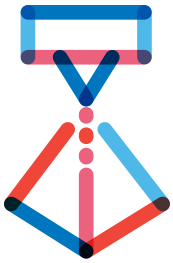
3D Printer

TOOL CARD



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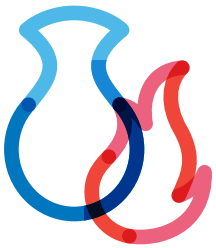
Clay Oven

TOOL CARD



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3D Printer

Difficulty: ●●●

What it is

3D printers are high-tech tools that turn CAD (computer-aided design) files into 3D objects made of plastic. There are many 3D printers on the market, but we use the 3D Systems Cube 2 on the Maker Truck. The Cube is robust, relatively simple to use and fairly inexpensive. 3D printers and CAD software are the most complex of our tools, though with some basic training and the innovation in CAD software (we prefer Autodesk's TinkerCad) great advances have been made in bringing 3D printing into classrooms and to those who are less experienced.

What it makes

3D sculptural objects and other useful objects, like specialized parts.

What it works with

Objects printed on a 3D Printer need to be created using appropriate software on an iPad or computer.

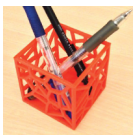
Materials

The 3D printer's main medium is plastic. Students use TinkerCAD (or other CAD software) to design a 3D object. These objects can take any shape the student can dream up and design using the software. The sky's the limit!

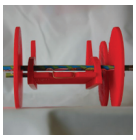
Activities and projects


Make your own board game


3D-printed glasses


Pen holder


3D name tags


Rubber band car

Find links to instructions at sparktruck.org/toolcards

Clay Oven

Difficulty: ●○○

What it is

When making projects out of polymer clay (like Sculpey®), we have found that it is important to buy a polymer clay oven (as opposed to a regular toaster oven — they look similar!). Luckily, polymer ovens are relatively inexpensive and can be purchased online or at an arts and crafts store. Polymer clay sculptures are brightly colored, easy to work with and hardened through baking.

What it makes

3D sculptural objects and other useful objects, like handles for stamps, etc.

What it works with

Students can use these tools in combination with the Vinyl Cutter, Laser Cutter and 3D Printer to create more complex projects.

Materials

Polymer clay sculptures really only consist of polymer, though once they are baked, the objects can be glued to other materials, such as wood, cardboard, etc. We recommend using gel superglue.

Activities and projects


Handles for stamps


Polymer clay beads


Garden markers

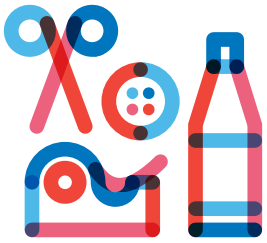

Wood-grain clay stamp


Clay cactus

Find links to instructions at sparktruck.org/toolcards

Craft Supplies

TOOL CARD



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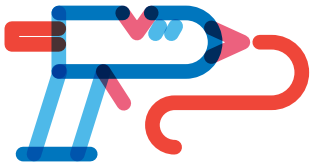
Hot Glue Gun

TOOL CARD



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Craft Supplies

Difficulty: ● ○ ○

What they are

We like having lots of craft supplies around while running many different hands-on activities. These are items you might find already in your classroom, in your home or at a well-stocked craft store like Michael's. We include in this category everything from crayons, paper, and scissors to popsicle sticks, googly eyes, pom-poms, paints, etc.

What they make

Simple 2-dimensional pictures and objects, as well as structures and objects like models and dioramas, simple machines, containers and more!

What they work with

Students can use these tools in combination with Shop Tools, Hot Glue Gun, iPad + Laptop, Simple Circuits, Laminator, Clay + Oven, Vinyl Cutter, Laser Cutter and 3D Printer to create more complex projects.

Materials

Great materials to use are construction paper, scissors, tape, pens, paints, popsicle sticks, pom-poms, fabric, googly eyes, etc.

Activities and projects


Collection of paper projects


Collection of popsicle stick projects


Collection of creature projects

Find links to instructions at sparktruck.org/toolcards

Hot Glue Gun

Difficulty: ● ○ ○

What it is

A hot glue gun is a light tool that heats a plastic stick to melting. Use the gun to lay down melted plastic. When the plastic dries it can act as an adhesive. Hot glue guns work particularly well with foam core, cardboard and popsicle sticks. While young children can use hot glue guns, it is important to train them on using them safely.

What it makes

2D objects as well as simple structures. Hot glue guns are great for building strong architectural objects because the glue itself is both strong and pliable when dried.

What it works with

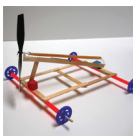
Students can use these tools in combination with the Craft Supplies, Shop Tools, Laser Cutter and Simple Circuits to create more complex projects.

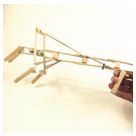
Materials

Great materials to use with hot glue guns are construction paper and cardstock, cardboard, foam core, fabric, popsicle sticks and more!

Activities and projects


Popsicle stick bridge


Propeller-powered car


Mechanical hand

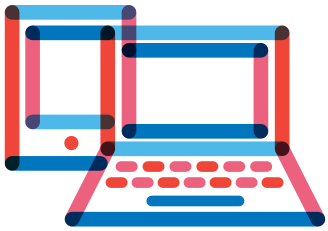

Cardboard model canoe


Tornado tower

Find links to instructions at sparktruck.org/toolcards

iPad + Laptop

TOOL CARD



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Laminator

TOOL CARD

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iPad + Laptop

Difficulty: ● ● ○

What they are

iPads/computers/laptops are handy tools for many uses, but with the Maker Truck we use a few specific programs in conjunction with other tools like the vinyl cutter, laser cutter and 3D printer to make things! We recommend using the programs Adobe Ideas, Adobe Illustrator, Autodesk's TinkerCAD and Google's Picasa, among others.

What they make

Refined 2D objects and digital assets. Students can make drawings and renderings that can become 2D and 3D objects.

What they work with

Students can use these tools in combination with the Vinyl Cutter, Laser Cutter and 3D Printer to create more complex projects.

Materials

Electricity and creativity! Using the iPad/computer/laptop is much more about the tools you will connect to than it is about the device itself.

Activities and projects


Laser-cut stamps


3D-printed glasses


Laser-cut keychain


Personalized jigsaw puzzle


Stop-motion movie

Find links to instructions at sparktruck.org/toolcards

Laminator

Difficulty: ● ○ ○

What it is

Laminators are machines that heat two pieces of thin plastic to seal and waterproof sheets of paper. They are fairly inexpensive, low-maintenance and very easy to use.

What it makes

Laminated paper objects can be used in many ways, from signage for your classroom to name tags, board game pieces, recipe cards, etc.

What it works with

Students can use these tools in combination with the Craft Supplies and Vinyl Cutter to create more complex projects.

Materials

The laminator requires plastic laminating sheets. Great materials to use with the laminator are construction paper and cardstock, plus pens, paints, stickers, etc.

Activities and projects


Laminated stickers


Handmade transparency

Quick & easy whiteboard

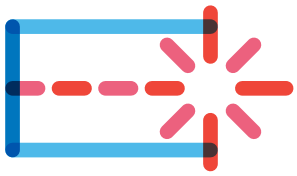

Stencils


Keyboard circuitry wallet

Find links to instructions at sparktruck.org/toolcards

Laser Cutter

TOOL CARD



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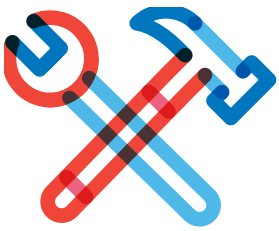
Shop Tools

TOOL CARD



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Laser Cutter

Difficulty: ●●●

What it is

A laser cutter is a sophisticated machine that uses lasers to make precision cuts into many different materials, including thin pieces of wood and acrylic, chipboard, food, fabric, paper, rubber, etc. The cuts are based on 2D vector (outline) drawing files created on the computer. At SMU, we use Adobe Illustrator for interfacing with our laser cutter.

What it makes

Refined and precisely cut two-dimensional objects out of most relatively thin and relatively soft materials.

What it works with

The laser requires iPads or a computer on which the designs are made, and a computer to send the files to the laser cutter. Students can use the laser cutter in combination with the Craft Supplies, Shop Tools, Hot Glue Gun, Vinyl Cutter and Clay Oven to create more complex projects.

Materials

Great materials to use with the laser cutter include acrylic, Mylar film, thin birch plywood, masonite, chipboard, foam core, paper, matboard, corrugated cardboard, laser-cuttable rubber, and cotton fabric.

Activities and projects


Stamps

Poster

Stencil letters

Keychain


Tangram puzzle

Find links to instructions at sparktruck.org/toolcards

Shop Tools

Difficulty: ●●○

What they are

Basic shop tools include screwdrivers, hammers, wrenches, pliers, box cutters, saws, clamps. Basic shop tools are used to make simple 3D structures using basic materials like wood, PVC pipe, cardboard, etc. These tools require supervision, some training and safety equipment (like safety glasses, etc.) but can help your students build sturdy, large-scale structures and objects.

What they make

Simple structures and objects like models and dioramas, simple machines, containers and more!

What they work with

Students can use these tools in combination with the Craft Supplies, Hot Glue Gun, Clay Oven, Vinyl Cutter, Laser Cutter, 3D Printer and Simple Circuits to create more complex projects.

Materials

Great materials to use with basic shop tools include nails, screws, glue, spray paint, tempera paint, zip ties, string, cardboard, foam core, wood, PVC pipe and more!

Activities and projects


Pallet wood lamp


Wooden crate with lid


Simple bird nesting box

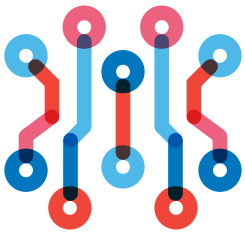

Bird house


Twin compost bin

Find links to instructions at sparktruck.org/toolcards

Simple Circuits

TOOL CARD



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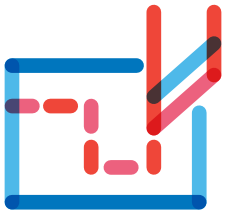
Vinyl Cutter

TOOL CARD



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Simple Circuits

Difficulty: ●●○

What they are

Simple circuits are a variety of projects and tools that allow students to explore circuitry and basic electronics. We recommend using "squishy circuits," MaKey MaKey, as well as basic circuitry elements like LEDs, watch batteries, small motors, etc.

What they make

Small, simple circuits that have enough power to light a small LED light or make a small motor run. From there, how you work LED lights or motors into the project is up to you!

What they work with

Students can use these tools in combination with Craft Supplies, Shop Tools, Hot Glue Gun, iPad/Laptop, Vinyl Cutter, Laser Cutter and 3D Printer to create more complex projects.

Materials

Great materials to use with simple circuits include watch batteries, small motors, LED lights, MaKey MaKey and conductive play dough, as well as popsicle sticks, construction paper, etc.

Activities and projects


Vibrating robots


Pallet wood lamp


Dead battery flashlight


Conductive play dough


Interactive animals

Find links to instructions at sparktruck.org/toolcards

Vinyl Cutter

Difficulty: ●●○

What it is

A vinyl cutter is a tabletop machine that can precisely cut shapes out of either sticker vinyl or heat-transfer vinyl (used with fabric, etc.). The cuts are based on 2D vector (outline) drawing files created on the computer. At SMU, we use Adobe Illustrator for interfacing with our vinyl cutter.

What it makes

Refined and precision-cut vinyl stickers & heat transfers.

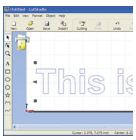
What it works with

The vinyl requires iPads or a computer on which the designs are made, and a computer to send the files to the vinyl cutter. In order to use heat-transfer vinyl on T-shirts or other fabric, a heat press or iron is required.

Materials

Great materials to use with the vinyl cutter are sticker vinyl, heat transfer vinyl, T-shirts, vinyl banners and silk screening.

Activities and projects


Learn the vinyl cutter


Personalize your space

Sticker logo


Space Invaders cutouts


Custom T-shirt design

Find links to instructions at sparktruck.org/toolcards