

Today in Mad Science® we learned all about...
RADICAL ROBOTS

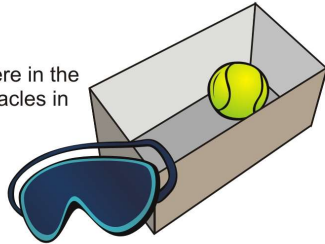
- Robots are machines that can do things automatically in response to their environment.
- Many robot arms move tools called end effectors. End effectors are built to do different jobs.
- Automotons are machines that do the same actions over and over, like a washing machine.
- Remote control devices work when humans guide them.



Let's Try This At Home!
IT MAKES SENSE

YOU NEED: a friend, a shoebox, a tennis ball, a blindfold

- 1 Have your friend leave the room.
- 2 Clear the floor and then place the shoebox somewhere in the room. Make sure that there are no other unsafe obstacles in the way!
- 3 Have your friend put on the blindfold. Position your friend at the entry of the room and give them a tennis ball.
- 4 Give your friend directions to walk to the shoebox. Direct them to drop the tennis ball into the shoebox.
- 5 Repeat steps 1-4 without the blindfold. What do you notice?



EXPLANATION: Being able to see helps us accomplish many tasks. It is difficult to design a robot that can see. Some robots use infrared light sensors to help them find or avoid objects. Infrared is a type of light that we can't see. Robots send out a light beam. The light reflects or bounces back. The robot senses the light and reacts to the beam.



Today in Mad Science® we learned all about...
MOVING MOTION

- Sir Isaac Newton came up with three laws to help us understand how things move.
- Objects tend to keep doing what they are doing.
- Heavier objects need more force than lighter ones to move the same distance.
- For every action, there is an equal and opposite reaction.



Let's Try This At Home!
EGGS-PERIMENT

YOU NEED: a hardboiled egg, a raw egg

- 1 Place the eggs on a table.
- 2 Spin both eggs on their sides. What do you notice?
- 3 Spin the eggs again. Touch the top of both spinning eggs and then quickly remove your finger. What happens?



EXPLANATION: Newton's first law states that objects tend to keep doing what they are doing. The hardboiled egg acts as a solid. The cooked egg inside spins at the same rate as the outside shell. It spins faster than the raw egg. The raw egg is liquid inside. It is hard to get the liquid moving as fast as the shell. The liquid has more inertia. This causes the raw egg to spin more slowly. It continues to spin after the shell is touched because the liquid inside keeps moving.



Today in Mad Science® we learned all about... MIX IT UP

- Mixtures are made up of two or more things.
- We can separate the different parts of a mixture if we know their properties.
- A property is what we use to describe an object.
- Solids, liquids, and gases do not have the same properties.
- Molecules are too small to see, but they make up everything in the world!
- Some powders dissolve quickly in water.



Let's Try This At Home! CORNSTARCH SLURRY

YOU NEED: cornstarch, water, 1 disposable cup, 1 spoon

- 1 Add five spoons of cornstarch to the cup.
- 2 Add five spoons of water to the cup and stir slowly.
- 3 Repeat with more water until all the powder is wet. Stir until the mixture is smooth.
- 4 Smack the mixture with the spoon. What happens?
- 5 Let the spoon sit over the mixture. What happens?
- 6 Quickly tug the spoon upwards. What happens?

EXPLANATION: You made a suspension! You added just enough water so that each bit of cornstarch touches a bit of water. The mixture acts like a liquid when you let it move slowly. It hardens when you move it fast. Quicksand acts this way too! Your suspension will keep in the fridge for about three days.



Today in Mad Science® we learned all about... LIFE IN THE SEA

- The ocean covers most of the Earth, and many plants and animals live under water.
- The ocean has many different layers. The deepest layers are cold and dark.
- Animals have adaptations that let them live in different parts of the ocean.
- Most fish have an organ called a swim bladder that helps them move up and down in the water.
- Baleen whales eat tiny plankton that they strain in their mouths.
- Toothed whales and sharks grab their food with their teeth and swallow them whole.

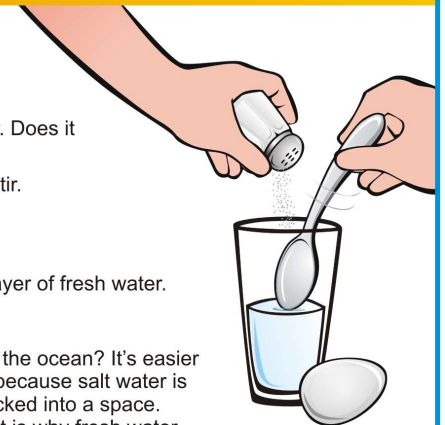


Let's Try This At Home! FABULOUS FLOATING

YOU NEED: a hard-boiled egg, water, glass, salt, spoon

- 1 Place the egg in a glass half-filled with water. Does it sink or float?
- 2 Remove the egg. Add salt to the water and stir.
- 3 Replace the egg in the water.
- 4 Repeat steps 2-3 until the egg floats.
- 5 Slowly pour water into the glass to make a layer of fresh water. What do you observe?

EXPLANATION: Have you ever gone swimming in the ocean? It's easier to float in the salty ocean than in lakes or pools because salt water is more dense. Density is the amount of matter packed into a space. Denser things sink below less dense things. That is why fresh water floats above salt water. The egg is more dense than fresh water, but less dense than salt water, so it floats between them.



Today in Mad Science® we learned all about... GET CONNECTED

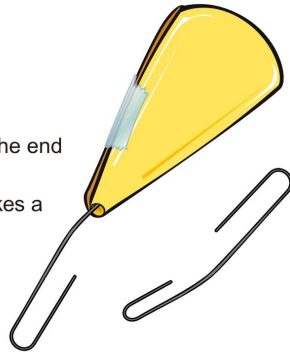
- Vibrations make sound. Sound travels in a wave.
- A telephone has a small speaker and microphone.
- Telephones turn your voice into a signal.
- Telephones and other devices can send messages over a large distance.
- A network is a set-up that links two or more devices.
- Cellular towers send and receive radio waves from cellular phones.



Let's Try This At Home! PAPER SPEAKERS

YOU NEED: a square Post-it™ note, a piece of tape, 2 paper clips, a rock

- 1 Unfold the paper clips so that the ends are still rounded.
- 2 Roll the Post-it note into a funnel shape and tape it to the end of one paper clip.
- 3 Scratch the paper clips against the rock. Which one makes a louder noise?
- 4 Try your test on different adult-approved surfaces.

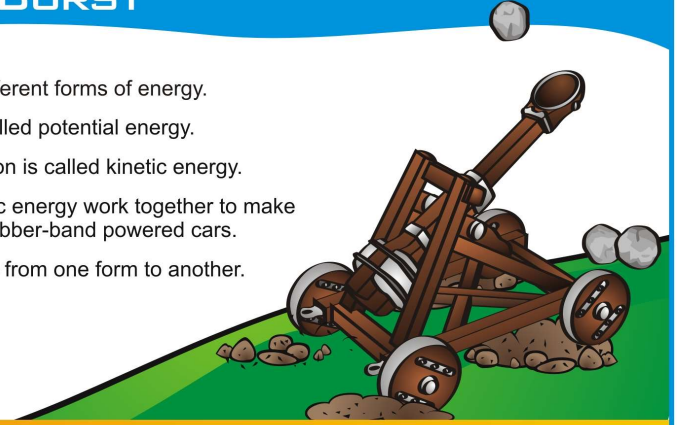


EXPLANATION: You made an amplifier! We hear vibrations as sounds. The funnel shape collects and sends vibrations out from the wide end. Telephone speakers and headsets contain a funnel shape that direct vibrations at your ears. Headsets with earbuds send the vibrations directly into your ear. Your ears are very sensitive. Turn down your headset volume to keep your hearing for life!



Today in Mad Science® we learned all about... ENERGY BURST

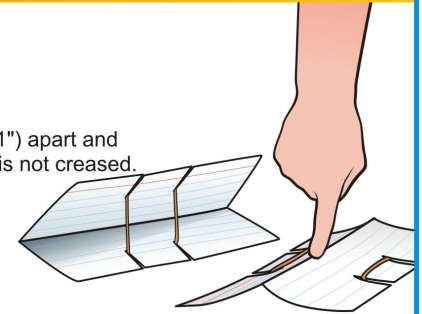
- There are many different forms of energy.
- Stored energy is called potential energy.
- The energy of motion is called kinetic energy.
- Potential and kinetic energy work together to make things move, like rubber-band powered cars.
- Energy can change from one form to another.



Let's Try This At Home! FLIPPING FOR SCIENCE

YOU NEED: index card, rubber band, scissors

- 1 Fold the index card in half horizontally.
- 2 While the card is folded, cut two slits 2.5cm (1") apart and 2.5cm (1") deep on the edge of the card that is not creased.
- 3 Open the index card partway.
- 4 Loop a rubber band through the four slits.
- 5 Flatten the index card with your fingers, then quickly let go. What happens?



EXPLANATION: You use energy to hold the index card flat. Some of that energy is stored as potential energy in the rubber band. Letting go of the card releases the energy stored in the rubber band. The potential energy changes to kinetic energy to flip the card.



Today in Mad Science® we learned all about...
ANIMALS

- Zoologists are scientists who study animals.
- Animals are living things that move and eat, just like us. Animals can have fur, claws, and hard shells to help them adapt to their environments and protect themselves.
- Animals can use camouflage to blend into their surroundings and protect them from their predators.
- Animals use noises to communicate with other animals to warn them about danger or let them know about food.
- Different animals make different tracks. Their feet are designed to help them live in their environments.



Let's Try This At Home!
BEAUTIFUL BIRDS

YOU NEED: empty milk carton, ruler, marker, scissors, string, birdseed, an adult helper

- 1 Have an adult make a hole in the carton top. Run string through it and tie a loop.
- 2 Draw a line around three sides of the carton, 14cm (5 1/2") from the bottom.
- 3 Draw a parallel line 7.5cm (3") above the first one.
- 4 Draw vertical lines 2.5cm (1") from the edges, connecting the two lines at each end.
- 5 Cut along the lines to make an opening. You made a birdfeeder!
- 6 Have an adult help you hang the feeder outdoors. Fill it with birdseed.

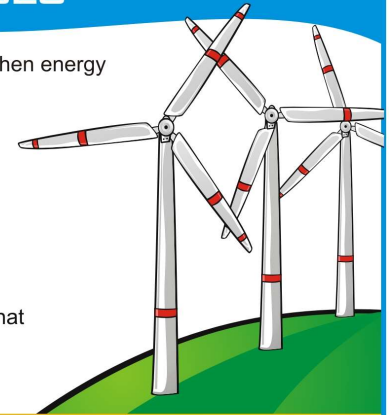


EXPLANATION: Bird feeders help you attract birds so you can observe them. Do different birds visit your feeder? Make notes about how they look. How are their beaks, colors, and calls different? Check your feeder daily to make sure it is always filled with seeds for your feathered friends.



Today in Mad Science® we learned all about...
SUPER POWER SOURCES

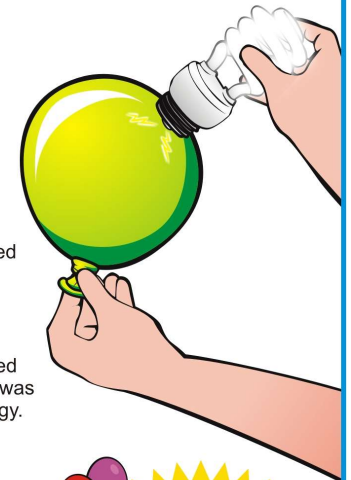
- Energy is what makes things work. Things work when energy changes from one type to another.
- We need energy to make electrons move. Moving electrons create power.
- Power is a measure of how fast energy changes. We get power from many sources.
- Renewable sources make power with things that we can reuse.
- Non-renewable sources make power with things that we use up.
- We should reduce our power use to save energy.



Let's Try This At Home!
LOW POWER LIGHT

YOU NEED: a balloon, a compact fluorescent light bulb, a dark room, an adult helper

- 1 Ask an adult helper to get you a compact fluorescent light bulb (CFL).
- 2 Inflate the balloon and rub it on your head.
- 3 Enter a room and make it as dark as possible.
- 4 Hold the light bulb gently by its coils and bring the balloon close to the metal base. What do you see?
- 5 What happens if you have two friends touch static-charged balloons to the bulb at the same time?



EXPLANATION: You used static electricity to turn on the light bulb! Compact fluorescent light bulbs (CFL) contain gas and a coating of powder. Electricity makes this gas excited and this makes the powder glow. The static from the balloon was enough to make a tiny light in the bulb! CFL's help save energy. They do not need a lot of electricity to work.

