CaveSim Programs for Arkansas Elementary Schools

Prepared by Dave Jackson, CaveSim creator and lead educator. Contact Dave: dave@cavesim.com

Teacher quotes:

“This is an incredible experience. My students absolutely enjoyed the CaveSim experience and learned so much! Thank you CaveSim!”
— Lori Hines, 3rd grade teacher, Grove Lower Elementary, Grove, OK

“CaveSim was amazing. I had students come up to me the next day, give me a big hug and say ‘Thank you Ms. Jones for having the cave at our school. It was so fun.’ Students were able to understand cave formations, organisms and cave safety. The cave experts were fantastic. You were able to share important content related to earth science and life science. Each part of the presentation was aligned to our science standards. Thanks for all that you do. We would love to see you back next year.” **— Pat Jones, teacher, Houston Elementary, Austin,TX**

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Summary

Thank you for your interest in CaveSim! The centerpiece of our programs is our mobile cave, which we'll bring to your school from Colorado in a 24' trailer. The cave is filled with formations, critters, and ancient artifacts, and students get a computerized score based on how carefully they avoid the stalactites and other objects as they explore.

CaveSim is much more than crawling through a mobile cave. We address Arkansas Department of Education Standards[1] with many hands-on lessons. K-5 programs are tailored specifically to elementary standards, and cover many subjects including science, math, engineering, PE, and art.

Programs are led by CaveSim inventor, educator, and MIT-trained electrical engineer Dave Jackson. Dave and his wife Tracy are both real cavers, and have been doing CaveSim programs at schools around the country for the last 11 years. Our lessons are designed by Tracy, who has a Masters of Art in Teaching, and are brought to you by Dave and our highly skilled CaveSim staff.

In addition to learning a wide range of classroom subjects, students also learn that they can do what Dave and Tracy have done: take what they've learned in school and use it to follow their passions to make the world just a little bit better.

We look forward to bringing CaveSim to your school to engage your students in a whole new way, and we're excited about working with you.

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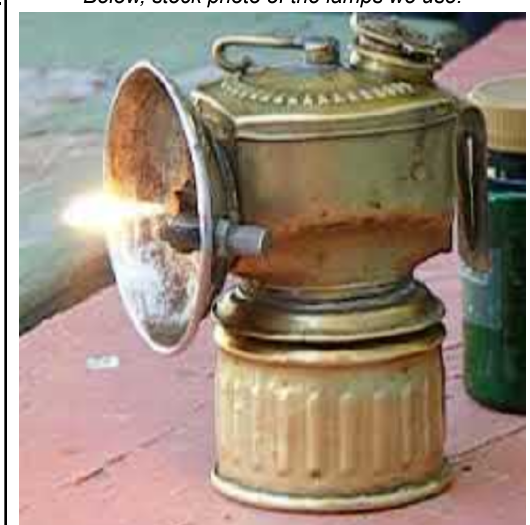
[1] http://www.arkansased.gov/divisions/learning-services/curriculum-and-instruction/curriculum-framework-documents

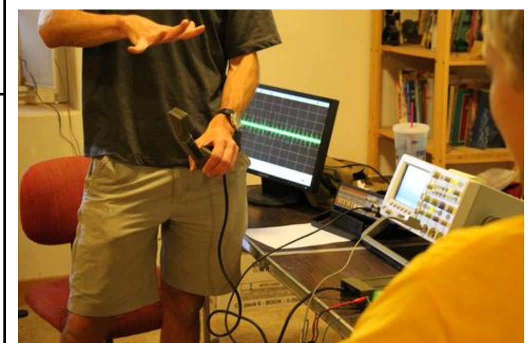
Program Components, with Arkansas Department of Education Standards alignment

All the components below are included in the cost of the program. Your schedule will determine how much we can cover. Programs are typically conducted by having students work with us at a series of different stations/lessons, as follows:

CaveSim program element: Horizontal Cave Exploration	Pertinent Arkansas Standards	Photos of past CaveSim programs
In the CaveSim mobile cave (contains 60' of passage with multiple levels in a 24' trailer), students explore in small groups (while wearing helmets) and:		
● Try to avoid bumping into artificial cave formations. Students learn that oil and water do not mix, and that touching formations can cover them with skin oil, which stops the formations from growing.	Physical Education PEL.1.K.2 Move forward, side-to-side, high/medium/low, stop/go, under, over, behind, beside, and through.	
● Look for cave biota (critters, all artificial), and discuss the cave ecosystem after they exit the cave. CaveSim staff teaches about the cave food web, including the amazing lampshade spider, which eats fungus gnats, which eat fungus, which eat deceased bats, etc. ● Learn about how cave passage forms. CaveSim staff talk about special bacteria that use enzymes to eat limestone (breaking chemical bonds to get energy).	Science 2-LS4-1 Make observations of plants and animals to compare the diversity of life in different habitats. Science K-LS1-1 Use observations to describe patterns of what plants and animals (including humans) need to survive. Science K-ESS2-2 Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.	
● Discussion of how humans use cave-based resources (e.g., limestone for concrete, guano for gunpowder during the Civil War)	Science 4-ESS3-1 Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.	
● CaveSim staff explain aqueous cave formations (helictites, soda straws, gypsum). Topics covered: water flow is usually downhill due to gravity; sometimes water flows against gravity due to capillary action (examples: water climbing up a towel, water flow inside cave formations). Students expand vocabulary with "capillary action."		*Thrilled to be exploring CaveSim in Glenwood Springs, CO, 2018. Photo by Chelsea Self, Post Independent.*
● Look for modern, man-made equipment in the cave, including rescue cache and vertical caving rope ladder (etrier). Students learn that the etrier (rope ladder) is named after the French word for stirrup. Students expand vocabulary with the word "cache."	Foreign Language Experiences CNN.2.K.3 Recognize words from other languages when encountered	
● Look for artifacts and rock art. Discuss the importance of artifacts to native people and scientists. Learn about a CaveSim staff member's experience with artifacts in caves in Mexico. Students discuss why we don't take artifacts.	Visual Art R.7.3.2 Identify the message communicated by a visual image. Visual Art R.8.3.1 Interpret art by considering a variety of components Visual Art CN.10.K.1 Explore ways a story can be told	
● Art program: prior to entering the cave, students make cave paintings on butcher paper. Students reflect on their art and write a few sentences about what story their art tells. While exploring the mobile cave, students make sketches of the cave paintings they find. After they exit the cave, students write a story about what they saw in the cave paintings. Students are invited to share the stories that they wrote.	Visual Art CR.1.K.2 Engage in creative artmaking through imagination and/or guided observation	*Elementary students in Cascade, CO explore the mobile cave.*
Space required: the 24' trailer is typically kept outside. See www.cavesim.com/site-logistics for more details. In inclement weather, we may close the trailer and do indoor activities.		

CaveSim program element: Vertical Caving	Pertinent Arkansas Standards	Photos of past CaveSim programs
On CaveSim portable 12’ A-frame w/ crash pads:		 *Above, a student in Colorado uses mechanical advantage to lift herself up the A-frame.* *Below, students in Montana work together under direct supervision from staff to lift a fellow student .* 
• While wearing helmets, students use a Bosun’s chair, ropes, and pulleys to learn about mechanical advantage afforded by 1:1 and 5:1 pulley systems, and learn that work is unchanged when a mechanical advantage is introduced. Students work together to lift a fellow student up the tower using the different systems. Students use their understanding of fractions to determine that the 5:1 pulley system reduces the required lifting force by a factor of 5. Forces, including the gravitational force, are discussed.	Science 3-PS2-1 Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object. Science 3-PS2-2 Make observations and/or measurements of an object’s motion to provide evidence that a pattern can be used to predict future motion. Science 3-ETS1-3 Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved. Science 1-ETS1-3 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs. Science K-PS2-1 Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object. Science K-PS2-2 Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull. Science K-ETS1-3 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.	
• CaveSim staff use harnesses and mechanical ascenders to ascend the A-frame. Staff discuss the ascender mechanics, equipment safety, and the important differences between caving and rock climbing equipment. Students learn the words “ascend,” “descend,” “vertical”, and “horizontal.” Students learn about current events in vertical caving, including ongoing efforts to find the world’s deepest cave. Students learn that some of the cavers who help with CaveSim have been over 6000’ underground.	Science 3-ETS1-1 Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. Science 2-ETS1-3 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.	
• Using climbing rope, CaveSim staff work with students to demonstrate the concept of wave propagation.	Science 4-PS4-1 Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.	
• With the help of students, CaveSim staff demonstrate the power of friction to rapidly destroy Nylon rope. Before the demonstration, students are encouraged to develop hypotheses about what will happen when two ropes are rubbed together, and then develop hypotheses about which rope will break first. After the two ropes are rubbed together rapidly and the larger rope breaks, students are encouraged to try to figure out why the larger rope broke. CaveSim staff explain the outcome by introducing the concept of “concentrated” (because of the way the experiment is done, the heat is *concentrated* in just one spot on the larger rope, and spread out on the smaller rope, hence the melting of the larger rope).	Science 4-PS3-1 Use evidence to construct an explanation relating the speed of an object to the energy of that object.	
• With the help of students, CaveSim staff demonstrate the power of friction to allow a person to ascend a rope using the Prusik knot. Depending on available time, students learn to tie the Prusik, the Alpine Butterfly, the Lark’s Head, and/or other knots.	Science 2-ETS1-1 Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.	
Space required: typically outdoors on flat ground. May also be placed indoors where ceiling height is >12’6”. Footprint is 7’ x 11’.		

CaveSim program element: Carbide Demonstrations	Pertinent Arkansas Standards	Photos of past CaveSim programs
To illustrate chemistry and physics concepts, CaveSim staff bring working carbide lamps and carbide to programs. Demonstrations include:		
• CaveSim staff light a working carbide lamp by placing carbide and water in the lamp to produce a small (and safe) quantity of flammable gas. The resultant gas (acetylene) burns to produce light and heat, but the lamp body also becomes warm because of the exothermic reaction between the carbide and water. Students can touch the lamp body to get a better understanding of the concept of an exothermic reaction. Older students gain an understanding of the concept of reflectors by observing the behavior of the reflector on the lamps. New vocabulary explained by CaveSim staff: "exothermic," with connection drawn to "exoskeleton."	Science 4-PS4-2 Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen. Science 4-PS3-2 Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.	
• CaveSim staff place carbide and ice in an open pan. As the ice melts, the water reacts with the carbide, producing the aforementioned acetylene gas. CaveSim staff discuss states of matter (solid ice turns to liquid water as it's heated by the carbide, and then to vapor as it boils). For older students, the concept of limiting reactants is introduced. By watching the exciting reaction occur, students gain a more intuitive understanding of the concept of a chemical reaction. New vocabulary taught by CaveSim staff: "reaction", "reactant."	Science 2-PS1-4 Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.	
• CaveSim staff demonstrate conservation of mass (matter) using carbide, water, Buchner funnel, and an electronic balance. The carbide/water reaction is allowed to occur, but the resultant acetylene gas is not allowed to escape. The mass reported by the balance remains unchanged until the gas is released through a nozzle and burned.	Science 3-ETS1-2 Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.	*Above, carbide lamp demonstration by CaveSim staff at a program in Colorado.* *Below, stock photo of the lamps we use.*
• Science experiment safety is emphasized (e.g., firmly close containers when not in use). • Fire safety is emphasized, with an emphasis on who is allowed to make a fire (a responsible adult), what must be present (a method of extinguishing the fire), where the fire should be made (in a safe container away from other fuel sources).		
Space required: typically conducted outdoors, but cannot be done in the rain. May be done indoors in an appropriate lab setting where a small quantity of smoke may be safely produced without setting off alarms or creating hazardous conditions. The smoke produced in this activity is equivalent to the smoke produced by extinguishing about a dozen birthday candles.		

CaveSim program element: Cave Rescue Phones	Pertinent Arkansas Standards	Photos of past CaveSim programs
Hands-on lessons about basic circuits using a pair of wired cave rescue phones. Activities include:		 *Two friends enjoy talking on the cave rescue phones during a 2013 CaveSim program in Colorado.*
• We bring two cave rescue phones to our programs. The phones are connected by wire, which allows us to discuss basic circuits, and demonstrate that a circuit requires at least one complete loop to function. Students can disconnect and reconnect wires for hands-on learning about conductors and insulators. Students talk with each other over the phones. CaveSim staff discuss the relationship between wire length, electrical resistance, electrical energy dissipation in the wire, and phone volume. Electrical circuits involving the earth as one of the conductors are discussed.	Science 4-PS3-2 Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents. Science 4-PS3-4 Apply scientific ideas to design, test, and refine a device that converts energy from one form to another. Science 1-PS4-4 Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.	
• Available upon request: Demonstrations with an oscilloscope (see https://whatis.techtarget.com/definition/oscilloscope) by CaveSim owner Dave Jackson, who has designed high speed computer chips for oscilloscopes. The oscilloscope produces a graphical representation of voltage on the cave rescue phone wire vs. time, which allows students to visualize their vocal energy on a screen. We discuss graph axes, and the relationship between time-based and frequency based graphs. Resonances/oscillation of electrical and sound signals are also discussed. This activity is typically done for middle/high school, but can be adapted to older elementary students.	Science 4-PS4-3 Generate and compare multiple solutions that use patterns to transfer information.	
Space required: typically outdoors for convenience, but can also be done in any classroom or indoor setting. Oscilloscope demo must be done indoors if it is raining. The oscilloscope has a VGA output, which can be projected to a smartboard, projector, or computer monitor for better viewing by students.		 *A CaveSim staff person teaches students about electricity and magnetism using cave rescue telephones and electronic test equipment (oscilloscopes).*

CaveSim program element: Bat games and lessons	Pertinent Arkansas Standards	Photos of past CaveSim programs
<u>Bat skeleton and guano</u> demonstrations and lessons: ● Discussion of similarities and differences between bat wing structure and human hands. Discussion of evolutionary pressures that may have created the similarities and differences. ● Discussion of bat tail structure and usage of the tail in steering, balance, and in catching insects. ● Discussion of different types/sizes of bats, and the role that they play in helping humans. Real-life lesson about bat eradication by farmers and the impact on their crops. ● Photographic and/or video demonstration of the ongoing White Nose Syndrome (WNS) epidemic that has killed nearly 6 million bats in the last ~10 years. For older grades, lessons about the WNS fungus (Pseudogymnoascus destrucans) and how it eats (metabolizes) bats alive. ● Discussions about history and the role that caves played in the civil war (as sources of saltpeter for the production of gunpowder). <u>Space required</u>: typically done by the trailer to engage students as they wait to explore. Can also be done anywhere inside.	<u>Science 4-LS1-1</u> Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. <u>Science 3-LS4-4</u> Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change. <u>Science 3-LS1-1</u> Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death. <u>Science 3-LS3-1</u> Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms. <u>Science 3-LS3-2</u> Use evidence to support the explanation that traits can be influenced by the environment. <u>Science 2-LS2-2</u> Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.	 *CaveSim program lead Dave Jackson teaches kids about bat biology in Glenwood Springs, CO. Photo by Chelsea Self, Post Independent.*
<u>Bat echolocation game</u>: Two at a time, students take turns roleplay a bat and a moth. The bat (blindfolded) tries to locate and tag the moth using only the "bats" voice and their hearing. The other students form a circle to contain the two students playing the bat and moth. Students learn about echolocation, and gain personal confidence. <u>Space required</u>: may be played indoors or outdoors. If outdoors, a safe surface must be used (to allow a blindfolded student to move in a small circle of other students without tripping on uneven ground.	<u>Science 4-LS1-2</u> Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways. <u>Physical Education PEL.3.4.3</u> Maintain a moderate to vigorous intensity level in a variety of activity settings (e.g., jump rope, tag, dancing) <u>Physical Education PEL.1.2.1</u> Perform movement patterns using various body parts (e.g., games, free movement) <u>Physical Education PEL.1.1.2</u> Move in various directions and through various pathways in regard to other students and objects (e.g., chase/flee, obstacles/obstacle courses) <u>Science K-ESS3-1</u> Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.	 *A student roleplaying the bat in the echolocation game during a 2012 program.*
<u>Bat Migration Challenge game</u>: Working individually or in groups (depending on grade level), students act out the lives of bats as they encounter daily challenges and opportunities. Students learn about the ways in which humans can act to help or harm bats. <u>Space required</u>: may be played indoors or outdoors.	<u>Science 3-LS4-3</u> Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.	

CaveSim program element: Geology	Pertinent Arkansas Standards	Photos of past CaveSim programs
Depending on the time available in your schedule, CaveSim staff can either do group demonstrations, or students can participate in our geology lab. Demos and labs are described below: ● Demonstration of how caves form. CaveSim staff apply weak acid to limestone, which causes the limestone to effervesce (fizz). Lesson about groundwater, why it's acidic, and how it makes caves.	Science 2-PS1-1 Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties. Science 2-ESS2-3 Obtain information to identify where water is found on Earth and that it can be solid or liquid.	 *CaveSim program lead Dave Jackson teaches kids about limestone solubility in weak acid during a demo in Austin, TX. Photo by Austin Parks & Rec staff.*
● Discussion on the formation of sinkholes, and the benefits / dangers that they afford humans.	Science 4-ESS3-2 Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans. Science 2-ESS1-1 Use information from several sources to provide evidence that Earth events can occur quickly or slowly. Science 2-ESS2-1 Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.	
● Six-station geology lab. Students rotate through six stations and conduct a different rock/mineral identification experiment at each station. Identification methods include tests of hardness, magnetism, and density. Also includes a fossil station.	Science 4-ESS1-1 Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time. Science 3-LS4-1 Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago. Science 2-PS1-2 Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.	
● Discussion of the uses that humans have for various rocks and minerals, including limestone (for concrete) and gypsum (a common cave mineral also found in drywall)		
Space required: may be taught indoors or outdoors.		

CaveSim program element: Squeezebox and Math	Pertinent Arkansas Standards	Photos of past CaveSim programs
We bring an adjustable-height wooden box through which students can crawl to safely test their ability to navigate tight spaces. Students use a tape measure to quantify how tight a space they can move through.	<u>AR.Math.Content.5.NF.B.6</u> Solve real world problems involving multiplication of fractions and mixed numbers <u>AR.Math.Content.4.NF.B.3</u> Understand a fraction a/b with a > 1 as a sum of fractions 1/b (e.g., 3/8=1/8+1/8+1/8) <u>AR.Math.Content.4.MD.A.1</u> Know relative sizes of measurement units within one system of units <u>AR.Math.Content.3.MD.B.4</u> Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch <u>AR.Math.Content.2.MD.A.1</u> Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes <u>Science K-ETS1-1</u> Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool. <u>AR.Math.Content.K.MD.A.1</u> Describe several measurable attributes of a single object, including but not limited to length, weight, height, and temperature	 *Students at a 2018 Austin, TX program use a tape measure to quantify their squeezebox skills.*  *A student in Colorado has fun making it through the squeezebox. Children with a wide range of ability levels can participate in our programs. The squeezebox lid easily lifts if a child is feeling uncomfortable.*
<u>Space required</u>: typically set up near the stretcher (see above). Any indoor or outdoor setting is fine.		

CaveSim program element: Rescue Stretcher	Pertinent Arkansas Standards	Photos of past CaveSim programs
We bring a cave rescue stretcher (Sked) to our programs. Students take turns getting into the stretcher. With the direct supervision of CaveSim staff, the student in the stretcher is carried through and around obstacles by fellow students. Students learn teamwork, communication, and leadership.	Physical Education PEL.1.3.1 Demonstrate directional movements (e.g., clockwise, counterclockwise, and spiral) Physical Education PEL.1.3.2 Practice locomotor movements in a variety of games Physical Education PEL.1.1.2 Move in various directions and through various pathways in regard to other students and objects (e.g., chase/flee, obstacles/obstacle courses)	 *With direct supervision from CaveSim staff, a team of kids gets ready to lift and carry a friend in the stretcher.*

The value of education: As an inventor and educator, Dave encourages students to study hard, find their passion, and understand that education is very important in life. During each program, Dave uses his personal story (including getting multiple degrees from MIT) to illustrate how education leads to great success and adventure. Pertinent standards: Science 4-ETS1-1 Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost; 4-ETS1-2 Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

Dave giving a keynote presentation in Lake George, CO.

Labs

Standard programs (above) can be enhanced by adding our labs. Labs provide an in-depth educational experience in a specific subject, like biology or engineering. We never use kits because our goal is to teach students that engineering and science projects are accessible to them without the use of pre-prepared materials. We emphasize conservation by using post-consumer recyclable materials in our engineering labs. Labs require extra funding for materials and staff time. Contact us for pricing.

Engineering Lab: Students create circuits using LEDs, switches, batteries, and other components to create an LED light system. They get hands-on experience with soldering (with supervision from CaveSim staff), and then design and make their own caving flashlight enclosure from recyclable materials. After creating their lights, students test their work in water to see if their lights are waterproof. Students have the chance to revise their designs if needed.

Subjects covered: Electromagnetics, product design, material science, and mechanical engineering.

Recommended time: 55 to 90 minutes. Recommended class size: Up to 25 students. Recommended grade levels: 5th grade and up



Above, students work on the Engineering Lab

Biota Lab: Students culture cave biota in Petri dishes, and learn that single-celled organisms can demonstrate intelligence. Students choose from multiple experiments, and discuss the factors that impact the outcome of their experiments.

Subjects covered: Experiment design, scientific method, and biology concepts.

Recommended lab time: 30 to 45 minutes, with a follow-up on a second day (with or without CaveSim staff present).

Recommended class size: Up to 30 students. Recommended grade levels: 4th grade and up.

High school students at a two-day program in Oklahoma get ready to inoculate their Petri dishes.

Karst Lab: Students get to make their own karst topography (cave landforms) using safe household materials. Students learn hydrology, geology, basic chemistry, landforms, states of matter.

Recommended lab time: 30-40 minutes.
Recommended class size: Up to 30 students.
Recommended grade levels: Spring-semester 3rd grade and up

Formation Lab: Students make their own cave formations (think stalactites) using safe household materials. Students learn hydrology, geology, basic chemistry, states of matter.

Recommended lab time: 30-40 minutes.
Recommended class size: Up to 30 students.
Recommended grade levels: 2nd grade and up

Above, 5th graders in Colorado work on the Karst Lab

Waves and Energy Lab: After watching a demo with real cave rescue phones, students make their own version using cups and string. Students conduct several experiments with their phones and record their observations. Students learn about waves, energy, and graphing.

Recommended lab time: 30-40 minutes.
Recommended class size: Up to 30 students.
Recommended grade levels: 2nd grade and up

Pricing and FAQ

How much do programs cost? This depends on factors like travel distance, number of days, and number of students. Our average price is $1658/day plus transportation costs. Please contact us for a quote.

Are deposits or contracts required? No. We will reserve your program date(s) once we agree on a price and you send us an email stating that you want us to visit your school at the agreed-upon price.

How are payments made? By check, made out to CaveSim LLC, as specified on the invoice that we'll email you. W9 available upon request.

Does CaveSim carry insurance? Yes. Once you commit to working with us, please let us know if you need a Certificate of Additionally Insured.

Are permission slips required? Yes. Paperless and printable versions in both English and Spanish are available: www.cavesim.com/waiver.

How much space is needed? Is power required? See www.cavesim.com/pages/site-logistics

Is this an outdoor activity? Typically yes. The cave stays inside the trailer (we don't move it into your school). Some activities can be moved inside in inclement weather (the tower can be moved indoors if you have 13+ foot ceilings in some part of your school). In light to moderate rain/snow, we put up tents to protect students and the cave.

Is the cave heated and air conditioned? Yes. Please provide access to 1 working 20A outlet in summer, and 2 outlets (15A and 20A) in winter.

How much setup and takedown time are needed? Typically 1.5 hours for setup, and 1 hour for takedown.

How many students can participate in a day? For elementary, 150-200. For MS/HS, 100-150. Educational value and number of students are inversely related. We're excited about working with you to size your groups for the best possible educational experience.

Does CaveSim do multi-day programs? Yes. We have done as many as six days in one school district.

Contact us: Email jacksondmit@cavesim.com or call 914-330-7824.

Safety and special needs

Teachers/staff can explore the cave, and students with special needs (physical or otherwise) may be assisted by school staff, students, and/or CaveSim staff. While each student is different, numerous wheelchair-bound students have explored CaveSim. Some students may have more difficulty avoiding cave formations, and our only requirement is that each student understand their goal of not touching the formations (for the safety of the system and students). Students who are unable to understand the careful-caving goal may participate in our other activities. CaveSim has night-vision cameras which allow us to check on students as they explore. We also have five access points to allow us to let participants out of the trailer if needed.

We follow the BSA's Youth Protection policy, which includes no 1:1 student/adult interaction.

Challenge by choice

Most students love exploring CaveSim. Occasionally we have a student who is unsure, uncomfortable, or afraid. We encourage him/her to set a goal for themselves and see if they can attain that goal. We teach challenge by choice, and have plenty of activities for students to try.

Classroom management

We've been doing our programs since 2010, and our staff includes former classroom teachers, so we have a good handle on classroom management. Because we spent over two years creating CaveSim, we set expectations at the start of the program: we expect students to respect the equipment and everyone involved in the program. We rarely experience discipline problems, but when we do we ask students to either change their behavior or take a break from the activity until they are ready to participate properly. Our goal is to work as a team with you, so please feel free to communicate with us about any issues that you foresee.