

Capillary Action Lesson Summary

Intro:

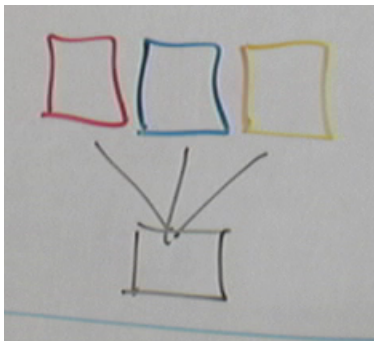
There's a guy, Eye-Gore, who likes to drink blue paint. It makes his whole body turn blue, and he gets sad.



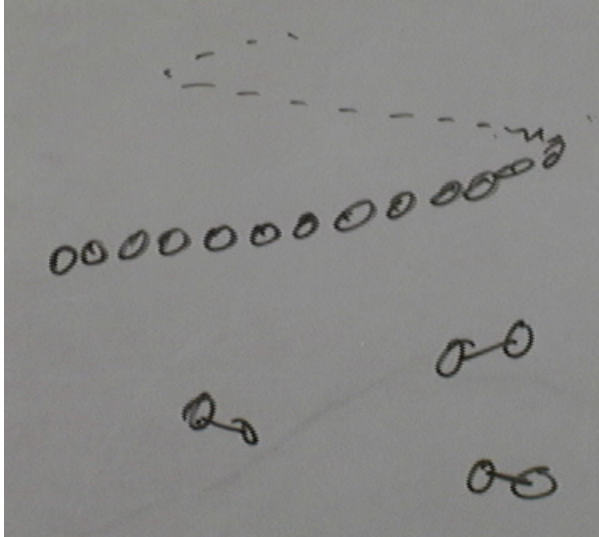
If he drinks orange paint, his body turns orange, and he gets happy. Black paint makes him turn evil. White paint makes him turn good. Drinking all this paint made him huge. In the cities, there were towers, and he would walk around and squash the towers. The people didn't like that.

There was an old guy in the town with a long beard and a cane. He said to give the paint guy as much paint as he could drink. But the people were afraid that the wrong combination of paints would turn black in his stomach, and he'd become evil.

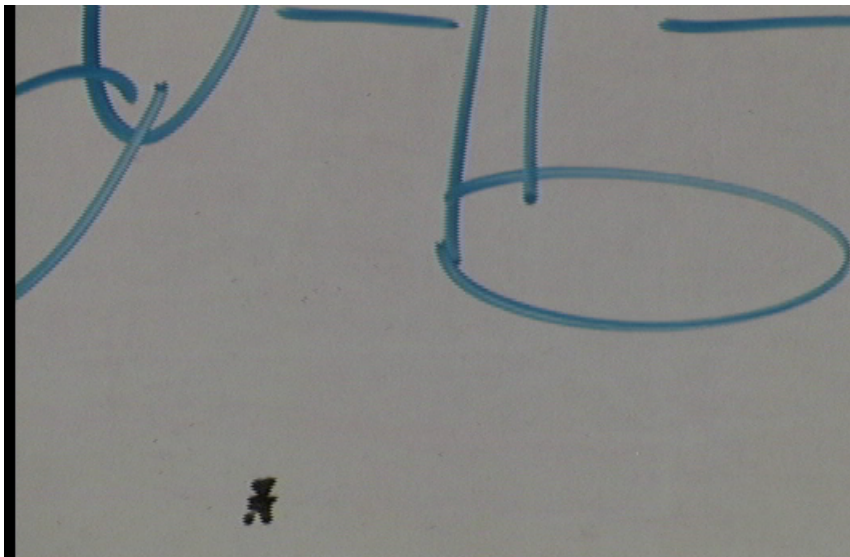
Ask students what three colors of paint would he have to drink in order to make black in his stomach. (Red, blue, and yellow.) If he drinks raspberry, blueberry, and lemon paint, then he'll become evil.



But the old man says he can make a special kind of paint that won't turn black in his stomach. Instead of having small molecules, his paint has really long molecules, like caterpillars.



Eye-Gore loved this new paint, and he drank lots of it. But the molecules were so large, his body couldn't take them apart. He couldn't digest them at all, so they went right through. He kept drinking more and more paint, but since his body couldn't digest it, he kept getting smaller and smaller until he was really tiny.

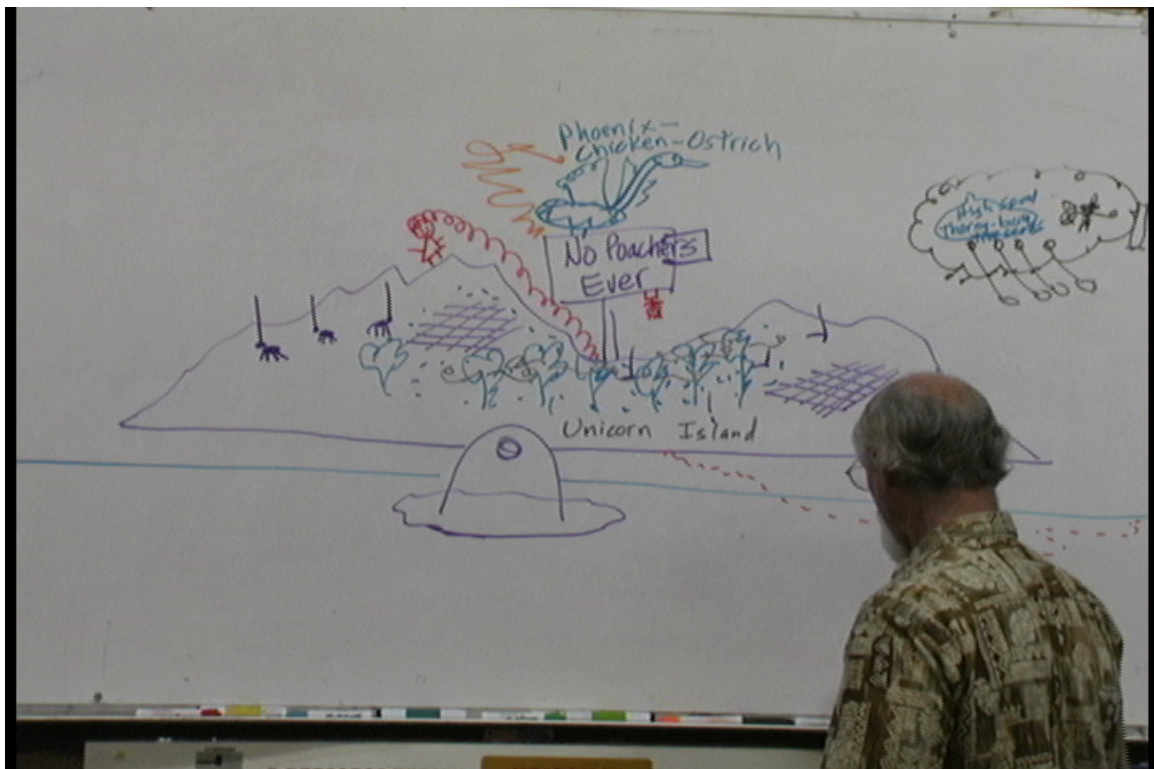


Most of the food colorings you buy today have really long chains, so your body can't digest them, because some people are allergic to them or are sensitive to them.

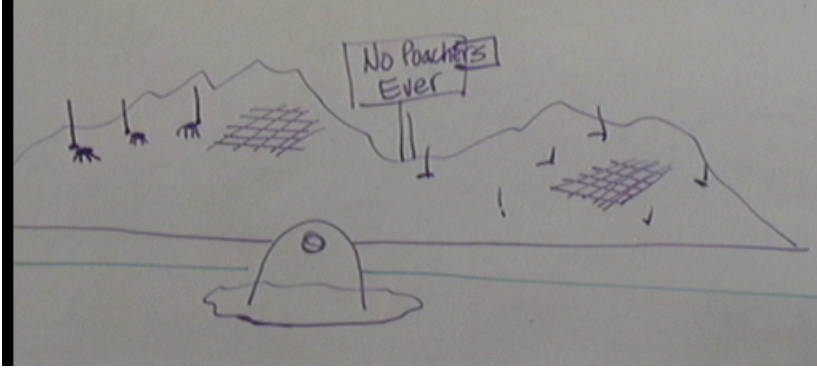
There was a kid who was a criminal at the age of five. He pushed another kid out of a tree and broke his arm. They found out that when he ate certain kinds of candy, he would get violent and start throwing chairs around, etc. Then they found that it only happened when he ate green candies. They finally discovered that a single drop of green food coloring would make him get violent. When they removed green food coloring from his diet, he became normal again.

Today, we'll see if there's a way to find out the difference between long and short molecules without a magnifying glass.

Crazy Story



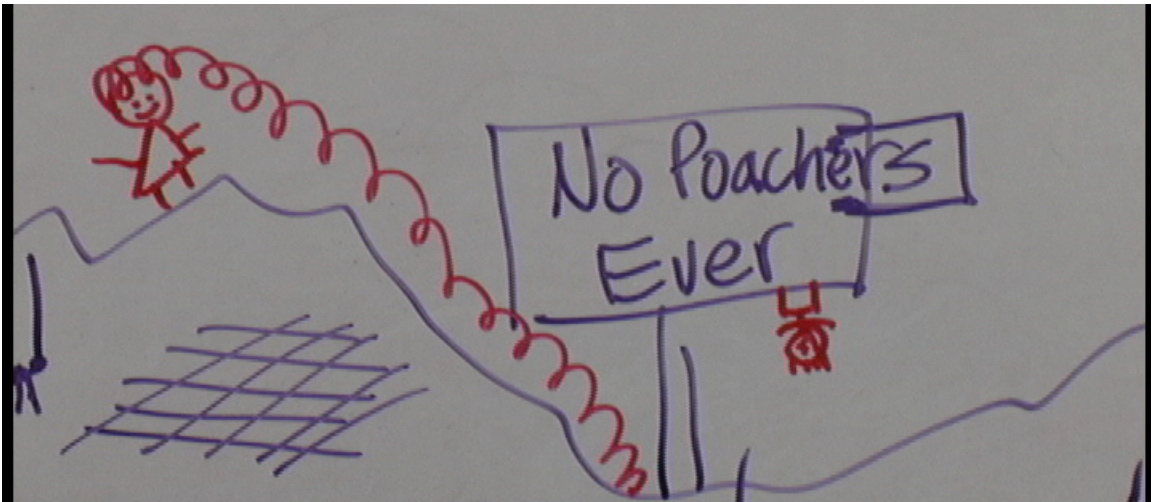
There was an island shaped like a seesaw. There were purple unicorns all over the island. They ate grapes, and there were vineyards on the island. Evil Mister Fred comes by in his cloud to capture the unicorns, because powdered unicorn horn could make people fly.



The unicorns have a sixth sense so they know where they all are on the island, because if too many are on one side, the island will tip and they'll end up in the water.

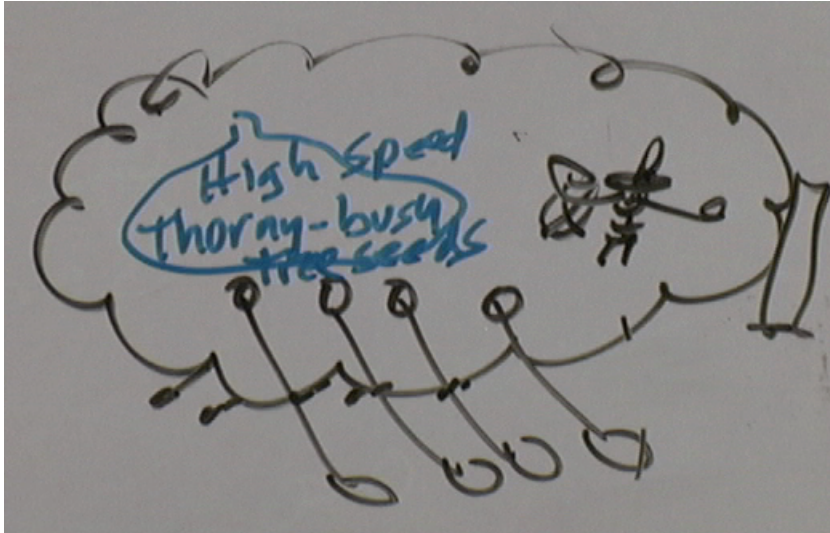
Unicorns sleep standing up. EMF flew above a sleeping unicorn, lowered a rope with bubble gum on the end, stuck it on the unicorn's horn, and started to lift it up. Right away, the other side of the island started to tilt down. The other unicorns knew that one was missing and they all ran around to find out who it was.

Jack and Jill were the caretakers, and they saw EMF trying to poach one of their unicorns.

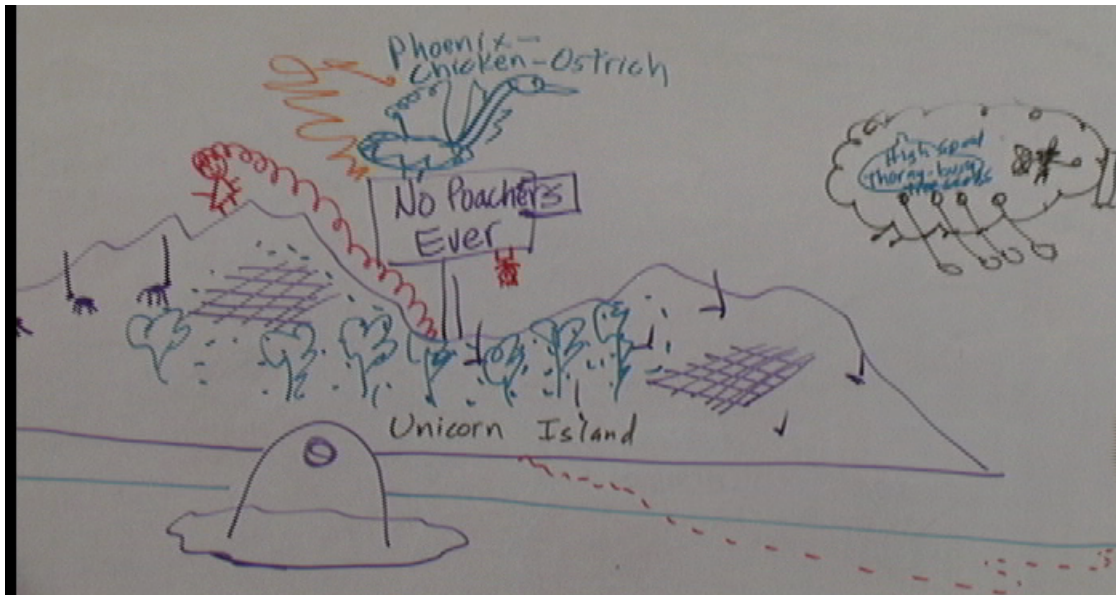


They had a flaming phoenix-chicken-ostrich. They sent it to snip EMF's rope with its beak to release the unicorn. This put the island back in balance.

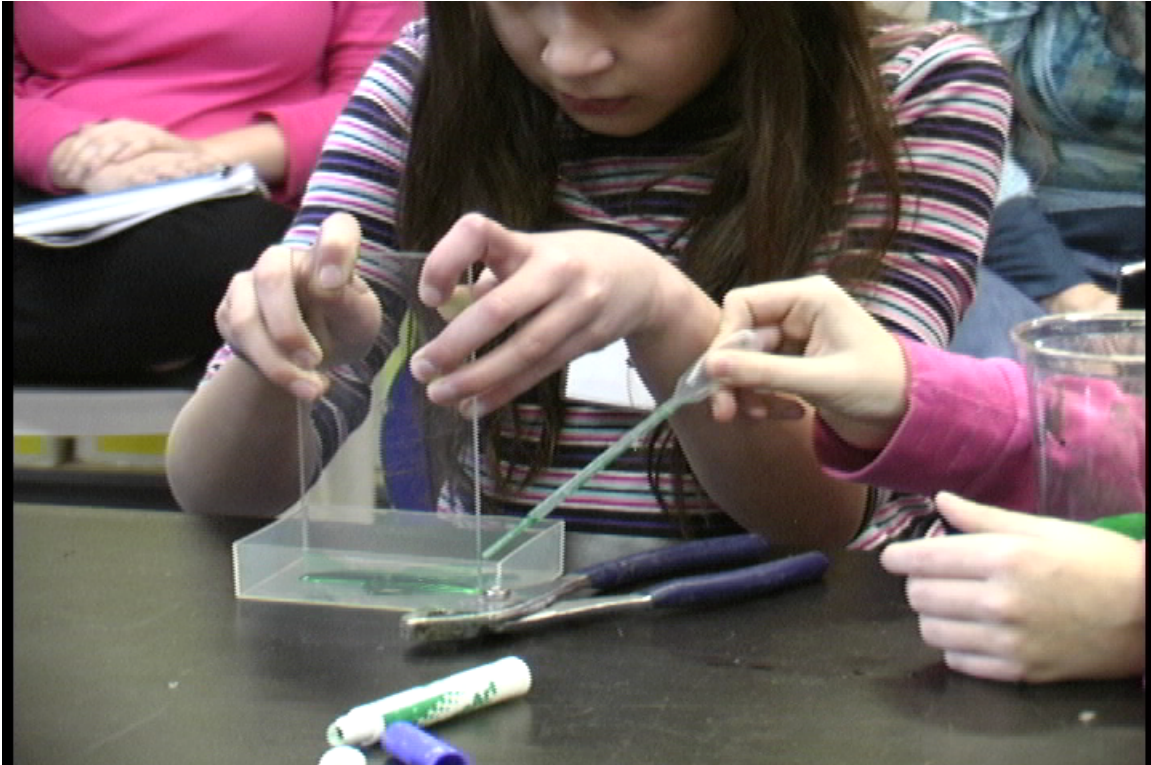
EMG called the Acme SOE and ordered some high-speed thorny bush tree seeds.



He sprinkled them on the island, and they started to grow quickly, mostly in the middle. They grew so close together that the unicorns couldn't run around to re-balance the island. If one unicorn ate too much, his buddies would have to eat less, or a unicorn on the other side would have to eat more, to keep the island from tilting.



When the trees matured, they grew mustaches, so J&J knew they came from EMF. Meanwhile, the island was starting to tilt back and forth and the unicorns couldn't stabilize it. EMF was waiting for it to get really unbalanced, and then he would offer to help rebalance it by taking the unicorns away.

Experiment – Make Water Go Uphill by Itself

(This lesson used washable markers.) Students broke the markers open and dumped the dye stick in water. Then they stuck a twisted paper towel into the water to see if it would soak up the colored water. Some of the dyes had more than one color in them.)

Working in pairs, students got a small plastic tub and two sheets of plastic held together. They put the plastic sheets in the tub and squirted some colored water into the tub to see if it would get pulled up between the plastic sheets. (see below)

Teacher takes a couple of squirts of various colors from students' cups and puts them all in one cup to make black. Is there a way to separate it back into the original colors?

Demonstrate how to put a drop of black color onto a coffee filter and see it separate.

Students get a couple of coffee filters. They can put a drop of their color on one and put a drop of the black on another.

To make it go faster, give students a souffle cup of water and a new pipette and let them add water to the coffee filter.

Filter paper is like the two plastic plates. There are thousands of tiny fibres that are close enough together to let the water crawl through it.

Notice which colors spread out the most. The bigger the molecule, the slower it goes. Water is small.



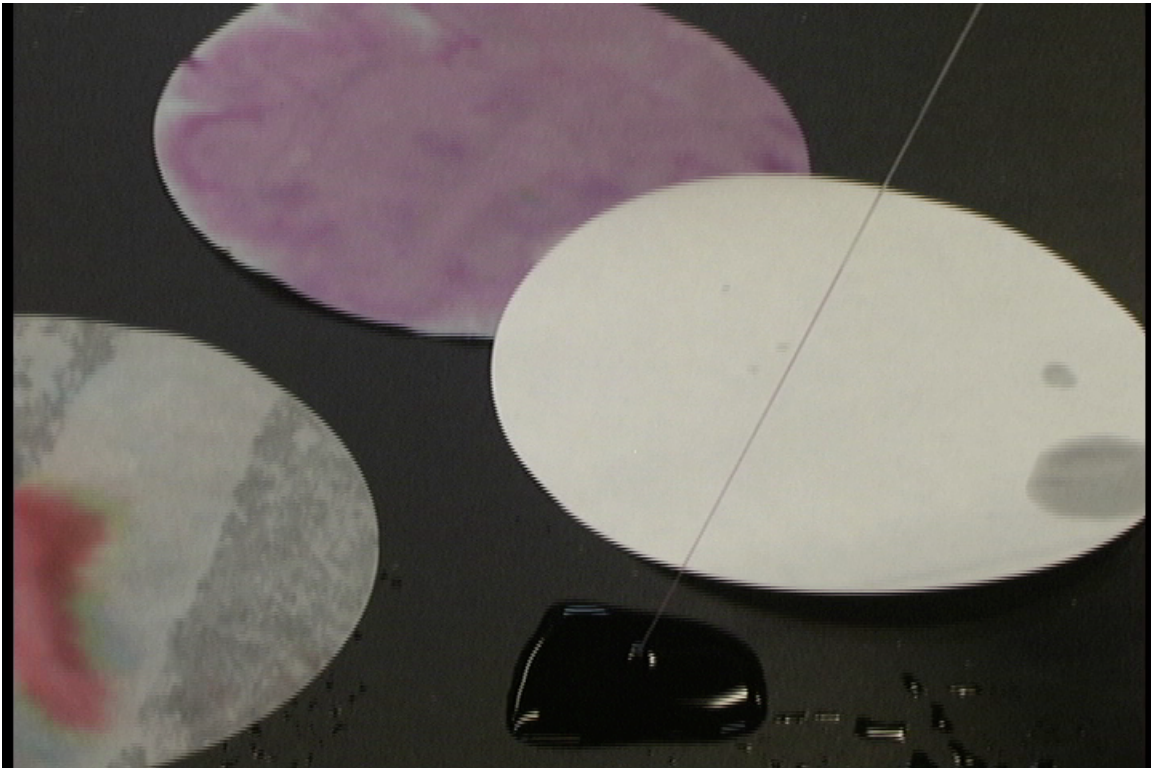
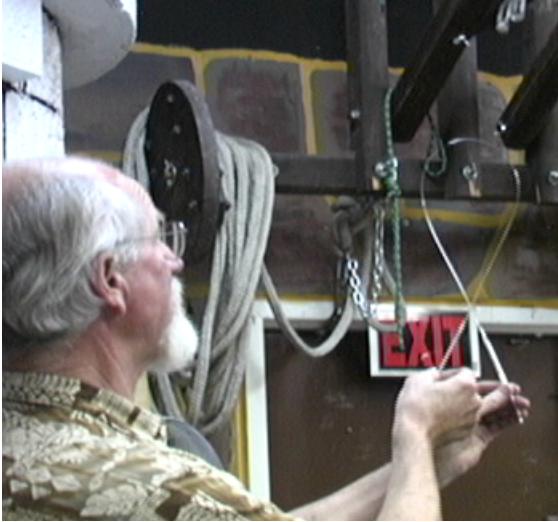
DEMO:

When a doctor takes a blood sample, it goes up in a long skinny tube. Here's how that happens.



Teacher sets up two torches close together. When they flames come together, they spread out.

Teacher holds a glass tube in the flames until it becomes red hot and saggy, then stretches it out to make a very long skinny tube. Bend it in half until it breaks.

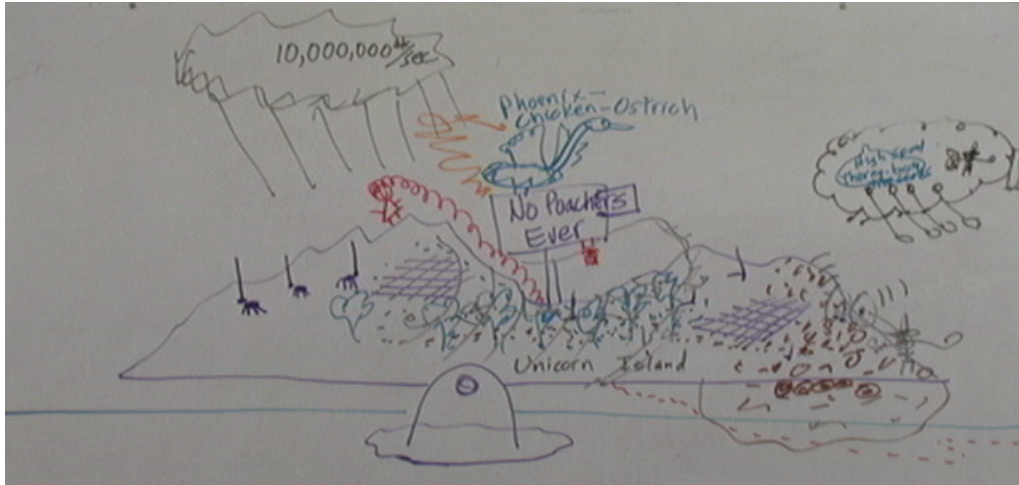


Stick one end of the broken tube in a puddle of dyed water and see how the water moves up the tube. When a doctor does this with a blood sample in a sterilized container, the

blood doesn't get contaminated, because bacteria can't live in the hot tube (2K degrees).

Students can keep coffee filters, but everything else goes in the garbage.

End of Story



EMF called the Acme SOE and ordered a herd of wildebeests because they like to run all together and smash through everything in their way. He put them all on one end of the island.

J&J called the Acme SOE and ordered a whole bunch of doughnuts, which can float in the water, and put them under that end of the island to hold it up.

Then EMF went down and smacked the wildebeest that was closest to the end of the island. It started a stampede, and they started running across the island. The unicorns, people, other animals, etc., had no choice but to run through the thorny bushes. The skinny people could run faster and they went through first. The medium people and unicorns ran second. The biggest people were going through slower and slower, and they were being chased by the wildebeests.

J&J ordered a flood. It came as a cloud above the opposite end of the island, dropping 10 million pounds per second of water. The flood pushed the wildebeests toward the other end of the island. The unicorns like water, so they stayed where they were, and everyone else sat under the unicorns to stay dry. A wall of water 100 feet high swept over the island and hit EMF.