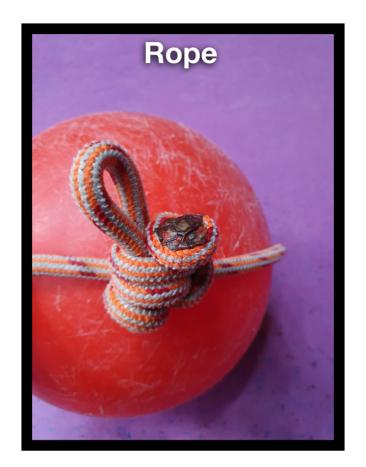
3.



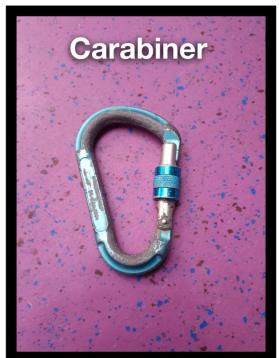
## Sinking Mat Feeder

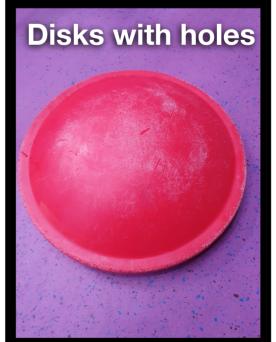
### **Components**











Link for the rubber mat:

https://rubbermatten24.nl/
ringmat-100-150.html?
channable=e3771.UkgxMDB4
MTUw&gclid=EAIaIQobChMIp
sXSoqiS5wIVg7TtCh3RFwT3
EAYYAiABEgIAgPD\_BwE



# **Soccer Ball Canon**

Large plastic tube in a cement base that can be anchored at the bottom of the habitat - ball can be inserted and shoot up the tube

#### **Types of enrichment:**



Cognitive



Social



Physical Habitat

#### Time to make:



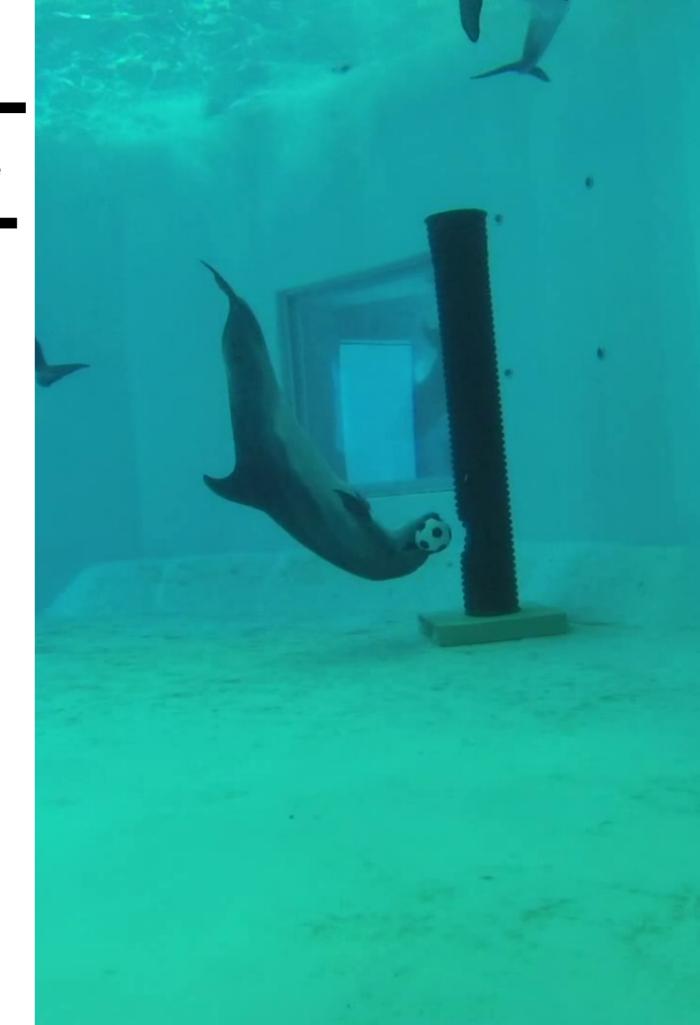
2 weeks

#### **Budget:**



€ 600

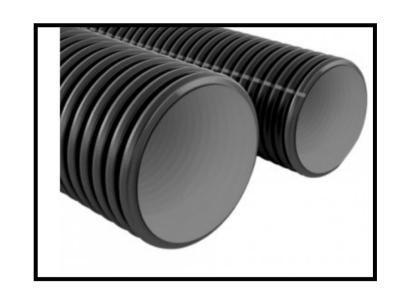
- Need safe and durable materials that animals can't bite, break or swallow.
- To prevent dolphins' injury, edges were polished and smoothed

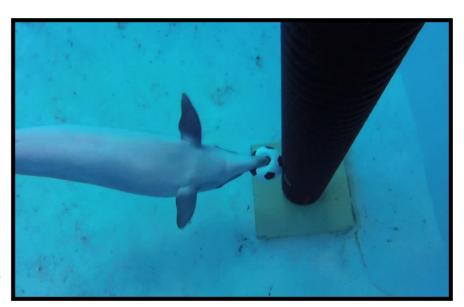


## **Soccer Ball Canon**

### Instructions:

- Buy a 2.5 m long plastic (polypropylene) tube with a diameter of 30 cm
- 2. Cut out a hole with a diameter of 23 cm almost in the bottom of the tube
- 3. Polish the edges of the tube and the hole
- Put the bottom of the tube into the shape where the cement will be poured to make a base. The shape of our basement was square, 75\*75 cm size.
- 5. Wait until the cement sets
- Once the cement has set, device is ready to be used





#### **Suggested training:**

- Hollow tube was used for training sessions. Tube was shorter and without base, so trainers were able to train dolphins in the surface of water.
- Training was really simple a dolphin needed to place the ball in the hole of tube and leave it. After that they started to do it in their free-time!

### **Soccer Ball Canon**

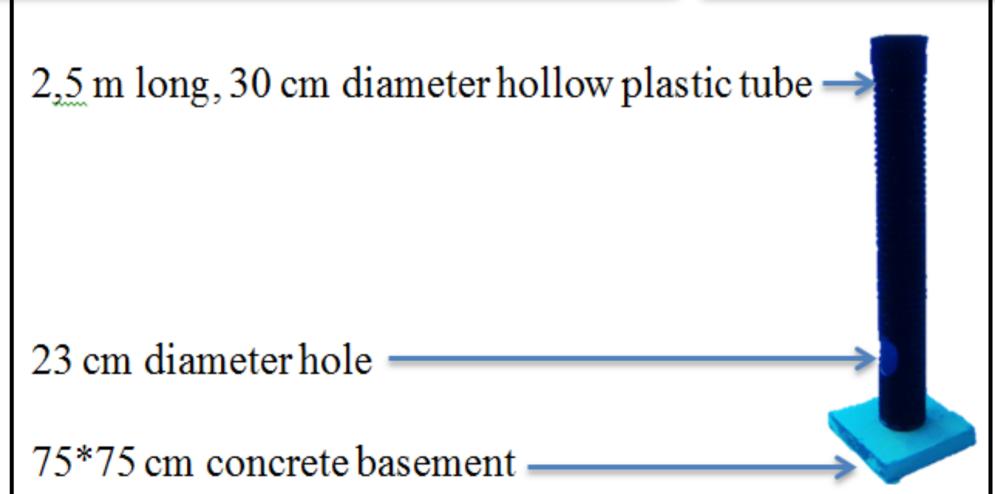
### Components

#### **Manoeuvring the device:**

The device can become really heavy, so to lower it to the bottom
of the pool is a challenge. We needed at least 4-5 men, but
perhaps others can choose lighter materials or consider how the
device could be better loaded and unloaded from the pool.

#### Sourcing the materials:

 Tube was made from strong polypropylene (PP) plastic (tubes commonly used in construction work) and fixed to a concrete basement.







## **Zorb Ball**

Large floating ball that a human can be inside of and animals can interact with

#### **Types of enrichment:**



Sensory



Social



Physical Habitat

#### Time to make:



15 minutes

#### **Budget:**



€100-200

#### Safety:

1 Ensure person in not in ball for too long - can get overheated inside, especially on hot days. Keep zipper accessible and ensure trainer in ball is supervised



## **Zorb Ball**

### Instructions:

- Lay out deflated ball with zipper facing up
- Put toys, objects or a trainer into the ball and zip shut
- Begin to inflate with pump (about 15-20 minutes)
- Roll to area to introduce can attach hook or rope or just let float
- 5. Allow animals to explore trainer can offer SDs
- Remove from area, unzip, rinse with fresh water and store



Link for the Zorb ball (buy pump separately):

https://www.amazon.co.uk/EOEDEAL-Water-Walking-Inflatable-zipper/dp/B0145AT8FI/ref=sr 1 8?





## **UW Bubble Shooter**

A device that makes bubble rings when attached to a SCUBA regulator

#### **Types of enrichment:**



Sensory



Physical Habitat



Cognitive

#### Time to set up:



15 minutes

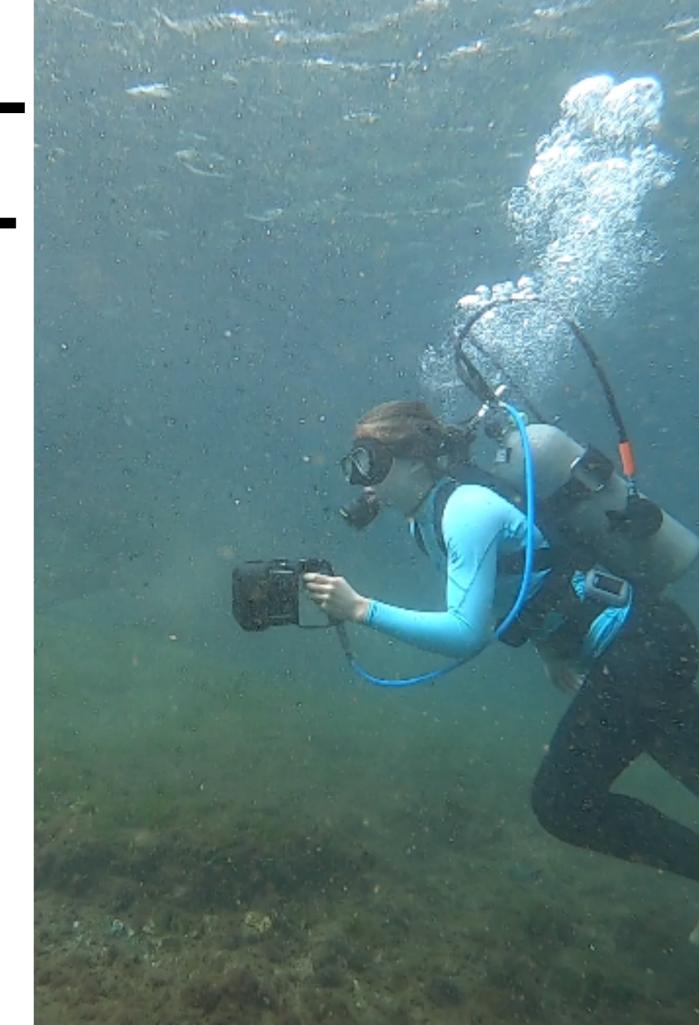
#### **Budget:**



€150 for bubble maker

#### Safety:

Tested to ensure that the power of the air coming from the device was not too strong.



## **UW Bubble Shooter**

### Instructions:

- Need one SCUBA tank filled with air
- Attach hose that will connect the device to the regulator
- Machine attaches to hose like a BCD turn knob half-way between off and all the way



- 4. Place bubble machine underwater and pull trigger and release for bubbles
- Allow animals to explore but do not aim directly at animal or person
- Breakdown by rinsing with fresh water while still attached, immersing machine in bucket of fresh water and pulling the trigger 6 times. Turn off tank and fire trigger once more (to let out air). Detach from hose to rinse completely. Fire trigger in air 6 more times, reattach and fire above water 6 times. Turn off, release pressure and lay to dry

## **U/W Bubble Machine**

## Set up









# Fishy Sea Grass

Various designs of fake plants attached to floor, with fish inside for dolphins to forage for.

#### **Types of enrichment:**



Food-related



Cognitive



Physical Habitat

#### Time taken to make: Budget:



30mins -1 hour



€ 35

- Connect the PVC pieces firmly to the hose. They could be a choke hazard if they come loose. (has not been observed)
- 2. Ensure fish doesn't go bad and all fish left in toy is removed.



# Kelp Forager

### Instructions:

- Cut a piece of hose to a length of your choice. Can be anything between 1m and several meters.
- Cut the PVC curtain pieces into square shapes and fold them once to create a pocket.
- Punch a hole in the curtain pieces where the two ends connect to one another and push them onto the hose.
- 4 Push a buoy onto the hose.
- 5 Make smaller PVC strips that are long enough to cover the pockets under the buoy.
- Push all the smaller strips of PVC onto the hose above the buoy and tie the hose end together so that the strips are locked in place.
- 7. Make holes for the carabiner at the bottom part of the hose.



PVC curtains are those sometimes used in commercial freezers or kitchens



# **Cooperative Feeder**

Plastic tubes filled with fish that dolphins must work with each other or a trainer to get out

#### **Types of enrichment:**



#### Social



Cognitive



Food

#### Time taken to make: Budget:



1 hour



€ 50-

- Make sure rough edges are sanded well (Dremel is good for this)
- Loops must be small enough so animals can't get them over their head (calves), but large enough to manipulate to open the apparatus



# **Cooperative Feeder**

### Instructions:

- Cut 5" PVC pipe to the desired length sand the pipe ends and the caps with a Dremel
- Drill a hole in the middle of each cap. Drill the hole the diameter of the rope, as it needs to be a tight fit to avoid water leaking into the apparatus.



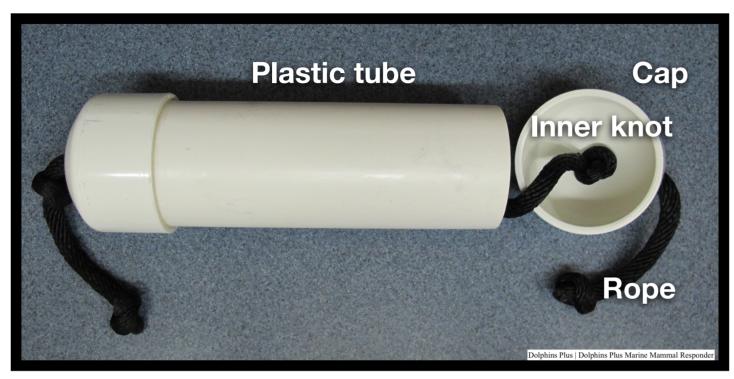
- 3. Measure and cut rope. Cut enough rope for each loop, knots, and the length of the PVC pipe (plus about 5 inches to allow the device to remain ajar once opened). Total rope was approximately 45" in length. Optional: Burn/melt the end of the rope
- 4. Thread rope through PVC cap 1, the PVC pipe, and through the PVC cap 2. Then thread the two ends back into the caps (to make the loops, see picture) to knot the rope on the inside of the cap/apparatus. May require some tools to help push the rope through the drill hole.
- Make tight knots on the inside of the caps, trim, then use the heat gun to melt the ends to ensure they do not fray.
- Use PVC glue to glue one cap to the PVC pipe. We did this to have one side that would open and another that would not.

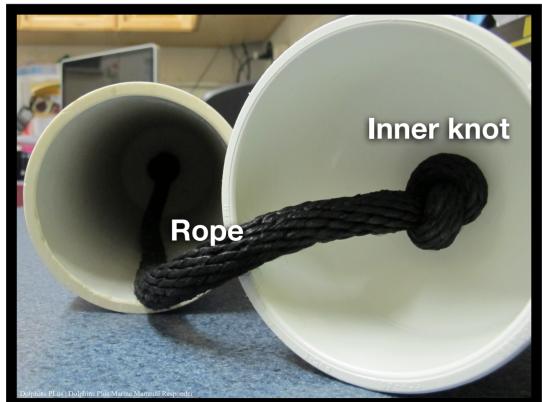


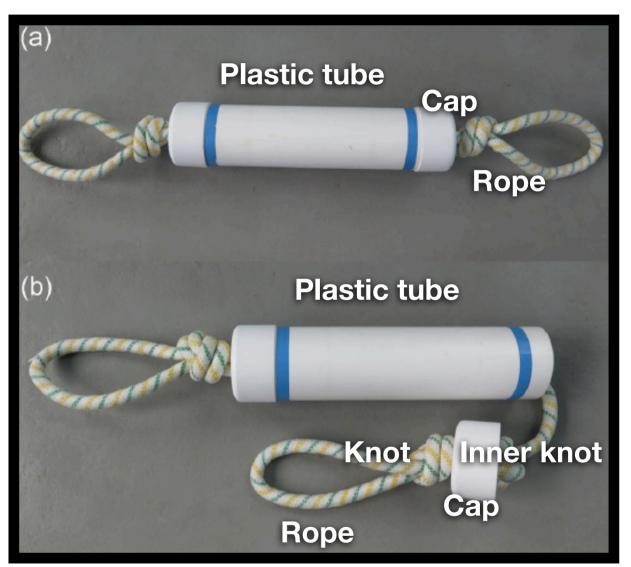
Check out the research articles on this device!!
Dolphins Plus/DPMMR: DOI 10.1007/s10071-014-0822-4
Ocean Park Hong Kong: DOI: 10.1002/zoo.21536

## **Cooperative Feeder**

### **Components**







#### Tip:

Ensure the proper time is given for the apparatus to dry once the glue is applied, and when drilling the holes for the ropes, do not over-drill as this will cause the apparatus to leak.



# Feeder Loop

A loop of feeders secured below or above water to which different items can be attached

#### **Types of enrichment:**



#### Food-related



Cognitive



Social



Physical Habitat

#### Time taken to make: Budget:



1 hour



€ 20

- 1. Size of the hoop was a concern so it needed to be large enough so dolphin couldn't get caught in it
- 2. Supervise during introduction



# Feeder Loop

### Instructions:

- 1. Thread the rope through the clear tubing.
- Tie knots at both ends. Ensure carabiner is threaded through one knot.
- 3. Burn off the rope at each end to ensure the rope melts.
- 4. Thread the excess rope back through the tubing.
- Add feeder (jolly ball or boomer bottle or anything else that can be used to fill with food) of your choice, or use for hoop play.
- To put underwater: A concrete block with a hook is required. Use the carabiner to attach the hoop to the concrete and use SCUBA to secure to bottom of the exhibit.



## **Feeder Loop**

## **Components**









# **Buoyant Activity Mat**

Rubber mat with near neutral buoyancy and firehose, jolly ball and other attachments.

#### **Types of enrichment:**



Sensory



Cognitive



Physical Habitat

#### Time taken to make: Budget:

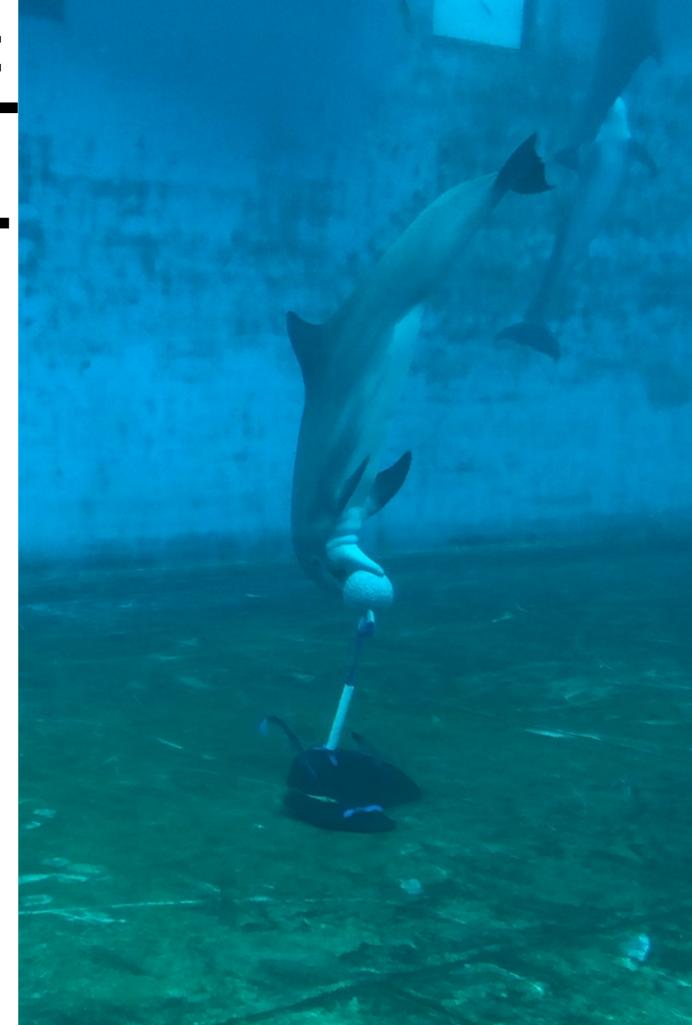


1 hour



Approx. € 200

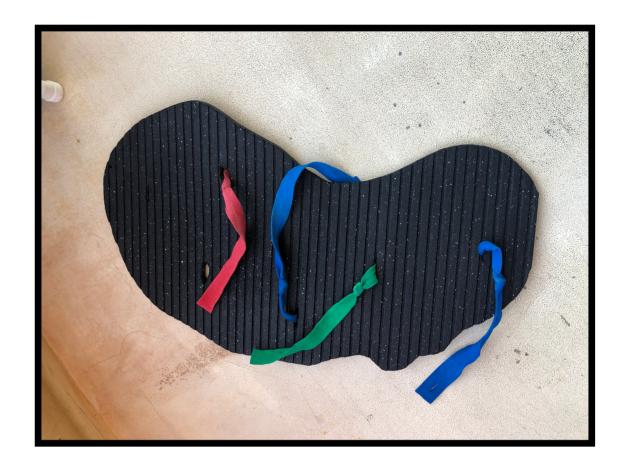
- Make sure car wash strips are an appropriate length to avoid any entanglement.
- 2. Horse stall mat is heavy so device will sink.

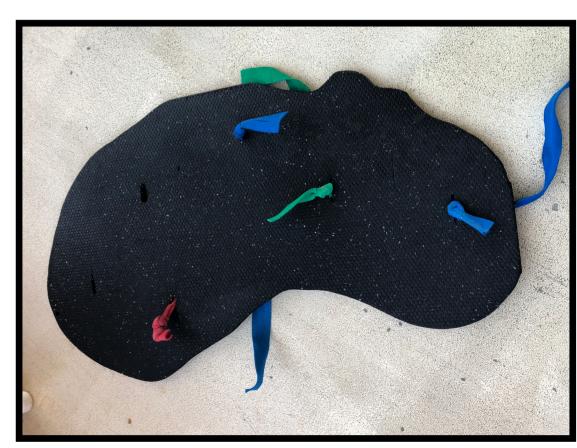


# **Buoyant Activity Mat**

### Instructions:

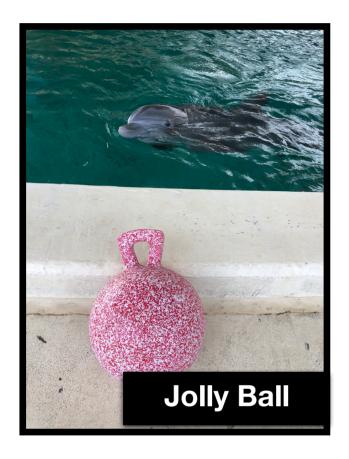
- 1 Cut horse stall mat in shape desired
- Cut holes in mat and attach car wash strips where desired (and appropriate length for your animals)
- 3 Attach one longer car wash strip
- 4. Slide PVC pipe onto long car wash strip (PVC pipe is to avoid anything/anyone getting tangled)
- 5 Tie jolly ball on end of long car wash strip





### **Buoyant Activity Mat**

### **Components**











# **Kelp Forest**

Artificial kelp forest made out of multiple fire hoses - designed for pinnipeds and not tested with dolphins yet.

#### **Types of enrichment:**



#### **Physical Habitat**



Cognitive



Food-related



Social

#### Time taken to make: Budget:



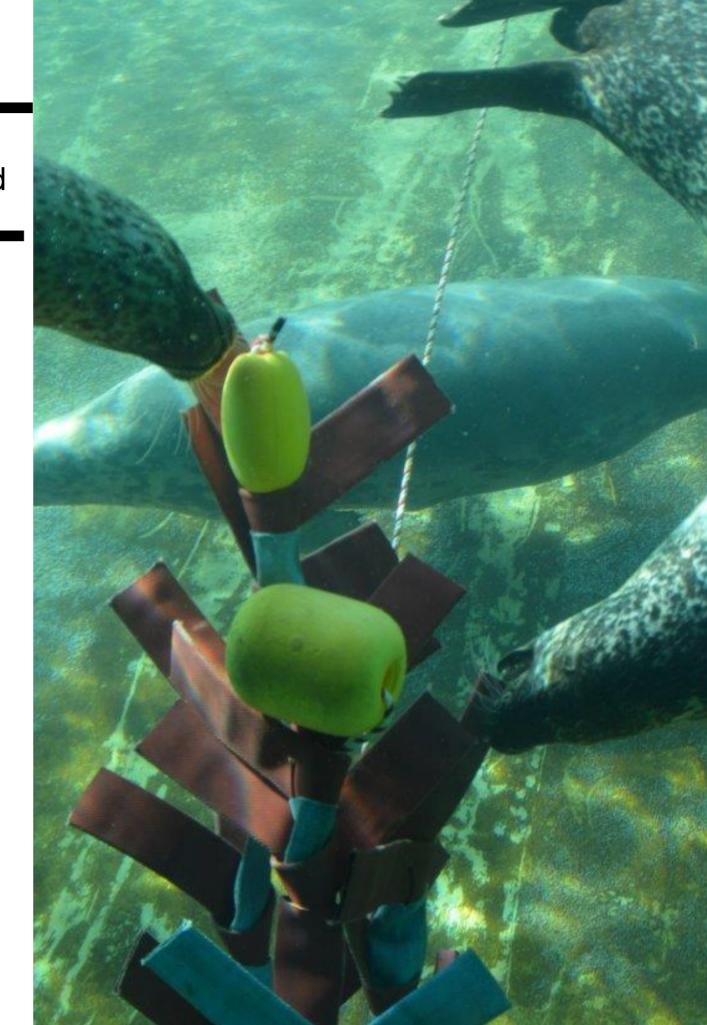
2-3 days



€ 40 (donated fire hose)

#### Safety:

- 1 This was designed for grey seals has not been tested with cetaceans.
- 2. Supervise during introduction



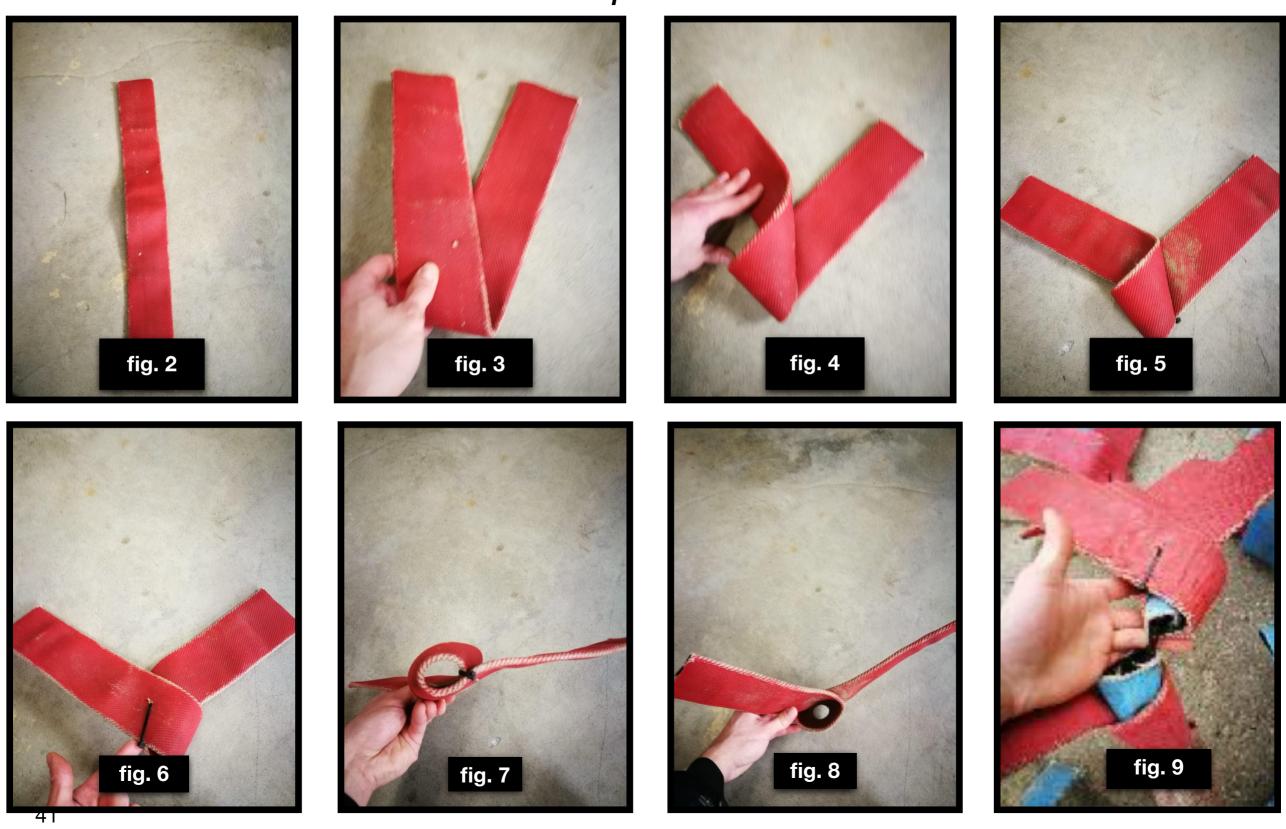
# **Kelp Forest**

#### Instructions:

- 1 Measure and cut the size of rope, hose and pipe elements. Depending on how many branches the kelp forest has to have, rope pieces have to be cut to size.
- 2. Fold hose parts into a "V" (*Fig. 2-3*) shape. Drill a hole in the hose and then fasten with a cable tie. (*Fig. 4-6*). (Best to turn the cable tie in the inside of the folded "V". It is important that there is an opening on the underside that is large enough to pass the rope through)
- The pieces can now be put into each other and connected with a rope. The individual strands can then be extended and stabilized by inserting tubes. The tubes are connected with the same rope. (Fig. 9)
- The individual branches should float in the water. To achieve this, different buoys or floats can be placed between the individual V pieces, or on the top of the branches.(fig 8) Floats that are used in shipping are very suitable for this purpose. These are very resistant and can be connected with a rope, because they have a hole in the middle.
- Now you can bind the whole structure to a canister filled with sand or anchor. The whole thing can then be connected with a rope to haul in the device.
- 6. If desired, fish can still be inserted into the individual hose parts, which then have to be taken out by the animals. Then it can be launched.

# **Kelp Forest**

### Components





# **Astroturf roller**

PVC roll with astro-turf wrapped around it for animals to rub themselves on and play with.

#### Types of enrichment:



Sensory



Physical Habitat

#### Time taken to make: Budget:



2 days



€ 10

#### Safety:

- Carpet must be secured properly so the animals can't rip it off or swallow the glue strips
- 2. Supervise when first introduced.



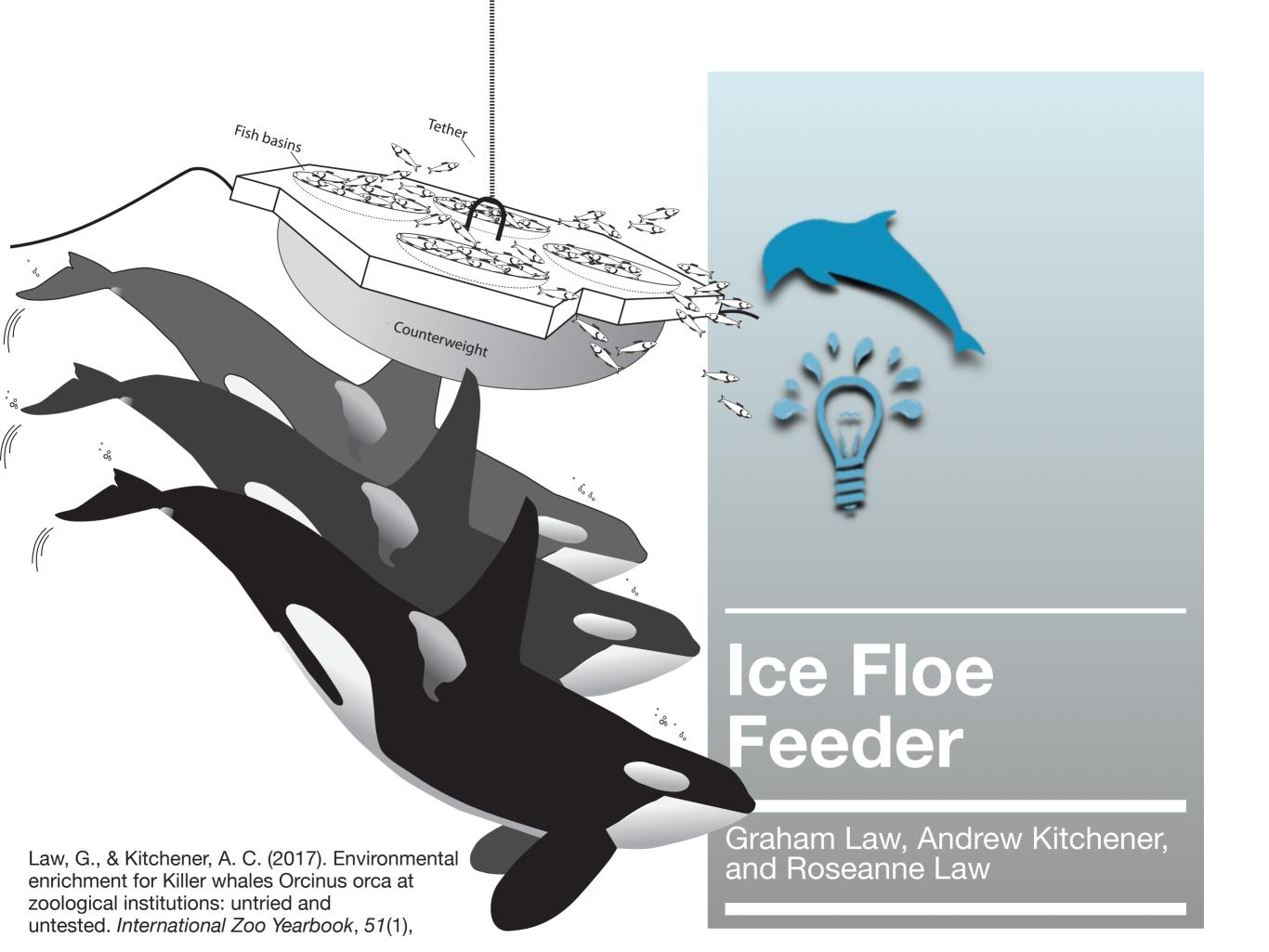
# **Astroturf roller**

#### Instructions:

1. Cut the astro-turf carpet so that it can be wrapped around the PVC roll.

- 2. Use water-resistant glue to stick the astro-turf carpet to the roll and make sure the carpet does not lift up from the roll anywhere (the animals will rip that carpet right off!).
- Make sure the glue has dried before using this device, which might take a day or two.





Bowls of fish on a weighted pivot system for orcas to simulate the wave feeding behaviour of their wild counterparts.

# Tether Counterweight

#### **Types of enrichment:**



#### Cognitive



Social



Food



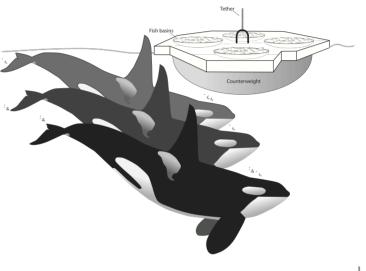
Physical Habitat

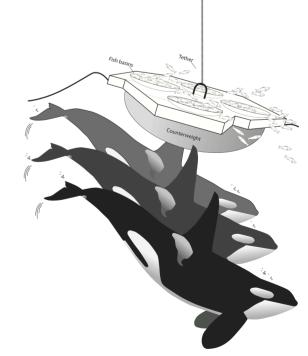
#### **Materials:**

Could include marine ply for ice floe, fibreglass for counterweight and fish basins, or adapted large sea buoys. Ballast could be concrete or dive weights.

#### Safety:

Materials used should be suitable for use in marine conditions and with orcas.

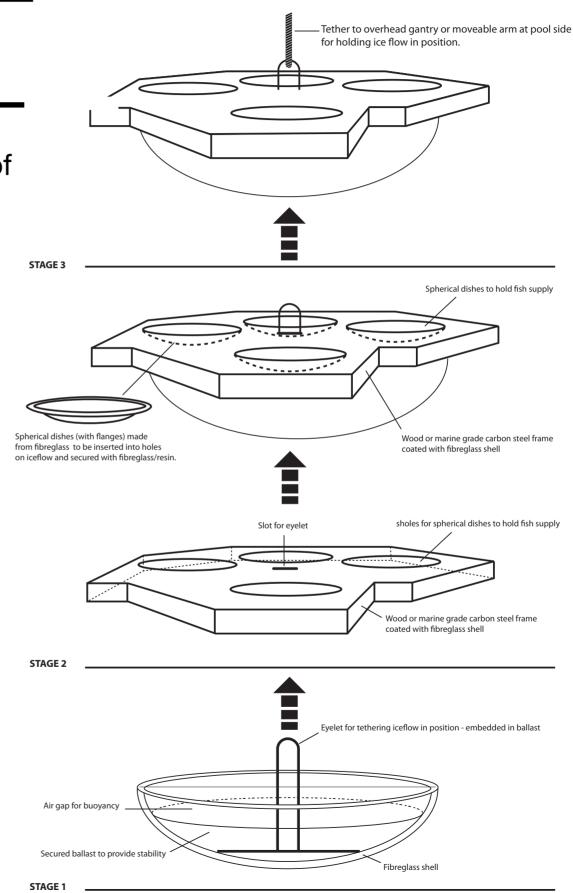




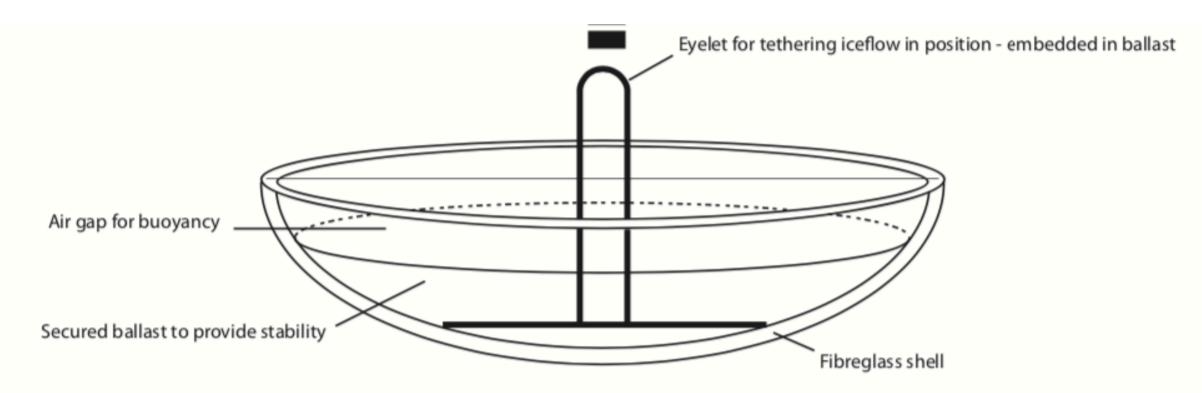
Concept drawing of construction of iceflow feeder for Killer whales by Rosanne Law, based on published paper: Environmental enrichment for Killer Whales Orcinus orca at zoological unsitutions: untried and untested. G. Law, A. C. Kichener First published: 05 Januay 2017 https://doi.org/10.1111/izy.12152

#### Instructions:

- 1 Create counterweight with a suitable amount of ballast to retain ice floe in level position (some advice from a marine engineer might be of value in assessing this).
- 2. Secure/anchor eyelet in ballast
- **3.** Build ice floe
- 4. Attach and seal ice floe to counterweight (see diagram)
- 5 Insert and secure fish basins
- Secure tether to eyelet on ice floe and attach to gantry of moveable arm on pool side – that will allow it to be held in position in free water.



#### Stage 1



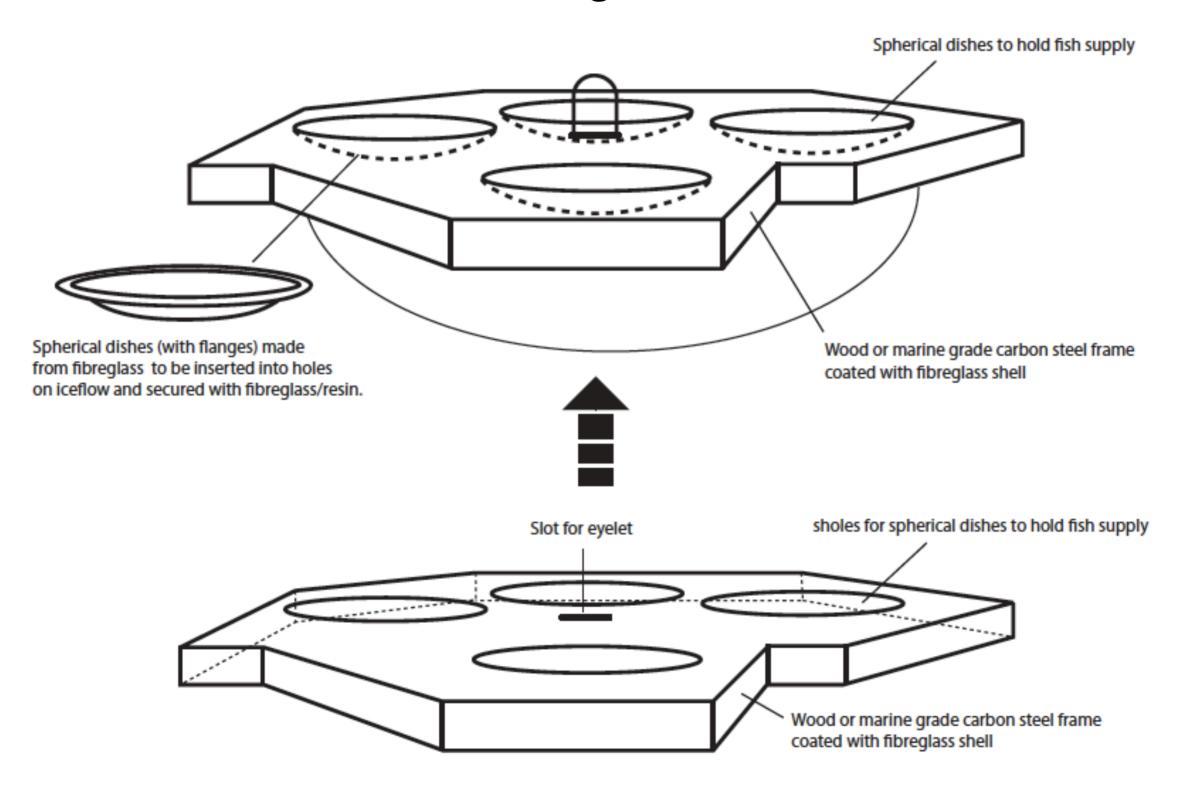
STAGE 1

The whole concept could be constructed from appropriate wood, metal, heavy duty plastic, glass-fibre (as long as it is robust and cannot harm the Orcas). Or, with the relevant skills in mould-making most of the components could be made from glass fibre or a high-density foam (which would also allow for making more than one). Or, commissioned/sponsorship sought, from a commercial specialist e.g. Thomas Fibreglass Technology:

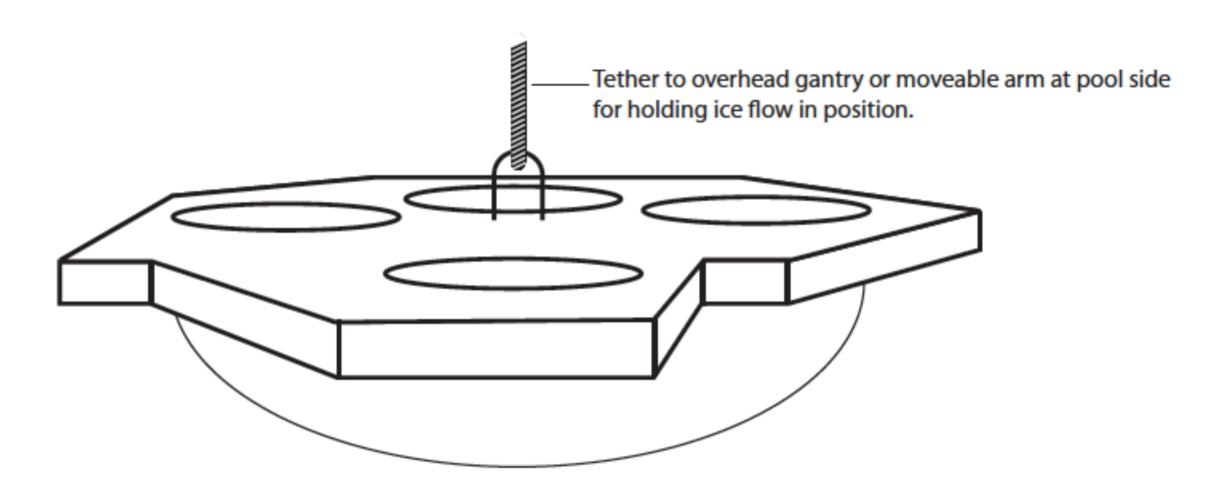
https://www.thomasnet.com/profile/30669691/fiberglass-technology-div-of-beachcomber-fiberglass-technology-inc-.html?

cid=30669691&cov=FL&heading=28310902&searchpos=1&what=Fiberglass+Fabrication

### Stage 2



#### Stage 3



STAGE 3

It would need to be tethered from above to keep it in a suitable free-water position for the behaviour to be successfully undertaken.

The size of the ice floe should be appropriate to the size/number of Orcas involved.

If captive average male 6.6m and average female 5.5m then not too small as it would be too easy to tip by individuals. Maybe around 3.5m wide.



# Sandbox Forager

Box of sand to be placed at the bottom of the pool for dolphins to forage fish out of.

#### **Types of enrichment:**



#### **Physical Habitat**



Social



Cognitive



Food

#### Time taken to make: Budget:



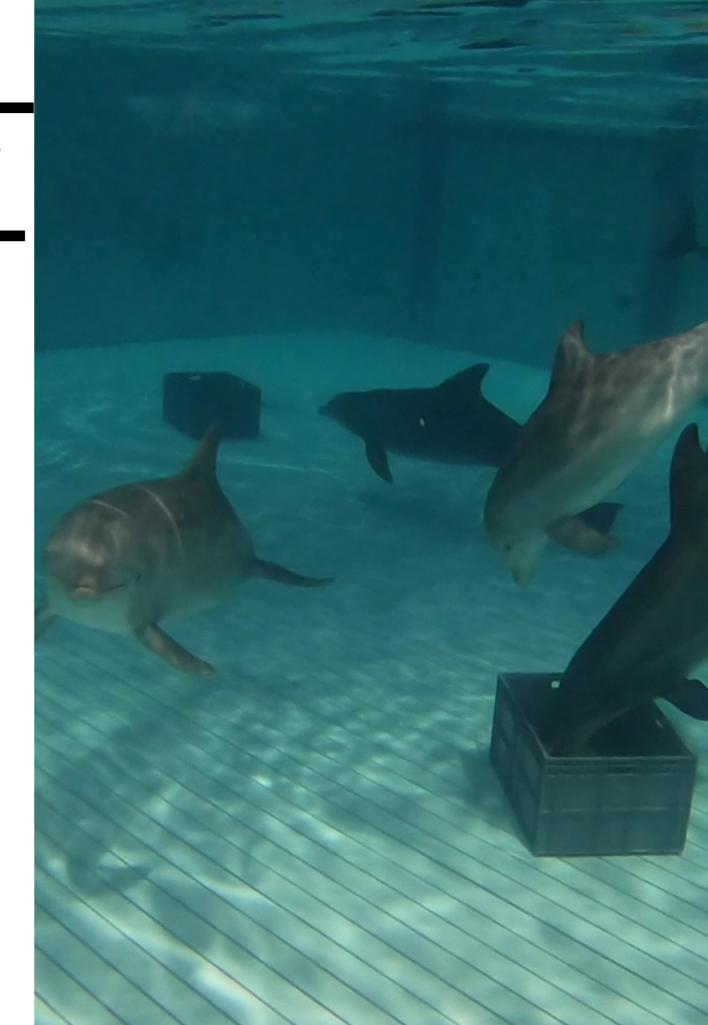
30 - 60 mins



€ 30

#### Safety:

1 If the container is too fragile it can break easily. This causes small sharp plastic fragments to be loose in the enclosure. Make sure the material is sturdy.



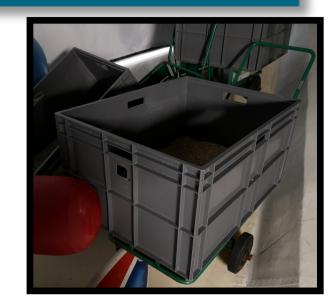
# Sandbox Forager

#### **Improvements:**

- Wider but smaller containers (gets heavy)
- More drainage holes (for quicker drainage)
- Finer filters to prevent the loss of sand.

#### Instructions:

- 1. Drill one or multiple holes into the bottom of your container. (more holes = faster water drainage)
- 2 Drill holes that are smaller then the coral sand or attach filters using adhesive onto larger holes to the sides of the container (see photo)
- When you've made the holes with attached filters, start filling the container with small amounts of sand.
- 4. Test and see how well the container will sink and if the filters keep most of the sand within the container.
- If it sinks well and does not spill out large amounts of sand, start to fill up a larger amount so that you really can bury the fish inside.







# Inflatable Fender

Large, robust inflatable cylinder for dolphins to play with.

#### **Types of enrichment:**



**Physical Habitat** 



Sensory

**Source:** <a href="https://www.tress.com/sv-se/sport-och-idrott/sim-och-bad/super-fender-655794">https://www.tress.com/sv-se/sport-och-idrott/sim-och-bad/super-fender-655794</a>

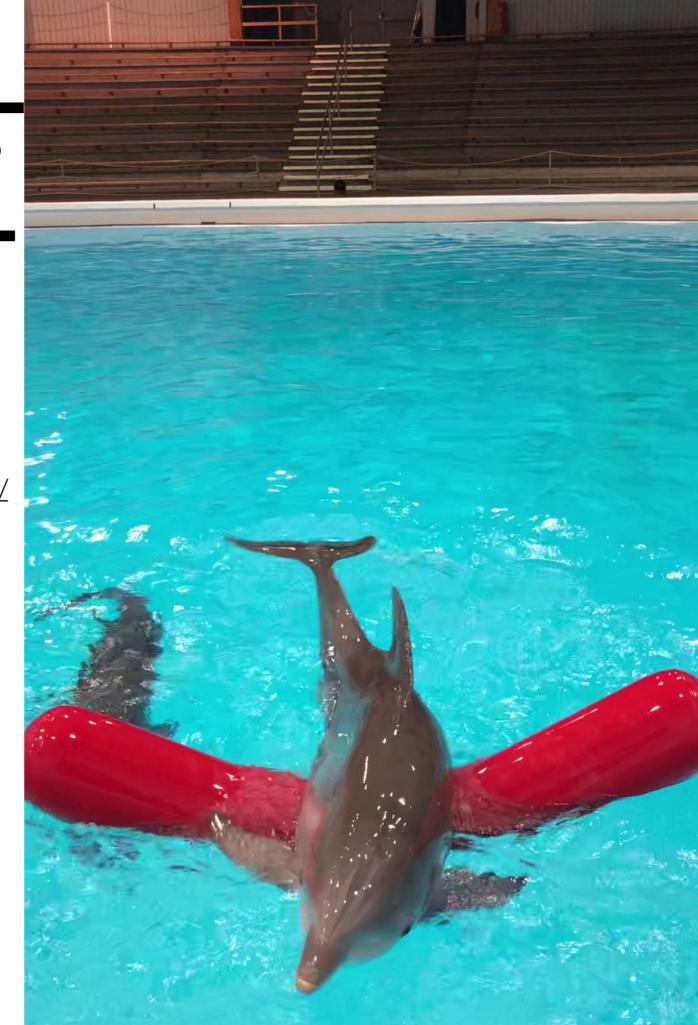
#### **Budget:**



€ 80

#### Safety:

1. The only safety aspect of this one is the plastic plug the cylinder has for the inflating nozzle. It is small and sits quite far in so it is hard for the animals to reach.





### Suspended Hoop Feeder

A hoop suspended by elastic with a ball feeder tied on and full of fish.

#### **Types of enrichment:**



Food



Physical Habitat



Cognitive

#### Time taken to make: Budget:



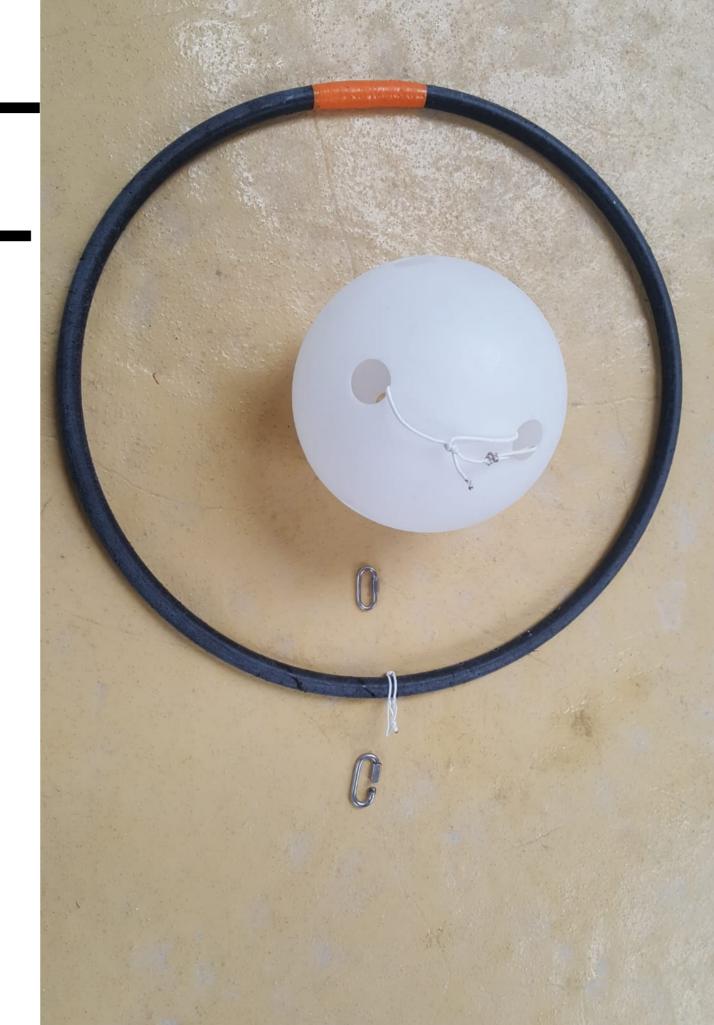
15 minutes



€ 40

#### Safety:

- Make sure the elastic is secured well attached to a wall/higher surface
- Supervise to ensure carabiners and elastic tether remain intact and are not consumed



# Suspended Hoop Feeder

#### Instructions:

- 1 Drill holes in feeder ball
- 2. Attach the hoop on the ball using the elastic
- 3. Place the elastic above the pool
- 4. Click the ball/hoop on the elastic cord using carabiners/musketon



Hoop partly immersed in water for the dolphin's to access the ball



Pre existing elastic suspension



Set up over dolphin habitat



### **Cone Games**

Use of baited cones to devise a number of challenges for the animals.

#### **Types of enrichment:**



Cognitive



Food



Sensory

#### Time taken to make: Budget:



N/A



€20 (or €0 if upcycled!)

#### Safety:

- 1 The hole should not be small enough for an animal to get its head stuck.
- 2. Make sure any sharp edges on the cones are sanded down.



# Cone games

### Suggested variations:

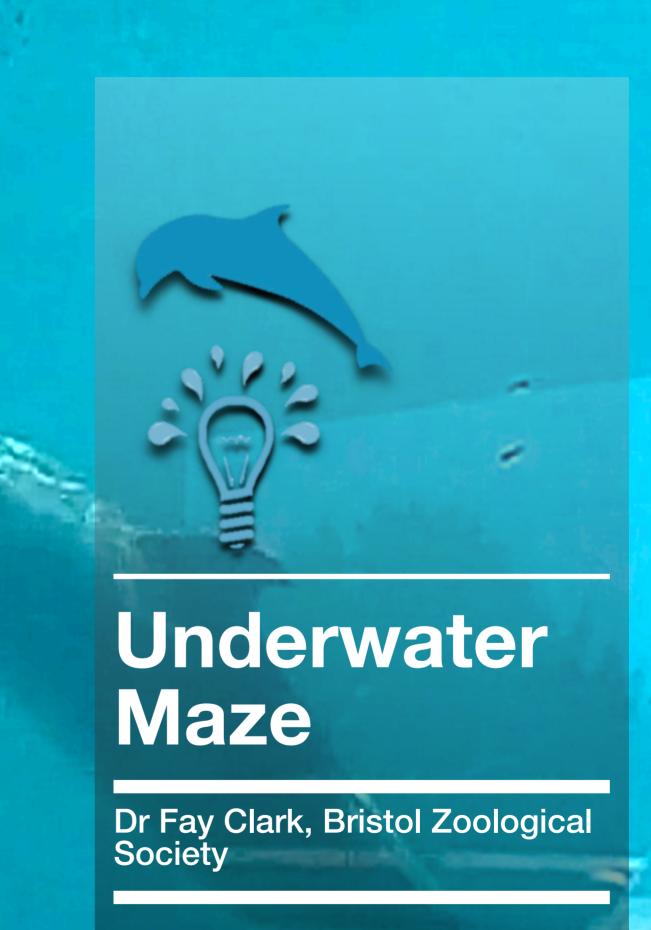
- Bait some of them with food, and some of them not, and introduce subtle cues to help the animal figure it out (e.g. colour, acoustic, size)
- 2. Make them weighted to increase the physical challenge for the animal
- Bury the fish under sand/a second item under each cone to introduce a second step
- Thread baited cones through rope to allow them to be moved side to side/up and down.
- 5. Stack them together with food inside
- Use them in training sessions e.g. in a memory task scenario



Fish or gelatin can be placed inside individual cones, cones stacked/threaded together, or in weighted cones.



Burying fish in the sand under cones can increase the challenge



#### **Underwater Maze**

A vertical maze constructed from plumbing pipe, submerged underwater, containing a gelatin ball reward.

#### **Types of enrichment:**



Cognitive



Social



Physical Habitat

#### Time taken to make: Budget:



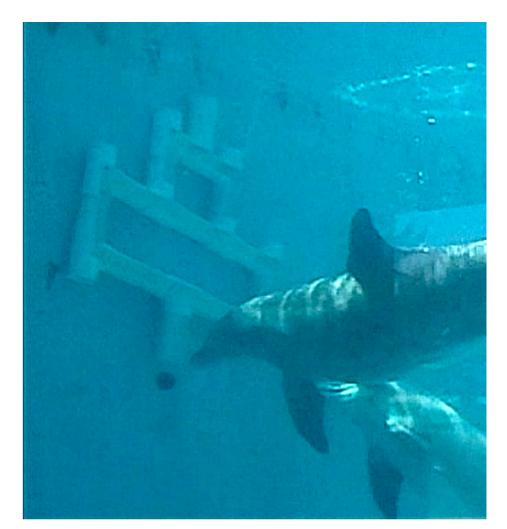
3 days



~€150

#### Safety:

- 1 Do not leave this device unattended, especially if using ropes to attach to the pool side.
- The metal hardware will eventually rust in salt water, and should be checked often.





Where the ball could exit the maze, a gelatin ball was used as the reward. If the maze is sealed, a small rubber ball can be used.

# **Additional Safety Recommendations**

Risk	Prevention
Ropes/cords used to tether the maze pose a strangulation hazard.	Use non-tangle ropes and cords or chains, avoid large loops.
The maze pipes could cause injury through scratching or entrapment of the dolphin's rostrum in the channel.	Test the diameter of the pipe channel using a scrap piece of pipe.  To protect dolphin's rostrums, the pipe channels should be well-sanded until smooth.
Metal fixtures and fittings could cause a choking hazard, particularly in dolphins who like to 'bring' things to their trainers.	Metal screws should be flush with the pipe, excess lengths removed, and sanded until smooth. Check the maze regularly for signs of damage or wear-and-tear (it will eventually erode in the salt water).
The reward ball poses a choking hazard.	The reward ball should be of a carefully considered material and size. I used a 90mm diameter purple synthetic rubber "Squeezz"™ ball (Kong®, Golden, CO) which was a perfect size for the size of pipes and channel diameter, and it was never allowed to exit the maze. A gelatine ball was created for the open exit version of the maze, so that if dolphins chose to eat the ball it would dissolve in their stomach (they never did eat it!).

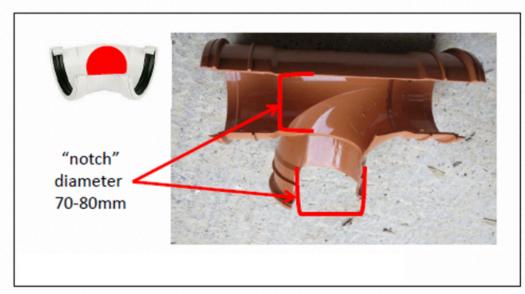
# Maze design

### Suggested materials:

- PVC plastic plumbing pipe, approx. 100 mm diameter.
- T-shaped pipe connectors, socket bends and pipe caps, approx. 100 mm diameter.
- 3. Stainless steel nuts and bolts
- 4. Carabiner clips and rope
- Workshop machinery: band saw machine or hand saw; sanding machine or sand paper; hand drill. Pipes can be glued or welded together if you have the ability to do this.
- 6. Gelatin balls if sealed maze, small rubber ball if unsealed. See below for gelatin ball recipe.

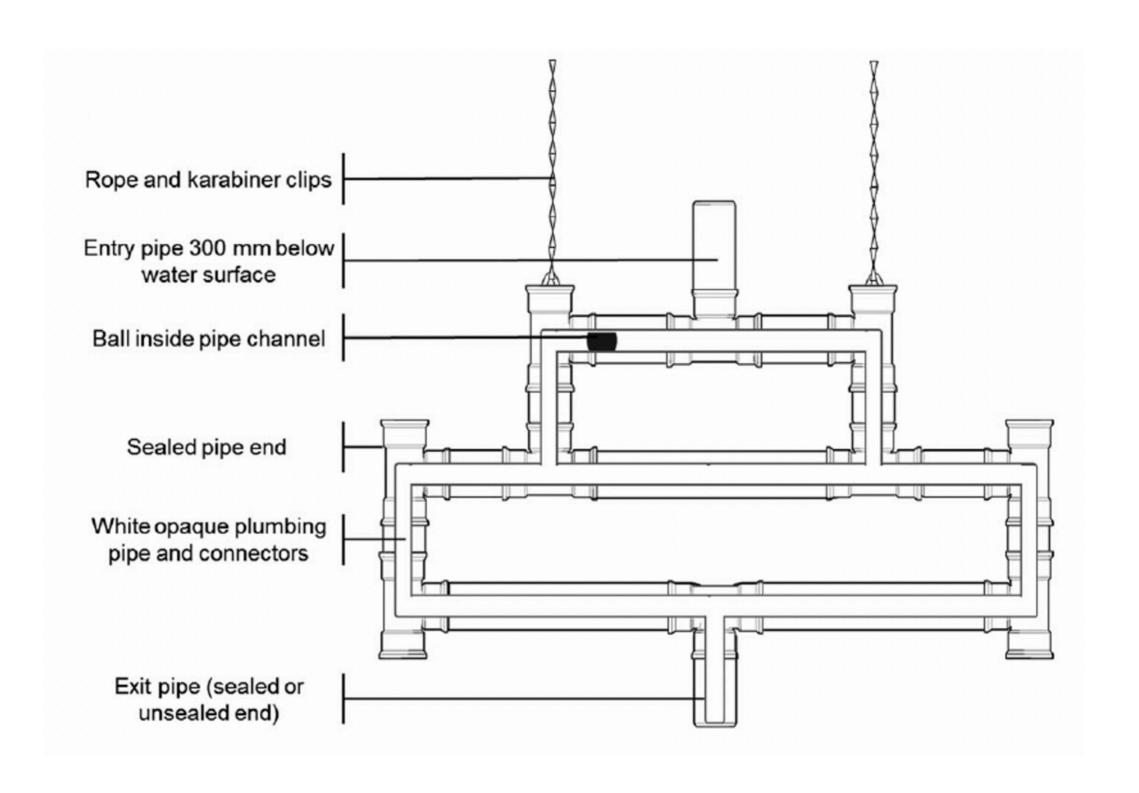


The pipe has a thickness of approximately 5mm. The PVC-U is easy to saw, drill, chamfer and sand (it is not particularly brittle), but is also easily scratched.

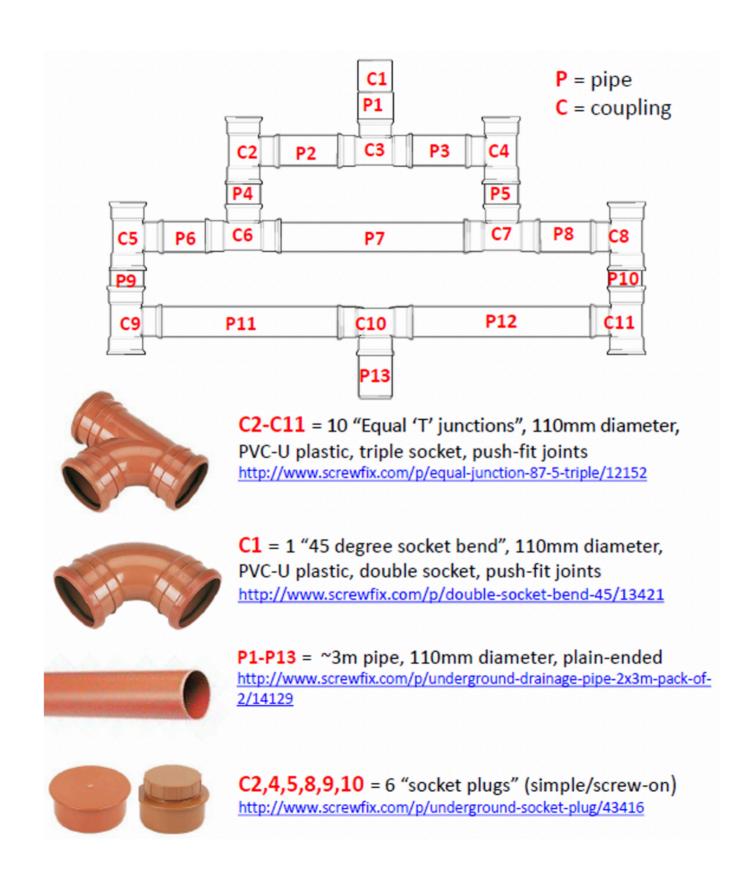


The pipe should ideally be sawn by machine AFTER pipes have been bolted together to create seamless notches. The exact diameter of the notch should be based on the average rostrum circumference of Six Flags dolphins. The notch diameter seen above was based on several captive dolphins measured at a Zoo in the Netherlands, just for guidance.

# Maze design

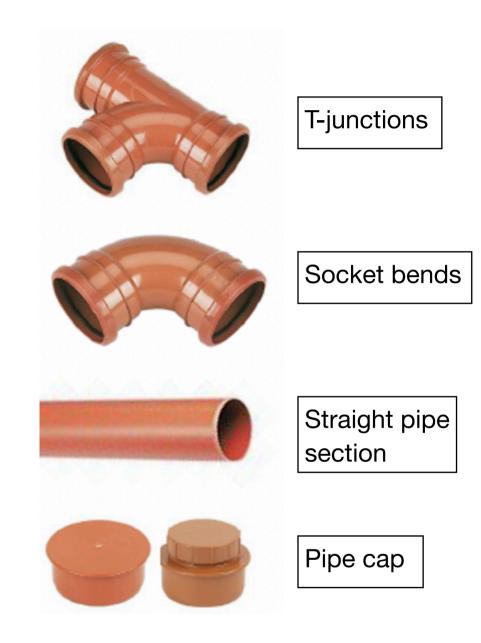


# Maze design

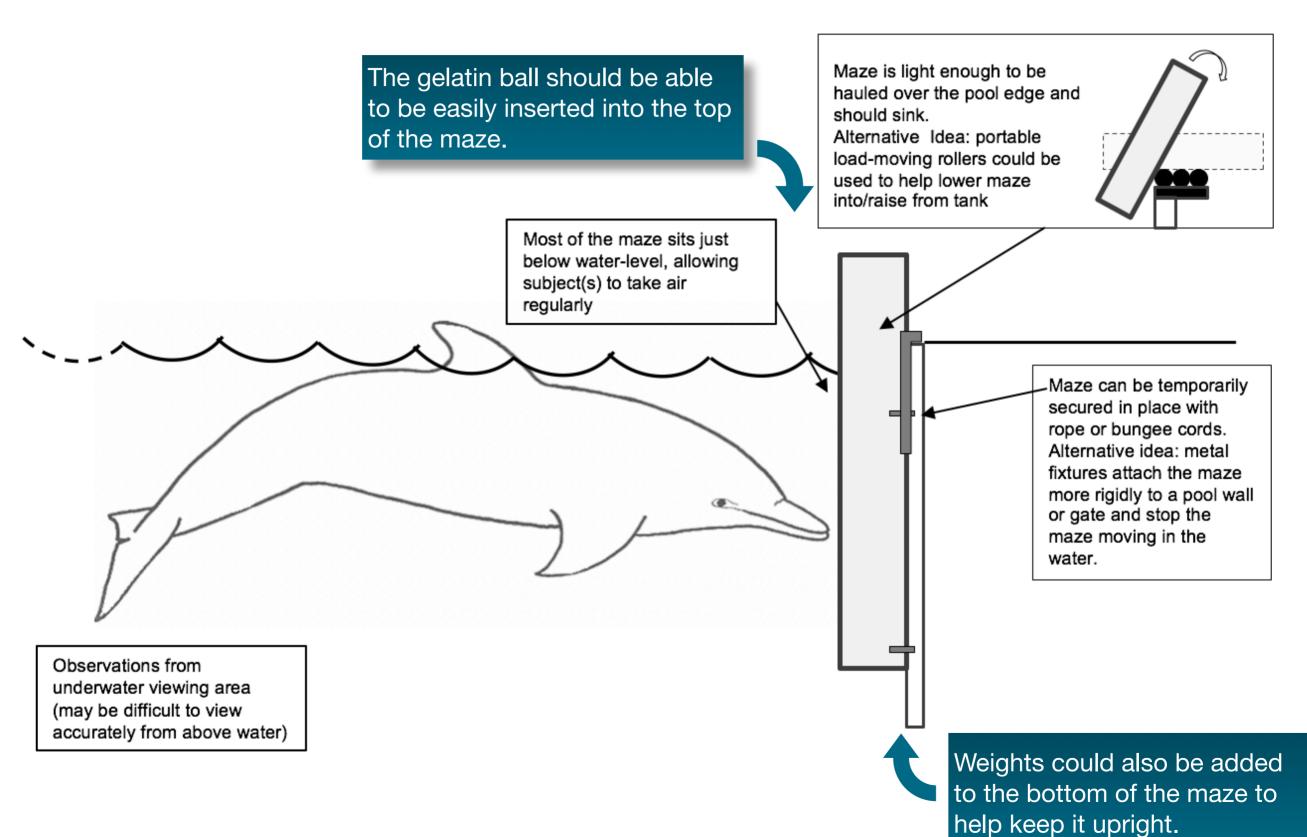


# Maze construction

- Choose a design of the maze channels and dead ends, and whether the maze will be sealed or unsealed. Measure the diameter of your animals' rostrums/noses to work out how wide the notches in the pipe should be (animals should be able to partially insert rostrum to move the ball, but ball should not be able to slip out).
- 2. From your design, work out how many straight pipe sections, T-junctions, socket bends, and pipe caps you need.
- 3. Use stainless steel nuts and bolts to construct maze (or glue/weld where possible).
- 4. Once the pipes are attached, measure and saw the notch out of the front of the maze.
- 5. Use rope covered in plastic hose tubing (to prevent entanglement) and carabiners to make attachment points at the top of the maze.



# Maze positioning suggestions



# Gelatin ball recipe

You will need: Gelatine powder (uncoloured, unflavoured), hot and cold water, measuring jug, bowl, whisk/fork, balloons, large plastic syringe (e.g. 60ml) with as wide a tip as possible, large tennis ball cut in half, optional: liquid food colouring

#### Procedure for making one ball:

- Measure out 180ml gelatin powder using a measuring jug, then place in a bowl and add 150ml of cold water. Whisk until the water is absorbed (will be lumpy).
- 2. Add 250ml hot (not boiling) water to the mixture, and whisk rapidly until there are no lumps. To avoid air bubbles in the mixture, tap the bowl on the table and skim the bubbles off the surface with a fork. Add ~4 drops of colouring if desired.
- Working quickly (the gello will begin to set immediately), fill the syringe with gello and squirt it into a balloon. The first couple of squirts will be easy, but as the balloon begins to stretch it will become harder. This is really a two-person job (one to use the syringe and the other to hold the neck of the balloon tightly).
- 4. When all the mixture is in the balloon, knot the neck and rinse the excess gello from the outside. Place the balloon inside the shell of the tennis ball, and refrigerate for at least 2 hours.



A balloon is filled with the jello mixture, tied and placed inside a large tennis ball to set. This creates a dense rubbery ball (that sinks and bounces) with a perfect round shape.



### Research & recommendations



This IdeaBox item is perfect for scientific research on dolphins' cognitive abilities!

A paper has been published on how bottlenose dolphins learned this maze:

Suggested schedule for scientifically evaluating the animals' use of the maze

Clark, F. E., Davies, S. L., Madigan, A. W., Warner, A. J., & Kuczaj, S. A. (2013). Cognitive enrichment for bottlenose dolphins (*Tursiops truncatus*): Evaluation of a novel underwater maze device. Zoo Biology, 32(6), 608-619.

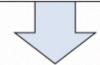
If your facility is interested in making this item and conducting research, please get in touch as Dr Fay Clark would love to collaborate!

#### **Final suggestions:**

- Recommended time to leave the maze in is 90 mins at a time to avoid habituation
- ► This maze would also be brilliant for pinnipeds! (remember to adjust those size dimensions).
- Ideally, the maze design could be variable, where the pipes and connectors could be safely rearranged to make new maze layouts on a regular basis!

Phase 1: Pre-challenge baseline 2-4 weeks

Baseline data collected on random days during normal management conditions



#### Phase 2: Cognitive challenge 4-6 weeks

Idea 1:

- The effect of device complexity (vary the complexity level of the maze)
- Each level repeated 4 times in random order Idea 2:
- The effect of reward (2 levels) reward chute is open or closed
- Each level repeated 4 times in random order

Inter-challenge baseline data will also be collected on random days in between experiments



Phase 3: Post-challenge baseline 2-4 weeks

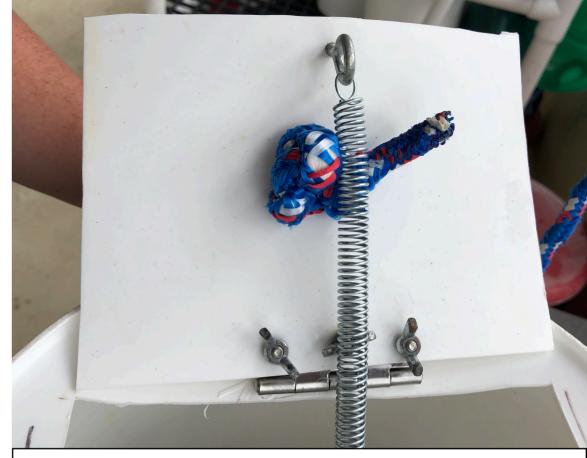
Baseline data collected on random days during normal management conditions



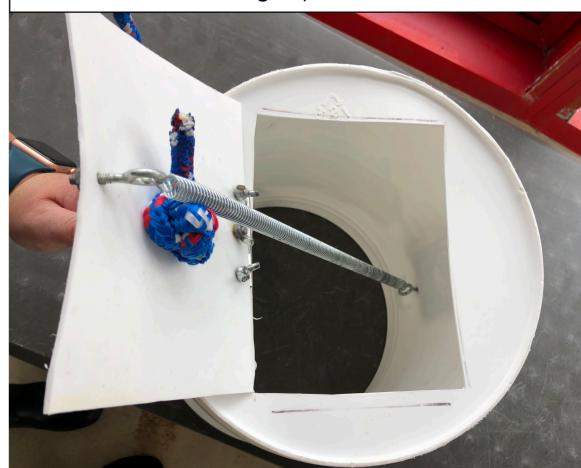
### **Hanging Piñata**

### Instructions:

- 1. Tie a monkey fist knot in one end of the rope then cut the rope to desired length (this will be what the animals pull on)
- 2. Cut rectangle hole in the bottom of the bucket
- 3. Cut a whole in the centre of the rectangle door, thread rope through it, then knot it as in photo
- 4. Attach a hinge (using screws, washers, and lock nuts) to the rectangle door
- 5. Attach a spring to rectangle door (on the opposite side of the hinge)
- 6. Re-attach door to bucket using the hinge
- Attach the other end of the spring to a place in the bucket where it can function properly, and with the desired resistance (same side as the rectangle door but towards open end of bucket). Tie rope to bucket handle to allow hanging.



Attach a hinge and spring to the rectangular door using screws, washers and lock nuts (sealed with Loctite Threadlocker glue)

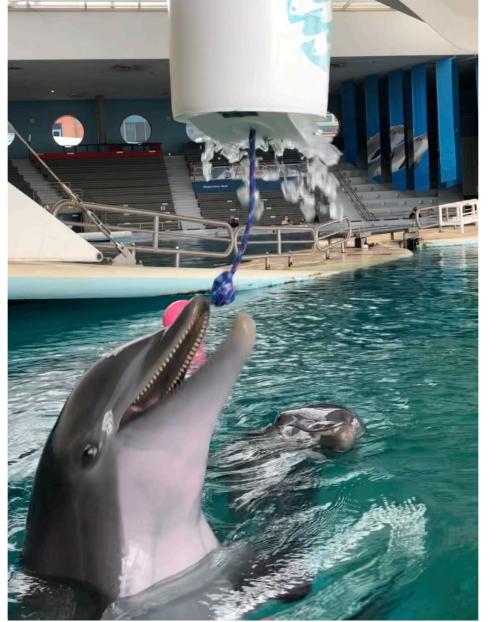


### **Hanging Piñata**

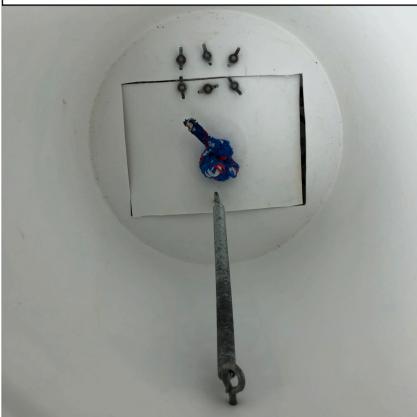
### Variations and more photos:

- Vary the reinforcement: Fill the bucket with ice, gelatine cubes, fish, or a combination of these
- Vary the resistance: add an extra spring to make it harder for the dolphins to get the fish
- ► Increase the social challenge: use a larger bucket or tray with 2 ropes that must be pulled simultaneously to release the fish (either make the door only release when both are pulled, or make the resistance so much that it needs 2 dolphins to release)
- Add in a ball game: make a bucket with a hole wide enough to let a ball through. Train the dolphins (if needed) to throw in a ball and pull the rope to release it again.

Dolphins pulled the rope to release the reinforcement, or they nudged and hit the bucket like a real Piñata!



View of the door from inside the bucket, showing the spring and hinge screws



View from outside and beneath bucket of the rectangular door with hinge and rope



### **Hanging Piñata**

A bucket suspended above the pool where the animals can pull a rope to release a door where reinforcement falls out.

### Types of enrichment:



Social



Food



Cognitive

### Time taken to make: Budget:



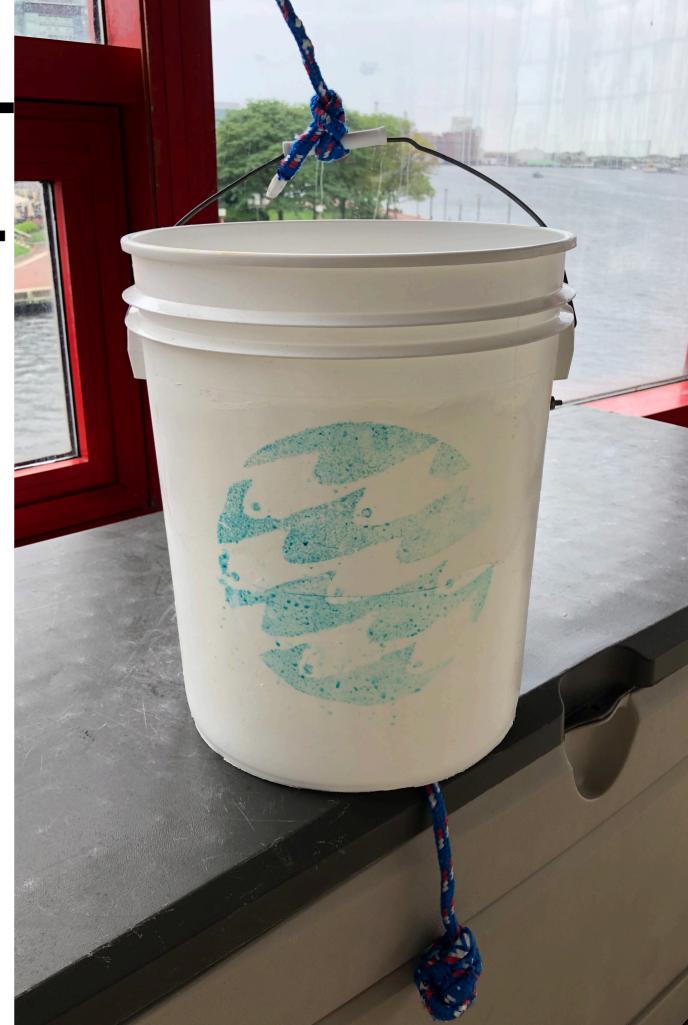
1 hour

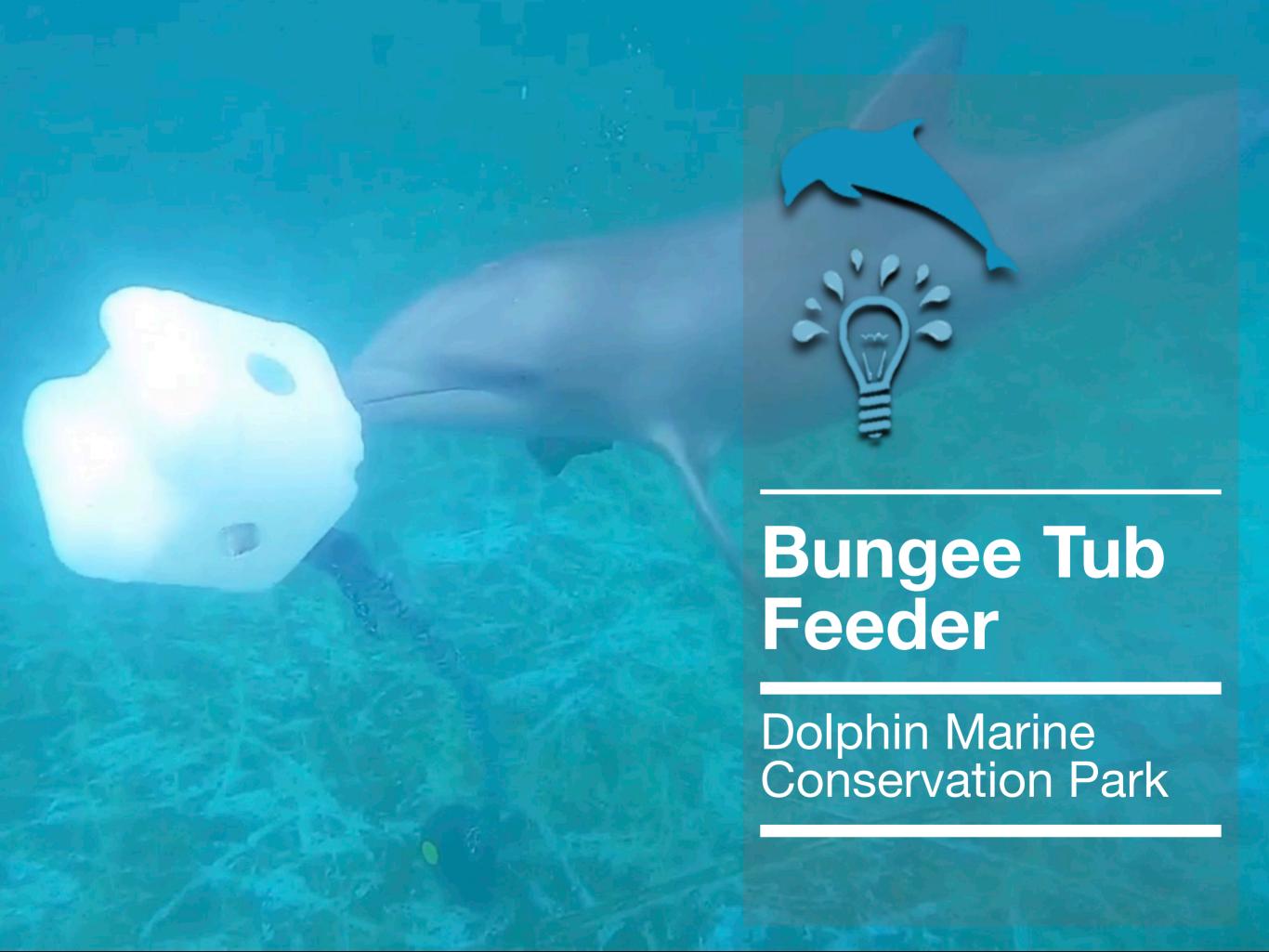


€ 25

#### Safety:

- 1 If hanging the Piñata outside, ensure that there is ample shade above it to prevent eye issues from looking up into the sun
- 2. Use Loctite Threadlocker glue to secure bolts and prevent any screws or nuts falling into the pool





## **Bungee Tub Feeder**

#### Time taken to make:

### **Budget:**



2 hours



€ 200\*

\*all pieces are interchangeable and can be used with other devices

Types of enrichment:

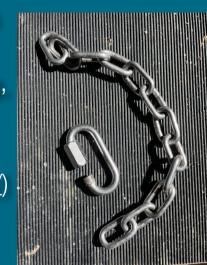






#### **Materials:**

- 1. Fender blue tip buoy
- 2. Fabric-coated bungee with stainless steel rings at both ends (can be bought from Aussie Dog, <a href="https://aussiedog.com.au/">https://aussiedog.com.au/</a> product/marine-bungee/)



- 3. Stainless steel chain
- 4. Stainless steel clip
- 5. Recycled detergent

### Safety:

- We recommend avoiding D-Shackles as a connecting clip as there are multiple pieces that can become dislodged and ingested. Instead, use 'quick link' shackle, as in photo.
- 2. Ensure chain loops have no gaps that a dolphin could become entangled in.

### **Bungee Tub Feeder**

### Instructions:

- 1. Clean the plastic detergent tub and remove any loose parts like the lid and tap connector. Using a circular jigsaw cut desired holes in the plastic.
- 2. Loop a short chain through the hole in the buoy or kettlebell and through the bungee connector and secure with a quick link shackle. Ensure the shackle is finger tightened. (Later to disassemble enrichment device we have a pair of pliers for easy undoing.)
- 3. Loop another chain through the food tub and bungee connector and again secure using a quick link shackle.

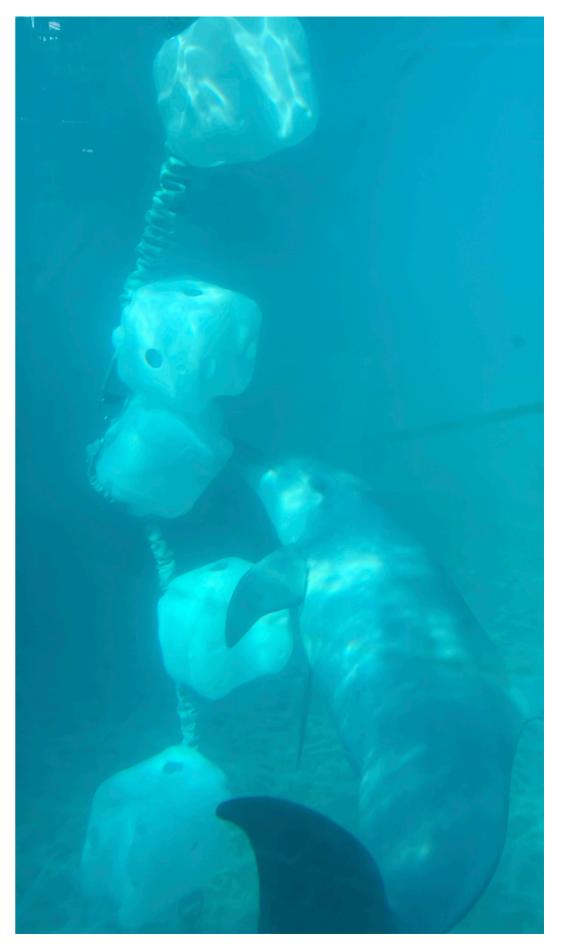


## **Bungee Tub Feeder**

Difficulty levels can be altered by changing the number of holes drilled into the tub, threading multiple tubs on the line, and changing the size of the holes.

The device can be **neutrally buoyant** from the surface, with the buoy, or **sunk**: replace the buoy with a 4kg weight to sink it to the bottom.





Caption



Multiple, detachable PVC tug feeders positioned within a firehose shell.

Types of enrichment:



Cognitive



Food-related



Social

#### Time taken to make:



6 hours

**Budget:** 



Free using donated or recycled items

### Instructions:

- 1. Cut four firehose strips to desired length. We did 24 inches long by 4 inches wide.
- 2. Sew 2 firehose strips together using an awl (hole puncturing tool) lengthwise, overlapping minimally so that PVC tubing can be inserted.



3. Continue to sew all firehose pieces together length wise to create a mat with open ends.



4. On both sides of the mat, 2 inches from the open ends, sew two strips of fire hose perpendicular to the firehose on the mat. Sew this piece of firehose to the mat on one side to create a sleeve for hanging or to slide rope through to attach buoys. We used 12 in long hose that is 2 inches wide.





- 5. On one side of the mat, begin to sew the 4 inch firehose closed, however leave a 1 inch gap un-sewn in the middle of the hose.
- **6.** Burn the edges of the firehose.

7. Cut PVC rods 3 inches smaller than the fire hose mat length. We cut our PVC pipe to 21

inches long.



- 8. Drill a hole in 4 of the caps of the PVC to allow for a rope or firehose tug.
- Attach firehose or rope tug to the caps. Tugs can be varying lengths and materials. To make the foraging device more complex, on the inside of the cap make the rope tug length 60 inches. This long tug in step 11 will be used to attach to the device.







10. Glue PVC caps to each of the rods.





In this optional step to make the challenge more complex, we will attach one tug with the long end on the inside of the cap, to the firehose shell. To do this thread the rope or p-hose through the un-sewn sleeve of the firehose mat and through the one-inch gap in the sewn side of the firehose mat. Knot the rope or p-hose so that it is not pulled back through.



12. Put all PVC rods in the open sleeves of the device. Optional: add food to solicit foraging.



**13.** Deliver to animals and enjoy!





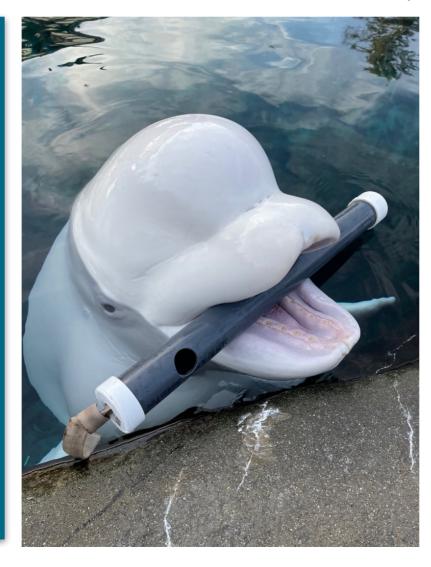
### Safety:

Firehose will wear and fray overtime and PVC caps may crack, so object should be inspected before and after use. 2. Holes in the PVC should be appropriate to animal's size as should the PVC rods and firehose holes.

This device can be used for multiple species, marine and terrestrial!

### **Variations:**

- 1. PVC pipes fully tucked in or hanging out
- 2. Sink device with weight, neutrally buoyant with float, hang from above
- 3. Change hole sizes
- 4. Make caps releasable, when pulled in opposite directions. See Tug-O-Feeder item in IdeaBox.







### Spin-the-bottle

A suspended cord with free-spinning bottles, which can be filled with fish, ice or water.

This entry was a happy collaboration- both Boudewijn Seapark and Dolfinarium Harderwijk came up with it around the same time!

### **Types of enrichment:**





Cognitive



Social

#### Time taken to make:



1 hour

### **Budget:**



€ 40

#### Safety:

- 1 Suspend cord at least 40cm above the water surface.
- 2. Supervise to ensure carabiners and elastic remain intact and are not consumed.



#### **Materials**

- 1. Empty vitamin pots
- 2. Two elastic tethers (e.g. high strength bungees)
- 3. Rope
- 4. Tube (gardenhose)
- 5. Two carabiners

### Spin-the-bottle instructions

- 1. Drill holes in the middle of the vitamin pots (take the diameter of the size of your tube).
- 2. Put the robe inside the tube and make a knot. Place the vitamin pot around the tube and make a big knot (to avoid extra movement).
- 3. Put all pots on the tube and finish with up with a new knot. This part is ready.
- 4. Attach the carabiners on the elastic tethers and secure them with tight knots.
- 5. Fill the pots with fish.
- 6. Attach the carabiners on the yellow tube. Attach the other side on the wall.









### Spin-the-bottle

### **Variations**

Suspend the line so that the bottles are out of reach of the dolphins to touch by rising up from the water.

Instead, suspend a buoy which hangs down within their reach. The dolphins must learn to hit the buoy to make the bottles move and spin, and the fish to be released.

While fish is an obvious choice for this item, it would also work very well with ice, gelatine cubes, as well as simply water.







### **Foraging Box**

A plexiglass box with holes designed to encourage walruses to suck out small food items, a natural foraging behavior. Adaptable for other species.

### Types of enrichment:



Foodrelated



Cognitive



Physical habitat

### Time taken to make: Budget:



30 minutes



€ 50-80

#### Safety:

The plexiglass box should be housed within a stainless steel cage housing (slightly larger than the plexiglass box itself) to prevent device breakage. The steel housing should be secured to the side or bottom of the pool or enclosure.



#### **Materials**

- 1. 5 sheets of plexiglass
- 2. Stainless steel hardware (bolts, nuts, corner anchors, chain, plates)
- 3. Stainless steel cage housing
- 4. Small Enrichment food item

### Foraging Box Instructions

Place five pieces of plexiglass in a rectangular shaped box (open on the top) and secure with corner anchors and bolts.

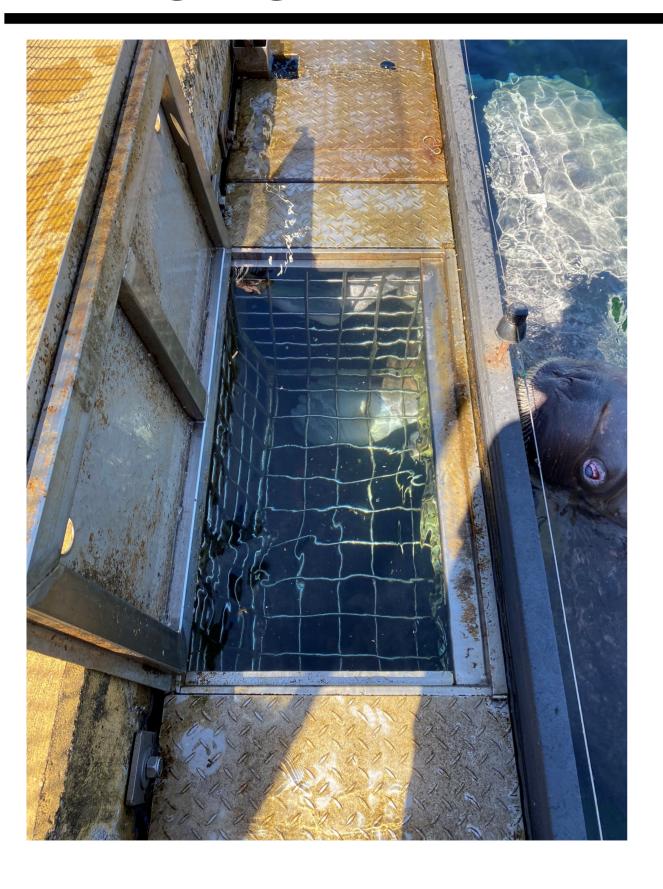
Drill the desired amount of holes into the plexiglass. For

walruses, the enrichment that is placed within the device are mostly mussels & fish (herring, mackerel). You can also vary the size of the holes (depending on desired food item).

- On top of the plexiglass-box place a chain to make it easy to put it into and pull out of the water/steel cage for cleaning and refilling.
- 4. Fill the plexiglass foraging box with desired enrichment/food items.
- Place foraging box inside of secured steel cage housing and monitor animal engagement.



# Foraging Box







### Fishing Pole

Fishing pole-style device to encourage active hunting and foraging in pinnipeds.

### **Types of enrichment:**



Food-related



Cognitive

### Time taken to make: Budget:



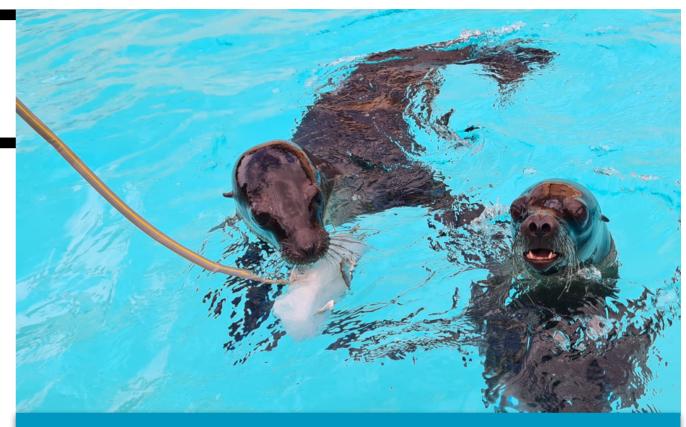
30 minutes



€ 10

### Safety:

- 1. Physical presence of the caretaker is necessary to hold device and monitor animal engagement..
- 2. Entanglement in the rope is possible. It is suggested to encase the rope in tubing to reduce this risk.



### **Materials**

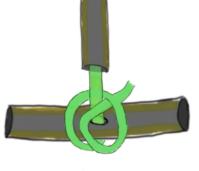
- 1. 2 meters of rope
- 2. A pole (2-3 m long)
- 3. Pieces of hose (one 2m and one 10cm)
- 4. A knife to cut materials and a drill
- 5. 1 locking carabiner
- 6. 1 stainless steel tray
- 7. (Crushed) ice and desired food item

## Fishing Pole

### Instructions: Line

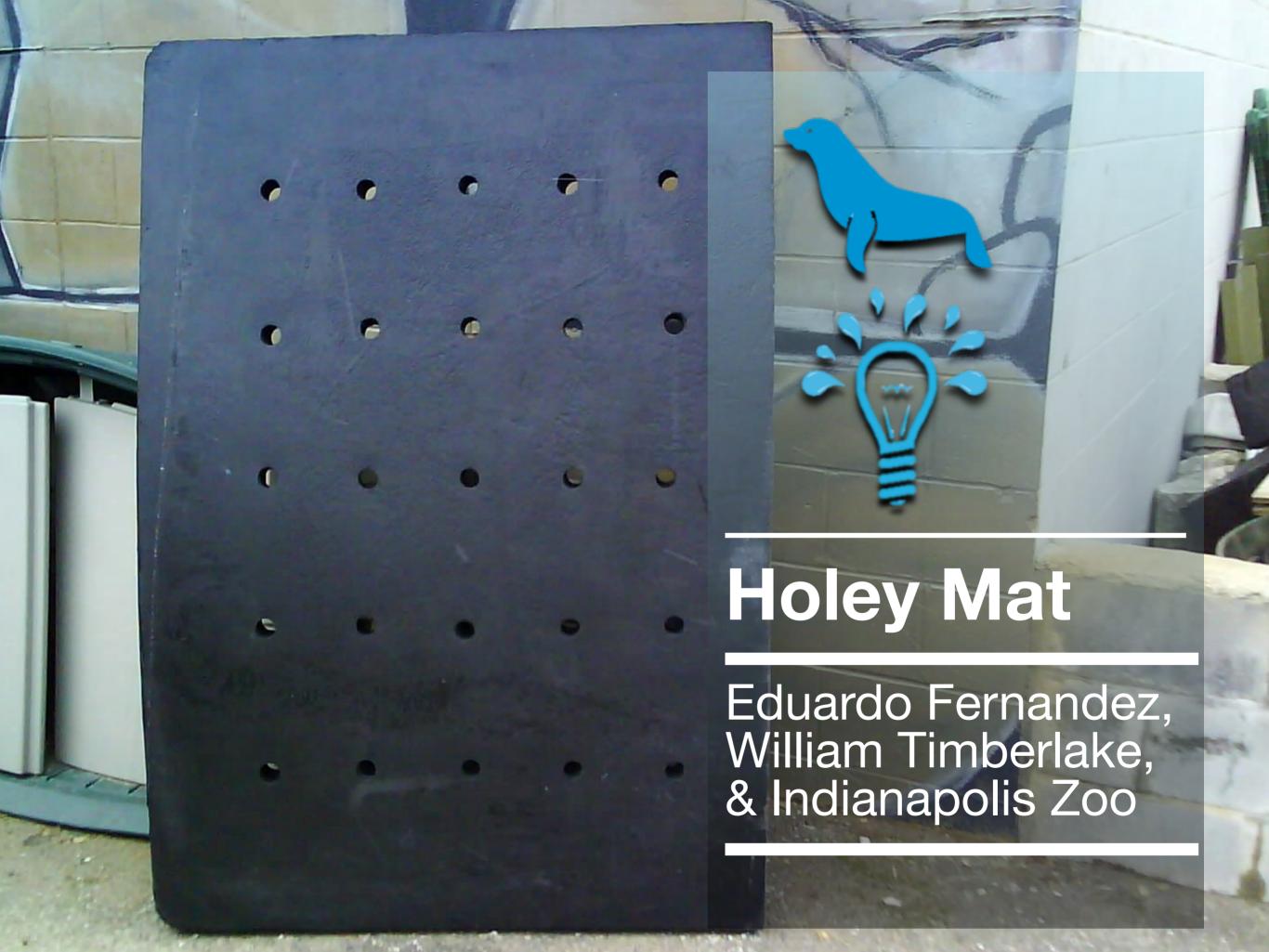
- Take a strong piece of 2 meter long rope and stringthe rope through the inside of the 2 meters long hose.
- Tie the carabiner to one end of the rope. This will be used to attach the enrichment device to the line.
- Take the small piece of hose and make two holes through it. Align the holes and tie a knot with the rope as shown in the diagram below:





Burn the ends of the knots in the rope to secure them together and prevent fraying.





## **Holey Mat**

Easy to construct, durable mats to encourage natural foraging behavior.

### Types of enrichment:





Cognitive

#### Time taken to make:



15 minutes

### **Budget:**



€ 95

#### **Instructions**

- Purchase 44mm thick Supersoft EVA Stable Floor mats: <a href="https://www.arkmat.co.uk/eva-stable-floor-mats-10-24-34-or-44mm-thick.html">https://www.arkmat.co.uk/eva-stable-floor-mats-10-24-34-or-44mm-thick.html</a>
- 2. Cut mats if smaller size is desired, or use as purchased.
- Drill holes in mat to accommodate the size of food enrichment items (mussels or clams recommended). Stuff food items into holes and place in pool.

#### **Materials**

- 1. 44mm thick Supersoft EVA Floor Mat
- 2. Drill
- 3. Food enrichment (e.g., mussels or clams)





### **Belt Feeder**

These feeders can be timed to release quantities of food or other enrichment throughout the day.

### **Types of enrichment:**





Food-related



Physical habitat



Varies

**Budget:** 



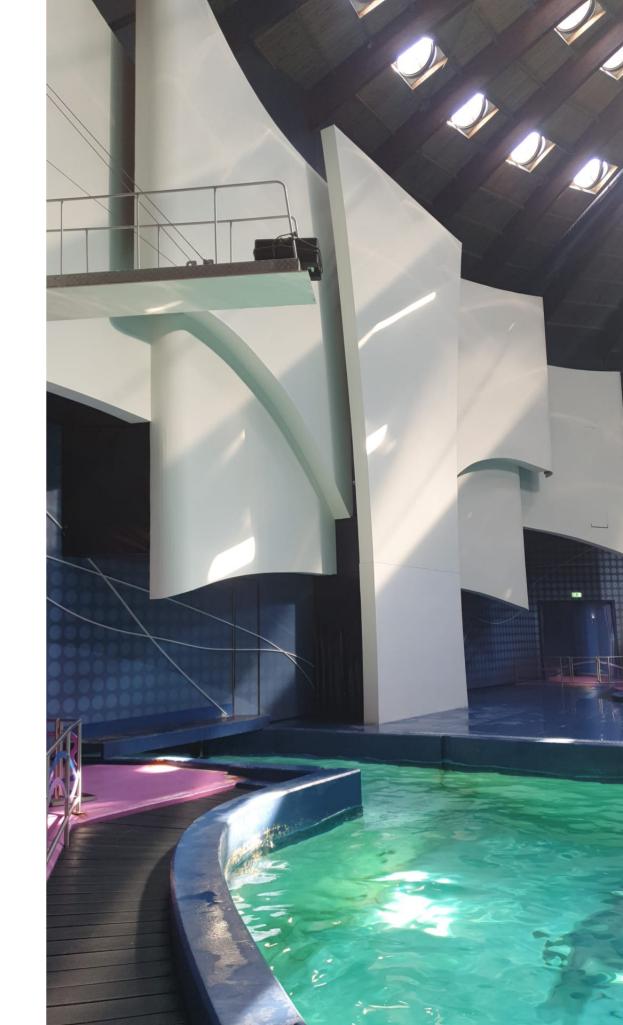
€ 300-700

There are an assortment of companies from which these feeders can be purchased or custom-designed:

Zoo Enrichment Lab: <a href="https://zooenrichmentlab.com/store/">https://zooenrichmentlab.com/store/</a> timed-feeders

Aquatic Solution: <a href="https://myaquaticsolutions.com/brands/">https://myaquaticsolutions.com/brands/</a> Fiap.html

FIAP: <a href="https://www.fiap.com/uhrwerkfuetterer-profi-5-kg-24-h.html?">h.html?</a> store=english& from store=english



### **Belt Feeder**

### Safety and Installation Tips

- Ensure that commissioned and/or built
   mechanisms are constructed with marine safe plastics and stainless steel fittings.
- 2 Securely mount the belt feeder well above where animals can reach. This also allows the food to scatter more when dropped.
- Be sure to pack ice with perishable food items to ensure they remain fresh throughout the belt feeder's timed schedule.
- Thorough cleaning between uses is highly recommended for safety. This will add to the longevity of the machine as well.
- 5. Different machines are suitable for wet and/or dry items. Be sure to check the manufacturers recommendations on the product you choose.





### Ice Pipe Feeder

Pipe-style feeder which has a hole running through the middle where fish can be hidden.

### Types of enrichment:



Food-related



Cognitive

### Time taken to make: Budget:



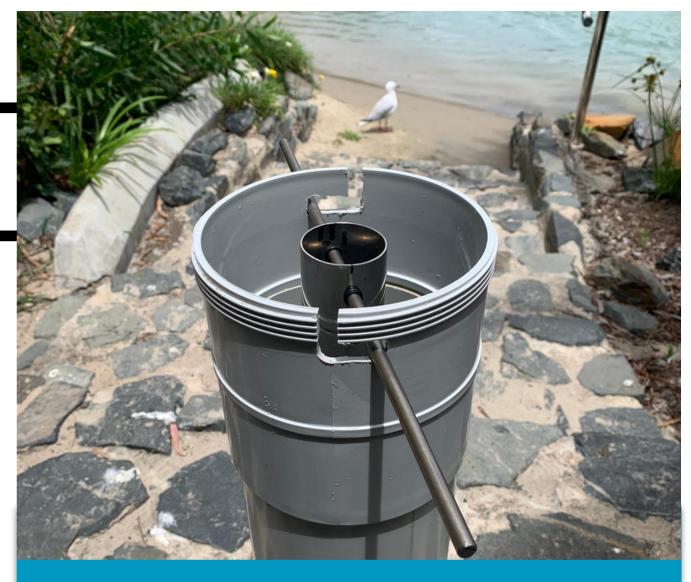
60 minutes



€ 30

### Safety:

1 Ice melting can cause some shapes of ice to be pointy or sharp if animals continue to play with the ice after fish have come out.



#### **Materials**

- 1. 150mm wide PVC pipe 500mm length\*
- 2. 150mm PVC cap
- 3. 150mm threaded access coupling and cap (If desired)
- 4. PVC pipe glue
- 5. 50mm Stainless steel hollow metal cylinder
- 6. Metal rod

\*Can use any size PVC pipe as long as it is wider and longer then hollow metal rod

### Ice Pipe Feeder

### Instructions:

- Add a small base to the hollow metal pipe, either epoxy resin, cement or weld a base on to keep the pipe hollow but not allow water to enter pipe once inserted.
- 2 Drill a hole through the top of the hollow metal pipe to be able to slot the metal rod through, which acts as a handle. Place rubber bands or o-ring's around metal rod when inserted into pipe to hold it in place.
- 3 Cut PVC pipe to desired length (must be longer than metal pipe once inserted). Glue the PVC cap onto the base of the PVC pipe and let dry.
- 4. Glue larger outer PVC threading (if desired) to the outside of the PVC pipe on the opposite end of the base, this aids in securing a lid and allows for ease of carrying and further keeping the metal rod from rising (If using threading and lid than make sure the L cuts are lower than the threading).

**ALTERNATIVE:** (Without adding threading and lid) Cut L shaped slots in the top of the PVC pipe where the metal rod will fit into, this will secure the metal pipe so that it doesn't float up in the freezing process.



## Ice Pipe Feeder

### Instructions continued...

- To freeze: fill PVC pipe with water and place hollow metal pipe in the middle of the PVC pipe, twist metal rod into L-shaped cuts for overnight freezing process. If using threading and lid, twist lid onto PVC pipe and place in freezer.
- To remove ice pipe: first remove the lid and allow to thaw a little. Twist metal rod out of L shaped slots and place metal rod on top of PVC piping. Fill metal rod with hot water to aid in releasing ice pipe from metal rod. Ice pipe should be able to release from PVC pipe after thawing time, if not can simply hose outside of PVC pipe.
- Making the feeder: add fish to inside of hollow ice pipe before giving to animals. You could also make a "plug" out of ice using a cap mould, condensed ice or even gelatin to increase the time before the fish are released. You can also freeze fish into the pipe in the freezing process.





## Weight Vending Machine

Device that releases a fish reward when a specific number (determined by the trainer) of weights are added.

### **Types of enrichment:**



Cognitive



Social



Food-related



Physical habitat

### Time taken to make: Budget:



15-20 hours



€ 720

### Safety:

The device and weights are designed for supervised use only.

#### **Resources:**

Lauderdale, L. K., & Miller, L. J. (2019). Common bottlenose dolphin (*Tursiops truncatus*) problem solving strategies in response to a novel interactive apparatus. *Behavioural processes*.

Kuczaj II, S. A., Xitco Jr, M. J., & Gory, J. D. (2010). Can dolphins plan their behavior?. *International Journal of Comparative Psychology.* 

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#### **Materials**

#### **Main Box:**

- 1/2" thick Polycarbonate Lexan Sheets (Note: Lexan is different than plexiglass)
- ¼" thick Polycarbonate Lexan Sheets
- L-Shaped Stainless-Steel Brackets
- Stainless Steel Hex Bolts
- Stainless Steel Lock Nuts
- 8" stainless steel hinges
- Kickboard/buoyant foam
- Pool Noodles (optional)
- Duct Tape (optional)

#### **Hooks:**

- L-Shaped Stainless-Steel Angle Bar
- Stainless-Steel Flat L-Shaped Right-Angle Brackets
- Stainless Steel Hex Bolts
- Stainless Steel Lock Nuts
- Pool Noodles (optional)
- Duct Tape (optional)

#### Weights:

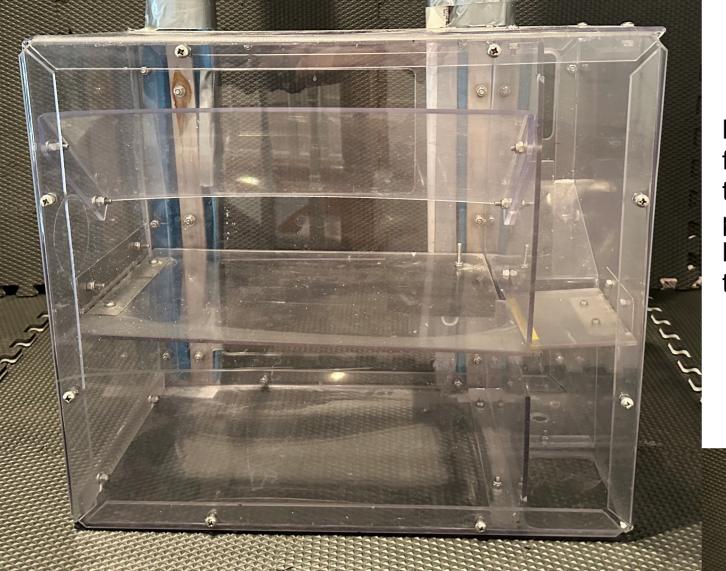
- 5/8" Polypropylene Rope
- Pool Diving Rings
- Electrical Tape
- Diving Weight (solid, not lead shot)

#### Instructions: Main Box

- Determine the overall dimensions of your box. The dimensions of our box will be used as a reference throughout. These measurements can be scaled or changed based on your needs.
- Cut 20.5" H x 23.5" W front and back panels of the box to size out of the ½" Lexan, 13.5" H x 23.5" W top and bottom panels from the ¼" Lexan, 20.5" H x 13.5" W right and left panels from the ¼" Lexan, 11" H x 18" W panel for the weight shelf from the ¼" Lexan, 11" H x 4.5" W panel for the fish shelf from the ¼" Lexan, 11" H x 11" W top divider panel from the ¼" Lexan, and 11" H x 6" W bottom divider panel from the ¼" Lexan.
- \*Optional Note: additional ½" diameter holes can be drilled onto the side panels if you would like the device to fill with water faster when it is submerged. Consider mounting an 18" W x 7.5" H panel on a 45-degree angle right below the opening on the top panel to prevent smaller dolphins and calves from putting their head in the hole.
- On the back panel, cut a 4.5" H x 3" W square hole in the upper right corner of the panel. This hole is used to add the fish reward to the device. Cut a 3" H x 5" W hole even with the weight shelf. This will allow the shelf to be lifted while it is being loaded and put in the water.
- On the right panel, cut a 1.5" diameter hole 1" below where the fish shelf will be mounted. This will allow the shelf to be lifted while the device is being loaded. Attached the fish shelf panel using a stainless-steel hinge.

#### Instructions: Main Box continued

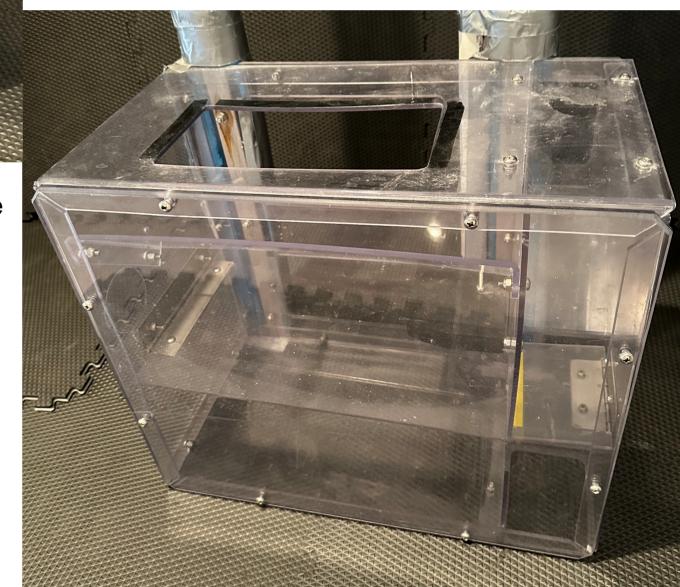
- On the left panel, attach the weight shelf panel using a stainless-steel hinge. Important: the fish shelf panel and the weight shelf panel should overlap by approximately ½" when the box is assembled. The fish shelf will sit on top of the weight shelf so it is held up until the fish reward should be released.
- On the left panel, attach the weight shelf panel using a stainless-steel hinge. Important: the fish shelf panel and the weight shelf panel should overlap by approximately ½" when the box is assembled. The fish shelf will sit on top of the weight shelf so it is held up until the fish reward should be released.
- On the top panel, cut a 11" W x 5.5" H hole on the left side of the panel. This is where the wights will be dropped into the device. Secure the top divider panel to the right side of the top panel using the L-shaped brackets with the bolts and lock nuts.
- 9 On the bottom panel, cut a 11.5" H x 4.5" W hole on the right side of the panel. This is where the fish will fall out. Secure the bottom divider panel to the right side of the bottom panel using the L-shaped brackets with the bolts and lock nuts.
- 10. Cut the appropriate amount of kickboard foam and use a bolt and lock nut to secure kickboard foam to the weight shelf panel. The amount of buoyant foam can be changed based on how many weights you want the dolphins to add before the fish reward is dropped.
- Assemble the top, bottom, front, back, right, and left panels using the L-shaped brackets with the bolts and lock nuts.



Lexan was selected because it is light weight, flexible, shatter-resistant, and crack-resistant. A thicker sheet of 1/2" Lexan was used on the front panel in case the device was kicked. ¾" bullet proof Lexan would be recommended for species larger than bottle nose dolphins.

All edges on device should be rounded. Edges could be covered in duct tape-wrapped pool noodles if the tools are not available to round the edges.

The holes in the device should be large enough to add weights and release fish but small enough that even a small, juvenile dolphin could not fit anything more than their rostrum in the device so that no body parts could get caught or stuck in the device.



#### Instructions: Hooks

Measure the distance between where the bottom of the device will sit and the waterline (do not forget the dolphins need to be able to swim over the device to drop the weights in the water). Measure how high the wall sits above the water line. Measure the depth of the wall where the hooks will sit. Measure how far the hooks will hang down on the outside of the habitat. For reference, the bottom of our device sat 45" inches under water (24" inches from the top of the device to the waterline), the distance from the waterline to the top of the wall was 6", the wall was 12" thick, and the hooks were 16" on the back side of the wall.

Note: add the thickness of the pool noodles (or other foam padding) to the measurements if you plan on wrapping the bars.

- Sum these distances to calculate the total length of the hooks. Cut the L-shaped stainless-steel angle bar to the appropriate length. Cut 90-degree angle cut outs where the bar will bend over the front and back of the wall. Bend the bars into a hook shape.
- Attach the stainless-steel flat L-shaped right-angle bracket to each of the bends in the bar to ensure the bars cannot be bent into a different shape. Attach the hooks to the main box using stainless-steel bolts and lock nuts.

Optional: To protect the habitat wall from the metal hooks, cut pool noodles to the appropriate size to be wrapped around the hooks. Place the pool noodles on the hooks and wrap with duct tape.

### Instructions: Weights

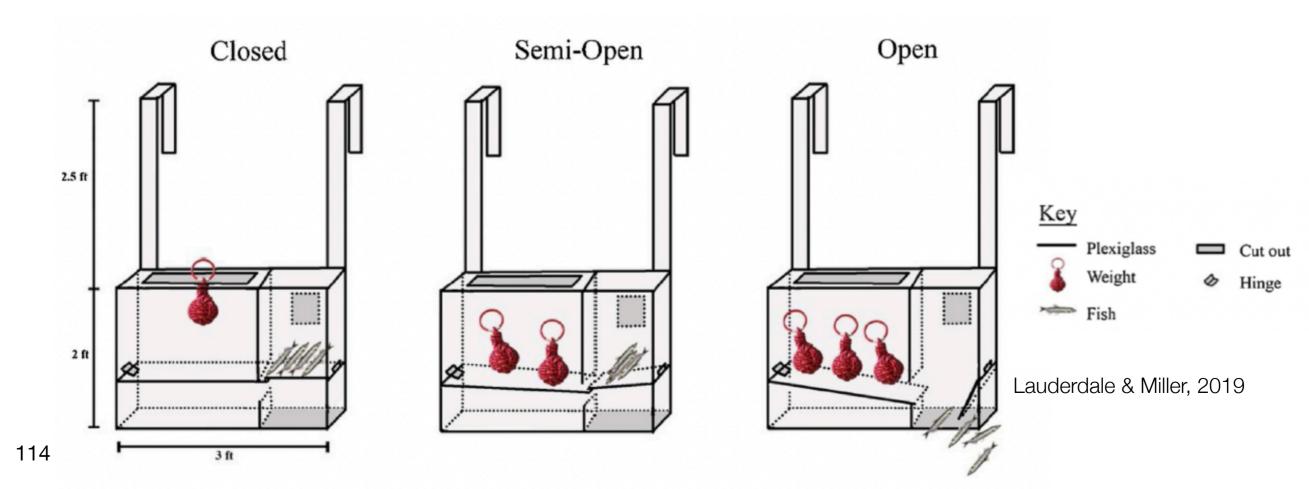
- Stack two dive rings together and wrap in at least three layers of electrical or duct tape.
- 2. Use the 5/8" Polypropylene rope to tie a monkey fist knot with the diving weight in the center. Here is a YouTube tutorial on how to tie a monkey fist knot with a similar size rope: https://www.youtube.com/watch?v=WcWaKWWviu0.
- Secure the wrapped diving rings to the top of the monkey fist with a square (or other appropriate) knot. Tie safety knots as close to the square knot as possible. Cut and burn the rope on the far side of the safety knot to prevent it from fraying.

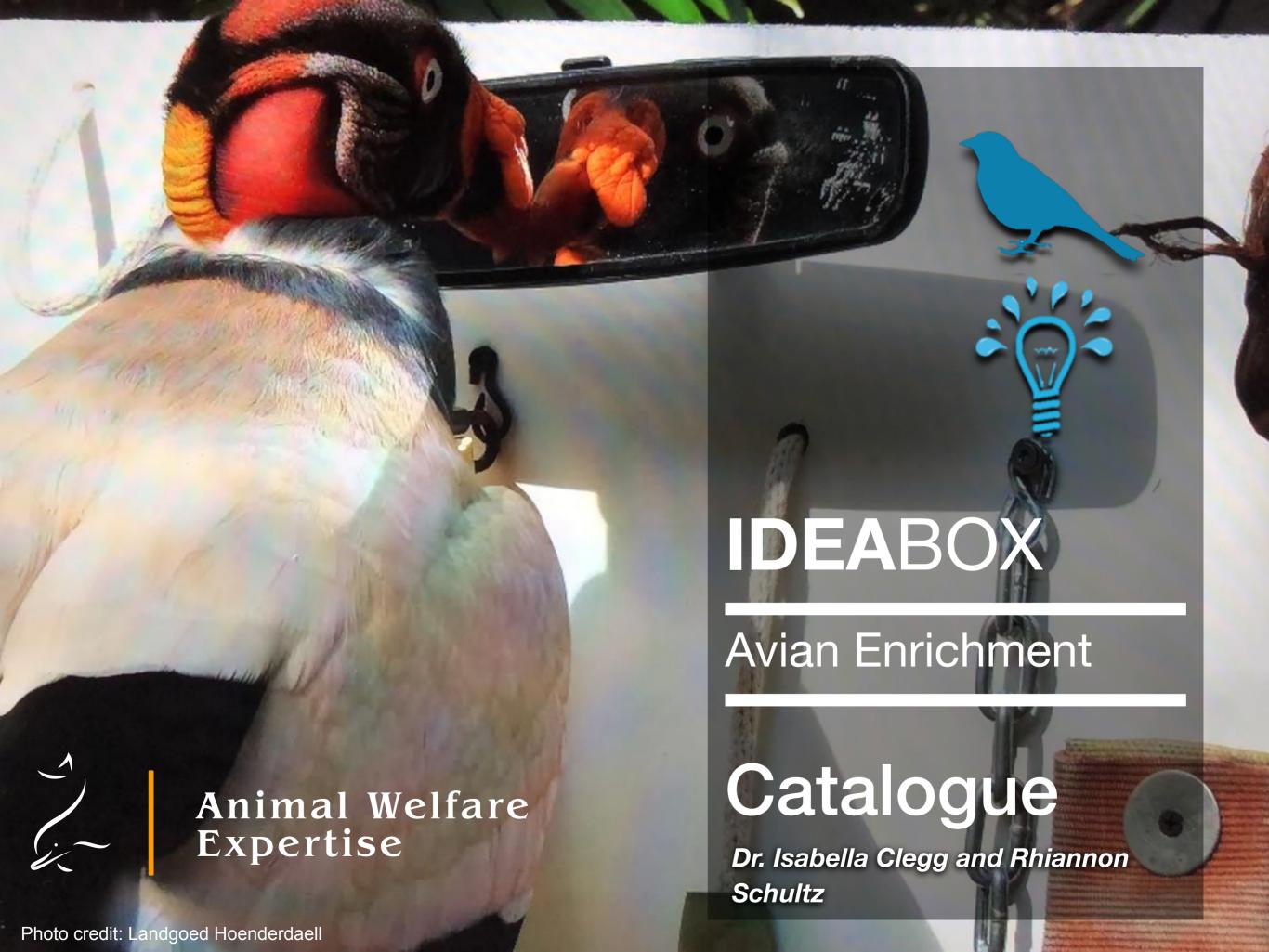


Note: The rings on the weights need to be monitored after each use. While the weights were designed for the dolphin to carry the ring over their rostrum, some dolphins chose to bite the rings to carry them. When regularly bent, the ring can break. To avoid this, the rings should be replaced when they no longer hold their round shape naturally. This could possibly be avoided by training the dolphins how to carry the weights with the rings over their rostrum as well. Ensure that the weights and rings are too large for the animals to swallow.

### Instructions: Loading the Device

- Lift the fish shelf up and then lift the weight shelf up (these should overlap, and the weight shelf should hold the fish shelf up). While continuing to hold the weight shelf up, load the fish into using the back upper right hole.
- Lower the device into the water. You can let go of the weight shelf once the float is under water. Add the weights to the habitat and let the dolphins solve the device!
- Once the dolphins have solved the device, remove the device from the water. The device can be reloaded with fish and returned to the water, or it can remain out of the water.







### **Tube Box**

Box with different sizes of tubes where food or items can be placed.

#### **Types of enrichment:**



**Food-related** 



Cognitive

#### Time taken to make: Budget:



15 mins



€ 0-30

#### Safety:

Animals should be observed while interacting with item to ensure that accidental ingestion of cardboard or tube material is not ingested. Note that if meat food items are used with cardboard tubes, device should be considered single-use.

- 1. Cardboard or PVC tubes or varying diameters.
- 2. Crate, box, or open bin in which to place tubes
- 3. Something to tie tubes together if needed.



### **Tube Box**

- Cut tubes to various lengths. Cardboard or PVC tubes can be used. The more tubes used the more engagement likely from the animal.
- Place tubes vertically into a carton, box, or crate.

  Make sure they fit in as snug as possible. Tying the tubes together can secure them further if needed.
- Place some food or other small enrichment items into some of the tubes.
- Place box with tubes into the animals enclosure and monitor engagement.





## **Busy Board**

Fidget activity board for birds that can be adjusted to fit a variety of species.

#### Types of enrichment:





#### Time taken to make: Budget:



120-180 mins

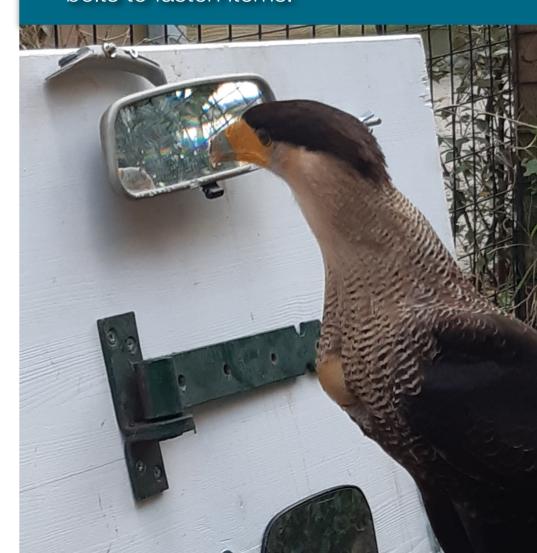


€ 10-30

#### Safety:

- Ensure all items used in construction are nontoxic to birds and cannot be removed by birds.
- Set fidget board flat on the ground or secure to aviary to avoid it falling over.

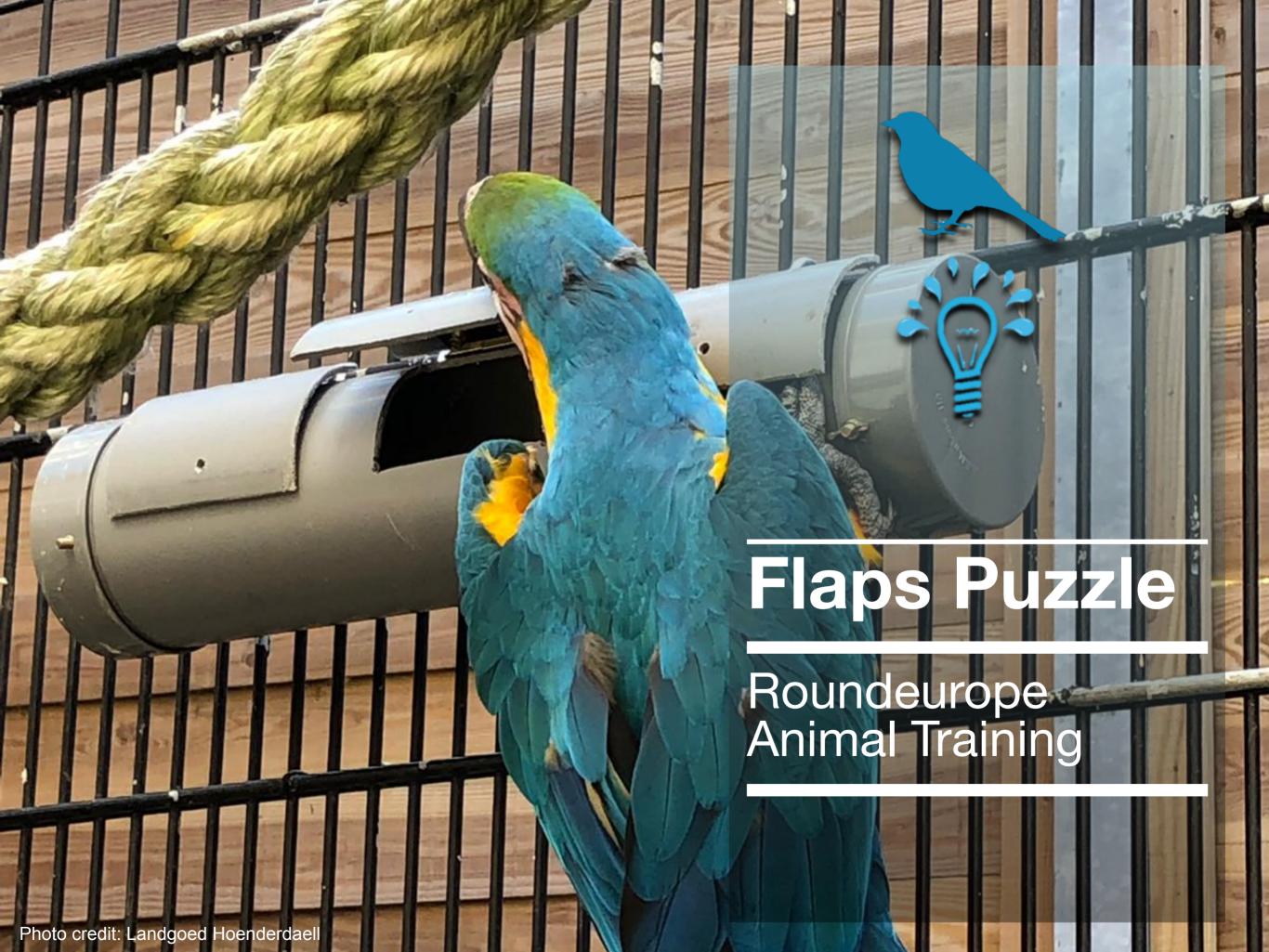
- 1. Variety of items that can be fastened to a board or surface. Recommended items include: chain, wood pieces and beads, plastic toys, grasses, food items, mirrors, and bells. You can use materials that are otherwise discarded by the technical department, but ensure they are nontoxic to birds.
- 2. Large board or flat surface to which items can be fastened. Use screws, ties, and bolts to fasten items.



- 1. Determine which size board to create and source a variety of items that are size-appropriate and nontoxic to birds.
- Adhere selected items to the back board (particle board works well) using fasteners that work best for each item. Suggested ways to attached items include using hooks, screws, and bolts. Using carabiners allows for items to be rearranged periodically. Food items may also be attached to the board.
- 3. Secure board to the side of the aviary or other enclosure furniture to avoid it falling over while birds engage. The board can also be laid flat on the ground.
- 4. Monitor interaction with the device. Note that it may take birds time to acclimate and explore the device.







# Flaps Puzzle

Puzzle to encourage foraging behaviour by lifting up flaps to get to the food stored inside.

#### **Types of enrichment:**



**Food-related** 



Physical habitat



Cognitive



Social

#### Time taken to make: Budget:



60 mins

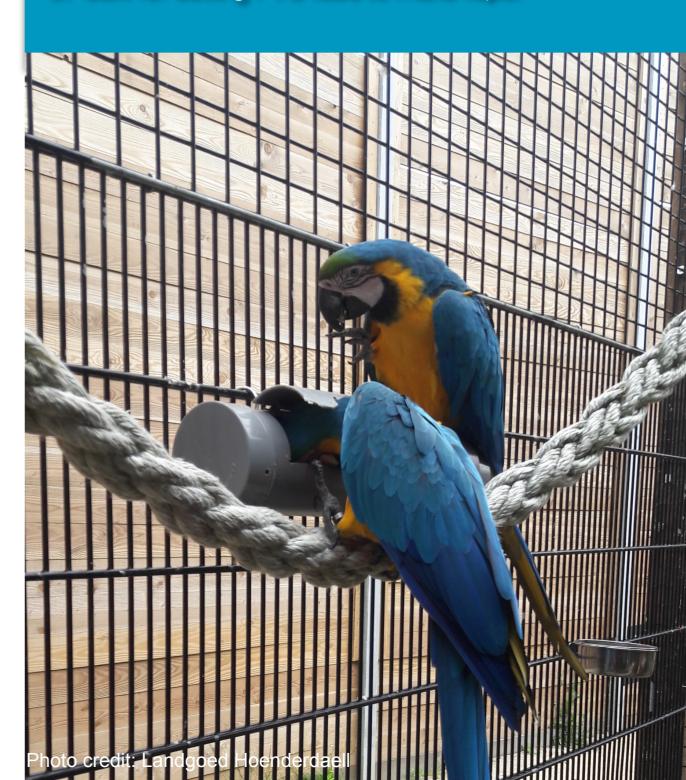


€ 10-20

#### Safety:

Animals should be observed while interacting with item to ensure that accidental ingestion of tube material does not take place. Puzzle should be securely fastened to enclosure to avoid being removed by birds.

- 1. PVC tube w/ fitted lids/caps and bird-safe glue
- 2. Small hinges with fitting screws.
- 3. Saw for cutting PVC tube to make flaps.



# Flaps Puzzle

- Cut tube to desired length. A longer tube allows for a larger puzzle and more birds to feed from it simultaneously.
- 2. Glue caps/lids to each end of the PVC tube using a bird-safe glue. Allow to dry completely before next step.
- 3. Use saw to cut out sections (see photo). Reattached these pieces with small hinges to make flaps on the side of the tube.
- 4. Use hooks or carabiners to secure Puzzle to the side of the enclosure or to enclosure furniture.
- Place some food or other small enrichment items into some of the tubes.







# Disc Puzzle

Roundeurope Animal Training

### **Disc Puzzle**

Tube with insertable discs that must be removed to access the food reward inside the tube.

#### **Types of enrichment:**





#### Time taken to make: Budget:



15-30 mins



€ 0-10

#### Safety:

Animals should be observed while interacting with item to ensure that accidental ingestion of cardboard or twine does not take place. Puzzle should be securely fastened to enclosure to avoid being removed by birds.

- 1. Cardboard tube
- 2. Discs cut from thin, flat cardboard pieces.
- 3. Rope or twine to create pull handle on discs.
- 4. Rope or twine to attached tube to enclosure or habitat furniture.



- 1. Cut cardboard tube to desired length. A longer tuber allows for more discs to be inserted and more engagement.
- 2. Cut the desired number of slots in the tube where cardboard discs can be inserted.
- 3. Cut round disks of cardboard that have the same diameter as the tube. Attach a small loop of rope or twine to one end of the discs for the bird to grab and pull.
- Insert the discs into the slots and make sure they can be pulled out. You can place food items into the tube after each disc, or only at the top of the tub so each disc must be removed before a food reward is accessed.
- Secure Disc Tube into the enclosure using rope or twine.

  Observe interaction with the device to ensure safety.







# Food Tube

Roundeurope Animal Training

### **Food Tube**

Easy to construct, tube puzzle for encouraging foraging behaviour and problem solving.

#### **Types of enrichment:**

#### Time taken to make:



Food-related



Cognitive



10 minutes

#### **Budget:**



€ 0-10

#### **Instructions**

- 1 Cut cardboard tube to desired length.
- Cut holes of desired shape(s) and size(s) along the tube (see image). Cut a small hole adjacent to the cut openings so that food items can be fastened by pulling and tying sisal rope through the hole.
- Place variable food items into tube near the cut openings and attache to the other end of the tube using the sisal rope (makes accessing food more challenging).

- 1. Large cardboard tubes
- 2. Sisal rope
- 3. Box cutter



