

Details of Winning Projects from Singapore Teams

1. Sustainability Challenge

Participating teams proposed an innovative solution to a sustainability issue in their local context. The teams trialled their idea and prepared a video presentation for their project. These projects have been published on the APT JSO website (<https://9thaptjso.org>).

Awardees	Sustainability Challenge Project
<p>Cedar Girls' Secondary School</p> <p>(Gold Award in Sustainability Challenge)</p>	<p>Project Title: Food Fashion</p> <p>Project Description: Food and textile waste is an issue that can lead to detrimental impact on the environment. The team from Cedar Girls' Secondary came up with a solution to repurpose food waste into fabric to reduce material footprint.</p> <p>Extracting organic fibres, scientifically known as Cellulose Fibres, from waste bread, bananas, and orange peels, the team expertly turned these samples into strings and bioplastics.</p> <p>These organically crafted materials' degree of strength, elasticity and absorption were put to the test. The team's goal was to find the best alternative for T-shirts used in physical education classes. After conducting various tests, the team discovered that samples made from bananas could withstand higher tension, elasticity, and absorbency than polyester.</p> <p>The team's finding can potentially fuel development in green fabric production, and combat food and textile waste by replacing synthetic fibres with cellulose fibres.</p>
<p>Pasir Ris Secondary School</p> <p>(Silver Award in Sustainability Challenge)</p>	<p>Project Title: Saponification</p> <p>Project Description: In alignment with the United Nations' Sustainable Development Goal 12, "responsible consumption and production", the team aimed to use saponification to reduce used-oil waste going to landfills.</p> <p>The idea was to convert used oil into soap to cut down the amount of waste (used oil) going to landfills. Upon</p>

	<p>testing, they found that their soap was not only effective in reducing bacterial growth, but also had similar or even more effective antibacterial properties as compared to other soaps available on the market. They also discovered that scent (alcohol with aromatic compounds of soap) and ethanol together further enhanced the effectiveness of their soap.</p> <p>The team plans to implement their findings within their school for any wipe-down purposes or as liquid hand soap use. Eventually, they intend to expand its use to the wider community.</p>
<p>Singapore Chinese Girls' School</p> <p>(Silver Award in Sustainability Challenge)</p>	<p>Project Title: Waterproof DIY bin liner with plant latex and oil</p> <p>Project Description: The project's aim was to find an alternative to plastic bags used to line trash bins. Their project highlights the global problem of the excessive use of plastic bags, and this gave inspiration to the team to replace plastic bags with waterproof newspaper.</p> <p>The team experimented with different types of plant latex and used cooking oil to design their prototype. They hope that their product would substantially reduce waste generation and promote plastic bag reuse.</p>
<p>Raffles Institution</p> <p>(Silver Award in Sustainability Challenge)</p>	<p>Project Title: Aquaponics in a School Setting</p> <p>Project Description: Wanting to explore sustainable ways of growing plants and producing food, the team set up a small-scale aquaponics system in a greenhouse to produce both fish and vegetables. The team hopes to build a sustainable mini ecosystem.</p> <p>Their system consists of red tilapia in a fish tank and kale in a hydroponics system. Water from the fish tank was filtered and pumped into the hydroponics system, before being returned to the tank. After two months of experimentation, the team discovered that the fishes grown had increased in size, but the kale did not grow well. The team then installed lights to increase the rate of photosynthesis and added seaweed fertiliser to provide additional nutrients.</p>

2. Science Process Skills Challenge

Participating teams were given two questions to solve at their local venue. The first question involved investigating and determining settings to optimise the power output from solar cells, and the second question required students to trial an approach to sort and identify plastics for recycling.

The four school teams representing Singapore from Cedar Girls' Secondary School, Pasir Ris Secondary School, Raffles Institution, and Singapore Chinese Girls' School were awarded Silver in this Challenge.