



A TEACHER'S PLAYBOOK:

SCSA IN YOUR SCHOOL

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About SCSA (Schools)

The SCSA (Schools) is organised by teachers for their own schools as a prelude to the SCSA competition. Through SCSA (Schools), outstanding toys can be selected from the schools' students and entered to the SCSA competition which takes place from May – July.



Students learning to use new tools at the SCSA 2016 Technical Workshop.

Why?

SCSA (School) offers an opportunity to all the kids in your school to experience the satisfaction of turning their imaginations into reality. During the process, students get the opportunity to build on their confidence, determination and perseverance through collaborative work. SCSA (Schools) can also be applied as part of the Applied Learning Programme (ALP) and Project Work (PW). Over 50 schools in Singapore held the SCSA (Schools) in 2016.

SCSA prepares our students for the future through developing their **21st century competencies**:

- Critical and Inventive Thinking
- Communication, Collaboration and Information Skills
- Decision-Making
- Self-Directed Learning
- Confidence

Check out what other schools organised for 2016's SCSA (Schools) at this link: goo.gl/PkABbp

“

SCSA has the ability to translate complex ideas into something that young children find simple and easy to comprehend. SCSA has made science learning fun and enjoyable.

”

*Mr Jegendren Tanapal
Yew Tee Primary School
Diamond Award Recipient*



*Mr Jegendren Tanapal
Yew Tee Primary School
Diamond Award Recipient*

“

The process of guiding the students and learning from senior teachers have also helped me grow as an educator, providing me an opportunity to teach science concepts in an interesting and engaging manner.

”

For Schools & Teachers

Friends of SCSA Award

Schools which have organised the SCSA (Schools) for three consecutively years are eligible to receive the “Friends of SCSA” Award. The award is an acknowledgement of the school’s continuous effort and support through organising of SCSA (Schools).

Blue Ribbon Award

Teachers who played great roles in motivating and mentoring students for this competition would also be recognised through the Blue Ribbon Award.

Diamond Award

Teachers with outstanding track records of making positive impact in the students through this competition will be recognised with the Diamond Award. To nominate teachers for either the Blue Ribbon or Diamond Award, simply complete the nomination form which can be found on the SCSA website (www.science.edu.sg/SCSA) and submit it to upstream@science.edu.sg.

“

I have enjoyed encouraging my students to learn more about science through SCSA. SCSA provides planned activities that are interactive and stimulates pupils' thinking.

”

*Ms Yong Hui Wen
Yishun Primary School
Diamond Award Recipient*



Timeline

EVENT	DESCRIPTION
TEACHERS' BRIEFINGS JANUARY 2017	During the briefing session, teachers will be able to view some of the past winning toys, and understand more about the qualities in a toy judges look out for, as well as more info about the SCSA (Schools).
WORKSHOPS FEBRUARY 2017	Different groups of the students can attend the workshops, and the information can be shared with other students in the class. <ul style="list-style-type: none"> ○ Creativity & Communication Workshop ○ Technical Workshop ○ <i>For Teachers:</i> Workshop on How to Prepare Your Students – Suggestions and Ideas.
REGISTRATION BY 15 MARCH 2017	Register your school by submitting Form A to the SCSA organisers by 15 March 2017 .
SUBMIT FORM B BY 30 APRIL 2017	Report on Progress of SCSA (Schools) Competition Using the Form B provided by organisers by 30 April 2017 .
TOY SUBMISSION 26, 29 & 30 MAY 2017	All toys are to be submitted to the SCSA organisers on these dates. Each toy must be <u>labelled</u> (with SCSA sticker labels provided) and <u>packaged securely</u> with the completed entry form.
FINAL JUDGING INTERVIEWS 4 & 5 JULY 2017	Shortlisted students will be informed via the school and will go through a round of interview with the SCSA judges.
AWARD CEREMONY & TOY EXHIBITION 26 JULY 2017	The winners will each receive an award at the award ceremony. Students will be able to view all the winning and shortlisted toys at the exhibition after the ceremony.

Planning for SCSA (Schools)

So how do you go about organising a SCSA (Schools) competition in your own school? Here we provide you with some tips and points of consideration when planning a SCSA (Schools) Competition.

Decide Who's Participating

It could be a small scale involvement of just one class or for an entire science club. Minimum of thirty students is all it takes to participate.

Curriculum Integration

SCSA (Schools) encourages independent learning, creative problem-solving as well as collaborative work as students get to work in pairs and sometimes families. Many of the teams that take part consist of students from different academic levels as well. It is wise to integrate SCSA (Schools) with existing programme frameworks, such as the Applied Learning Program (ALP) and Project Work (PW). Otherwise, it is also a good activity for Science teachers to incorporate into their lessons.

“

Over the years, we have seen our students demonstrate self-directed and collaborative learning as they explore and work on applying science concepts into their toys, while at the same time, teachers from different subjects such as English, Mathematics and Art have helped to impart different skills that assist in the toy development.

”

*Mdm Cheong Oi Koan
Compassvale Primary School
Diamond Award Recipient*

Manpower

For larger scale formats, fellow teachers, from different disciplines even, could be roped in to help out. The parent network often is able to provide excellent help with the logistical portion of the competition, such as with toy carnivals or showcase as well as during submission of toys.

Call for Entries

To promote students interested in this project, you may hold an assembly talk about the competition and even showcase samples of past award winning toys. Informative mailers about this project can also be distributed to families to encourage guidance and support to the students.



“ What we are really looking for is how students can think out of the box. That forms the very basis for STEM education and the start for our future scientists and engineers. ”

*Dr Chew Soon Hoe
Assistant Professor, NUS
SCSA 2016 Judge*

Judging

It is up to your school to decide on the judging criteria of the competition. Exhibition of the toys with a voting component or a show-and-tell during recess time are interesting possible ways of judging the toys. Various modes of judging can be used to select the winners of the SCSA (Schools) Competition. Schools may not just stick to simply one type of judging process but to combine them or implement their own method.

○ Toy display

Students can make use of this opportunity to explain how their toy was made and how to play with the toy. The “play-testing” can generate additional ideas and improvements to the toys, which can be carried out before the toy is submitted to the national SCSA competition.



Toy display at Yang Zheng Primary School

○ Show and Tell Presentation

Show-and-tell is a common mode of judging. This is a good way to understand the students’ thought process in creating the toy and also to expose students to presentation skills. Judges can consist of not simply teachers, but possibly even parent volunteers who are often very enthusiastic in helping out and an alternative point of view.

“ The children benefit by gaining confidence through presenting their ideas in front of a crowd. ”



*Mr Lee Hong Khim
Head of Department (Science)
Pei Chun Public School*

○ Voting

Instead of judging by a few people, voting by students in the school could be done to select the winners. A mini exhibition could be put up during recess time where students can play with the toy and vote for their favourites.

○ Peer Judging

What better way to select the most interesting toys for children than for children to decide? It can be carried out as an activity during lessons. Students often have different insights from adults. Through this, they can also learn to share constructive feedback with each other.



Show and tell presentation at Yang Zheng Primary School

Judging Criteria

Schools are free to set their own criteria for the judging of the toys for the SCSA (Schools) Competition. Students are encouraged to explain in detail how their toy works, how they came up with the toy and show understanding in the scientific principles behind it. In the main SCSA competition, toys are judged on various criteria, such as:

- Science
- Creativity
- Robustness
- Fun and Aesthetics

The list above is definitely not exhaustive. The aim of the competition is to encourage students to get hands-on, engage in problem-solving, and apply science and engineering concepts while creating their own prototypes. While judging the toys, it is important to keep those objectives in mind.

As the winning toys are meant to be submitted for the SCSA main competition, it is also important to keep in mind the pointers for toy submission mentioned in the next section upon choosing the winning toys.

Certificate

We will provide **certificates for every SCSA (Schools) participant**, and **up to 40 exclusive SCSA tokens**. Schools can also provide their own certificates or awards to their students.



Guiding Students

Students are always full of creative ideas. With appropriate guidance, amazing toys can be produced by them. Here are various ways in which teachers and parents can play a part to help them create their toys.

Ideation

Group brainstorming sessions promotes team cohesiveness and develop self-confidence through voicing out of ideas to their peers.

Toy design worksheets can help students frame their thought processes. It is an opportunity for them to partake in independent research and exploration for ideas. Students can be encouraged to look around their own environment to draw inspiration.

Toy Design Plan

Name of Toy

Scientific principle displayed

How to play?

Sketch of toy

Workshops

Simple technical skills workshops during or after lessons can be useful for kick-starting projects. An after-lesson consultation clinic can provide students with guidance on how to improve their prototypes. It will be helpful in keeping students interested and encourages them to persevere in solving any problems with their creation.

Teachers may opt to register their students for the workshops organised by the SCSA organisers in February. These workshops are often limited in space. Hence, attendees these workshops are encouraged to share what they learn back in school. Special teacher's workshop on how to efficiently mentor students will also be offered.

Organise a Toy Take-Apart Session

Learn more about toy making by deconstructing them ! Make surprising discoveries about what mechanisms, motors and wires are used to make these toys work. This is also an inexpensive way to gather materials for making toys and an opportunity to explore new uses for everyday objects. Students can volunteer their old, unwanted or broken toys for the session, and witness them being transformed into brand new handmade ones.

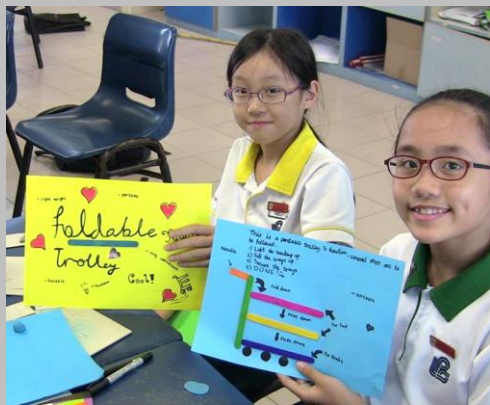
Show-and-tell

Encourage students to share their ongoing design plans. Provides an opportunity for students to voice out any problems they face with their projects. Exchanging ideas are also a good way of generating new ideas, and improving on toys. Students and teachers will be able to provide feedback on how to improve the toys.

Examples of past SCSA (Schools) Competition



Toy display at Tampines North Primary School



Generation of ideas for their toys by students from Loyang Primary School



Workshop for toy design conducted for Paya Lebar Methodist Girls' students

Journaling of Toy-Making Progress

Creating a toy-making journal serves as a good practice for students' record keeping skills while working on their projects. By noting down the progress of their projects from the start till fruition, they can better understand the thought process and share their journey with their peers.

Set up a Materials Corner

Toy ideas can often arise simply by looking at what you have. Setting aside a materials corner helps students to conceptualising their toy. It can also serve as a resource corner for students while making their toy. Encourage students to donate usable materials to the corner. Keep a look out for unusual items to add to this corner – for example pizza spacer (picture on the right), honey dipper, banana cutter, earphone winder, etc.



Pizza spacer and honey dipper

CONDUCTING A TOY TAKE-APART SESSION

What do you need?

- Mahjong paper and markers
- Toys
- Tools to unravel toys, e.g. screwdriver, pliers, scissors
- Small bowls to keep small parts

What to do?

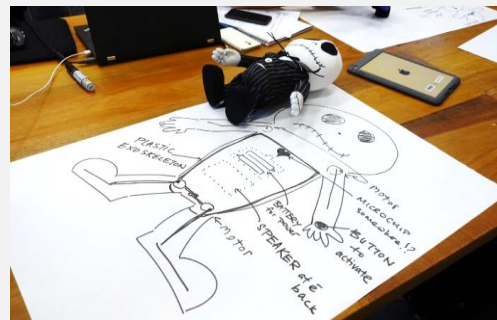
Sit students in small groups to take apart different toys. Before dissecting the toys, get students to predict how they think the toys work. Gather the students in teams to draw on paper.

As the toy is being taken apart, have students draw and record down the mechanisms and parts in the toy.

Explain to students how the mechanisms work and the scientific principles behind them. Ask students what other materials can be used to replace the mechanisms in the toy.

What type of toys?

Wind-up toys and electronic plush toys are simple toys that can introduce clockwork, gears, crank and cam mechanisms and circuits.



Reflections

The toy-making journey imparts many values to a student on top of simply winning a competition. It is a developmental journey and it would be beneficial to get the students to jot down and internalise what they have learnt and gained through the project. Make them realise that they are now young creators! This would encourage the students to be curious, carry on creating and learning science in their everyday life. Hopefully, they will now look at learning science through a different set of eyes.

Tips for Creating Good Toys

Sturdy Casings

Having sturdy casings for the toys will be very helpful. While cardboard boxes and disposable food containers can be used for toy casings, it is preferable to look for more robust and stable containers. Chocolates, snacks and biscuits often come in thicker plastic or even metal containers, and in different sizes – with the correct tools, these can be turned into good quality toy casings. With better quality casings, the toys can be further ensured to stay intact by the time it reaches the judges for judging.

Size of Toys

An often overlooked consideration by the students and teachers would be the size of the toy creation. Large toys tend to be too complex and less user friendly and hence compromises the quality of the toy. Toys that are too large also pose many problems when transporting it to school or when submitting the toy, which may result in the toy being damaged.

Instructions

Imagine from the point of the user, an instruction sheet on how to play would definitely come in handy. This helps everyone to better understand the toy and the concept behind it.

List of Items

Include a list of the different parts of the toys and maybe even the materials used, especially if the toy is made up of many different components. Just so we know what got packed in the box!

Maintenance

As with all handmade toys and prototypes, maintenance and repairs are commonplace. Do keep in mind accessibility of certain parts such as batteries, which will require replacing when they run out.

Be Different

Encourage students to be creative and make toys from their own ideas.

Resources

Tools & Material

Common Household Items as Materials

Materials and supplies for toys can be found everywhere – encourage your students to be on the lookout for items in their house that can be used for toy making. Stationery, kitchen tools, bathroom accessories are all good sources of materials. Encourage them to re-use items they can find as well instead of buying new ones. This can get them to use their creativity while providing an economical choice.

In the list below are some common items that can be used and is definitely not exhaustive! Basically anything can be used for creating the toy.

- Biscuit tins
- Cardboard boxes from appliances
- CDs & CD covers
- Plastic bottles & drink cans
- Rubber elastic bands
- Pencils, binder clips, correction tapes and other stationery
- Festive decorations



The winning toy for SCSA 2016 by Lai Shi Jie of Concord Primary School uses many common household items such as food containers, chopsticks and rubber bands.

Where to Find Supplies

That said, should you or the students need to acquire materials to construct the toy, below is a list of some stores where some of the common supplies required can be found.

Where	Locations	What You Can Find There
Daiso	Various outlets in Singapore	Art supplies, sewing & crafting tools Wood, plastic & cardboard sheets Hardware supplies & small electronics
Ikea	Alexandra, Tampines	Powered hand tools Hardware accessories (Eg. Screws, bolts) Art supplies & stationery Kitchen supplies

Where	Locations	What You Can Find There
Cash Converters	Outlets in Ang Mo Kio, Bedok North, Chinatown, Jurong East, Kallang Bahru, Tampines, Toa Payoh & Ubi	Electronic devices Household supplies and appliances Toys Art supplies & crafting tools
Value\$	Various outlets in Singapore	Batteries, torchlights Hardware accessories (Eg. Screws, bolts) Art supplies, sewing & crafting tools Household tools
Spotlight	Plaza Singapura	Art, craft & sewing supplies Cloth & plastic materials Styrofoam blocks
Art Friend	Bras Basah Complex	Art, craft & sewing supplies Styrofoam blocks Paper, cardboard, plastic materials
Electronics Stores	Sim Lim Tower	Electronics supplies (Eg. wire, batteries, battery holders, buzzers, LEDs, switches)

Note: This list is provided for reference only, and is not an endorsement of any of the suppliers listed.

Online Resources

There are many resources online where you can find more ideas for projects to do with students. Here are some of them:

- **Tinkering Studio**
(tinkering.exploratorium.edu)
- **Instructables**
(www.instructables.com)
- **Toys From Trash**
(www.arvindguptatoys.com/toys.html)
- **Design Squad**
(pbskids.org/designsquad)

SCSA 2017

Submission of Toys

When submitting toy entries for SCSA 2017, the packaging is crucial. As the toys will be transported around through the various stages from submission to judging, toys should be securely packaged and clearly labelled to prevent any missing parts or mix-up with other entries.

- **Test toys** repeatedly before submitting them. Secure any flimsy parts properly. Make sure the judges will be able to witness the wonders of the student's creation!
- For battery-powered toys, do remove the **batteries** and ensure the toy is **switched off** prior to submitting. Pack batteries in a separate bag.
- **Label all toys** with the provided SCSA sticker labels (ScizKid or WhizKid). Sticker labels should be on the toy itself instead of the packaging. Do label all toy parts with the name and school to ensure the toy parts can be identified easily.
- **Entry forms** (in SCSA leaflet) should be packaged with each individual toy.
- **Securely package** all toy parts with the entry form in either a transparent ziplock bag or a box (max size A3 i.e. 45cm X 30cm X 22.5cm). There must be only one toy per container (multiple toys, each in its container, can be placed in a bigger box for transport purposes). Do not simply place the toy in an open-ended paper bag as the toy may fall out.
- **Label the boxes** with the full **school names** for easy recognition during submission and also when collecting the toys after the competition.



Proper labelling on a visible part of toy.



Good labelling of school name on the boxes.

Final Judging Interviews

Shortlisted students will be informed via the schools by mid-June. The shortlisted students will be scheduled for an interview with our judges in Science Centre Singapore, before the winners are decided.

The interview will be held with a panel of maximum 4 judges. The student will present on the toy that she/he has made using a poster, explaining the design of the toy and the scientific concept that is illustrated with the toy. The judges will interview the students regarding their toy-making journey and their understanding of the science concepts.



Students at the Final Judging Interviews for SCSA 2016.

Awards Ceremony & Exhibition

Results of the SCSA 2017 will be announced at the Awards Ceremony and awarded by distinguished guests. Family and friends of the shortlisted students will all be invited to the event. Shortlisted toys will also be exhibited at the exhibition held in conjunction with the ceremony, where students can then visit and experience the outstanding toys that other students had created. The posters created by the students and used for the final judging interviews will also be displayed.



Guest-of-honor giving the opening speech at the SCSA 2016 Awards presentation ceremony and visiting the shortlisted students at the exhibition.

After SCSA

So what happens after conducting SCSA (Schools) and taking part in SCSA 2017? We hope that creative toy-making will not stop at SCSA for your school.

- **Display Winning Toys**

Schools with winning or shortlisted toys in SCSA can display the toys in school and let other students have a go at playing with the toys. This also inspires other students to embark on their very own toy project.

- **Toy-Making Holiday Project Work**

Set students some fun holiday homework in the form of a toy-making project! Instead of worksheets, let students work on a physical problem instead which they can eventually play with. This encourages students to engage in constructive play during their holidays.

- **Science Toys Demonstration**

The science toys created are great engaging demonstrations for students during science lessons. Students can easily visualise the concepts and even recreate it themselves.

Checklist



SCSA (SCHOOLS)


1. **Plan** and discuss with your school on how your SCSA (Schools) will be carried out.
2. **Register** for SCSA (Schools).
3. **Publicise** the competition to students and **inform** the parents.
4. **Conduct** your own **workshops** or sign up for the workshops organised by us.
5. **Check on students' toy progress.** Additional activities can be conducted after class to assist students in their making of their toy.
6. **Collect** submissions from students.
7. **Judge** the toy submissions to select the winning toys. Take more photos of the process!
8. **Present** the **certificates of participation** and **prizes** to student participants.
9. **Submit Report of Progress** using Form B and send us any **photos and/or videos** taken throughout your SCSA (Schools). **Nominate** you or your colleague for the Blue Ribbon and Diamond Award!
10. **Pack and submit** winning toys for SCSA 2017.
11. If students are shortlisted for SCSA 2017, inform the parents of the **final judging interviews.**
12. **RSVP for SCSA Award Ceremony and Exhibition** in July. Arrange for your students to come down and be inspired by the other students' creations.

Good luck and have lots of fun!

See you at the Awards Ceremony and Exhibition.


Website


Latest updates on the competition can be obtained from:

 www.science.edu.sg/scsa

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