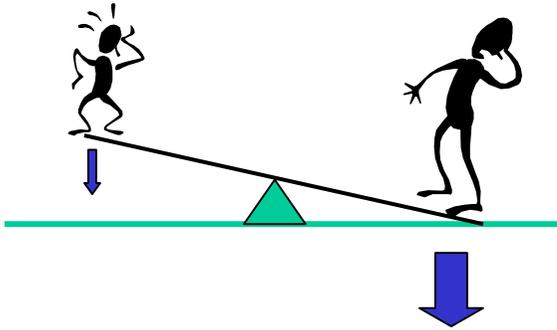


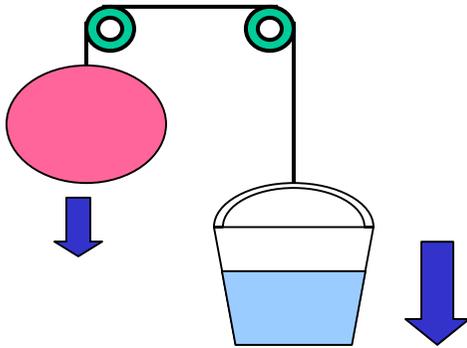
Momotaro – the science behind the scenes

Gravity, Levers and Pulleys

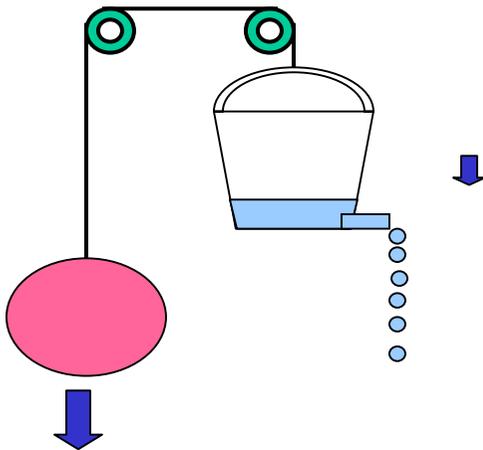
Keywords: mass, gravity, force, lever, fulcrum, pulley



You all know what it is like when your Dad is on the other end of the see-saw? You are up in the air and your dad is sitting on the ground. *Gravity* is pulling both of you down to the centre of the earth, but as your Dad has more *mass* (there's more of him) he gets pulled with more *force*....so he goes down and you go up.



A see-saw is really a type of *lever* with the *fulcrum* half way between the two ends. A pulley is a lot like this as the axle is in the centre too.

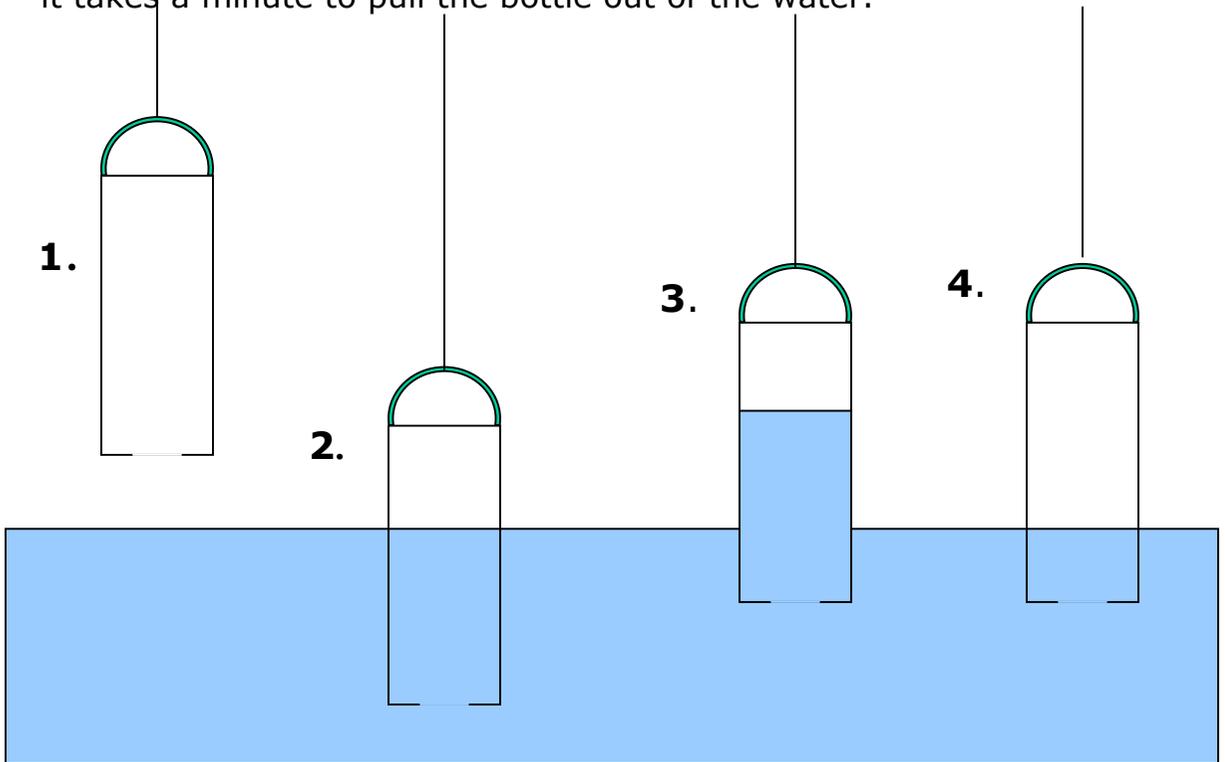


This means that when you have two things hanging by a string over a pulley, the one with more *mass* is pulled down by *gravity* with more *force* and it will drop while the other side goes up.

The peach starts off held up by a heavy bottle of water. But when the water slowly drains out, the *mass* of water in the bottle is reduced and eventually it has less mass than the peach. And we all know what happens then.....the peach goes down and the bottle goes up!

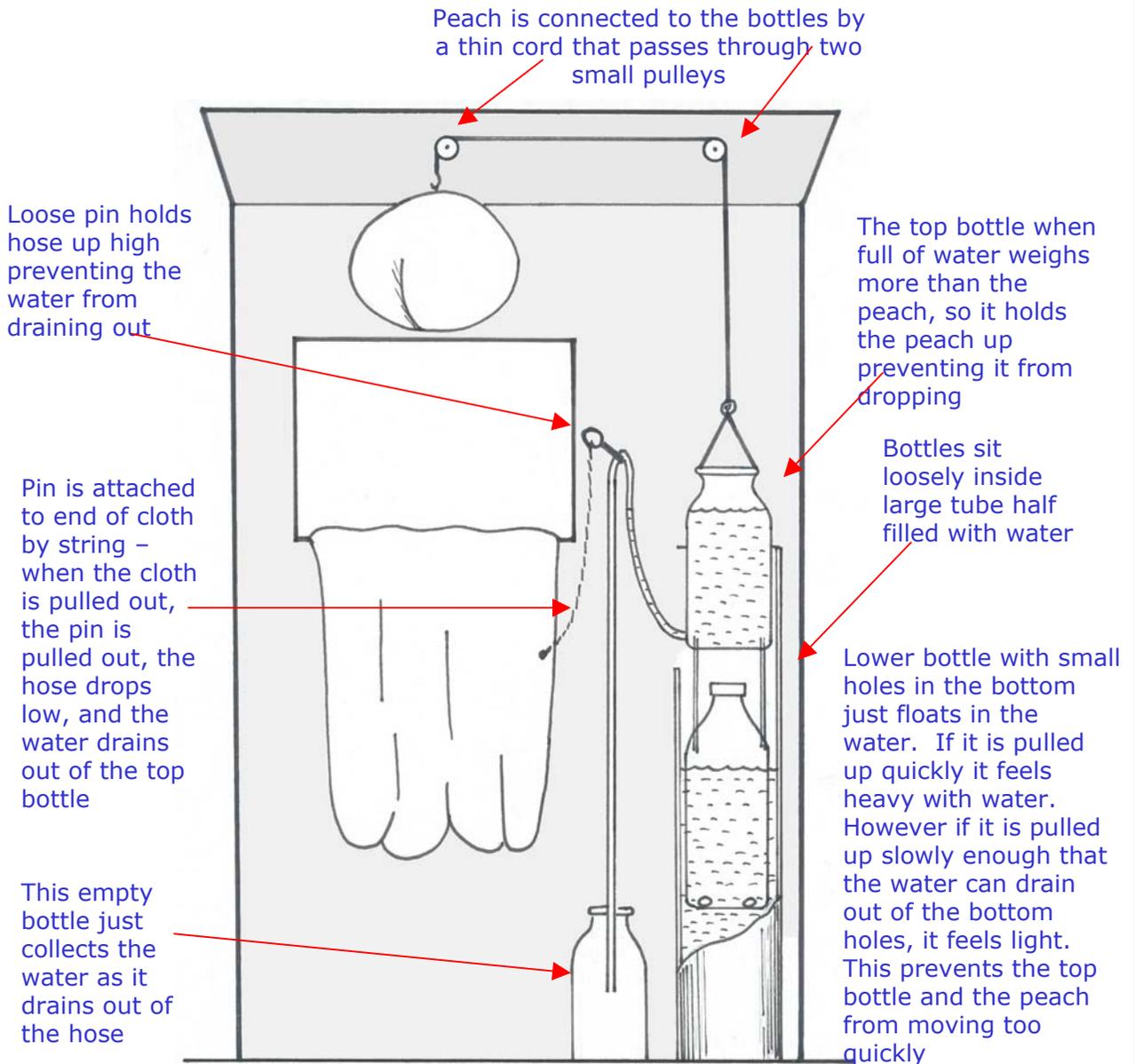
Lets slow down the Peach

One big problem with the peach was to slow it down. If there was only the peach on one end of the string and an empty bottle on the other, the peach would drop really quickly. To slow it down a second bottle was used. 1. This has a small hole in the bottom of it. 2. The bottle is allowed to just sit half filled in a tub of water. 3. Can you imagine what would happen if you pulled it up quickly?.....You would also pull up most of the water in the bottle as it would not have time to drain out, so it would feel really heavy. 4. Now can you imagine what would happen if you pulled up really slowly.....that's right, the water would have time to drain out of the hole in the bottom so it would feel really light and be easy to pull. This is what slows down the decent of the peach.....as it falls down it pulls the bottle with the hole up, and the hole is just big enough that it takes a minute to pull the bottle out of the water.



Something very similar is used in your family's car! You may know that each wheel is connected to a spring to help the car to drive smoothly over bumps. Each wheel also has a *shock absorber* to stop the car from being too bouncy. Each one of these is a long tube with a slightly smaller tube inside it. The smaller tube has little holes and is filled with oil instead of water. However the same sort of thing happens.....the oil goes back and forth in the holes. This allows the wheels to bounce up and down, but stops them from moving and bouncing too fast.

Gravity, Water, Pulleys and String!



This is the view from the back of the Momotaro screen. The doors are opened, and the blue 'river' cloth is pulled out. After a minute or two, the peach gently drops down into view. How does this happen? Magic? No! Gravity and water, pulleys and string!

- The peach is held up by a cord with a heavy bottle of water holding down the other end.
- When the cloth is pulled out, a pin which holds up the drain hose is also pulled out which allows the hose to drop.
- The water slowly drains out of the top bottle. When enough has drained out that it weighs less than the peach, the peach starts to drop and the bottle goes up.
- To stop the peach then dropping quickly like a rock, its movement is slowed down by the second bottle hanging under the first. This has small holes in the bottom which stops it from being pulled up and out too quickly