



STEAM Summer Camp After School Ideas

TOPIC	ACTIVITY	DESCRIPTION	APPLICATION	QUICK LAUNCH CODE
Animals	Frog Life Cycle	What is a life cycle? Organisms go through many changes in form throughout their lives. Reproduction allows these organisms to create new life that starts the cycle all over again. This is called the cycle of life. While each organism's life cycle is unique, all life cycles have common features such as birth, growth, reproduction, and death. In this activity, students will learn about the stages of the frog life cycle.	VIVED Science	AP27
	Frog Dissection	Dissection is a valuable and effective tool that allows scientists to learn about the organ systems of living creatures. Students will dissect a virtual frog to analyze its internal structures and functions. Students will observe the levels of organization, including the organs and organ systems, that work together within this organism. This activity specifically focuses on the circulatory and digestive systems.	VIVED Science	AP27
	Owl Pellet and Food Chain	When you think of a predatory animal and its adaptations for hunting prey, what comes to mind? Claws, sharp teeth, speed? What about an owl's adaptations for hunting? An owl's adaptations include excellent vision, speed, and sharp talons to capture their prey. Students will learn about an owl's position in the food chain by analyzing and dissecting both a virtual and a real owl pellet.	VIVED Science	AP27
	Fish Structure and Function	Students will construct an argument that fish have internal and external structures that function to help them survive, grow, behave, and reproduce. They will collect notes and images to use as evidence.	Experience	E410
	How Animals Use Their Senses	Students will explore how animals receive information through their senses, process the information in their brain, and respond to the information in different ways.	Experience	E414
	Ants	Students will explore ants in two different environments - dining room and forest. In this activity, students will learn the various functionality of this app while learning the basics about how ants forage for food. They will also be challenged to collect as much food as possible within a time limit, using knowledge they gain about pheromone trails and obstacles.	Experience	E448
	Idea Sheet: Mammals	Use this idea sheet to inspire students to explore and ask questions. Each idea sheet covers a different set of models in various topic areas. This idea sheet contains: - pictures of models to investigate in the applications - essential questions to ask students of every grade level - suggested worksheets that ask students to name, draw, compare, record observations, tell stories, and more!	zSpace Studio	AP21
	Idea Sheet: Insects	Use this idea sheet to inspire students to explore and ask questions. Each idea sheet covers a different set of models in various topic areas. This idea sheet contains: - pictures of models to investigate in the applications - essential questions to ask students of every grade level - suggested worksheets that ask students to name, draw, compare, record observations, tell stories, and more!	zSpace Studio	AP21
Animals Extension		Make an animal	Tinkercad BlocksCAD3D	W20 AP45
Cycles	Butterfly Life Cycle	Did you know that butterflies only live, on average, about one month? Of course, there are some exceptions, such as the monarch butterfly, which can live up to nine months, or the smallest butterfly, called the western pygmy blue, which might only survive for one week. Despite its relatively short lifespan, the butterfly goes through a remarkable transformation during its lifetime. In this activity, students will learn about the different stages of the butterfly life cycle.	zSpace Studio	A055
	Fern Life Cycle	Did you know that ferns are older than dinosaurs? Ferns are a very old group of plants. They showed up in the fossil record about 350 million years ago. Ferns ruled the Earth until flowering plants showed up around 120 million years ago. Most ferns could not compete with flowering plants and were almost driven to extinction. Only one group survived by living in the shadows, and now all modern-day ferns are its descendants. In this activity, students will learn about the specialized plant structures that increase the fern's probability of successful reproduction.	zSpace Studio	A095
	Reduce, Reuse, and Recycle	Did you know that the average American throws away more than 4 pounds of garbage a day, or over 1600 pounds a year? That's a lot of trash! Garbage is just one type of pollution that affects the world we live in. Many of the activities that people do every day cause pollution that harms our land, air, water, and other living things. In this activity, students will become junior environmentalists and learn about different types of pollution. They will explore ways to help reduce human impact through reducing, reusing, and recycling.	zSpace Studio	A128

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Cycles	Global Water Distribution and Water Cycle	Students will gain an understanding of how water is distributed on the globe by exploring the amounts of fresh water and salt water on Earth as well as where each is found. Students will explore the phases of the water cycle as well as the driving forces behind them (gravity and the Sun).	Experience	
	Rocks and the Changing Earth	Students will explore the formation of the Earth and rocks over time and at varying scales. They will be able to communicate how different types of rocks are formed and what conditions are needed for them to be formed. Students will make a model of the rock cycle.	Experience	E449
	Trophic Levels in an Energy Pyramid	Have you ever wondered why there is such an abundance of plant life on Earth? Plants are a crucial component of our planet because they provide almost all living organisms with energy, a requirement for all life to function. Plants convert sunlight energy into a form that is usable by other organisms. An energy pyramid is a model that depicts the flow and transfer of energy from organism to organism. In this activity, students will learn about the levels of the energy pyramid and observe how organisms are grouped into these levels. Students will calculate how much energy is transferred from one trophic level to another, as well as account for the energy not transferred due to its use for life-sustaining functions.	zSpace Studio	A290
Cycles Extension		Design a sustainable system (hands-on)		
Dinosaurs & Fossils	Paleontologist for a Day	Did you know that it is believed that there were approximately 700 different species of dinosaurs? Who knew there were so many dinosaurs? Dinosaurs roamed the planet between 230 and 65 million years ago. Much of what we know about these extinct creatures comes from fossil evidence. In this activity, students will dig into the world of paleontology and analyze fossil data to provide evidence about the types of dinosaurs that lived long ago and also about the nature of their environments.	zSpace Studio	A064
	Let's be Dinosaur Detectives	Dinosaurs are amazing, extinct animals that roamed the Earth millions of years ago. Students will be dinosaur detectives who explore a variety of different dinosaurs that lived in the Mesozoic era. Students will analyze these dinosaurs to determine similarities and differences in their body structures and functions. Students will identify how variations in dinosaur characteristics provided advantages for their survival.	zSpace Studio	A052
	African Grassland: Fossil Study	Ready to go on a safari? Imagine riding in an open-top jeep across Kenya and seeing lions and zebra on Africa's iconic grasslands. Did you know that this part of Africa was not always grassland? The geography of the Earth has changed over time. In this activity students will explore the geology of the African grasslands for clues about how the Earth has changed.	zSpace Studio	A072
	Digging for Trilobites	Trilobites are extinct marine mammals that lived on Earth before the time of the dinosaurs. They lived in oceans all over the world and their fossilized remains can be found on every continent. In this activity, students will learn about trilobites and make observations about all the trilobite fossil models available in Studio.	zSpace Studio	A171
	Tyrannosaurus Rex	From fossils, we can learn many things about extinct organisms. For example, by analyzing an organism's physical attributes, we can make reasonable predictions about its diet and its adaptations to live in certain environments. In this activity, students will analyze the fossils and physical attributes of one of the largest and fiercest dinosaurs of all time, the mighty Tyrannosaurus rex.	VIVED Science	AP27
	Taung Child Skull Examination and Mystery	We can learn a lot about our ancestors by examining fossilized remains. Fossils that bridge the gap between apes and modern humans can show us the features our ancestors had, what kind of lifestyle these ancestors may have led, and what kinds of predators were after us long, long ago. Students will examine the Taung Child skull and draw conclusions about it, as well as discover the predator that killed this particular Taung Child.	zSpace Studio	A068
	Relative Age of Fossils	The Earth is made up of rock layers, or strata. Did you know that the layers of the Earth can tell us about prehistoric times and life that once existed? By observing and comparing the different rock layers, we are able to determine the relative age of each layer. Fossils found within these layers can then be dated to determine their relative ages. These fossils provide insight about the environment and the organisms that existed during the time period when the Earth layer was created. In this activity, students will examine layers of the Earth from the United Kingdom and predict the relative age of the layers and fossils found within the layers.	zSpace Studio	A585
	Collection: Dinosaur and Reptile Fossils	Have you ever wanted to be a paleontologist who discovers old dinosaur bones? Who wouldn't? Dinosaurs are a diverse group of extinct reptiles that lived millions of years ago. Reptiles and birds are the closest animals we have to modern-day dinosaurs. As such, there are many similarities in the fossils they left behind. In this activity, students will learn about the world of paleontology and explore fossils from different dinosaurs and reptiles.	zSpace Studio	A232
	Idea Sheet: Dinosaurs	Use this idea sheet to inspire students to explore and ask questions. Each idea sheet covers a different set of models in various topic areas. This idea sheet contains: - pictures of models to investigate in the applications - essential questions to ask students of every grade level - suggested worksheets that ask students to name, draw, compare, record observations, tell stories, and more!	zSpace Studio	AP21
Dinosaurs & Fossils Extension		Simulate a fossil dig (hands-on)		
Energy	Renewable vs Nonrenewable Energy: Solar Panels	Most people know that the Sun is our closest star, the center of our solar system, and a giant ball of hot gases (5,778° K to be exact!). But many people might be surprised to find out that the Earth receives only a tiny fraction of the Sun's warmth. Even so, the Sun is a very important source of clean, renewable energy for our planet. Students will take a closer look at the Sun, solar energy, and special devices designed to convert solar energy into electricity to meet our increasing energy demands. Students will then conduct in-depth research about the pros and cons of solar power.	zSpace Studio	A320
	Renewable vs Nonrenewable Energy: Water Wheels and Hydropower	How can the energy of water be harnessed to do work for people? With a water wheel, of course! People have been using water wheels for over 2,000 years to grind wheat into flour. Water has been used as a renewable energy source for a very long time. In this activity, students will examine different types of water wheels, compare how these early designs were similar to the hydroelectric dams of today, and explore the positive and negative environmental effects of hydropower.	zSpace Studio	A545
	Renewable vs Nonrenewable Energy: Wind Turbines	When you go sailing or fly a kite, what kind of energy are you using? Wind power! Since wind power does not create pollution, it is one of the cleanest forms of renewable energy. Students will learn about using the wind as a renewable energy source as they analyze the structures of a wind turbine in VIVED Science. Students will then conduct in-depth research about what causes the wind, and identify the pros and cons of wind power.	VIVED Science	AP27

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Energy Extension		Design a wind turbine	Tinkercad BlocksCAD3D	W20 AP45
Engineering	Engineering Design Process	What do cell phones, parachutes, bubble wrap, and water treatment facilities all have in common? While they may seem very different, they were all designed by engineers to solve a particular problem. In fact, engineers use their knowledge of math and science to design solutions for all different kinds of problems. These solutions may take the form of materials, structures, or even entire systems. In this activity, students will learn about engineers and their iterative design process.	zSpace Studio	A169
	Engineering Design Process: K-2	When architects and engineers design schools, they always have student safety in mind. In fact, engineers use their knowledge of math and science to design solutions for all kinds of problems. These solutions may take the form of materials, structures, or even entire systems. In this activity, students will learn how they can use the engineering design process to find solutions to real-world problems.	Newton's Park	A501
	Engineering Design Process: 3-5	What do cell phones, parachutes, bubble wrap, and water treatment facilities all have in common? While they may seem very different, they were all designed by engineers to solve a particular problem. In fact, engineers use their knowledge of math and science to design solutions for all kinds of problems. These solutions may take the form of materials, structures, or even entire systems. In this activity, students will learn how they can use the engineering design process to find solutions to a recycling problem.	Newton's Park	A500
	Design Challenge: Recycling	Engineers use their knowledge of math and science to design solutions for all kinds of problems. These solutions may take the form of materials, structures, or even entire systems. In this activity, students will learn how they can use the engineering design process to find solutions to a recycling problem. This activity expands on the Engineering Design Process: Grades 3-5 introductory activity by asking students to design multiple solutions to an engineering problem. Students will design fair tests that control variables in order to determine which design is the most efficient.	Newton's Park	A499
	Engineering Design Process: MS	What do cell phones, parachutes, bubble wrap, and water treatment facilities all have in common? While they may seem very different, they were all designed by engineers to solve a particular problem. In fact, engineers use their knowledge of math and science to design solutions for all different kinds of problems. These solutions may take the form of materials, structures, or even entire systems. In this activity, students will learn how they can use the engineering design process to find solutions to real-world problems.	Franklin's Lab	A508
	Design Challenge: Festival Lights	A string of lights can be used for many purposes, but lighting all of its bulbs economically can pose a challenge. Students will be challenged to develop a solution to an electrical problem. Using the engineering design process, students will build an engineering solution to a real-world problem utilizing their understanding of electricity. Students will identify a series and a parallel circuit, analyze their advantages and disadvantages in lighting a string of light bulbs, and calculate the cost involved.	Franklin's Lab	A505
	Engineering Design Process: HS	Engineers engage in solving complex problems that take into account issues of social and global significance. In this activity, students will learn how they can use the engineering design process to find solutions to real-world problems. Students will use quantitative methods to compare different solutions. Students will use mathematics and/or computer simulations to test solutions under different conditions, prioritize criteria, consider trade-offs, and assess social and environmental impacts.	Franklin's Lab	A507
	Design Challenge: Friday Night Lights	A string of lights can be used for many purposes, but lighting all of the bulbs efficiently can pose a challenge. Students will be challenged to develop a solution to an electrical problem. Using the engineering design process, students will build an engineering solution to a real-world problem utilizing their understanding of electricity. Students will identify a series and a parallel circuit, analyze their advantages and disadvantages in lighting a string of light bulbs, and determine the most efficient design. In this activity, students will learn how they can use the engineering design process to find solutions to real-world problems.	Franklin's Lab	A506
Engineering Extension		Build out designs from Newton's Park and Franklin's Lab (hands-on)		
Habitats	Trip to the Rainforest	Did you know that about half of all known plants and animals live in the tropical rainforest? Or that there are most likely plants and animals in the rainforest yet to be discovered? In a 4-mile radius you might see 1500 different flowering plants or 750 different trees. 70% of the plants used to treat cancer are found in the rainforest. In this activity students will swing through the trees and explore the plants and animals that live in this biome. Students will evaluate why these plants and animals survive in the rainforest. Students will select a rainforest animal and research and present information on that animal to the class.	zSpace Studio	A148
	Trip to the Tundra	Have you ever thought about what it would be like to live in one of the coldest places on Earth? How would you stay warm and protected from the freezing cold temperatures? Let's go on a trip to the Arctic, Antarctic, and Alpine tundra to explore our planet's coldest biome. In this activity, students will learn about the tundra biome and investigate the special characteristics plants and animals rely on to survive in this extremely cold environment.	zSpace Studio	A288
	Trip to the Ocean	Did you know that the Earth's oceans make up approximately 70% of the Earth's surface? Yet the ocean is still one of the greatest mysteries because only 5% has been explored. Marine biologists study saltwater organisms and the habitats they depend on to survive. In this activity, students will dive in and explore the plants and animals that live in this aquatic biome. Students will select a marine plant or animal, research it, and present the information they find.	zSpace Studio	A300
	Trip to the Desert	What would you do if your city ran out of water? If you were given only two gallons of water per day, how would you make the best use of it? Plants and animals in the desert are experts at dealing with limited resources. In fact, they are able to live successfully in the driest biome on Earth! In this activity, students will learn about deserts, the challenges of living there, and how plants and animals have adapted to survive in their extremely dry conditions.	zSpace Studio	A298
	Trip to the Temperate Forest	Want to go camping in the great outdoors? A temperate forest is the perfect place to pitch a tent between the trees and enjoy nature. In this activity, students will explore the temperate forest biome and learn about the variety of plants and animals that live there. Students will then have the opportunity to create "Forest Ranger's Guidebooks" demonstrating their knowledge of the forest trees and the animals that depend on them for food, shelter, protection, and more.	zSpace Studio	A311
	Idea Sheet: Biomes	Use this idea sheet to inspire students to explore and ask questions. Each idea sheet covers a different set of models in various topic areas. This idea sheet contains: - pictures of models to investigate in the applications - essential questions to ask students of every grade level - suggested worksheets that ask students to name, draw, compare, record observations, tell stories, and more!	zSpace Studio	AP21
	Collection: Animal Homes	A home is a place where someone or something lives. All homes, including animal homes, are unique. While the appearance of the homes might be different, they all have the same purpose. The purpose of a home is to provide shelter and protection. In this activity students will explore and compare different animal homes, identifying what makes each home unique.	zSpace Studio	A263

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Habitats Extension		Create an environment (hands-on)		
Health	Human Eye and Eye Disorders	Do you or does someone you know require corrective lenses to see clearly? Most of us rely on our eyes to provide essential information about our surroundings during nearly every waking moment, yet vision problems are common. Students will review the parts of the human eye and their functions. Optionally, students will make pinhole cameras to replicate how the brain processes and responds to sensory information from the eye. Students will research common eye disorders and create 3D presentations that explain how these disorders affect the brain's normal ability to process and respond to sensory information from the eye.	VIVED Science	AP27
	Human Ear and Ear Disorders	Listen... do you hear something? If so, you know your ear and your brain are busy sensing and interpreting the sound. The human ear is a fascinating organ because it is made up of three tiny bones that work together to transmit sound. These bones inside the ear are so small that they could fit on your thumbnail. In this activity, students will explore the parts of the human ear, the functions of these parts, and several common ear disorders that affect the sense of hearing.	VIVED Science	AP27
	Exploring Lab Skills	Explore and practice the lab skills of making a serial dilution and running a gel electrophoresis.	Experience	E443
	Testing for the Flu	Students will learn about pipetting and testing for the flu, including: how to perform a 3-serial-dilution procedure correctly, the importance of accuracy and preventing contamination during a lab procedure, how to run an RT-PCR test, how to read an RT-PCR test result, and making connections between running the RT-PCR test and detecting the flu.	Experience	E435
	Human Response to the Flu	Students will learn how a human responds to the influenza virus and how they can defend themselves against it. Specifically, they will learn the symptoms of the flu, structure and function of a virus and a human cell, stages of viral replication, impact of natural defenses, vaccines, antibiotic medication and antiviral medications on viral replication, impact of rest and fluids, antiviral medications, and antibiotic medications on the severity of flu, and the impact of handwashing and vaccines on the likelihood of contracting flu.	Experience	E436
Health Extension		Explore the Human Body	Human Anatomy Atlas by Visible Body	AP26
Human Body	Human Eye and Sense of Sight	Now you see me, now you don't! The human eye is an amazing organ. After the brain, your eyes are the next most complex organ in the human body. In fact, the muscles in your eyes are the most active muscles in the body. In this activity, students will learn about the human eye and the sense of sight. Students will dissect a virtual human eye and a real cow's eye (optional). Students will conduct several experiments about the sense of sight.	VIVED Science	AP27
	Human Ear and Sense of Hearing	You probably already know that your ears are necessary for hearing and balance. But did you know that the tiny hairs inside your inner ears are necessary for hearing? In this lesson, students will learn about the human ear and the sense of hearing. Using VIVED Science, students will learn about the parts of the human ear. Students will conduct further research about the functions of its structures. Students will also conduct several experiments about the sense of hearing (optional).	VIVED Science	AP27
	Skin and Sense of Touch	Have you ever been scratched by a cat or poked by a friend? How did you feel that sensation? We use special sense receptors in our skin. Students will learn about the human skin and its important role in the sense of touch. After conducting an experiment about the sense of touch, students will draw conclusions about which areas of the body contain the most sense receptors and why the sense of touch is so important for survival.	VIVED Science	AP27
	Brain and the Nervous System	How does the human body communicate sensory information from the extremities to the brain? It uses the central and peripheral nervous systems. Students will first learn about the central nervous system, specifically how the brain and spinal cord work together to obtain information about the environment using the senses. Students will then conduct research about the central and peripheral nervous systems using multiple resources. Finally, students will work in small groups to create life-size posters about the human nervous system and make class presentations.	VIVED Science	AP27
Human Body Extension		Explore the Human Body	Human Anatomy Atlas by Visible Body	AP26
MakerSpace	Quadcopter 1	Have you ever heard of a machine called a drone that is capable of flying without a pilot inside? Many of these drones are considered "quadcopters" because they have four ("quad-") propellers. This activity is the first of three activities challenging students to troubleshoot a broken quadcopter by using parts from a functioning quadcopter. Two quadcopters will be displayed on the breadboard. Students will use trial and error to identify the broken motor(s) and then use their knowledge of the parts of a motor to troubleshoot the motor(s) and make the quadcopters functional.	Franklin's Lab	A342
	Quadcopter 2	This activity should follow Quadcopter 1 as it builds on the problem-solving practice provided in that activity and increases the complexity of the problem-solving exercise. Students will be challenged to solve a problem with an electrical circuit that simulates a quadcopter. Two quadcopters will be displayed on the breadboard. Students need to use trial and error to identify the broken motors and switches. They will then use their knowledge of the parts of a motor and a switch to troubleshoot the broken parts so that they can fix the quadcopters.	Franklin's Lab	A343
	Quadcopter 3	In this activity, students will be challenged with solving a problem with an electrical circuit that simulates a quadcopter. They will be presented with a broken copter and then challenged to create a working copter that they will use to troubleshoot the broken copter.	Franklin's Lab	A344
	Miniature Golf Tournament	Miniature golf is not only fun, it's a great way to apply the laws of physics and the principles of mathematics. Just imagine what it would have been like to play a round of miniature golf with Sir Isaac Newton! The students will work in teams to design and build a real miniature golf course in the classroom. Once students complete the task, they will apply insights from the project to "take it to the next level" and build the same course in Newton's Park. The goal of this project-based learning activity is to give students an opportunity to build a miniature golf hole in the classroom and create the same design task in zSpace. As students observe what makes a real golf hole "easy" or "hard," it will inform their golf course designs. The zSpace experience enables students to systematically conduct repeatable tests changing different variables such as gravity, the mass of the golf ball, and the force exerted on the ball. It also makes it possible to slow down time, freeze motion, and even display the path of a ball as it rolls across the plane. Compared to simply playing a game of real miniature golf, these insights will greatly enhance student learning! The project features a high-energy "tournament" in which students demonstrate their learning.	Newton's Park	E440
	Design a Roller Coaster	Roller coasters come in all different shapes and sizes, but they all have one thing in common: they are thrilling! Whether it is the speed, loops, or dips, roller coasters keep people coming back for more! Students will use ramps, platforms, launchers, and balls to build a unique roller coaster.	Newton's Park	A472

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MakerSpace Extension		3D Printing	Tinkercad	W20
		Coding	BlocksCAD3D	AP45
		Build out designs from Newton's Park activities (hands-on)		AP23
		Fly Drones after working in Franklin's Lab (hands-on)		AP22
Math	Famous Structures: Ratios	Ratios are everywhere! We use them in recipes, to create scale models of towns, and to plan budgets for family spending. The comparisons between the heights of various buildings can also be expressed as ratios. Students will measure the heights of and develop ratio expressions for various famous structures.	zSpace Studio	A265
	Building Fences and Measuring Rugs: Perimeter and Area Challenge	If you want to buy a rug for your living room, do you choose the rug based on its area or its perimeter? How are these two concepts related? The purpose of this activity is to challenge students to show what they've learned about finding perimeter and area by solving word problems.	Euclid's Shapes	A369
	Filling Pools and Frosting Cakes: Volume and Surface Area Challenge	What's the difference between volume and surface area? How can you tell which one a problem is asking for? The purpose of this activity is to challenge students to solve word problems involving volume and surface area of rectangular prisms.	Euclid's Shapes	A374
Math Extension		Build out structures (hands-on)		
Plants	Key factors for Plant Growth	What do plants need to survive and grow? It seems like a pretty simple answer: Plants need air, water, and sunlight in order to grow. But did you know that different plants have different structures to increase their chances of survival? In this activity, students will compare a variety of plants and identify common structures necessary for survival.	VIVED Science	AP27
	Exploring Plants	This experience explores plant types, growth rate, parts, life cycle, impact of weather and much more. Several activities are available for Exploring Plants.	Experience	E426
	Plant a Wall	This PBL includes multiple activities. In this activity students will design, build, install, and maintain a living plant wall as a class project. Students will engage with zSpace to learn about the plant life cycle, plant adaptations, and key factors for plant growth and also get their hands dirty in the garden as they design and build a plant wall. Working as a class to build a plant wall provides rich opportunities for students to practice 21st-century skills (creativity, critical thinking, collaboration, and communication). The finished product strongly aligns with the Engineering, Technology and Application of Science (ETS) standards in the Next Generation Science Standards.	zSpace Studio	A066
	Plant Biomimicry	Did you know plants are the only living organisms that can make their own food? They can grow anywhere, even in the ocean! Most plants have several basic parts: roots, stems, leaves, flowers, fruit, and seeds. Plants also help inspire scientists to create inventions to help solve human problems. This is the basic idea of biomimicry, an approach to innovation that looks to nature for sustainable solutions to human problems.	zSpace Studio	A578
	Idea Sheet: Flowers	Use this idea sheet to inspire students to explore and ask questions. Each idea sheet covers a different set of models in various topic areas. This idea sheet contains: - pictures of models to investigate in the applications - essential questions to ask students of every grade level - suggested worksheets that ask students to name, draw, compare, record observations, tell stories, and more!	zSpace Studio	AP21
Plants Extension		Grow plants (hands-on)		
Robotics	Troubleshooting Basics	Have you ever seen a mechanic working on a car? The mechanic's job is to look for broken parts and then replace or fix those parts so that the car works again. Students will troubleshoot four flashlight circuits: two with regular flashlight bulbs and two with LEDs. Students will explore various potential solutions until they fix each circuit. Based on this experience, they will develop their own troubleshooting flowchart for a circuit.	Franklin's Lab	A345
	Exploring zBot	Have you ever had an electronic device that randomly stopped working? This can be very frustrating, especially when you do not know anything about electronics or how to troubleshoot the problem! Students will be guided through a detailed exploration of zBot, a Franklin's Lab robot made with simple electronic components, allowing them to identify and understand its inner workings.	Franklin's Lab	A352
	Troubleshooting zBot	Suppose a friend's favorite electronic gadget suddenly stops working. If you know how to troubleshoot the device and get it working again quickly, you can save the day! Troubleshooting is a learned skill; further understanding of circuitry and electricity can enhance the ability to troubleshoot broken electronics. Students will troubleshoot, identify problems, and repair a broken zBot.	Franklin's Lab	A354
	zBot Challenge	Building a robot from scratch can be quite a daunting challenge! But in zSpace, this task is easily achievable and stress-free! Students will design and build a zBot without worrying about damaging or wasting valuable components during the exploration process. zSpace's special robot has components that can be explored, changed, destroyed, and rebuilt without any concern over use of materials!	Franklin's Lab	A353
Robotics Extension		Build robots (hands-on)		
Space	Introduction to the Solar System	Planet Earth is our home. Although we think of it as a big, wide world, it is only one tiny part of a much larger universe. In fact, Earth is only one of the planets that revolve around the Sun in our solar system. The Sun, our closest star, is only one of many stars in the galaxy. Our Milky Way galaxy is only one of many galaxies in the universe. In this activity, students will explore the universe and Earth's place in it. Students will also take a closer look at our solar system and gather data about the planets that revolve around our Sun.	Experience	E433
	Space Living and Research	Have you ever wondered what it would be like to live in space? Would there be gravity in space? These are just two of the questions that astronauts are researching while living on the International Space Station. In this activity, students will learn whether there is gravity in space, how weightlessness affects the human body, and what other research is being conducted in space about gravity and microgravity.	zSpace Studio	A067
	Games Around the Solar System	Imagine playing baseball on the Moon. Could you hit a homerun? Students will experience what it is like to play sports on different celestial bodies. They will explore how gravity affects the movement of balls during each sport and compose an argument explaining which celestial bodies are best for different sports.	Newton's Park	A474
	Idea Sheet: Planets	Use this idea sheet to inspire students to explore and ask questions. Each idea sheet covers a different set of models in various topic areas. This idea sheet contains: - pictures of models to investigate in the applications - essential questions to ask students of every grade level - suggested worksheets that ask students to name, draw, compare, record observations, tell stories, and more!	zSpace Studio	AP21

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Space Extension		Create an environment in space (hands-on)		
Weather	What is the Weather Today?	Would you wear shorts in the winter or go ice skating in the summer? Of course not! The clothes you wear and the things you do depend on what the weather is like that day. In this activity, students will learn how sunlight, wind, precipitation, and temperature work together to create local weather conditions. Students will observe and record daily weather to identify patterns to help predict future weather conditions.	zSpace Studio	A511
	What is the Weather This Season?	How are meteorologists able to predict the daily weather? Simple: with the help of some very specific weather tools. Depending on where we live, we experience different seasonal weather conditions. In this activity, students will describe typical weather conditions expected during a particular season and learn about the tools that meteorologists use to predict weather patterns.	zSpace Studio	A519
	Clouds and Weather Patterns	Did you know that by looking at the clouds you can predict the weather? It's true! The different cloud formations can forecast what weather conditions are coming your way. At first glance, clouds may all look alike, but they definitely are not. Clouds can tell you what the weather is like now and what it will be like in the future. In this activity, students will identify different cloud formations, describe how clouds predict weather patterns, and explain how winds and clouds in the atmosphere interact with landforms to determine patterns of weather.	zSpace Studio	A081
	Sea and Land Breezes	Students will collect data to provide evidence for how the movement of air masses results in changes in weather conditions.	Experience	E421
	Weathering - Freeze and Thaw	Weathering describes how weather conditions, such as rain and temperature changes, cause man-made and natural materials to break down. Students will make observations about how water and ice impact weathering of roads and rocks.	Experience	E420
	Idea Sheet: Clouds	Use this idea sheet to inspire students to explore and ask questions. Each idea sheet covers a different set of models in various topic areas. This idea sheet contains: - pictures of models to investigate in the applications - essential questions to ask students of every grade level - suggested worksheets that ask students to name, draw, compare, record observations, tell stories, and more!	zSpace Studio	AP21
Weather Extension		Track local weather (hands-on)		