SOLE
How to Bring Self-Organized Learning Environments to Your Community

By Sugata Mitra
TED Prize Winner
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Welcome to the Self-Organized Learning Environment (SOLE) Toolkit, an online resource designed to help educators and parents support kids (8-12 years old) as they tap into their innate sense of wonder and engage in child-driven learning.

**CHILD-DRIVEN LEARNING IS**

- Self-organized
- Curious
- Engaged
- Social
- Collaborative
- Motivated by peer-interest
- Fueled by adult encouragement and admiration

Educators of all kinds (parents, teachers, community leaders, etc) play an important role in both teaching kids how to think, and giving them room to feed their curiosity. The SOLE approach embraces a process where kids learn how to ask questions that make them come alive to the world, questions like the following,

What is a soul? Can animals think? How does my digestion system work?
To prepare for the realities of the future workplace and the rapidly changing technological landscape, it is critical for educators to invite kids to get good at asking big questions that lead them on intellectual journeys to pursue answers, rather than only memorizing facts.

After a series of experiments revealed that groups of children can learn almost anything by themselves, researcher Sugata Mitra began his pursuit to inspire children all over the world to get curious and work together. In 1999, Sugata and his colleagues dug a hole in a wall bordering a slum in New Delhi, installed an Internet-connected PC, and left it there (with a hidden camera). Soon, they saw kids from the slum playing with the computer, learning English and searching through a wide variety of websites on science and other topics, and then teaching each other.
Sugata and his colleagues carried out experiments for over 13 years on the nature of self-organized learning, its extent, how it works and the role of adults in encouraging it. His innovative and bold efforts towards advancing learning for children all over the world earned him the first-ever $1 million dollar TED Prize award. At the 2013 TED conference, Sugata asked the global TED community to make his dream a reality by helping him build the ultimate School in the Cloud where children, no matter how rich or poor, can engage and connect with information and mentoring online.

In addition to revealing his plan to create a virtual school that offers a child-driven learning experience, he invited thinkers and doers worldwide to create their own miniature self-organized learning environments (SOLEs) and share their discoveries.

Thank you for responding to Sugata’s call to action by investing your time and creativity to improve how kids learn in your community. This toolkit is here to guide you as you embark on an adventure where kids direct their own learning with a curriculum of big questions, dynamic interactions, and boundless possibilities.

We look forward to hearing what happens on your Self-Organized Learning Environment (SOLE) adventures. Share your stories and feedback here: www.ted.com/solefeedback
“Who knows what we’ll need to learn thirty years from now? We do know that we will need to be good at searching for information, collating it, and figuring out whether it is right or wrong.”

— Sugata Mitra

What’s a SOLE?

SOLE noun. [sohl] Self-Organized Learning Environment

Self-Organized Learning Environments (SOLEs) are created when educators and/or parents encourage kids to work as a community to answer their own vibrant questions by using the internet.

HERE ARE THE BASIC PARAMETERS

- Children between 8 and 12 years old choose their own groups of four and their own questions to explore
- Children can look to see what other groups are doing and take that information back to their own group
- Kids can move around freely
- Kids can change groups at any time
- Children can talk with each other and discuss with other groups
- Participants have the opportunity to tell their friends what they learned after the SOLE

The SOLE learning path is fueled by big, kid-created questions, self-discovery, sharing, and spontaneity.
Why set up a SOLE?

Here is just a partial list of the many ways that Sugata’s and others’ studies have shown that people like you can benefit from SOLEs:

**EDUCATORS & PARENTS**

- Get better at asking questions
- Become more in tune with what children are most interested in
- Feel connected on a more equal level, instead of hierarchically
- Expand their understanding of what kids can learn on their own
- Have **FUN!**

**HOME**

- Opportunity to actively participate in your child’s learning
- Cultivate a culture of curiosity in the home
- Reinforce and expand on what your kids have already learned in school
- Strengthen connections between parents and kids
- And of course—have **FUN!**

**CHILDREN AT SCHOOL OR AT HOME**

- Take ownership of their learning experience
- Improve reading comprehension, literacy, behavior, language, creativity, and problem-solving abilities
- Develop habits to become a lifelong learner
- Develop stronger memory recall
- Strengthen interpersonal skills
- Get better at integrating what they already know into classroom discussions
- Develop a more trusting relationship with educators and adults, generally
- Increase motivation to learn about more subjects and ideas
- Have **FUN!**

**SCHOOLS OR AFTER-SCHOOL PROGRAMS**

- Encourage children to learn independent thinking and learning skills earlier
- Create cultures of curiosity and child-driven learning
- Experience more invigorated and interested classrooms
- Offer more opportunities for both independent thinking and collaboration
- Create more intergenerational admiration and understanding
- And you guessed it—have more **FUN!**
The SOLE Mindset

To make the most out of the experience, adopt the SOLE mindset:

**CHILD-DRIVEN**

Kids are motivated by choice and the interests they share with their friends. Self-directed learning is more sustainable, long-lasting learning.

**COLLABORATIVE**

Kids learn socially before internalizing knowledge. Learning with a crew also helps with memory recall and the development of social skills.

**CURIOUS**

All kids are born with an innate sense of wonder. Kids construct their own understanding of new concepts by relating it to what they already know.

**OPEN-MINDED**

Kids are capable of understanding more than adults usually give them credit for, especially when they’re in a flexible environment where it is okay to experiment, “unlearn” beliefs and assumptions when necessary, and make mistakes.

**TRANSFORMATIVE**

Children have the ability to think critically and can learn astonishingly quickly.

**ENCOURAGING**

The most effective educators are great witnesses, supporters, and structure-providers, but not answer-suppliers. The Internet helps children answer almost any question, but encouragement helps kids have the confidence to be resilient and solve problems.

**PATIENT**

It may take some time for educators to become comfortable with a new technique and for children to adapt to a new way of learning. If at first you don’t succeed, try and try again.

**SOLES FEED THE FIRE OF CURIOSITY**

- Kids are in charge of finding answers
- A peer helper is responsible for behavior management
- Children are free to organize groups on their own
- Kids perceive greater control of their own learning

“Education-as-usual assumes that kids are empty vessels who need to be sat down in a room and filled with curricular content. Dr. Mitra’s experiments prove that wrong.”

— Linux Journal
**ORGANIZE**

*How to set up a SOLE*

**BUILD YOUR SOLE:**

Now, it is time to create your own SOLE space! Here’s what you need:

<table>
<thead>
<tr>
<th>SIMPLE SOLE ESSENTIALS: AT SCHOOL</th>
<th>SIMPLE SOLE ESSENTIALS: AT HOME</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="computer_icon.png" alt="Computer" /> 1 computer per 4 kids (Hint: A large screen helps the whole group get a better view)</td>
<td><img src="laptop_icon.png" alt="Laptop" /> 1 laptop or desktop per group of 4 children</td>
</tr>
<tr>
<td><img src="whiteboard_icon.png" alt="Whiteboard" /> A whiteboard or blackboard to write questions on</td>
<td><img src="paper_icon.png" alt="Paper" /> Paper and pens for kids to take notes for their sharing at the end of the SOLE</td>
</tr>
<tr>
<td><img src="pens_icon.png" alt="Pens" /> Paper and pens for kids to take notes for their sharing at the end of the SOLE</td>
<td><img src="optional_icon.png" alt="Optional" /> Optional: Webcam, microphone, and creative software packages for graphics, video, music and communication</td>
</tr>
</tbody>
</table>

For younger kids, a nametag or something fun to designate the helper’s role.
PLAN YOUR SOLE:

Once you design your SOLE space, it’s time to plan your first SOLE. Here is a sample SOLE plan that can be adjusted to fit your schedule, space, and community realities.

The time required for review and feedback may vary depending on the complexity of the question posed during the investigation period and the answers the kids collect.

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**ACTIVITY: 5 MINS**
- Pose an inquiry question (see the next section "Discovery" for details).
- Generate interest by offering a creative prompt, like an image or video, or playing audio that relates to the question.
- Explain the SOLE process.
- Nominate a helper and briefly describe the role.

**ACTIVITY: 40 MINS**
- **Let the adventure begin!** Kids work in groups to find answers online to the inquiry question.
- Delegate behavior management and problem-solving to the helper.
- Use open and useful questions
- Document the SOLE. Take notes, photos, quotes, and audio recordings. Ask participants what their experiences of the SOLE were.

**ACTIVITY: 10-20 MINS**
- Find a welcoming space for the children to share their stories of collective discovery.
- Facilitate a discussion about the question itself and their investigation process.
- Engage the kids in their own review: What would they do differently next time, both individually and collectively? What did they think they or others did really well?

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Can you kill a goat by staring at it?  
—Curiosity Catalyst
The magic sparked by the SOLE experience emerges from fascinating questions igniting children’s curiosity. When launching a SOLE, it is important for educators to model a spirit of wonder to set the tone. By demonstrating their own inquisitiveness when introducing queries for kids to explore, adult facilitators will create an open, flexible, and encouraging space for children to take intellectual risks.

We have found that large, open, difficult and interesting questions often make the best “big” questions for SOLE inquiries. Questions that are unanswerable; such as “who made space?” help encourage kids to offer theories instead of concrete answers. Even though it may be tempting to ask questions with seemingly easy answers, it is important to ask big picture questions that promote deeper and longer conversations.

For example, here are some sample “big” questions a group of fifth graders investigated:

- What was ancient Egypt really like?
- Why do people slip on wet surfaces?
- Did dinosaurs really exist?
- Can you kill a goat by staring at it?
- Why aren’t there any mammals bigger than a blue whale?

Here are more big questions you can ask:
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do boys think differently from girls?</td>
<td></td>
</tr>
<tr>
<td>Can anything be less than zero?</td>
<td></td>
</tr>
<tr>
<td>Will robots be conscious one day?</td>
<td></td>
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<tr>
<td>Is it more dangerous to fly in an airplane or to drive?</td>
<td></td>
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<tr>
<td>Are there more stars in the universe or grains of sand on all the world’s beaches?</td>
<td></td>
</tr>
<tr>
<td>What is irony?</td>
<td></td>
</tr>
<tr>
<td>Why do things fall down and not up or sideways?</td>
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<tr>
<td>What are the five best tips for better searching on Google?</td>
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<tr>
<td>Do fish feel pain?</td>
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<tr>
<td>Is it disgusting to eat insects?</td>
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</tr>
<tr>
<td>Why haven’t we seen evidence of intelligent alien life? (Fermi’s question: where are they?)</td>
<td></td>
</tr>
<tr>
<td>Was the color “orange” named after the fruit or vice versa?</td>
<td></td>
</tr>
<tr>
<td>Is there life on other planets?</td>
<td></td>
</tr>
<tr>
<td>What is altruism?</td>
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</tbody>
</table>

**MORE QUESTIONS**

**WATCH IT:** View a SOLE question demonstration in this video:  
www.bitly.com/soledemo
Next, here are some examples of how to frame and build up to a question in a discussion with 8-12 year olds:

1. **Say:** “I was playing with Google Maps today and I want to show you something.”
   **Next:** Zoom in on Italy on Google Maps, and then on Rome, and finally end up at the Colosseum.
   **Ask:** “What’s that big round building and why is it broken?”
   **Result:** The SOLE should lead to children learning about the Roman Empire and its demise.

2. **Say:** “Are you awake and full of energy today? I have a really hard but important question for you.”
   **Ask:** How does an iPad know where it is? You ask for my location, and it tells you. How does it do that?”
   **Result:** Their SOLE explorations will eventually take you to GPS, satellites, and finally trigonometry.

3. **Say:** “You know what, I don’t really feel like standing here and talking all afternoon. But I have a puzzle for you to solve, if you can.”
   **Ask:** “Can you guess what is common between rubies, sapphires, and airplanes?”
   **Result:** The SOLE journey will lead the children to the answer: aluminum. After the kids arrive at that result, it is a perfect set-up for an additional discussion about how else aluminum is used in the world.
EXAMPLE OF CHILDREN’S WORK

Photo by: Amy Dickinson, Newcastle, UK
EXAMPLE OF CHILDREN’S WORK

Photo by: Amy Dickinson, Newcastle, UK
While every SOLE experience is unique, here are some common situations you might encounter.

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>POSSIBLE SOLUTION</th>
<th>OUTCOME</th>
</tr>
</thead>
<tbody>
<tr>
<td>One child tattles on another for not doing any work.</td>
<td>Educator asks the kid to inform the helper.</td>
<td>Children realize that the “easy option” of having a teacher “fix” a problem is not the answer. This forces them to communicate and work through challenges.</td>
</tr>
<tr>
<td>One child in a group is distracted and appears unengaged.</td>
<td>Ask the helper if there is anything they can do to encourage the group to get engaged. This also might be a perfect moment to remind them that children can change groups at any time.</td>
<td>Kids understand that they can make choices and change the situation by moving groups.</td>
</tr>
<tr>
<td>An entire group is not working on the task at hand.</td>
<td>Remind the group of the SOLE agreements. Work with the helper to find a solution and let them make the decisions.</td>
<td>Kids learn the importance of choosing a team that can work together.</td>
</tr>
</tbody>
</table>
### How do my eyes know to cry when I’m sad?

—Curiosity Catalyst

<table>
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<th>PROBLEM</th>
<th>POSSIBLE SOLUTION</th>
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</tr>
</thead>
<tbody>
<tr>
<td>A group presents an inaccurate or irrelevant answer.</td>
<td>Ask questions about how they arrived at the answer by asking about their sources.</td>
<td>Kids learn to curate information, understand what constitutes viable evidence, and interrogate Internet sources more critically.</td>
</tr>
<tr>
<td>Children have trouble reading material they find online.</td>
<td>Since children have different reading levels, sometimes the best option is to ask kids to explain their findings in their own words rather than reading directly from a source.</td>
<td>Kids don’t see reading as a barrier. This reduces anxiety about presenting information during the review.</td>
</tr>
<tr>
<td>The helper is misbehaving.</td>
<td>Provide helpful suggestions and advice about how to help manage the class. Try to avoid challenging the helper in front of their peers. Praise examples of good behavior during the review.</td>
<td>The helper will develop more social skills and confidence. Class behavior improves and there is less need for educator intervention.</td>
</tr>
<tr>
<td>Kids complain that there is nothing to do because someone else is using the computer.</td>
<td>Ask the kids about how they felt about sharing computers during the review and discuss future solutions.</td>
<td>Kids learn to develop their own solutions, manage relationships, and become more resourceful.</td>
</tr>
</tbody>
</table>
SOLE is a global laboratory. Share your feedback and help us reinvent how kids learn.

TELL US! Share your stories

Submit your feedback here: www.ted.com/solefeedback
Your voice matters. Share stories your SOLE adventures with us.

EMAIL
Write us: solesupport@ted.com

SURVEY
Fill out this quick survey: www.ted.com/solefeedback

CONVERSATION
Join our TED conversation: Share your ideas by telling us: What is the most important thing you’ve learned on your own?
www.ted.com/sugataconversation

TWEET
Tweet at us at @TEDPrize and share your SOLE stories using this hashtag: #TEDSOLE
VIDEOS

Sugata Mitra’s TED Talks
http://bitly.com/SugataTalks

GOOD “Future Learning” Video
Sugata Mitra gave a computer to a group of children in Hyderabad, India with a speech to text interface. Due to their strong accents, the computer wrote gibberish when they spoke. When the kids informed Sugata about the computer’s inability to comprehend their accents, he encouraged them to figure out how to make themselves understood to the computer and traveled back to England.

Two months later, their accents transformed, and the entire group of children had the same neutral British accent as the computer because of their own self-teaching.
Sugata Mitra launched an experiment in Kalikuppam with a really challenging question: “Can Tamil speaking 12 year old children in a south Indian village, teach themselves biotechnology of DNA replication in English by themselves from a streetside computer?”

After leaving the children with the computer for two months, the children confessed that they didn’t understand anything. At first, Sugata wasn’t surprised about their inability to find the answer because of the difficulty of the subject matter until a young girl elaborated: “Apart from the fact that the improper replication of the DNA molecule causes genetic disease, we’ve understood nothing else.”

It was then that he realized that if the experience he witnessed in Kalikuppam could happen, kids anywhere can learn just about anything on their own.
Sugata Mitra traveled to a school in Turin, Italy, where the kids couldn’t speak English. Not being able to speak Italian himself, he wrote on the board in English: “How did the dinosaurs die?” Within twenty minutes, the kids translated the sentence and answered the question in both languages.

Next, in English, he asked, “Who is Pythagoras and what did he do?” This question proved a little trickier for the ten-year-olds, but in a few minutes, right-angled triangles began to appear on the screen, bringing shivers to Sugata’s spine as he was informed that he spelled Pythagoras wrong and the kids spelled the philosopher and mathematician’s name for Sugata in Italian.
ACKNOWLEDGEMENTS

Research

This toolkit was adapted from Sugata Mitra, Paul Dolan, David Leat, Emma Crawley, and Suneeta Kulkarni’s *The Self Organised Learning Environment (SOLE) Support Pack* published in 2010.

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And thank you to thousands of children around the world.
Help us reinvent the way kids learn.

www.ted.com/sugata
“My wish is to help design the future of learning by supporting children all over the world to tap into their innate sense of wonder and work together. Help me build the School in the Cloud, a learning lab in India, where children can embark on intellectual adventures by engaging and connecting with information and mentoring online. I also invite you, wherever you are, to create your own miniature child-driven learning environments and share your discoveries.”

—Sugata Mitra