Ask Good Questions, Get Good Answers

What do you love? What are you good at? What problem do you want to solve?

That was Google's invitation to the fourth annual Google Science Fair. Students answered by the thousands. Projects poured in from 120 countries. In September, judges chose the winners.

Canada's Hayley Todesco was one of them.

■ Water from waste

"I love nature. I'm good at building things. I want to help save the planet."

Hayley won the 17-18 age group and the Local Award, given to a project that tackles an important local issue. The Calgary teen found a faster way to clean up toxic oilsands tailings.

Tailings are the waste left over after oil is extracted from the Earth. They're stored in large, man-made lakes. In 2010, tailings ponds covered 176 square kilometres. By 2020, they'll take up 250 square kilometres.

■ A lesson that stuck

Hayley thought back to Grade 5. A speaker told her class about a 200-year-old method for cleaning drinking water by filtering it through sand and bacteria. The students tried it out using pop bottles and sand.

"We put muddy water in the top and it came out totally clean. That was my eureka moment."

Would it work on tailings?

It took two years to do the testing and analyze the results. But her simple, low-cost method breaks down the toxins 14 times faster. Clean-up time could drop from centuries to decades.

■ Feed the world

"We love microbiology. We're good at growing things. We want to aid the food crisis."

People told a trio of Irish girls that their idea to make seeds sprout faster wouldn't work. But Ciara Judge, Émer Hickey and Sophie Healy-Thow didn't listen.

Not only did it speed germination by up to 50 percent, it increased the harvest by up to 75 percent. It also won them the $50,000 grand prize and the 15-16 age group. They hope the technique will reduce world hunger.

Sophie said, "Knowing our work may be able to help farmers all over the world is absolutely amazing."

■ Ideas taking flight

"I love robotics. I'm good at coding. I want to help flying robots save lives."

A Pittsburgh boy won the 13-14 age group and the new Computer Science Award. Mihir Garimella programmed his flybot to dodge moving objects like a fruit fly.

"Nature has already solved a lot of the problems we're trying to solve in robotics. Fruit flies are actually able to escape within about 300 milliseconds—faster than we can blink our eyes."

He hopes the technique will help search-and-rescue drones spot and avoid danger.

■ Voters choose TALK

"I love robots. I'm good at computer science and maths. I want to change the world."

Arsh Dilbagi, 16, won the $10,000 Voter's Choice Award. The Indian teen invented a pocket-sized device called TALK for people who can't speak. It converts puffs of breath into speech. The aid is inexpensive and 300% faster than other devices.

■ Safe and sound

"I love solving problems. I'm good at daydreaming. I want to help our aging society."

Kenneth Shinozuka's grandfather inspired his winning project. Alzheimer's made his granddad wander at night. So Kenneth designed a sensor that slips into his sock. When his granddad's feet hit the ground, it sends an alert to his aunt's phone. She wakes up before he can get hurt.

This practical invention earned the New York boy the $50,000 Scientific American Science in Action Award.

■ Your turn

Inspired yet? Think. Dream. Create!