High Touch High Tech®

Science Experiences That Come To You

Make Your Own Toy – Bug Bot

Supplies:

Type A (Bug Bot)

- Foam Tape
- 1 Popsicle Stick
- Scissors
- 1 Vibrating Pager/ Cellphone Motor
- 1 Lithium Battery
- Googly Eyes
- 1 Pipe Cleaner
- Elmer's Glue
- *Other craft supplies can be used to personalize your Bug Bot

Type B (Bristle Bot)

- Toothbrush head
- Foam Tape
- Scissors
- 1 Vibrating Pager/ Cell Phone Motor
- 1 Lithium Battery

Waiting to explore new toys from your holiday wish list can drive you bananas. So, we've got a new toy you can make to keep you engaged and entertained. Dazzle your friends and family by creating your very own Bug Bot!

Instructions:

Type A (Bug Bot)

Gather the supplies for the Type A (Bug Bot). You need 1 popsicle stick, foam tape, scissors, 1 vibrating pager motor, 1 lithium battery, googly eyes, 1 pipe cleaner, and Elmer's glue. Ask an adult to help you find the supplies. When creating your Bug Bot, you may need some assistance with the motor and lithium battery.

Begin by cutting the popsicle stick so it is 1.5" to 2" long. Glue the googly eyes on one end of the popsicle stick.

Cut a 1 inch piece of foam tape. Take your vibrating pager or cell phone motor and attach it to the piece of foam tape. (Do not remove the paper on the other side of the foam tape.)

Now you need to attach the battery to your Bug Bot. Notice that the battery has 2 wires, or leads, connected to it. Bend the leads in opposite directions. One lead should touch the foam tape. The tape will help make a stronger electric connection. (The two leads will connect to the battery on opposite sides. However, do not connect the leads to the battery until the Bug Bot has dried.)

Remove the paper on the backside of the foam tape to expose the adhesive. (The foam tape is connected to the motor.) Firmly push this side of the tape onto the top of the Bug Bot's body.

Cut the pipe cleaner into 1.5" inch sections. You need 4 pieces of pipe cleaner. These will be the legs of your Bug Bot. Bend the pieces into an "arc" shape. Glue the pipe cleaner pieces to the bottom of the popsicle stick. (The motor and battery are on top.) The pipe cleaner sections should look like 4 upside-down "V"s in a row. The legs need to be fairly even so they all touch the table when the Bug Bot is sitting still.

Ask an adult to help with the next steps:
*<u>**Note:</u> **Very important**…The legs need to be slightly shorter as you move from the back of the Bug Bot to the front. If they are not even at first, let the glue dry. Once dry, you can take a sharp pair of scissors and cut the legs as needed.*

Let everything dry before attaching the leads from the motor to the battery. The two leads will connect on opposite sides of the motor. Once the leads are attached, the motor will make the unbalanced weight of the Bug Bot start to spin. Be sure that you place the Bug Bot on a flat surface. Because the Bug Bot is unbalanced, it makes the device vibrate. The Bug Bot vibrates and moves!

*<u>**Note:</u> The leg length, battery and motor placement all influence the behavior of the Bug Bot. Therefore, experiment with your Bug bot. Try moving its legs, making them shorter, or placing the motor in a different spot. Experimenting may be necessary to correct its movement.*

Be creative with your Bug Bot and have fun! Make an obstacle course or maze. Set up barriers and watch your Bug Bot maneuver around objects.

Invite your friends over and make multiple Bug Bots. You can have races or play "bumper-bots"!
Create some head-to-head Bug Bot collisions!

Type B: (Bristle Bot)
Want to try a different kind of Bug Bot? First, you need a toothbrush with a flat surface. (If the bristles are uneven, you can use scissors to make bristles all the same length.)

Ask an adult to help you with this next step. You will need to cut off the handle of the toothbrush. All you want is the bristled head. Follow the same steps as the Bug Bot. But, this time you have a Bristle Bot!

The Science Behind It:
History of Science Toys - Every year, creative new toys are invented. We see them advertised around the Holidays, and everyone is excited! Over the past 100 years, there have been a wide variety of very influential and ground-breaking toys. Some of the most exciting designs were Science Toys!

In 1923, the first chemistry set for kids was released! This kit was designed to teach basic chemistry skills. Although this toy was marketed only to boys, the company sold millions of chemistry sets over the next 30 years!

The design for the classic yo-yo toy can be traced back to nearly 500 B.C. However, children in the US were introduced to the toy in 1928. Originally called the “Wonder Toy,” the yo-yo quickly became the favorite of kids of all ages, even adults! People began participating in yo-yo contests throughout the country.

The same company that produced the first chemistry set for kids, designed toy microscopes in the 1930s. The variety of toy microscopes had three different levels of magnification. This science toy taught kids how to view bees, flies, and other insects up close. Of course, the set came with photos of the insects to view. But, everyone was encouraged to find other insects and rocks to view up close!

While a photographer was snapping images in an Oregon National Park, he thought of a wonderful new science toy – a small gadget to view 3-D colored photos. A stereoscope, invented in the 1800s, combines two photographs of the same image from slightly different angles. When both images are placed on top of each other, it has a 3-D affect. The photographer wanted to make this image in color. Working with a company, they invented the View-Master. This small red toy debuted at the 1939 World’s Fair. At first, the View-Master had images of National Parks. Eventually, Disney caught on to the craze of the new colored stereoscope.

Everyone loves to blow bubbles! Kids have blown bubbles from soap for decades. But, in 1940, a cleaning supply company started selling Bubble

Solution in bottles. These bottles soon came with bubble wands of various sizes and shapes. Bubbles continue to be a well-loved science toy!

A mechanical engineer was testing out equipment on ships. He needed to design a fragile spring. One day, he accidentally knocked the spring off a shelf. The spring then "walked" along the floor instead of falling flat. This engineer had a great idea! He designed a spring that coiled 80 ft. of thin wire into a 2-in. spiral. His wife chose the name of this gadget – the Slinky!

Chemists were afraid that the US would run out of rubber during World War II. Therefore, these scientists began researching and experimenting on ways to create a synthetic rubber substance. Although the scientists were unsuccessful in their efforts, they did invent a stretchable "solid liquid" substance – Silly Putty! This new science toy was packaged inside colorful plastic eggs to the delight of children across the country!

Because clay was too difficult for young children to play with in the classroom, a concerned dad sent solid, mashable wallpaper cleaner to a school. It was a hit! He then started sending this substance to other schools. The cleaner was now more popular as a science toy. This substance was soon sold as Play-Doh!

The seemingly magic drawing toy, Etch A Sketch, is actually a unique science toy! This device has a plastic screen on a thin box. The Etch A Sketch contains a mixture of tiny plastic beads and aluminum powder. Two knobs control horizontal and vertical rods. When you turn the knobs, the rods move a stylus where the two meet. When the stylus moves, it creates a static charge from the beads and aluminum powder leaving a line. Invented in 1959, this science toy is still a favorite!

So whether you enjoy toys of old or new, science has played an important role in their development. We can't wait to see the next generation of new FUN science toys!

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