

# Summer Classes 2020

All classes \$200 per half day

## WELCOME TO SUMMER AT LEONARDO'S BASEMENT

We are excited to present our schedule of summer classes. Every year instructors dream up ideas for classes after watching and listening to you during the previous year. They will encourage you to design and build engineering, art and technology projects that spring from your imagination.

Leonardo's Basement is unlike any educational organization in the world. It is the largest (and oldest, since 1998) making space for builders of all ages. It is dedicated to helping students develop projects by dreaming and taking risks. To learn decision making by making decisions. To learn problem solving by solving problems. To develop technical skills using hand and power tools, computers and other technology. To value process over product. To have fun being curious, creative, and industrious.

You will have considerable freedom. Along with freedom comes responsibility. We expect you to be self-directed, to respect others, and to work hard. We expect that you will follow three simple rules:

**Be safe, be nice, and have fun.**

### NEW & SPECIAL in 2020:

- Blacksmithing, welding, metalworking, 3D printing, gaming hardware and software, and woodworking for teens;
- Sandbox games, wooden swords, giant pyramid, hydro dipping, solar & wind power, large houseboat build, and
- Additional weeks of spectacular outdoor "Adventure Playground" for ages 6 and up.

We look forward to seeing you!



Steve Jevning  
Founder and Executive Director

### REGISTRATION NOTES

- Individual and collaborative project building in engineering, art, design, and technology for ages 6-17
- 11 weeks of full and half-day workshops Monday-Friday begin June 8.
- Friday-only workshops.
- AM (8:00-9:30 am) and PM (3:00-5:00 pm) extended day.
- Lunch: students registered for both an AM and PM workshop should bring a lunch.
- All half-day workshops are \$200. [Scholarships](#) are available.
- Cancellation Policy - If you cancel a class:
  - 1) At least three weeks before the class begins we will refund the entire class fee, less a \$25 processing fee;
  - 2) At least two weeks before the class begins we will issue a credit for the entire class fee to your Leonardo's Basement account for a future class or workshop, or
  - 3) Less than two weeks before the first day of class you will not receive a refund or credit.
- Workshop in south Minneapolis, near 35W and Hwy 62 (Crosstown), at [150 West 60th Street, 55419](#)

Other questions? Look at [FAQ here](#) or [contact us](#).

Register at [leonardosbasement.org](http://leonardosbasement.org)

# Summer Classes 2020

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## Week 1 - June 8-12

### AM

#### **Welding With a Taste of Blacksmithing**

Sample a delicious meal of metalworking. You will learn and explore welding techniques and build one or more creative projects to take home. Make a practical project or fun sculpture, it's up to you. You can also add a side dish of blacksmithing to the welding main course. One day during the week you will work with one other student to learn the basics of blacksmithing: heat iron in a coal-fueled forge, grab a hammer and pound away on an anvil. You can make a fancy hook or something else.

Ages 14 and up

#### **CNC Cutters**

Design projects that will require a vinyl cutter or laser cutter. Make a personalized graphic for your laptop, water bottle or skateboard; or vinyl decals for your phone, bag or clothing. Make dioramas, puzzles or castle models using the laser engraver. Learn how to import your vector (outline) designs from Inkscape graphics software to the computer-controlled vinyl cutter or laser engraver.

Ages 11 and up

#### **Wizards of Wood**

Saws, drills, files, hammers, vises, clamps and all of the wood that you can shake a stick at! Scrap wood, plywood, 1x4's, 2x2's, 2x4's and more. Cut and shape wood to build one or more projects. Learn about fasteners and finishing too!

Ages 6-12

#### **Adventure Playground**

Perhaps you have heard of Adventure Playgrounds. Over 80 years ago an architect in Denmark noticed that kids were playing everywhere EXCEPT on the playground equipment that he designed. He figured out that kids in the city wanted the same experiences as kids living in the country, "A junk playground in which children could create and shape, dream and imagine a reality." The outdoor yard at Leonardo's Basement is just such a play and build area. We will provide a broad assortment of building materials and tools and supervision while you and your friends build your own projects and create your own worlds.

Ages 6 and up

#### **Zip Lines**

Start by imagining cities, forests or amusement park themes, individually or collectively. Then add zip lines, pulleys and string to enable animals, people and vehicles travel from place-to-place high above the ground! Think flying monkeys or monorails or hungry squirrels or superheroes. Add motor-powered climbers if you can. Plan for distance, or make something that moves in crazy or complicated ways. Make it tabletop sized on your own, or work together and fill the room!

Ages 8-12

### PM

#### **Animal House**

Does your dog need an outdoor shelter? Does your cat need a place to perch? In this class, you could build a house (or why not a castle?) for your dog, a tree for your cat to climb, a labyrinth for your mouse, or an obstacle course for your hamster. Your pets will thank you!

Ages 8-12

#### **Public Art Squad**

Add a little whimsy and wonder to our exterior space. Projects might include painting and installing decorative wood to disguise the chain link fence with cleverness, developing and planting a guinea pig garden, reimagining the cracks in the concrete steps, or creating a special faerie world for ongoing imaginative building and playing in the Adventure Playground. At the end of the week you'll [exit through the gift shop](#).

Ages 12 and up

#### **Toy Inventors Workshop**

Let's use batteries and motors and rubber bands and balloons and string and glitter. Make tops, JiggleBots, catapults, optical toys, and things with wheels. You can invent and make your own board game or card game. Experiment with hand-cranked contraptions and make new ones.

Ages 6 and up

#### **Tools 1.0**

Do you ever just want to hit nails with a hammer? Or drill holes with a drill? Use wire cutters, and a vice? This is the perfect class for you if you want to gain experience with tools! Make wacky sculptures. Drill holes to make pictures. Then use your new skills to construct something practical, whimsical or both! You will also use other tools like handsaws, hacksaws, hot glue guns, pliers and wire cutters.

Ages 6-9

#### **Launch After Lunch**

Build slingshots and other projectile-launching machines like catapults. After you have built a couple of prototypes and learn how they work, scale them up to launch balls, water balloons, and cupcakes. Perhaps build a human slingshot!?

Ages 10 and up

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## Week 2 - June 15-19

### AM

#### Welding

Attention new or experienced welders: put on your safety gear and start welding. You will explore the techniques of welding steel and then let your imagination run wild. The sky is the limit as you weld your designs, devices, and sculptures.

Ages 14 and up

#### Practical, Playful Furniture

Add a custom coat rack to your porch or a bookshelf for your bedroom. Add clever personal elements as you develop your design. Use a number of different tools to build your project. We will help you to make it look good and last a lifetime.

Ages 10 and up

#### Rotate, Revolve & Repeat!

Consider planets and other objects in the solar system in a (black) (w)hole new light! Make planets in the solar system and then add a light source to represent the sun. Experiment with rotation and revolution (around the sun). How does your planet appear when observing from another place in the solar system? Use your light source to observe its effect on a top-secret rocket that takes you to another world or the shuttle for your return trip. Perhaps build a custom space station.

Ages 6-10

#### Sandbox Games IRL

Draw inspiration from Minecraft, Stardew Valley, Terraria, Factorio, Roblox, a Building Mechanic from Fortnite, or another of YOUR favorites. Design a world on a giant piece of graph paper and then construct your pixels in 3-dimensions using wood and paper cubes. Build terrains structures, props and characters. Perhaps a castle with turrets and a dungeon; or a tower that stretches to the sky, or an enormous maze. Join us for the ultimate building challenge. Anything is possible (well, except for playing the video game).

Ages 9-12

#### Imagine, Invent, Innovate

Ever think of something that should exist, but doesn't? Have an invention you've been thinking about? Not quite sure exactly how it will work or how you should make it? This workshop will support your work on designs, solving problems, and building your ideas. Share your challenges and the project with others to get their suggestions. You'll leave with a prototype and the memory of models that didn't quite work. Enjoy the journey!

Ages 6-12

### PM

#### 3D Printing

Learn how to use CAD software to make solid models. You will cover the basics of designing in 3-dimensional space and learn how software helps turn ideas into physical objects. After creating your CAD design you will use another software product to "slice" your model and generate machine code for the 3D printer. Finally, your 3-dimensional design will be printed in ABS plastic. Discover how fun and easy it can be to bring your ideas to 3-dimensional life!

Ages: 13 and up

#### Diagon Alley: Potions, Apothecary, and Wands

Imagine that you are the producers and manufacturers for Diagon Alley stores like Slug and Jiggers Apothecary, Quality Quidditch Supplies or Ollivanders Wand Shop. You will make essential Harry Potter accessories and invent a few more!

Ages 8 and up

#### Musical Instruments and Sound Waves

You've got music in your soul and sound wave science in your brain. Now you need just the right instruments and experiments to mash them up. Create a brand new kind of musical instrument with strings or air or jingles and jangles. Experiment with sound; even fill wine glasses with water. Make a sculptural tower of sound? Or a guitar? Or a . . . You decide!

Ages 6-9

#### Creativity Convention

This workshop offers you a different take-it-or-leave-it theme each day incorporating engineering, design, art, and building. Work with tons of cool materials like: wood, fabric, cardboard, metal, plastic, electronics and use the tools you need to work with them!

Ages 6-12

#### Paint Pendulums (and Other Colorful Physics)

Create delivery systems to roll, bounce, drip, splash, spray, and dribble paint. Use those mechanical contraptions and clever containers to paint on wood, canvas, and 3D objects (that you will also make!).

Ages 10 and up

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## Week 3 - June 22-26

### AM

#### Adventure Playground

Perhaps you have heard of Adventure Playgrounds. Over 80 years ago an architect in Denmark noticed that kids were playing everywhere EXCEPT on the playground equipment that he designed. He figured out that kids in the city wanted the same experiences as kids living in the country, "A junk playground in which children could create and shape, dream and imagine a reality." The outdoor yard at Leonardo's Basement is just such a play and build area. We will provide a broad assortment of building materials and tools and supervision while you and your friends build your own projects and create your own worlds.

Ages 6 and up

#### Better Than an Operation

Know a lot about a favorite subject? Wanna stump your friends and learn about electricity? You will design and build a cool electronic game like "Operation," but way better. Choose a theme like unicorns or mythological beasts. Or Harry Potter or Star Wars. Then make electricity your foil - learn about conductivity, circuitry, and soldering. Build a cool container to hold your questions/answers and test the knowledge and physical skills of your friends.

Ages 10 and up

#### Metal Sculpture

Learn your way around the metal shop. Cut, bend, and weld steel to create unique sculptures that bring your bedroom walls or garden to life. Make realistic or abstract art. Perhaps a functional and/or bizarre table. An indoor or outdoor mobile. You decide. And really, what's a more impressive skill than welding?

Ages 14 and up

#### All You Can Build Buffet

Choose from a smörgåsbord of materials (think: wood, game pieces, pulleys, fabric and bins, boxes and trays of other tasty options). Prepare them and or take them apart with utensils, I mean . . . tools, like: saws, drills, tape, hot glue, and wire. What you cook is up to you!

Ages 6-12

#### LEGO Dream City

Our cities are continually evolving. Build your own city (and the occasional monster) using our ginormous collection of LEGO bricks while you learn how cities work and grow. This class is about building with LEGO bricks and you can expect a few surprise pop-up building competitions during the week but the only requirement is an interest in the world's favorite construction toy. (LEGO maniacs encouraged).

Ages 8 and up

### PM

#### Woodworking

Learn woodworking skills by building a birdhouse, board game, stool, bookshelf, small bench, or a box for your collectibles or jewelry. Work in the woodshop to design your project and use basic woodworking and construction techniques including measuring and cutting parts, power tool use, joinery, and wood finishing.

Ages 12 and up

#### Reverse Engineering

Old (and new) machines are really fun to take apart. They are full of twirly, shiny cool, bits and pieces that you can use to make NEW cool, shiny, twirly, robotic sorts of things. No hammers allowed!!!

Ages 6-11

#### Game On!

Explore the world of 3-dimensional puzzles. Start by making Cat's Cradles to loosen up your brain and fingers. Grab some graph paper and design labyrinths (with a single path to the center and back out) and mazes (with multiple choices of path and direction). Then look for interesting material to build your 3-dimensional quandary. How about adding a marble to your project, or building a clever roller-coasty run for it to follow?

Ages 6 and up

#### Kinetic! Art That Moves

This will be a busy week as you fashion mobiles, kinetic sculpture and automata. Remember the mobile from above your crib? Make your own dangling, bouncy, spinning creation with fascinating and fun material from the shop. You'll also make moving sculptures with creatures or shapes by twisting and bending wire, to make them strong and squiggly. A few springs will help add movement. Finally, use your knowledge of movement and newly-acquired skills to design and build a hand-cranked [automaton](#).

Ages 8 and up

#### En Garde

Before you prepare for a fight you need a sword. In this workshop you will craft a wondrous single or double-edged training sword. From wood! Start with a straight, sturdy 1x4, then make big cuts with a table saw before using hand tools like chisels, surform, rasps, and files on you way to a hard, sharp, edge. You'll need a handle design, too. Hopefully, you will have time to make a sheath.

Ages 10 and up

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## Week 4 - July 6-10

### AM

#### Magical Tree Houses

Build a model tree house with swings and ramps. Learn to build zip lines from branches and porches. Add lights and switches or imaginary characters. An elevator with a pulley might lift your treasures to the sky.

Ages 6-12

#### Raiders, of the Lost Junkyard

Sometimes, when something quits working, it is just the beginning! Take apart stuffed animals, toys, household items, games, and electronics. Use the pieces to make something that the world had never before seen! Checker board out of gears? Robot from an old VCR? Uni-Fish from plastic animals?

Ages 6-12

#### Mini-Mansions & Tiny Towns

Ready to have a mansion OR your very own castle on a hill? Construct a scaled down version of your favorite fantastical, historical or literary structure. Maybe your vision will be for a single spectacular & detailed Hogwarts or you may want to have a few buildings in your own village!

Ages 8-13

#### Fools-ball!

Combine your favorite elements of foosball, pinball, air hockey and Skee-Ball to create your own moving-object board game. Use ping-pong balls, trophy figures and other cool materials along with some clever physics to create tabletop games.

Ages 10-14

#### Heath Robinson Machines

Perhaps you have heard of Rube Goldberg and his drawings of complicated contraptions. He had a counterpart in Great Britain named [W. Heath Robinson](#). You will work as a group to complete a VERY BIG Heath Robinson Build. Our 15-foot tall ceilings with metal trusses and steel beams allow for generous elevation and support for a lot of weight. That means zip lines, pulleys and other hardware will probably be a big part of your chain reaction contraption. Thinking big usually means making big mistakes. Make a bunch. Make it cool.

Ages 12 and up

### PM

#### Build What You Want

This week, the workshop is yours. Your scientific lab, woodshop, studio, craft room, giant junk drawer. Yes, we are here to help you; but the big project decisions are all yours! Look everywhere for the exact materials, tools and equipment that you will need to create your project(s).

Ages 6-10

#### Build a Bigger 'Bot

It's about time Leonardo's Basement had a robot mascot patrolling the workshop. In this class you will work as a group to design and build a mobile robot. You'll scrounge or make the drive train, body, controller, sensors, and power supply. As you put it all together and test it you might add other features. Maybe add an arm. Learn woodworking, metalworking, electrical wiring, mechanics, and programming. One of your first tasks will be to brainstorm possible tasks for the robot to perform.

Ages 13 and up

#### Causation Contraption

Build the biggest, most amazing energy moving apparatus that you can. Create an incredible machine that will tower over your head and send balls of energy knocking things over under your feet. Perhaps you will add amazing features to the track. Or figure out how to get balls to the top. How big can you make it? How clever? How many times will you and your friends rebuild it?

Ages 6-10

#### Chess & Other Board Game Design

Want a personalized chess set, battleship game or checker board for the next time you play? We have a variety of materials that can be used or commingled. Think LEGO, rope, wood, hardware, toys, jewelry, construction toys, metal, plastic, silverware, stuffed animals, and . . . for playing pieces. You'll make a board, of course. And a carrying case, if you wish!

Ages 8-12

#### Making (Painting) Miniatures

Do you have gaming miniatures that haven't been painted, or that you'd like to repaint? Warhammer? How about learning to customize non-gaming small objects like Matchbox or Hot Wheels vehicles? Railroad or dollhouse miniatures? Or LEGO minifigs? How about Yu-Gi-Oh! or Pokémon characters? Star Wars? Marvel, DC, HeroClix? Learn to paint, or improve your hand and spray painting skills, in this workshop.

Ages 12 and up

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## Week 5 - July 13-17

### AM

#### Adventure Playground

Perhaps you have heard of Adventure Playgrounds. Over 80 years ago an architect in Denmark noticed that kids were playing everywhere EXCEPT on the playground equipment that he designed. He figured out that kids in the city wanted the same experiences as kids living in the country, "A junk playground in which children could create and shape, dream and imagine a reality." The outdoor yard at Leonardo's Basement is just such a play and build area. We will provide a broad assortment of building materials and tools and supervision while you and your friends build your own projects and create your own worlds.

Ages 6 and up

#### Toolcraft

Do you ever just want to hit nails with a hammer? Or drill holes with a drill? This is the perfect class for you if you've never tried using tools before! Make wacky nail sculptures with wood, nails and a hammer. Drill holes to make pictures on wood. Then use your new skills to construct something practical, whimsical or both! You will also use other tools like handsaws, hot glue guns, vices and wire cutters.

Ages 6-9

#### Intro to Laser Engraving

We have a laser engraver that etches and cuts through things with a laser . . . well, flat things that is. But you can make a lot of 3D things from flat things! Dioramas, puzzles, castles, and models. It's time to turn your thinking up-side down and figure out how to create three dimensional designs from two dimensional pieces.

Ages 12 and up

#### LEGO Masters

Are you up for a daily LEGO building challenge? Themes for the structure or problem or theme will be drawn from a hat each day. How will you plan and build your solution? How will you manage your construction to generate a really cool project in the allotted 2-hour building time?

Ages 10 and up

#### Hollywood Prop Department

Recreate some of your all-time favorite movie props. Think of those memorable items from ET, Ghostbusters, Wizard of Oz, Indiana Jones, Back to the Future, Pirates of the Caribbean, Marvel Universe, and Star Wars. There is no limit to the possible number of knock offs you can make. Come with ideas, leave with treasures.

Ages 8-12

### PM

#### Creativity Convention

This workshop offers you a different take-it-or-leave-it theme each day incorporating engineering, design, art, and building. Work with tons of cool materials like: wood, fabric, cardboard, metal, plastic, electronics and use the tools you need to work with them!

Ages 6-12

#### Godzilla's Guide to City Planning

Start by creating a map or blueprint to determine the scale of your city. Use wood, Styrofoam, cardboard, foam core and found objects to create your 3-dimensional city! Where will the parks, bakeries, waterways, hospitals, and schools be located? Are cars allowed? Is it rural, urban, suburban or Martian? You have so many decisions to make!

Ages 8-13

#### Craft Galaxy

Buttons and feathers and beads, oh my! Bring your ideas and let your imagination run wild. We have so much stuff. Seriously! Like button makers, picture frames, cardboard, hot glue, paint, heat guns, ribbon, drills, beads, jewelry, jewelry wire, fabric, dowels, foam, and vats and vats of assorted and colorful trinkets on hand. Use them!

Ages 8 and up

#### Engineers of the Sea

You will design make model boats, ducks, mermaids, rafts...whatever you can dream up that rides or glides on the surface of water. Your vessel may require a sail, wings, motor, fins, or a propeller. Whatever it takes, we'll make it out of a variety of materials. Use wood and foam plus learn how to use the tools to cut and attach them. Of course there will be many chances to test and re-design your craft or creature in the water!

Ages 6-10

#### Tabletop Gamer's Toolkit

Never show up to the table unprepared again! Craft accessories for, or entire, games. Make dice, cards, or miniatures. Build dilapidated buildings, unbreakable defense lines, or any kind of natural structures. Use wood, fabric, foam, and much more to make fine creations. Laser cut, carve, and assemble your miniature world. Design, build, and paint terrain, whether it's for games like Warhammer, Dungeons and Dragons, Magic: The Gathering, KeyForge, a game of your own invention, or for no game at all!

Ages 12 and up

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## Week 6 - July 20-24

### AM

#### Welding

Attention new or experienced welders: put on your safety gear and start welding. You will explore the techniques of welding steel and then let your imagination run wild. The sky is the limit as you weld your designs, devices, and sculptures.

Ages 14 and up

#### Wood You Like to Build?

Saws, drills, files, hammers, vises, clamps and all of the wood that you can shake a stick at! Scrap wood, plywood, 1x4's, 2x2's, 2x4's and more. Cut and shape wood to build one or more projects in the woodshop. Learn about fasteners and finishing too!

Ages 6-12

#### Fabulous Fabric-ation Guild

Fun or Fancy or Fashionable. Use fabric and feathers and fringe. You will be able to construct fabulous things by hand sewing, machine sewing or gluing. This is YOUR sewing workshop, you decide how to thread it.

Ages 8 and up

#### LEGO Animation

Our wide range of LEGO characters are waiting for you to help them tell their story! Choose any tale and put LEGO into action! You will work in small groups to create the scenes, take pictures, produce and edit a video of your work! Make your own LEGO Movie and post it on YouTube.

Ages: 9 and up

#### Making Simple Machines

Do you like to build things that move? This is the class for you. You will learn about and use six simple machines that make human work easier. Using levers, wedges and screws we will construct vehicles or other toys that move. Use your creativity and engineering skill to use recyclables and new materials to create your own moveable machines. At the end of the week you will test your vehicles against other engineers in the class. Happy building!

Ages 6 and up

### PM

#### Metal Magic

Are you itching to work with metal so you can learn to weld once you are 14 years old? This workshop is about making creatures and creations out of old watches, nuts, bolts, cogs, springs, and anything else you can get your hands on. Learn to bend, cut and shape metal. If you need a better way to attach pieces together you can learn to rivet and solder too!

Ages 10 and up

#### All You Can Build Buffet

Choose from a smörgåsbord of materials (think: wood, game pieces, pulleys, fabric and bins, boxes and trays of other tasty options). Prepare them and or take them apart with utensils, I mean . . . tools, like: saws, drills, tape, hot glue, and wire. What you cook is up to you!

Ages 6-12

#### Shark Tank for Guppies

This workshop is for the curious and industrious! Come in with an idea, or generate one here. Work together or with others to: Build a prototype, create a name for your product, a logo and packaging. At the end of the week, make your pitch. We'll film it!

Ages 12 and up

#### LEGO on the Move

Designed for students who want to get started building motorized machines with LEGO. Classes will focus on building techniques and simple machines. This class is an opportunity for kids to design and build something that moves on its own. It's also great preparation for LEGO robotics.

Ages 6 and up

#### Physics Games

Moving pieces are key to these games. Maybe you'll use bouncing balls, spinning tops, rubber bands and springs to launch your pieces! You make the rules, the pieces and the board itself. Include animals, people, mountains, pulleys, bells, spinners or giant dice. Make it all extremely 3-dimensional. Make it wacky. Make it yours!

Ages 8 and up

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## Week 7 – July 27-31

### AM

#### **Giant Pyramid**

Build a momentous monument from Egyptian cardboard that is so big that you will need days to explore! What relics and treasures lie within? What traps and hidden spaces will you make? Is that mummy alive!? Will you ever find your way out?

Ages 9 and up

#### **Furniture Making**

Learn and practice your woodworking skills. Build a coffee, side or end table; a step-stool or bench, or a book shelf. After you decide upon size, style and design, you will learn more advanced woodworking and construction techniques including measuring and cutting parts, joinery, power-tool use, and wood finishing. Material fee \$30

Ages 12 and up

#### **Mad Hatters and March Hares**

Have you ever wanted to go to a tea party just like Alice in Wonderland? Well now you can create one. Start with the guests: We'll deconstruct stuffed animals to build new creatures using a needle and thread or hot glue. Sew clothes for them if you wish. Build yourself a fancy hat to wear to tea and then make one for the animals. Next, we'll need treats. Felt, fabric, buttons, glitter, doo-dads, and springs should work just fine. Finally we can celebrate all the unbirthdays with a wild tea party.

Ages 8 and up

#### **Playhouses**

Make your own playhouse out of cardboard as fancy or as rustic as you like. As the week progresses you can add a room each day. It's YOUR cottage or castle so we'll create them to fold up and take home when you are finished.

Ages 6-12

#### **LEGO Machines**

Build motorized machines and contraptions with LEGO. Engineer sturdy and functional frames to hold gears, pulleys and motors. Make a practical mechanism or a whimsical sculpture. Build a fast vehicle or a very powerful one. Craft a one-of-kind gadget or gizmo.

Ages 6-10

### PM

#### **Droids to Stormtroopers**

Explore iconic Star Wars characters by making costume replications from cardboard. You can use our templates for a classic clone warrior or create your own templates for your favorite Bounty Hunter, Jedi, or Drone. At the end of the week we will have our own troop! And then . . .

Ages 9 and up

#### **3D Printing**

Learn how to use CAD software to make solid models. You will cover the basics of designing in 3-dimensional space and learn how software helps turn ideas into physical objects. After creating your CAD design you will use another software product to "slice" your model and generate machine code for the 3D printer. Finally, your 3-dimensional design will be printed in ABS plastic. Discover how fun and easy it can be to bring your ideas to 3-dimensional life!

Ages 13 and up

#### **Invent What You Want**

This week, the workshop is yours. Your scientific lab, woodshop, studio, craft room, giant junk drawer. Yes, we are here to help you; but the big project decisions are all yours! Look everywhere for the exact materials, tools and equipment that you will need to create your project(s).

Ages 6-14

#### **Interior Designer**

Design things that make your space more functional and more FUN! You'll do some measuring of floor and wall dimensions, note floor type and the amount of light in the space that you want to improve. Think items like clocks, mirrors, foot stools, coat rack, lights and 3-dimensional art. You can: take-apart, reconfigure or build your projects from scratch to create one-of-a-kind accessories and furnishings.

Ages 11 and up

#### **H2(g)O**

Work inside the shop to build seaworthy projects and then take them outside to launch in multiple water resources in the Adventure Playground outside. You will design, build, and test vessels that go in, on, AND under the water. Use foam, wood, upcycled objects and the necessary tools. Perhaps you'll make boats, narwhal, rafts, mermaids, octopi, Sponge Bob, sharks, launchers, squirters, or splashers. You'll decide!

Ages 6-10

# Summer Classes 2020

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## Week 8 - August 3-7

### AM

#### **Welding**

Attention new or experienced welders: put on your safety gear and start welding. You will explore the techniques of welding steel and then let your imagination run wild. The sky is the limit as you weld your designs, devices, and sculptures.

Ages 14 and up

#### **Fairy State Fair**

Make rides, pools, zip lines, swings, concession stands, unicorn arenas (or stables), and other attractions for fairies and their friends! Use water resistant materials so your creations can be outside.

Ages 6-11

#### **Intro to Gube Roldberg**

Contraptions that transfer energy from one object to another are sometimes called causation machines. That's what Rube Goldberg machines are. Think dominoes tipping over; or balls rolling down a ramp and crashing into something. How about a pendulum? Or a catapult? Find items and materials in the shop that can crash and roll and bounce and drop upon other objects. Connect them all together and make a one-of-a-kind Gube Roldberg machine.

Ages 6-11

#### **Your Pet Wants You to Take this Workshop**

We don't (yet) have building options for pets, so it's really up to you! If you would like to build a bed, shirt, habitat accessory or chew toy for your favorite animal, this is the class for you. Dog Blanket? Yup. Cat climber? Sure. Rat maze? Of course! Invent a better rabbit toy or hermit crab hut in the company of other animal-loving inventors.

Ages 8-12

#### **Cyberpunk Gadgets**

Create the future! Design and build cybernetic enhancements, a hacker's toolkit, or your own far off city. Scavenge, solder and combine materials from the workshop to build something from your favorite cyberpunk world, or one that you create all of your own!

Ages 11 and up

### PM

#### **Leather & Laser Lab**

Some of the earliest records of humans using leather are over 7,000 years old! Both experienced and beginning leather workers will make bracelets, earrings, wallets, or belts. Leather can also be used to sculpt creatures and masks. In this class you will learn old techniques to sew, cut, and shape materials. You may even jump thousands of years into the future into the 21st century and use lasers to cut and engrave your designs.

Ages 12 and up

#### **All You Can Build Buffet**

Choose from a smörgåsbord of materials (think: wood, game pieces, pulleys, fabric and bins, boxes and trays of other tasty options). Prepare them and or take them apart with utensils, I mean . . . tools, like: saws, drills, tape, hot glue, and wire. What you cook is up to you!

Ages 6-12

#### **Magic Makers!**

You are a maker of magical experiences. Create things that will surprise and delight people who discover them. Things like: painted rocks with positive messages, ladders or swing sets for faeries and elves, rainbow phoenix feathers, signs for unicorn crossings, or dragon egg shells. Put them around our neighborhood, in your neighborhood, or in your yard!

Ages 6-12

#### **Mini Golf Madness**

Design and build the cleverest mini golf course ever. Make moving obstacles and ramps, holes and tracks to challenge each other. Perhaps your course has a trivia component, or a joke challenge. Create clubs or paddles and you'll be ready to share your course on Friday.

Ages 10 and up

#### **Electronics Lab**

Design a contraption, game, car or other creation. Use simple circuitry to create things that move and light up. Construct series and parallel circuits. Add switches and motors or lights. Then test and re-invent until you are satisfied. What do you want to build? Let's do it!

Ages 8-11

# Summer Classes 2020

All classes \$200 per half day

## Week 9 - August 10-14

### AM

#### Favorite Eats From Around the World

Travel the globe in just one week while cooking up tasty favorites from around the world. Create and enjoy the flavors of:

- The Middle East with homemade hummus and pita;
- Foods of Europe with fresh pasta or pizza margherita from Italy plus crepes, mousse or crème brûlée from France;
- Asia, with vegetable sushi rolls of Japan, noodle dishes from Thailand, or curries and naan of India, and
- Mexico with fresh guacamole and street tacos or tamales.

No passport required!

Ages 10 and up

#### Build Your Own Arcade Game (Software and Hardware)

You'll go retro and spend the week at the arcade -- no quarters needed. Program a 2-D retro arcade-style game using the MakeCode Arcade platform. MakeCode Arcade is a web-based code editor that can use either block editor interface (like Scratch) or JavaScript for programmers of all levels to create arcade-style games. Add your own artwork to your game to make it one-of-a-kind. Play and share your game with others on the web and on a handheld gaming machine that you will also build! Includes a materials fee of \$35.

NOTE: Students must have previous experience programming in block-based code editors (Scratch or something similar).

Ages 13 and up

#### Stuffed Animal Design, aka Vegan Taxidermy

Level-up from Build-a-Bear and create completely unique stuffed animals for your bed, backpack or wall. Use existing stuffies and plush toys and fabric to make a brand new beast! Combine your favorite features from 2 or 3 animals, invent a new one or make a family of animals that you already love! Sharp scissors, steady hand, hot glue and sewing supplies will bring your critters to life!

Ages 8 and up

#### Stop Motion Animation

Explore the world of video by creating your very own stop motion animation. Bring your drawings, clay, paper, dolls or anything else to life with movie magic! Learn basic computer and camera skills. Walk away with the next viral video!

Ages 9-15

#### Marble Runs & Superball Walks

Create mazes, contraptions and games for spheres of all sizes and speeds! Make your version of: pinball, shoot the moon, marble run, tiny ping pong or something else! You'll take your tabletop games and toys home at the end of the week to challenge and amaze your family.

Ages 6-10

### PM

#### Invent What You Want

This week, the workshop is yours. Your scientific lab, woodshop, studio, craft room, giant junk drawer. Yes, we are here to help you; but the big project decisions are all yours! Look everywhere for the exact materials, tools and equipment that you will need to create your project(s).

Ages 6-12

#### Heath Robinson Machines

Perhaps you have heard of Rube Goldberg and his drawings of complicated contraptions. He had a counterpart in Great Britain named [W. Heath Robinson](#) who drew similar machines. You will work as a group to complete a VERY BIG Heath Robinson Build. The 15-foot tall ceilings with metal trusses and steel columns and beams allow for generous elevation and support for a lot of weight. That means zip lines, pulleys and other hardware will probably be a big part of your chain reaction contraption. Thinking big usually means making big mistakes. Make a bunch. Make it cool.

Ages 12 and up

#### The Wrong Brothers Gliders

Let's take the time to make some mistakes and be foiled, air foiled that is. You will make gliders out of paper, foam, tape, bamboo or balsa and let fly. . . After reviewing the results go back to the drawing board. Two wings? Three? Short or long fuselages? The answers are in the asking.

Ages 8-12

#### Water Games!

Ever think about all of the different things that water does? Use hoses, PVC pipe, funnels, foam, wood and pumps. Make explosions, experiments (and cool off) with water. Make things to sail, float, sink and paddle. Learn some different things that YOU can do with water.

Ages 6-9

#### Solar Wind

No, not the really hot plasma leaving the sun at incredible speed. Rather, you will combine both words and forms of renewable energy. Capture and experiment with solar and wind energy to power your projects. We have a bunch of ~~small~~ solar panel and wind turbine/generator kits plus other electrical components and materials that you will use to make projects to take home for further experimentation.

Ages 9-13

# Summer Classes 2020

All classes \$200 per half day

## Week 10 - August 17-21

### AM

#### Look Alikes

Twenty years ago an artist named [Joan Steiner](#) published a series of books with photographs of amazing dioramas of everyday scenes that she crafted using common materials. Look very closely at this image for an example. You will create large and small worlds by using conventional materials in unconventional ways. Surprise your friends and family when they look closely at your imaginative work. Make them smile!

Ages 9 and up

#### Water Park Design Engineer

You know those really cool water park and amusement park rides? The prototypes that you design and build will be faster, spinnier, slipperier, splashier and wilder! The scale will be appropriate for an action figure or doll (but you will also get plenty wet when you test your models).

Ages 6-10

#### Hydro Dip et al.

Begin the week experimenting with spray paint on different projects and objects including a stretched canvas; make a finished piece to showcase your individual style. Then explore hydro-dipping on a variety of materials culminating with a fabulous design on a pair of sneakers, if you choose to bring some.

Ages 14 and up

#### Obstacle Schmobstacle

What is an obstacle anyway? We'll figure it out together as we design and build our own obstacle course! Using your sharp wit, a variety of tools and building materials (maybe a water feature?) build obstacles through which you will leap, duck, swing, dodge and wiggle.

Ages 9-14

#### Cardboard Fantasy Architect

Moving into your Hobbit Hut, Faire House, Space Capsule or Castle will be a whole lot of fun after you bring it home. But first you need to design and build that personal dwelling from your favorite fantasy story. Cardboard and fabric will be your primary building materials. Create details with stencils, paint and random objects.

Ages 6-12

### PM

#### Wood You Like to Build?

Saws, drills, files, hammers, vises, clamps and all of the wood that you can shake a stick at! Scrap wood, plywood, 1x4's, 2x2's, 2x4's and more. Cut and shape wood to build one or more projects in the woodshop. Learn about fasteners and finishing too!

Ages 6-12

#### Leonardo's LEGOLAND

We have tubs of LEGO including pieces for cities, ships, castles, trains and spaceships. We also have plants, animal and human minifigs. This is a Build What You Want workshop. You can build whatever you choose. Perhaps a machine, a city, a medieval forest, fleet of ships or a Star Wars battle. Best of all. You decide. You can make as many things as you have time to finish (and take apart on Friday)!

Ages 6 and up

#### Intro to LEGO Robots

Design and build autonomous robotic creations using LEGO Mindstorms NXT. Write computer programs to make the machines navigate on their own, sense their surroundings and perform practical and playful tasks. This class is a fantastic introduction to robotics. It is also appropriate for students with some Mindstorms experience who want to further develop their skills.

Ages 9 and up

#### 2D or Not 2D

Explore design software and use the laser engraver to etch and cut all kinds of material. Burn two-dimensional images on flat materials AND/OR make finished 3D projects from those flat things! Think: dioramas, puzzles, and models.

Ages 11 and up

#### RC Road Club

Why are race car tracks so flat? We'll build up, down and all around, and build a RC car track that makes use of space and whatever materials we can find. Think jumps, loops, obstacles, switchbacks up walls, pits of mud and ramps going out windows! We'll have a few RC cars to race, but bring your own if you have one.

Ages 8-12

# Summer Classes 2020

All classes \$200 per half day

## Week 11 - August 24-28

### AM

#### Adventure Playground

Perhaps you have heard of Adventure Playgrounds. Over 80 years ago an architect in Denmark noticed that kids were playing everywhere EXCEPT on the playground equipment that he designed. He figured out that kids in the city wanted the same experiences as kids living in the country, "A junk playground in which children could create and shape, dream and imagine a reality." The outdoor yard at Leonardo's Basement is just such a play and build area. We will provide a broad assortment of building materials and tools and supervision while you and your friends build your own projects and create your own worlds.

Ages 6 and up

#### Magical Creatures and Baby Beasts

Use foam, knives, scissors, and markers to carve and color creepy crawlies. Baby basilisks, or cockatrice chicks or magical unhatched owl eggs, pixies, dragons, fairies and their familiars. Kinetic or static, cuddly or cuddly; you design and decide!

Ages 8-12

#### Build What You Want

This week, the workshop is yours. Your scientific lab, woodshop, studio, craft room, giant junk drawer. Yes, we are here to help you; but the big project decisions are all yours! Look everywhere for the exact materials, tools and equipment that you will need to create your project(s).

Ages 6-10

#### Summer Sweets

Let your sweet tooth lead the way! Learn techniques as you make & bake many classic cookie recipes building foundations for experimentation and sweet, colorful toppings. Dough can be rolled, sliced, dropped and layered. Keep in mind, that gingerbread is an equally enjoyable foundation for houses, cars, robots, people, spaceships, or . . . Build, slather, bring it to life!

Ages 9 and up

#### Wheels on Wheels and Ramps and . . .

Engineer a toy that rolls and spins and jumps and shakes on a landscape of your design. Truck, duck, robot, wagon or dragon; they all have wheels in this imaginative workshop. Choose the number, size and even shape of the wheels. Build from scratch or use repurposed toys from the warehouse. Test your designs on the terrain that you and your friends build: steep & dangerous? Curvy and hilarious? It's up to you!

Ages 10 and up

### PM

#### Houseboat

What features will your custom-built houseboat have? Work as a team to design and build 10'x16' giant boat with a wooden deck and barrels for flotation. Add a structure to make shade on your craft and other elements to personalize your boating experience. Sorry, no motors; you'll need to figure out propulsion. On Friday you will transport your boat to the lake for its maiden voyage!

Ages 9 and up

#### Wooden Castles

Design towers and dungeons with dragons and trap doors. Create ramps and catapults with springs and lights and hinges. Or build a spectacular castle like the one that Cinderella lives in. Or Hogwarts. Perhaps add ghosts like in the Tower of London. Learn woodworking skills along the way and take your creation home at the end of the week.

Ages 6-12

#### Diagon Alley: Potions, Apothecary, and Wands

Imagine that you are the producers and manufacturers for Diagon Alley stores like Slug and Jiggers Apothecary, Quality Quidditch Supplies or Ollivanders Wand Shop. You will make essential Harry Potter accessories and invent a few more!

Ages 8 and up

#### Reverse Engineering

Old (and new) machines are really fun to take apart. They are full of twirly, shiny cool, bits and pieces that you can use to make NEW cool, shiny, twirly, robotic sorts of things. No hammers allowed!!!

Ages 6-12

#### Multiplayer Gamer's Workshop!

Do you like MMPORGs, RPGs, AC, and HP? How about rogues, wizards, and warriors or kobolds, trolls, and dragons? Good news, we've got a game you can create yourself. Make the rules, the board, the traps, and the treasure. Is it a puzzle, strategy, or adventure? Dice, cards, or both? You design the story and guide adventurers to glory or ... doom!

Ages 10 and up