



AEROSPACE

SUMMARY: Launch your imagination to new heights as you explore aerospace engineering! Discover the secrets of working in space – efficiency and compact, modular design. Create a trussed space station module, then connect it with others to create a massive modular spacecraft. Finally, assemble, test and take home your own Mad Science® Astro Lander – it's a space capsule with a parachute that you can launch!

EDUCATIONAL VALUE: This class teaches children about the Engineering Design Process and aerospace engineering. They build, test, modify and re-test a space station model made with LEGO® bricks. They discover the importance of compact, modular design for space stations, and learn how parachutes can be used to return components to Earth. This program engages the children in hands-on engineering, and the principles of aerospace design.

Take Home Project: The Mad Science® Astro Lander is a launch-able parachute toy that safely carries a space capsule back to Earth. Experiment with the weight of your payload and the angle of your launch. Molded dots make the capsule compatible with your LEGO® bricks at home! See if you can touch down on-target with the included landing pad!





BOATS

SUMMARY: Children create a sea-worthy vessel as they set sail with nautical engineering! They build and test a paddlewheel boat powered by potential and kinetic energy. Then they try changing specific variables to improve speed, buoyancy, and stability. Finally, they assemble, test and take home their own Mad Science® Wave Rider – an elastic band-powered boat!

EDUCATIONAL VALUE: This class teaches children about the Engineering Design Process and nautical engineering. They build, test, modify and re-test a boat model made with LEGO® bricks. They discover the importance of buoyancy and propulsion for watercraft, and learn how cargo must be carefully balanced to ensure stability. This program engages the children in hands-on engineering, and the principles of nautical design.

Take Home Project: The Mad Science® Wave Rider is a boat that is powered by potential energy. Wind up the latex-free elastic band to watch it go, and try adding weight to see how this affects its buoyancy. Molded dots make these pieces compatible with your LEGO® bricks at home! Dive into nautical engineering!



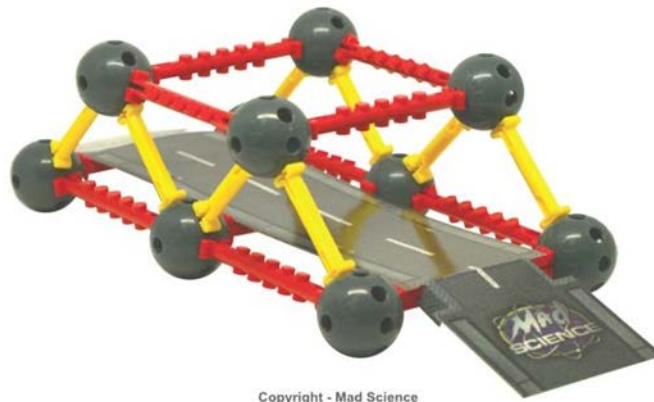


BRIDGES

SUMMARY: How can you build the strongest bridge? In this class, children work together with their fellow civil engineers to build and test different bridge designs. They learn about strong shapes and structures, and use what they learn to create the strongest bridge possible. Then they test and improve their designs for strength and stability. Finally, they construct their very own Mad Science® Truss Bridge that they can take home to continue their investigations.

EDUCATIONAL VALUE: This class teaches children about the Engineering Design Process and civil and structural engineering. They build, test, modify and re-test a variety of bridge models made with LEGO® bricks. They discover the importance of strength and stability, and experiment with triangles to learn how trusses can be used to stabilize a bridge. This program engages children in hands-on engineering, and the principles of structural design.

Take home project: The Mad Science® Truss Bridge lets you build and test a strong structure. Connect ball-and-beam components, and learn about the importance of triangles as strong shapes in structural engineering and bridge design. Molded dots make these pieces compatible with your LEGO® bricks at home! Rearrange your components to create your own connections.





CARNIVALS

SUMMARY: Children feel the thrill of a carnival as they build a spinning swing ride! They learn about the forces and mechanical engineering concepts behind some of their favorite amusement park rides. Then, they improve and test their designs to create an even wilder ride. Finally, they assemble, test and take home their very own Viking Ship Ride model!

EDUCATIONAL VALUE: This class teaches children about the Engineering Design Process and mechanical engineering. They build, test, modify and re-test a carnival ride model made with LEGO® bricks. They discover how gears, pendulums and cams are useful design tools for mechanical engineers, and they learn the importance of safe, stable design for carnival rides. This program engages the children in hands-on engineering, and principles of physics and design.

Take home project: With the Mad Science® Viking Ship Ride, you can build a model carnival ride. Experiment with pendulum motion and center of gravity. Become a mechanical engineer, and learn all about the physics of fun!





CREATURES

SUMMARY: Children discover nature's engineering secrets as they investigate biomimicry and biomechanics! We can learn a lot about efficient design by observing plants and animals. In this class, children build a walking insect machine then test different ways to help it climb up the steepest incline. Then, they each build and test their own Mad Science® Peacock Puzzle – a walking wind-up that they can take home!

EDUCATIONAL VALUE: This class teaches children about the Engineering Design Process, and biomimicry and biomechanics. They build, test, modify and re-test a six-legged, insect-like creature made with LEGO® bricks. They discover how design solutions found in nature are useful inspirations for engineers. This program engages children in hands-on engineering, and principles of biomechanics, biomimicry and design.

Take home project: Piece together the Mad Science® Peacock Puzzle to create a colorful, wind-up walker. Learn about balance and biomechanics as you compare the toy's two-footed motion with that of a real bird. Go wild with bioengineering!





MACHINES

SUMMARY: Engineering is creative! Children learn how gears, wheels and axles, and levers are useful tools for mechanical engineers. They combine simple machines with art and design to create and test a motorized drawing machine made with LEGO® bricks. Finally, they each build their own Mad Science® Sky Roller – a zipliner they can take home to continue tinkering!

EDUCATIONAL VALUE: This class teaches children about the Engineering Design Process and mechanical engineering. They build, test, modify and re-test a drawing machine made with LEGO® bricks. They discover how simple machines including gears, wheels and axles, and levers – are useful design tools for mechanical engineers. This program engages children in hands-on engineering, and principles of physics and design.

Take home project: The Mad Science® Sky Roller is a zipline-style cable car that you put together. Launch it along the line, and add or remove weight to see how it affects its speed and balance. The Sky Roller is hands-on, high-flying fun!





TOWERS

SUMMARY: Reach for the sky! Find out how structural engineers use ideas from physics to solve construction problems. Children collaborate and build a structurally sound tower with a working elevator made with LEGO® bricks. Then they test and improve their designs for strength and stability. Finally, they try to create the most stable tower possible using their very own Mad Science® Sky Beams that they can take home.

EDUCATIONAL VALUE: This class teaches children about the Engineering Design Process and structural engineering. They build, test, modify and re-test a tower model made with LEGO® bricks. They discover the importance of strength and stability for tall buildings, and experiment with a model elevator to learn how pulleys can be used to move a load more easily. This program engages children in hands-on engineering, and the principles of structural design.

Take home project: With the Mad Science® Sky Beams, you can combine platforms and columns to try to create the tallest, strongest structures possible! Test your design with a wind test, and then make improvements, just like a real structural engineer!



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VEHICLES

SUMMARY: Get in gear as an automotive engineer! Children build a motorized vehicle and learn how to optimize it. They use gears, wheels and axles to reduce friction and make work easier. Then they shift things into a higher gear to get a hands-on understanding of transmissions and gear ratios. Finally, they each build and test their own Mad Science® Hovercraft XS – a vehicle model they can take home!

EDUCATIONAL VALUE: This class teaches children about the Engineering Design Process and mechanical engineering. They build, test, modify and re-test a vehicle made with LEGO® bricks. They discover how simple machines including gears and wheels and axles – are useful design tools for mechanical engineers. This program engages children in hands-on engineering, and principles of physics and design.

Take home project: The Mad Science® Hovercraft XS is a mini hovercraft you build yourself! The battery-powered fan motion lets it overcome friction and ride on a cushion of air. Test out a vehicle that's literally above the rest!



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