PARENT GUIDE

A robot is defined as a machine which can sense, think, and act on its own. Robots may be machines, but the goal for many who work in robotics is to create a robot that acts like a human being. In this project your child will build a robot model with human attributes.

Robotics is the science with four main objectives.

DESIGN BUILD CONTROL OPERATE

In the robot model project, your child will be provided the “DESIGN” for making a robot. Their job is to BUILD the robot. After completing the robot model, ask your child what they could change in the design to CONTROL what the robot does. This could mean that they would think of ways to add movement, sound, or lights to the robot. How would they plan to OPERATE this added technology?

Robot Model Project

STEAM: Technology (Robotics)

Technology (Robotics) design process is a series of steps used to work and solve problems.

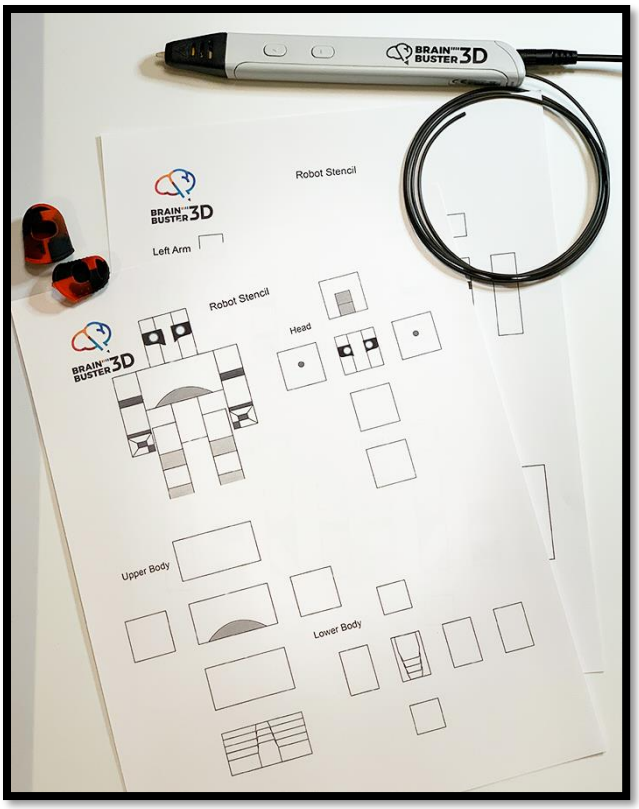
DESIGN BUILD CONTROL OPERATE

Building a Robot Model will help your child learn Technological Skills. How?

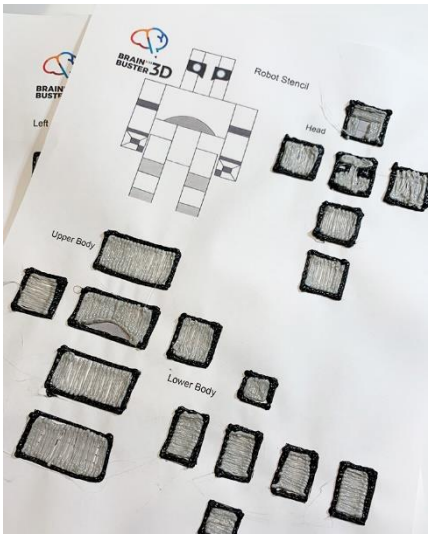
- They will use a stencil which is they DESIGN to create each part of the robot.
- They will need to arrange the parts of the robot as they would a puzzle, and determine which parts need to be welded together to BUILD the 3D form of the robot.
- When they finish the model, help your child think about ways they could CONTROL and OPERATE the actions of the robot. Examples would be to give the robot mobility, sound, or light.

Materials Needed: Robot Stencil (page 7 & 8), 3D Pen, 2-3 colors of PLA filament, scissors, silicon thumb & finger protectors, a paper towel or napkin.

Optional: To keep the stencil intact, place it in a plastic sheet protector.



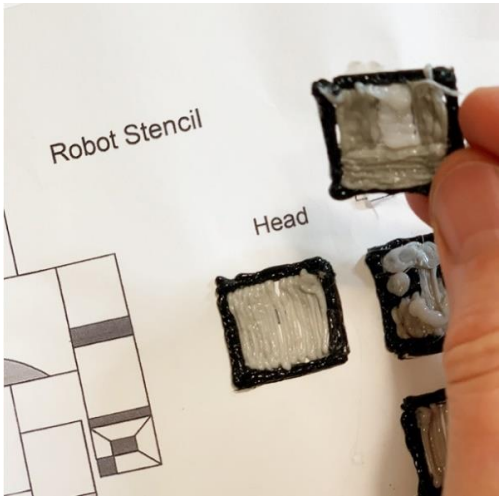
STEP ONE:



Make a copy of the Robot Stencil. If you need directions about how to operate a 3D pen, please refer to the Parent Guide for Operating a 3D Pen. Once the 3D pen is heated and loaded with filament, help your child find a starting point on the stencil to anchor the filament. Move the 3D pen along the lines to outline each part. Once all the parts are outlined, they will fill in each part by moving the 3D pen back and forth between the outline they made.

They can select any color of filament to create their robot model. If they do not like the PLA filament colors' that they have, they can paint the parts with acrylic paint before they remove them from the stencil or paint their finished robot model.

STEP TWO:



If they use a plastic sheet protector, the parts should peel off the stencil easily.

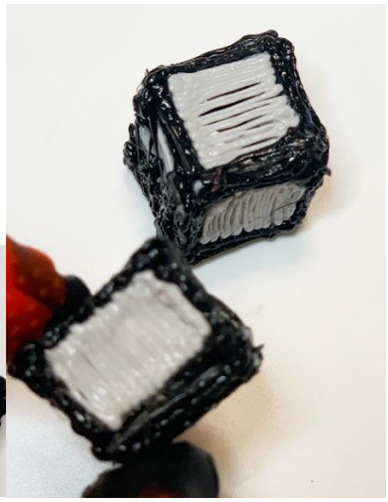
If they made the parts by extruding the filament directly on the paper stencil, some of the paper will stick to the back of the parts they made.

To remove the paper, rinse the plastic parts with warm water and dry them with a paper towel.

STEP THREE:

Robot Head

Robot Arms



Robot Neck

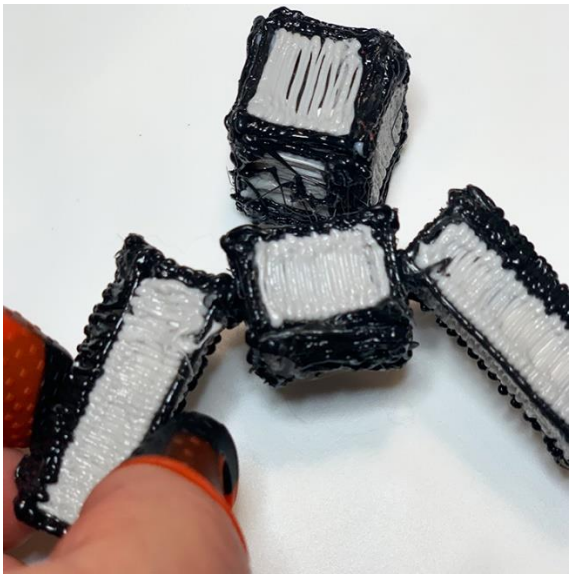
For the model of a robot, they will be welding squares and rectangles together to make a series of cubes and rectangular prisms. Have your child build all the cubes and rectangular prisms.

Helpful Hint: Use playdough or clay to hold the pieces together as they weld the seams from the inside.

When they no longer can weld from the inside, add filament to the corners outside of the cube or prism to weld the parts together. Add filament along the outside seams to reinforce them.

Once all the cubes and prisms are built, your child will arrange them as pictured, as they would a puzzle to see which parts will be welded together to form the 3D robot model.

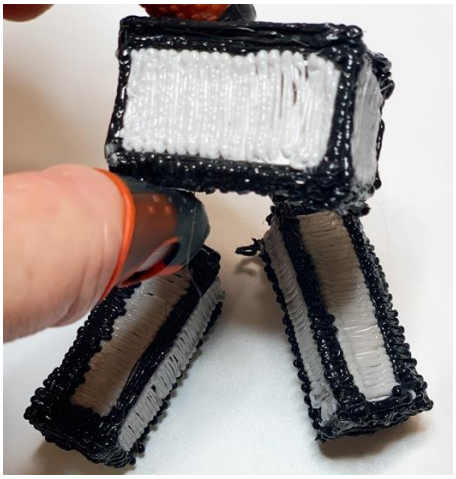
STEP FOUR:



To start your child will weld the head to the neck. Then weld the arms to the neck at an angle as pictured.

STEP FIVE:

Robot Legs



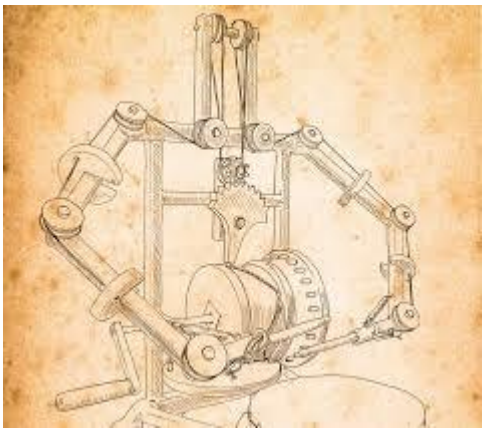
Robot Body

Robot Body & Legs

Your child will weld the legs to the body as pictured.

Congratulations! The 3D robot model project is complete.

Inspiration from Leonardo Da Vinci:



When the famous Renaissance painter and inventor Leonardo da Vinci was only 12 years old, his first design was the plans for a mechanical knight which moved its head, raised its arms, and would sit up. Later when he was an adult, Leonardo built the mechanical knight with the ideas he had from his childhood designs!

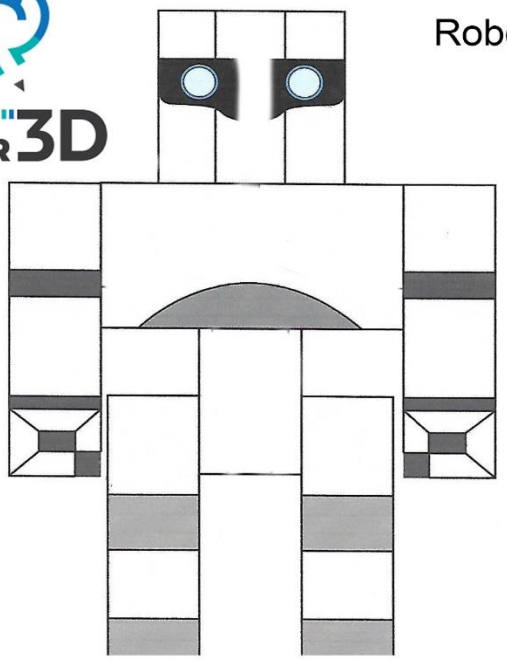
Help your child take the da Vinci challenge! Next time they build a robot, help them plan the technology for adding movement. They can get ideas from drawings by innovators like Leonardo Da Vinci.

Help your child think about how they would make the head, arms, and legs of the robot move side to side or back and forth.

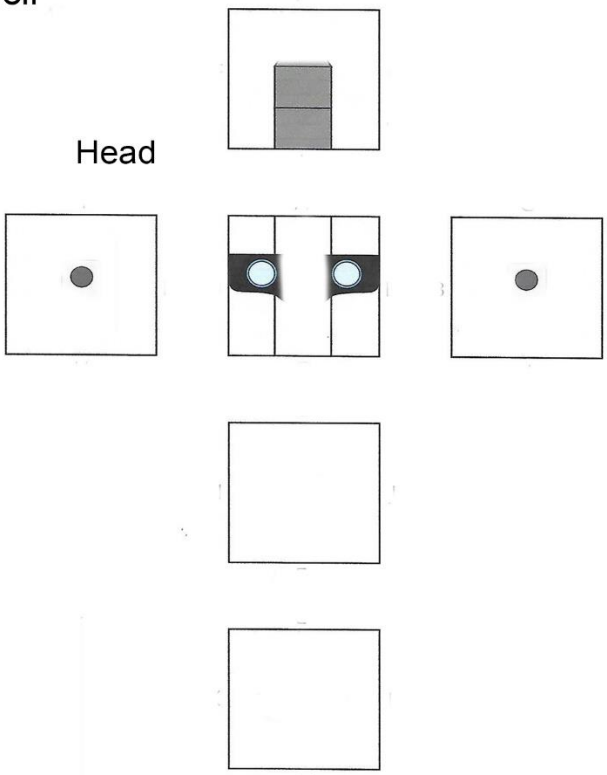
Your child has a great advantage over Leonardo Da Vinci.
They do not need to wait until they are an adult to build their designs.
They can build them today!

BRAIN BUSTER 3D

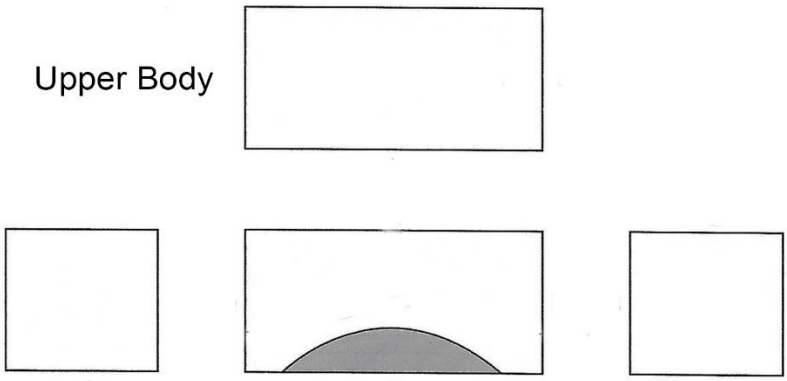
Robot Stencil



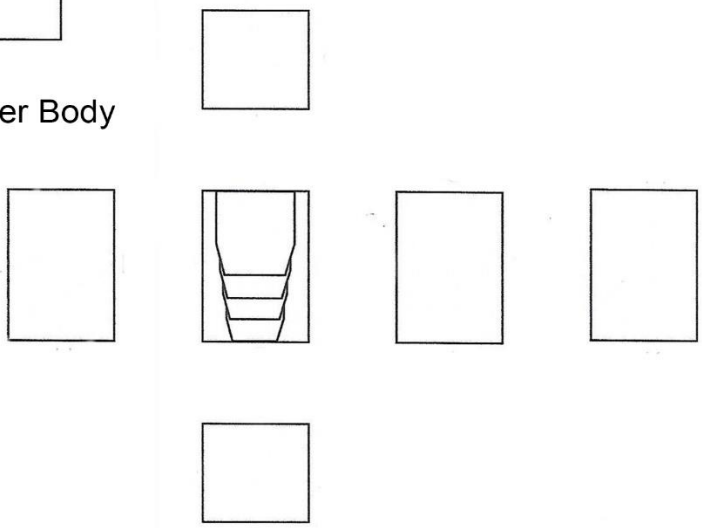
Head



Upper Body



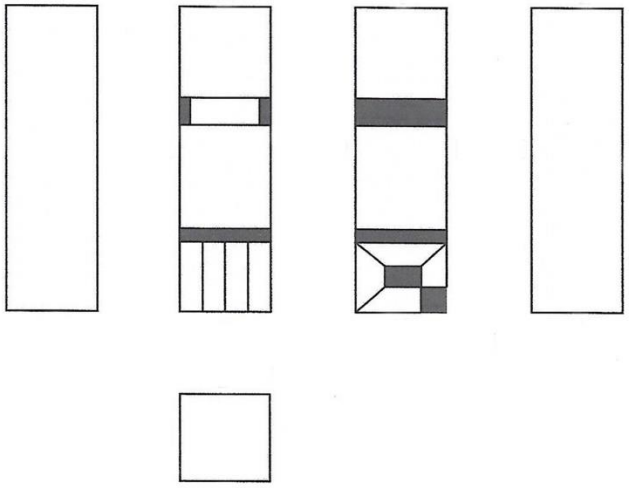
Lower Body



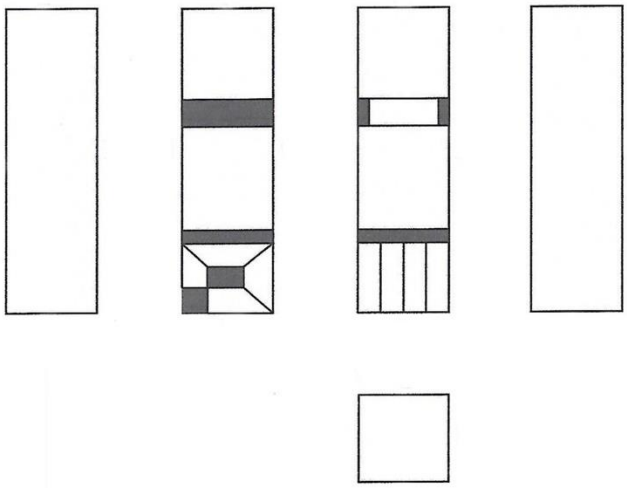
BRAIN BUSTER 3D

Robot Stencil

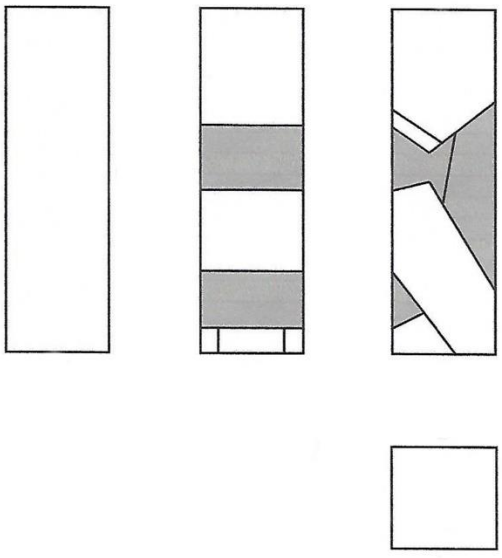
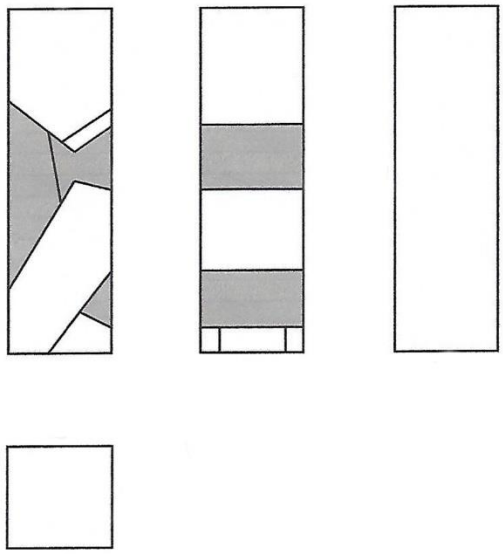
Left Arm



Right Arm



Left Leg



Right Leg