Creating Creative Children

It cost $10 billion and was designed by the best people science and engineering has to offer, with more than 10,000 scientists in more than 100 countries participating in its creation. Within days of turning it on, however, they knew they had a problem.

The Large Hadron Collider, designed to reproduce the Big Bang, requires extreme cold to operate correctly. The temperature inside its 27-kilometer tunnel is just slightly above absolute zero—colder than space.

Just days after it began operation in September of 2008, a faulty electrical connection between two magnets caused its temperature to rise to -279.7 degrees Fahrenheit. Six tons of liquid helium escaped, and more than 50 of LHC’s dipole magnets had to be replaced. These are not the kind of magnets you would find on a fridge. They weigh about 20 tons. It took months and millions of dollars of magnets you would find on a fridge. They weigh about 20 tons. It took months and millions of dollars of magnets. The helium escaped, and more than 50 of LHC’s dipole magnets had to be replaced. These are not the kind of magnets you would find on a fridge. They weigh about 20 tons. It took months and millions of dollars of magnets.

The temperature inside its 27-kilometer tunnel is just slightly above absolute zero—colder than space.

The Large Hadron Collider, designed to reproduce the Big Bang, requires extreme cold to operate correctly. The temperature inside its 27-kilometer tunnel is just slightly above absolute zero—colder than space.

Just days after it began operation in September of 2008, a faulty electrical connection between two magnets caused its temperature to rise to -279.7 degrees Fahrenheit. Six tons of liquid helium escaped, and more than 50 of LHC’s dipole magnets had to be replaced. These are not the kind of magnets you would find on a fridge. They weigh about 20 tons. It took months and millions of dollars of magnets. The helium escaped, and more than 50 of LHC’s dipole magnets had to be replaced. These are not the kind of magnets you would find on a fridge. They weigh about 20 tons. It took months and millions of dollars of magnets.

The Large Hadron Collider, designed to reproduce the Big Bang, requires extreme cold to operate correctly. The temperature inside its 27-kilometer tunnel is just slightly above absolute zero—colder than space.

Just days after it began operation in September of 2008, a faulty electrical connection between two magnets caused its temperature to rise to -279.7 degrees Fahrenheit. Six tons of liquid helium escaped, and more than 50 of LHC’s dipole magnets had to be replaced. These are not the kind of magnets you would find on a fridge. They weigh about 20 tons. It took months and millions of dollars of magnets. The helium escaped, and more than 50 of LHC’s dipole magnets had to be replaced. These are not the kind of magnets you would find on a fridge. They weigh about 20 tons. It took months and millions of dollars of magnets.

The Large Hadron Collider, designed to reproduce the Big Bang, requires extreme cold to operate correctly. The temperature inside its 27-kilometer tunnel is just slightly above absolute zero—colder than space.

Just days after it began operation in September of 2008, a faulty electrical connection between two magnets caused its temperature to rise to -279.7 degrees Fahrenheit. Six tons of liquid helium escaped, and more than 50 of LHC’s dipole magnets had to be replaced. These are not the kind of magnets you would find on a fridge. They weigh about 20 tons. It took months and millions of dollars of magnets. The helium escaped, and more than 50 of LHC’s dipole magnets had to be replaced. These are not the kind of magnets you would find on a fridge. They weigh about 20 tons. It took months and millions of dollars of magnets.

The Large Hadron Collider, designed to reproduce the Big Bang, requires extreme cold to operate correctly. The temperature inside its 27-kilometer tunnel is just slightly above absolute zero—colder than space.

Just days after it began operation in September of 2008, a faulty electrical connection between two magnets caused its temperature to rise to -279.7 degrees Fahrenheit. Six tons of liquid helium escaped, and more than 50 of LHC’s dipole magnets had to be replaced. These are not the kind of magnets you would find on a fridge. They weigh about 20 tons. It took months and millions of dollars of magnets. The helium escaped, and more than 50 of LHC’s dipole magnets had to be replaced. These are not the kind of magnets you would find on a fridge. They weigh about 20 tons. It took months and millions of dollars of magnets.

The Large Hadron Collider, designed to reproduce the Big Bang, requires extreme cold to operate correctly. The temperature inside its 27-kilometer tunnel is just slightly above absolute zero—colder than space.

Just days after it began operation in September of 2008, a faulty electrical connection between two magnets caused its temperature to rise to -279.7 degrees Fahrenheit. Six tons of liquid helium escaped, and more than 50 of LHC’s dipole magnets had to be replaced. These are not the kind of magnets you would find on a fridge. They weigh about 20 tons. It took months and millions of dollars of magnets. The helium escaped, and more than 50 of LHC’s dipole magnets had to be replaced. These are not the kind of magnets you would find on a fridge. They weigh about 20 tons. It took months and millions of dollars of magnets.

The Large Hadron Collider, designed to reproduce the Big Bang, requires extreme cold to operate correctly. The temperature inside its 27-kilometer tunnel is just slightly above absolute zero—colder than space.

Just days after it began operation in September of 2008, a faulty electrical connection between two magnets caused its temperature to rise to -279.7 degrees Fahrenheit. Six tons of liquid helium escaped, and more than 50 of LHC’s dipole magnets had to be replaced. These are not the kind of magnets you would find on a fridge. They weigh about 20 tons. It took months and millions of dollars of magnets. The helium escaped, and more than 50 of LHC’s dipole magnets had to be replaced. These are not the kind of magnets you would find on a fridge. They weigh about 20 tons. It took months and millions of dollars of magnets.

The Large Hadron Collider, designed to reproduce the Big Bang, requires extreme cold to operate correctly. The temperature inside its 27-kilometer tunnel is just slightly above absolute zero—colder than space.

Just days after it began operation in September of 2008, a faulty electrical connection between two magnets caused its temperature to rise to -279.7 degrees Fahrenheit. Six tons of liquid helium escaped, and more than 50 of LHC’s dipole magnets had to be replaced. These are not the kind of magnets you would find on a fridge. They weigh about 20 tons. It took months and millions of dollars of magnets. The helium escaped, and more than 50 of LHC’s dipole magnets had to be replaced. These are not the kind of magnets you would find on a fridge. They weigh about 20 tons. It took months and millions of dollars of magnets.

The Large Hadron Collider, designed to reproduce the Big Bang, requires extreme cold to operate correctly. The temperature inside its 27-kilometer tunnel is just slightly above absolute zero—colder than space.

Just days after it began operation in September of 2008, a faulty electrical connection between two magnets caused its temperature to rise to -279.7 degrees Fahrenheit. Six tons of liquid helium escaped, and more than 50 of LHC’s dipole magnets had to be replaced. These are not the kind of magnets you would find on a fridge. They weigh about 20 tons. It took months and millions of dollars of magnets. The helium escaped, and more than 50 of LHC’s dipole magnets had to be replaced. These are not the kind of magnets you would find on a fridge. They weigh about 20 tons. It took months and millions of dollars of magnets.

The Large Hadron Collider, designed to reproduce the Big Bang, requires extreme cold to operate correctly. The temperature inside its 27-kilometer tunnel is just slightly above absolute zero—colder than space.

Just days after it began operation in September of 2008, a faulty electrical connection between two magnets caused its temperature to rise to -279.7 degrees Fahrenheit. Six tons of liquid helium escaped, and more than 50 of LHC’s dipole magnets had to be replaced. These are not the kind of magnets you would find on a fridge. They weigh about 20 tons. It took months and millions of dollars of magnets. The helium escaped, and more than 50 of LHC’s dipole magnets had to be replaced. These are not the kind of magnets you would find on a fridge. They weigh about 20 tons. It took months and millions of dollars of magnets.

The Large Hadron Collider, designed to reproduce the Big Bang, requires extreme cold to operate correctly. The temperature inside its 27-kilometer tunnel is just slightly above absolute zero—colder than space.

Just days after it began operation in September of 2008, a faulty electrical connection between two magnets caused its temperature to rise to -279.7 degrees Fahrenheit. Six tons of liquid helium escaped, and more than 50 of LHC’s dipole magnets had to be replaced. These are not the kind of magnets you would find on a fridge. They weigh about 20 tons. It took months and millions of dollars of magnets. The helium escaped, and more than 50 of LHC’s dipole magnets had to be replaced. These are not the kind of magnets you would find on a fridge. They weigh about 20 tons. It took months and millions of dollars of magnets.

The Large Hadron Collider, designed to reproduce the Big Bang, requires extreme cold to operate correctly. The temperature inside its 27-kilometer tunnel is just slightly above absolute zero—colder than space.

Just days after it began operation in September of 2008, a faulty electrical connection between two magnets caused its temperature to rise to -279.7 degrees Fahrenheit. Six tons of liquid helium escaped, and more than 50 of LHC’s dipole magnets had to be replaced. These are not the kind of magnets you would find on a fridge. They weigh about 20 tons. It took months and millions of dollars of magnets. The helium escaped, and more than 50 of LHC’s dipole magnets had to be replaced. These are not the kind of magnets you would find on a fridge. They weigh about 20 tons. It took months and millions of dollars of magnets.

The Large Hadron Collider, designed to reproduce the Big Bang, requires extreme cold to operate correctly. The temperature inside its 27-kilometer tunnel is just slightly above absolute zero—colder than space.

Just days after it began operation in September of 2008, a faulty electrical connection between two magnets caused its temperature to rise to -279.7 degrees Fahrenheit. Six tons of liquid helium escaped, and more than 50 of LHC’s dipole magnets had to be replaced. These are not the kind of magnets you would find on a fridge. They weigh about 20 tons. It took months and millions of dollars of magnets. The helium escaped, and more than 50 of LHC’s dipole magnets had to be replaced. These are not the kind of magnets you would find on a fridge. They weigh about 20 tons. It took months and millions of dollars of magnets.

The Large Hadron Collider, designed to reproduce the Big Bang, requires extreme cold to operate correctly. The temperature inside its 27-kilometer tunnel is just slightly above absolute zero—colder than space.
not one is creative as much as it is if one does creative.

It is becoming clear that the doing involves hard work, and it involves restriction to a greater degree than has been commonly recognized. It turns out that creativity can, and often does, partner with constraint and deliberate intention.

Diane author Frank Herbert wrote, “Seek freedom and become captive of your desires. Seek discipline and find your liberty.” Herbert’s words reveal the paradox of creativity: We often find it within constraint, even in activities that are imbued with freedom. Many pursuits commonly considered inventive clearly benefit from or depend upon constraint and rules. No one would argue that the Blue Angels pilots should break out of their routines and spontaneously express individuality in flying patterns. Like gymnastics, water ballet, and sonnets, precision flying depends upon total adherence to the rules of the game to reveal its beauty.

While no one is suggesting you have to follow all the rules all the time, there is an element of truth to the idea that creativity is not necessarily a free-for-all. The poet e.e. cummings is famous for breaking the rules of capitalization in his poems by using majuscules in unusual ways. So often did he do this that his name is often spelled with lowercase letters. Although his typography was creative, no one doubts that he knew the rules he was breaking. His breaking of the rules was a creative choice made from knowledge and understanding, not ignorance.

Quick: Who do you think painted the portrait below?

Let’s make it a little easier. Who do you think is least likely to have painted this portrait? If you guessed Pablo Picasso, you’re right, and you’re not alone. Picasso’s strong association with Cubism makes identifying him as the artist of representational art a task best done by breaking into it. This painting demonstrates clearly what happened before he became a master at breaking the rules of art as it existed in his day, he mastered the rules themselves.

This idea applies in the classroom as well, where creativity and cognitive strength often conflict. Teachers want students to work the problems using the methods taught and/or tested, while inventive students want to solve the problems in their heads or by using less conventional methods. The solution for parents and teachers lies in the lessons of e.e. cummings and Picasso: Let them break the rules once they’ve proved they’ve mastered them.

The boundaries that can build ingenuity often arise from the habits of individuals during the process of creating. The author Stephen King explained, “There are certain things I do if I sit down to write...There’s a certain time I sit down, from 8:00 to 8:30, somewhere within that half-hour every morning...I have my vitamin pill and my moccasins...and the papers are all arranged in the same places. The cumulative purpose of doing these things the same way every day seems to be a way of saying to the mind, you’re going to be dreaming soon” (Lisa Rogak, Haunted Heart: The Life and Times of Stephen King).

To paraphrase Louis Pasteur, creativity favors the prepared mind. The idea that it should be effortless, that if you must work for ideas you are not truly creative, somehow persists, even though virtually every individual recognized as original would argue the point.

Like a famous actress who gets “instantly” discovered after years of appearing in bit parts and waiting tables, everyday creativity is rarely a eureka moment. Mark Ronco explains, “Creative insight is not a quick ‘aha!’ but instead is protracted.” So-called “eureka!” moments do not spring fully formed from the head of Zeus like Athena. Instead, they are the culmination of long periods of work and effort.

When mathematician Andrew Wiles finally solved what had been called the most difficult math problem of all time, Fermat’s Last Theorem, many people focused on the amazing “aha!” moment he had in his office one September, ignoring that it occurred after years of effort and a famous false solution earlier. Wiles himself says that mathematics is like going through a dark mansion whose furnishings and walls reveal themselves only after months of study. To be effective creators, children must be taught that prolonged effort is not the opposite of ingenuity, it is its superfood.

As researchers continue to explore creativity, the themes of effort and boundary arise again and again, not as its only components, just often overlooked ones. It is up to the adults who surround children to share that the so-called hard sciences are not at odds with the arts. Parents and teachers have the opportunity to regenerate a Flynn Effect for creativity, helping children to resist a slump by embracing and modeling the ideas that creativity can operate within boundaries and that eureka is not a moment but a process.

© American Mensa, Ltd. All rights reserved.

RESOURCES
UNLEASH YOUR KID’S (OR YOUR) CREATIVE MIND.

CHILDREN’S BOOKS
- Beautiful Ours! by Barney Saltzberg
- The Dot by Peter Reynolds
- Perfect Square by Michael Hall
- Lines that Wiggle by Candace Whitman

BOOKS FOR ADULTS AND TEACHERS
- Flow! The Psychology of Optimal Experience by Mihaly Csikszentmihalyi
- How to Think Like Leonardo da Vinci: Seven Steps to Genius Every day by Michael Gelb
- How to Develop Student Creativity by R. J. Sternberg and W.M. Williams
- Igniting Creativity in Gifted Learners by Joan Franklin Smutny and S.E. von Fremd
- Zing! Seven Creativity Practices for Educators and Students by Pat Mora

ONLINE
- Take the Epstein Creativity Competencies Inventory at MyCreativitySkills.com. Teachers and managers can use MyCreativitySkills.com/managers to see if they have the skills to foster creativity in others.
- Go to www.coe.uga.edu/torrance/creativity-resources for a list of creative resources.
- Find out more about the Creative Resources for Educators and Students at MyCreativitySkills.com.
- Use approachable, non-threatening art forms to help children rediscover their creative sides. Zentangle®, requiring nothing more than paper and a pen, brings out the artist in even the most reluctant skeptic. Using repetition of patterns within confined spaces, Zentangle can be learned rapidly and developed over long periods of time. See www.zentangle.com for more information.

HOW TO DEVELOP CREATIVITY IN CHILDREN
- STEP AWAY FROM THE WATERCOLORS. Avoid what Mark Ronco calls “art bias.” Help children see they can be creative in many areas of their lives, and help them recognize when they have used it to solve common problems. What is the most creative way they can make their beds? How could something in recycling be reused?
- ENCOURAGE CURiosity. When Nobel Prize-winner Isidore Rabi was asked what led him to become a scientist, he said, “My mother made me a scientist without ever knowing it. Every other child would come back from school and be asked, ‘What did you learn today?’ But my mother used to say, ‘Irzy, did you ask a good question today?’ That made the difference.” Helping children learn to ask open-ended questions is a key to developing creative as well as cognitive understanding. How could that object be used differently? If you could interview someone, who would you ask her?
- ALLOW MESSes. Diverse environments rich in supplies and invitations to create are conducive to exploration. Allow children a space they can set up their materials and leave them for awhile, allowing them to dabble, go away, and return so that the creative process becomes an integral part of the day rather than something they do at a certain time.
- BE SEEN AT PRACTICE. This doesn’t necessarily mean learning to play the piano. Giving yourself problems to solve and allowing children to see you attempt to solve them through trial and error and then hear you reflect on the ideas that finally worked lets creativity become a part of their toolbox for life.
- RECOGNIZE IT. Point out examples of creative problem solving in the news, in books you’re reading, and within the family. Brainstorm different ideas, even of random things (e.g., list 50 things that are green, five uses for an empty swimming pool, or the top 10 things about the verb “to go”).
- FIND AN AUDIence. When your child creates something shareable, share it. The context of creativity sends a message about its value. Do not be limited to the fridge or the kitchen table with Plexiglas cut to fit and rotate their messages about its value. Do not be limited to the fridge and leave them for awhile, allowing them to dabble, go away, and return so that the creative process becomes an integral part of the day rather than something they do at a certain time.
- PROVE THEY CAN DO IT. Use approachable, non-threatening art forms to help children discover their creative sides. Zentangle®, requiring nothing more than paper and a pen, brings out the artist in even the most reluctant skeptic. Using repetition of patterns within confined spaces, Zentangle can be learned rapidly and developed over long periods of time. See www.zentangle.com for more information.

© American Mensa, Ltd. All rights reserved.

AUGUST 2012 | 21