BURNS McDONNELL

BATTLE OF THE BRAINS

a K-12 STEM Educational Competition

IMAGINE
EXPLORE
CREATE

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BATTLE OF THE BRAINS

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HELPING KIDS CREATE SOMETHING AMAZING WITH STEM.

The drive to strengthen communities is the heartbeat of Burns & McDonnell, in our work and with the **Burns & McDonnell Foundation**. Over the past few years, we've invested **more than $5 million in grant programs** that support STEM education, from an innovative educational competition to K-12 outreach efforts.

So why do we care so much about this cause? Every day, our employee-owners rely on STEM skills, passion and **lifelong curiosity** to change the world. The opportunity to light the same spark and build the same foundation in kids? Well, that's pretty amazing. STEM education is **a pipeline to a better world** — for students and for us all.

Kids who love STEM start out with greater economic potential.

- Jobs requiring STEM skills are **growing at 1.7 times** the rate of non-STEM jobs.
- Those with STEM jobs earn **26% higher wages** than those in other jobs.
- The top 10 majors with the **highest median earnings**? All STEM fields.

When kids love STEM, it means a brighter future for the United States.

- While just 5% of U.S. workers hold jobs in STEM-related fields, they are responsible for more than **50% of our sustained economic growth**.
- A strong foundation in STEM breeds **innovation, ideas and progress**. In a time of intense global competition, the U.S. has the potential to lead once more.

Despite all these opportunities in STEM, a gap remains.

- By 2018, more than **1.2 million STEM jobs** in the U.S. will remain unfilled because there won't be qualified candidates to fill them.
- Only **16%** of high school seniors are considering a STEM career.
- **Nearly 75%** of those who hold a STEM bachelor's degree do not work in STEM occupations.

We believe **amazing is in our reach**, that the U.S. should be a place where kids develop the next great app — not just use it. We believe this is where STEM professionals will discover a revolutionary water filtration system or design a building with zero environmental impact. With a strong foundation and ongoing support, it will happen. Together, we can **spark an interest for students** that can shape their path and resonate throughout their lives.

A PLACE WHERE BIG IDEAS COME TO LIFE.

A science center thrives because of **inviting exhibits**, but also because it's valued as a **community amenity** and **tourist attraction**. A beneficial cycle begins with repeat attendance and volunteer support, providing financial support that pours back into the center.

The people feed the rejuvenation. At Science City, the Burns & McDonnell Foundation is giving that beneficial process a **kick-start** — and encouraging kids to love STEM at the same time.

Our partnership with Science City centers on the **Burns & McDonnell Battle of the Brains**, one of the country's most robust STEM competitions. With this innovative effort, schools throughout the greater Kansas City metropolitan area can earn a piece of a $150,000-plus grant by designing the next great exhibit for Science City.

How It Helps

The benefit is twofold — **promoting STEM education** and **adding new innovative exhibits**. Our efforts reflect our deeply held beliefs:

- Students of all ages and abilities will benefit from exposure to STEM topics.
- A project-based, experiential learning opportunity can encourage a passion for STEM.
- Teachers supporting extra opportunities to engage kids in STEM merit a high level of support.
- Kansas City deserves an innovative, state-of-the-art science center for our children.
- Science City can fulfill its promise as a world-class science center.

We're moving the needle. Since we began in 2011, nearly **5,000 students** have benefited from a one-of-a-kind educational experience. Each year, we hear countless students say this effort is **changing the course of their future**. We've opened three exceptional student-inspired exhibits at Science City, boosting attendance and encouraging thousands of visitors each year to explore STEM topics.

How It Works

The initiative begins with the Battle of the Brains **citywide competition**, motivating and **educating K-12 students** about STEM topics, while promoting the resurgence of Science City. A public vote spreads the enthusiasm throughout the metro area.

The Burns & McDonnell Foundation funds a **$1 million-plus grant program** to develop innovative permanent exhibits at Science City and provides grants for STEM programming to the top 20 schools.

We know it's a special opportunity to **inspire a student to pursue a STEM career**. Do you remember when you discovered the passion for the work you do today? Perhaps it was an exceptional teacher, an inspiring book or a relative in the same industry. We hope, someday, that many students in the Kansas City area can point to the **Burns & McDonnell Battle of the Brains as their spark**.

EVERY LAST DROP

Water feels ordinary to us because it's so familiar, but it's a truly extraordinary molecule. **EVERY LAST DROP** explores water and our relationship to it.

In **What Is Water?**, dive into the fascinating scientific properties of H_2O.

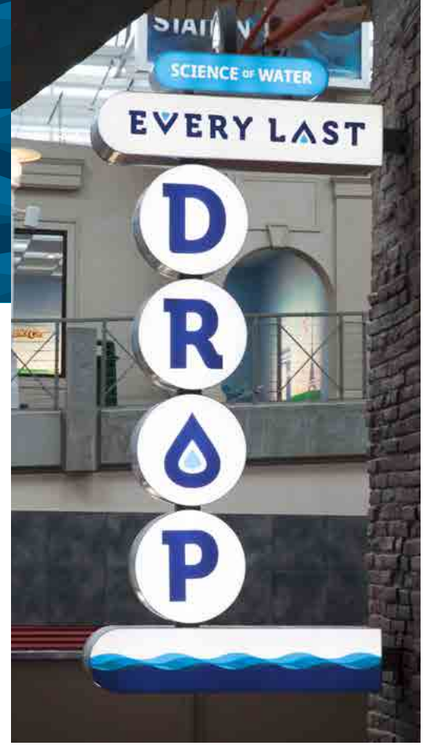
- Splash and learn at two activity-packed **Water Tables**. Use tabs to direct the flow of water, turn a water wheel, overflow a tipping cylinder, toss balls into a water vortex and more!
- Make water move uphill with an **Archimedes Screw**. One of the oldest architectural tools, it helps H_2O defy gravity.
- Look up! The lights above the exhibit have a story to tell. They're **Suspended Water Molecules**, and they reflect the physical states of the three phases of water.
- In this exhibit, you'll even learn from what you sit on. The **Water Is Life Benches** share simple but surprising facts about the world of water.
- Ice, liquid or vapor — water is a beautiful, captivating wonder. Investigate the **Phases of Water** through three interactive touchscreens.

In **Tapped Out**, learn more about how we use water and why we should conserve it.

- Learn more about **Rain Barrels** and how they help conserve water. (Though this is probably the only one filled by a **Floating Faucet**.)
- The **Tapped Out Room** is a visual masterpiece with stunning images and interesting stories.
  - From individual efforts like the Life Straw to massive projects like the Colorado River revitalization, learn more about innovative **H_2O Engineered** solutions.
  - While 70% of the Earth's surface is water, less than 1% is available for human consumption. Explore **How We Use Water**, from drinking to "hidden water" in food and manufacturing.
  - Most of us have never been really thirsty, but it's different in other parts of **Our Tapped Out World**. Learn more about water scarcity and the organizations working to help.

Explore the interaction between **Water & Life**, from watersheds to water treatment.

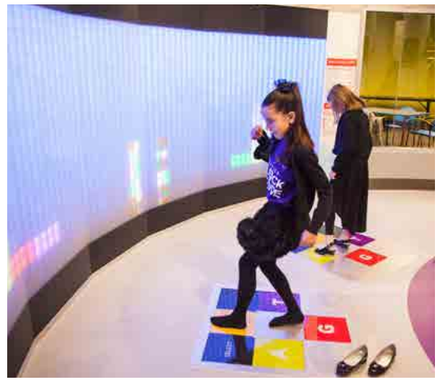
- At **Cleaning Our Water**, pump water, press levers and turn basins at the interactive water treatment wall. Follow the process to understand where you get your water — and where it goes after you use it.
- A river runs through the exhibit and some of it comes to life. Step on the **Projected River** to make waves and chase fish.
- Learn more about the world's **River Cities**, get tips on how to **Clean Up Our Rivers** and read how **Kansas City's Great Flood of 1903** affected Union Station.
- Have you ever walked through a cloud? At the **Cloud Fall**, you'll learn that water is in the air all around you — and experience it for yourself.
- In **Exploring an Aquifer**, go deep in the earth where groundwater is found. Illuminate how water levels have changed over the years and see how much an aquifer refills when it rains.
- When **Stormwater** streams into our storm sewers after a heavy rain, where does it end up? Learn more about Kansas City's approach to keeping our waters clean.
- Sculpt your own landscape on the **Interactive Sand Table**, make it rain and watch water flow through mountains and valleys. It's all under your control in this augmented reality exhibit.

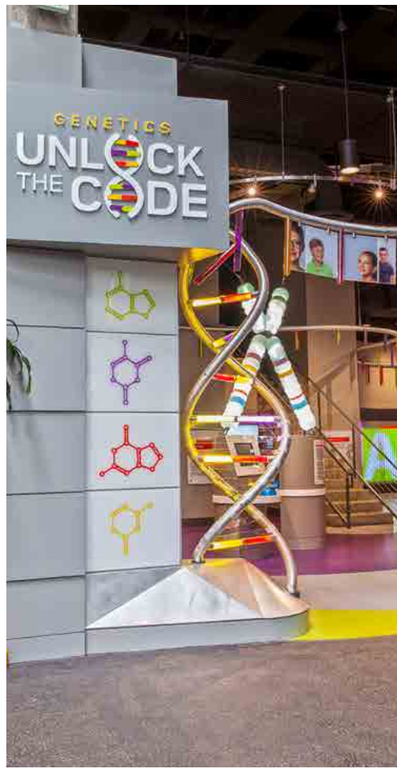


GENETICS UNLOCK THE CODE

You are 99.9% identical to the person standing next to you. **GENETICS: UNLOCK THE CODE** helps visitors discover the science and wonder behind that fraction of a percent.

- At the **DNA Dance-Off!**, hop on an interactive floor to make keratin DNA. See the code — and your results — on a massive LED wall. Compete with others or challenge yourself in the world's first genetic dance-off.
- Copy yourself in the **Duplication Station** — a photo booth with a twist. How will you interact with your group of clones?
- What would you look like with black curly hair and dimples? **Try-a-Trait** is an augmented reality experience that lets you explore what you'd look like with different inherited traits.
- Test your knowledge in the **Genetics Quiz**, using body motion to select answers.
- In **Genes and You**, an interactive book tells the amazing story of you. Flip the pages and watch the story unfold on the screen in front of you.
- Stick out your tongue, smile and check your earlobes and hairline at the **Trait Tree**. Follow the directions to discover how many share your traits.
- **DNA's Double Helix** — the most recognizable symbol in genetics— has a starring role, at the entrance and unwinding throughout the exhibit.
- Walk under the giant, lighted **Chromosome 17**. Each chromosome contains thousands of our genes; learn about some of them here.
- Explore the visual world of genetics at the **Spin Browser**. Spin the dial to speed up or slow down videos of DNA, mitosis, twins and more.
- From regenerating worms to birds that can't sing, learn crazy but true facts about animal genetics in **Genetics in the Wild**.
- We share 99.9% of our genetic code with other humans. But we also share 85% with cows. At **Genes in Common**, guess how much we are like other species.
- A baby gets half its chromosomes from its mother and half from its father. So is it a boy or a girl? Make a prediction and press a pop-o-matic dome to explore a **Matter of Chance**.
- Will you **Find Your Future** in genetics? Investigate jobs by watching videos of young professionals to guess their career.
- Explore a geneticist's **Picture of Us** — the karyotype — and take a closer look at six genetic conditions.
- How can a genetic condition make **One Big Impact** on muscle strength? Lift two backpacks to see the difference. In **Muscle Bound**, twist a cylinder to show the science behind the change.
- Read the stories on the **Just Like You** column to better understand a day in the life of local young people with Down syndrome, sickle cell disease, hemophilia and cystic fibrosis.
- Genetics is a small, small world. Peer into digital **Microscopes** to explore chromosomes, blood cells, muscle fibers and more.
- Your body has more than 37 trillion cells, and each one has everything needed to copy itself. Learn all about **What's Inside Our Cells**.





THE SCIENCE OF ENERGY

FEATURING UNPLUGGED THE EXPERIENCE

The **SCIENCE OF ENERGY** explores energy and our relationship with it. Through interactive discovery, you'll earn a better understanding of where energy comes from, with an emphasis on renewable sources. Build on the basics to understand humankind's impact on energy resources and explore a global perspective into the world's relationship with energy, now and in the future.

- Hop on the **Power Wheel** to harness your own human energy and generate electricity. Step onto the giant wheel and get walking to light up an Unplugged sign while a digital display tracks speed, distance, calories burned and watts of energy generated.

- Demonstrate how the body is an energy-generating machine with the **Bicycle Generators**. Jump on a stationary bicycle and pedal away, transferring the energy from food into motion. That motion, in turn, generates electricity that powers up small electronics relevant to your life.

- The **Electric Hand Crank Generator** explores the machines that turn energy into electricity. Turn the crank to power up lights and a fan, getting an inside look at a generator that uses conductive wires spinning through a magnetic field.

- At the **Wind and Solar Impact Table**, learn more about wind and solar power and its role in our energy mix. By turning up the wind to activate turbines, adjusting sunlight levels and changing the angle on solar panels, you can influence the energy generation of a model city.

- The **Turbine Display** tells more about wind as an energy source, from its use by our ancestors to its practical applications today. A digital display offers interesting content while a massive turbine blade display offers a real-world perspective.

- The **Solar Panel Display** highlights the potential of the sun to help meet our energy needs. Get an up-close view of a solar panel, used all over the world to harness the sun's energy on homes, businesses and even street signs.

- At the **Energy Spectrum Wall**, get a straightforward but comprehensive look at where we get our energy, from nonrenewable fossil fuels like coal and gas to renewable sources like wind and hydro.

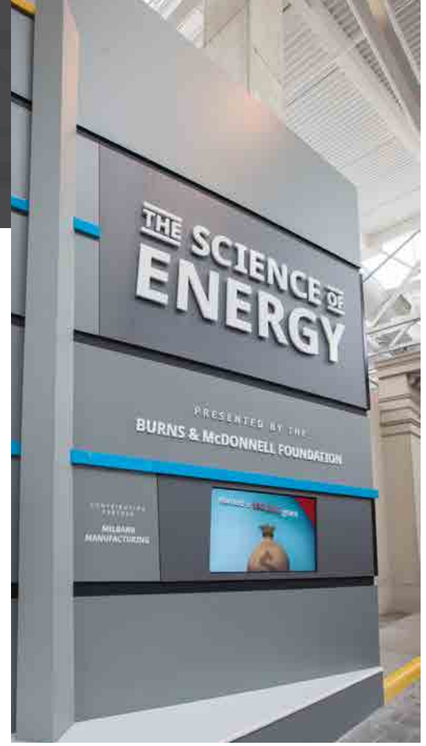
- The **Imagine Energy Digital Wall** is a giant, interactive touchscreen with a world of information about energy — history, science, global perspective, future, careers and opportunities. Navigate tabs to reveal information, images and video within a dynamic framework.

  - **The Timeline** offers a historical perspective of humankind's relationship with energy, beginning with the control of fire and continuing through today's exploration of renewable energy sources.

  - **The Science** is a foundational presence for the entire exhibition, offering information on core terminology and landmark discoveries.

  - **Global View** uses an interactive map to offer a comprehensive perspective on energy, instantly identifying countries that are power players in energy production and consumption.

  - **The Future** offers a glimpse of technologies that may shape tomorrow's energy world and a fuller understanding of why this research is so vital.



SCIENCE ON A SPHERE offers a world's worth of information — literally! This room-sized, global display system uses computers and video projectors to display planetary data on a 6-foot-diameter sphere. Science On a Sphere was developed by the researchers at the National Oceanic and Atmospheric Administration (NOAA) to help illustrate earth system science for people of all ages.

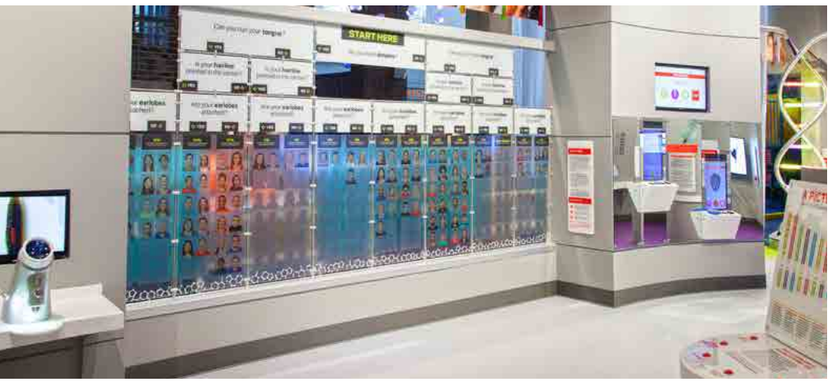
Using NOAA's collective experience and knowledge of the Earth's land, oceans and atmosphere, this exhibit offers captivating lessons on environmental processes. With 360-degree projections, the globe becomes the blue marble of Earth with more than 300 data sets that display weather patterns, tectonic shifts and other geophysical phenomena.

It's a visualization tool that gives you a completely new perspective. With one touch, you can see all the way to the bottom of the ocean where the Titanic sits, the 2011 earthquake in Japan and spreading tsunami, or actual satellite images of our planet taken as recently as two hours before.

The **BURNS & McDONNELL ENGINEERIUM** provides a deep dive into hands-on learning, encouraging kids to consider careers in technology and engineering. Since 2008, the Engineerium has reached thousands of kids who have participated in programs devoted to robotics, computing and sustainability. Relevant, interactive programming appeals to a wide age range with topics such as Robotics 101, LEGO Robot Challenge, Smart Robots and Renewable Wind.

The Engineerium also offers hands-on STEM learning activities that provide scientific and educational content related to touring exhibits at Union Station.

It's a venue that provides ample space for Science City's commitment to daily science demonstrations and weekend workshops. Free 20-minute Saturday Walk-Up Workshops include Food Science in the Kitchen, Making Magic in the Maker Studio and Builder Wars with LEGOs. Saturday Science Labs offer the chance to assist in the dissection of a pig heart or cow eyeball.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THE EXPERIENCE
BROUGHT TO YOU BY THE Burns & McDonnell FOUNDATION


500 STUDENTS
501 ENTRIES
193 SCHOOLS
20 FINALISTS
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