**Results of 21st International Elementz Fair**

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| **GROUP A** | |  | |
| Group Code | Awards | School Names | Project Titles |
| A2 | Merit | Dunman High School | Linking River Water Quality to Landuse |
| A3 | Silver | St. Joseph's Institution | Feasibility of an Oil-Waterfall Graphic Curtain |
| A4 | Silver | Riverside Secondary School | Investigating the effect of preservatives on food decay |
| A5 | Merit | School of Science and Technology, Singapore | Investigation of the humidity on the visibility of a light source |
| A6 | Gold | Fuhua Secondary School | Investigating which bubble tea brand has the lowest sugar level |
| A7 | Merit | Jurong West Secondary School | Robotic Laundry Machine ( from washing machine to drying poles ) |
| A8 | Merit | Singapore Chinese Girls' School | Microfuel cell |
| A9 | Gold | Sembawang Secondary School | Effect of colour of light on growth of plants |
| A11 | Bronze | Raffles Girls' School (Secondary) | How supplementation of *Lactobacillus casei* to the diet can affect 𝛃-amyloid accumulation |
| A12 | Bronze | Christ Church Secondary School | Portable Uroflometry |

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| **GROUP B** | |  | |
| Group Code | Awards | School Names | Project Titles |
| B1 | Merit | School of Science and Technology, Singapore | Investigation of the factors on the range of a water rocket |
| B2 | Merit | Pasir Ris crest secondary school | Investigating the Possibility of Creating a Biodegradable plastic that can be used as fertiliser out of fruit and vegetable waste |
| B3 | Merit | Jurong West Secondary School | Automatic Window Pane Cleaning Mechanism |
| B5 | Silver | St. Joseph's Institution | Effects of different types of micro-plastics on morphology and swimming behaviour of *Paramesium* species |
| B6 | Bronze | Anderson Secondary School | To investigate which household product will extend shelf-life of bananas |
| B7 | Silver | Vinschool Education System | C. militaris fungus Hybridization |
| B8 | Gold | Raffles Girls' School (Secondary) | Effect of krill oil on accumulation of 𝛃-amyloid in Caenorhabditis elegans |
| B9 | Bronze | Chung Cheng High School (Yishun) | Investigating the Legitimacy of the Five-seconds Rule |
| B10 | Gold | Nan Chiau High School | Yeast Strains in Cotton-Derived Biofuel |
| B11 | Merit | Singapore Chinese Girls’ School | Bioplastic |
| B12 | Silver | CHIJ St Nicholas Girls’ School | Comparing effectiveness of synthetic antibacterial Soaps in killing *E. coli* bacteria with plant-based alternatives |

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| **GROUP C** | |  | |
| Group Code | Awards | School Names | Project Titles |
| C1 | Gold | River Valley High School | Conversion of Rainwater to Electricity in Singapore’s High Rise Buildings |
| C2 | Bronze | Edgefield Secondary School | Study of the production of biogas from food waste |
| C3 | Merit | CHIJ St Nicholas Girls’ School | Effects of Tea Tree Oil on Bacteria Growth |
| C4 | Merit | School of Science and Technology, Singapore | Investigation of the effect of height of a damper on the vibrational amplitude of a wooden cane |
| C5 | Silver | Chung Cheng High School (Yishun) | Investigating Effects of Different Types of Milk on Cottage Cheese |
| C6 | Merit | Montfort Secondary School | How do different types of sand affect the height at which its collapses after being stacked above each other? |
| C7 | Gold | Catholic High School | Evaluating chitosan and alginate packaging as a potential way to replace plastic packaging |
| C8 | Bronze | St. Joseph’s Institution | Investigating the effects of conservation of angular momentum on the flight of helicopter |
| C9 | Bronze | Singapore Chinese Girls’ School | Investigative study of the flight of the shorea seed |
| C10 | Silver | Kranji Secondary School | Optimising Diezoelectricity |
| C11 | Merit | Yio Chu Kang Secondary | Powering Mass Rapid Transit (MRT) Trains using Wind Energy |
| C12 | Silver | Springfield Secondary School | Solar disinfection of water (SODIS): An investigation on the amount of time required for effective pathogen inactivation |

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| **GROUP D** | |  | |
| Group Code | Awards | School Names | Project Titles |
| D1 | Silver | Yio Chu Kang Secondary | Exploring the incorporation of Solar Cells and PDLC films on windows to reduce temperatures in classrooms |
| D2 | Gold | Woodlands ring secondary school | Building an Omnidirectional Four Wheels Robot with the Ability of Object Tracking and Following |
| D3 | Gold | Compassvale Secondary School | Investigation on the efficacy of biosorbent in purifying water |
| D4 | Merit | Fuchun Secondary School | Optimal Wing Area for Unpowered Glider |
| D5 | Bronze | CHIJ St Nicholas Girls’ School | Investigation of the parameters affecting the distance travelled and trajectory of a playing card |
| D6 | Bronze | Hwa Chong Institution (Sec section) | Rice Husk-derived Activated Carbon as an Eco-Friendly Adsorbent for Water Purification |
| D7 | Silver | Raffles Girls' School (Secondary) | Comparative studies on the supplement of various fatty acids for ameliorating cognitive and motor dysfunction in Drosophila melanogaster model of Alzheimer’s disease |
| D9 | Merit | Singapore Chinese Girls' School | Investigative study of the helicopter |
| D10 | Merit | School of Science and Technology, Singapore | Determination of Planck's constant using different LEDs |
| D12 | Merit | St. Joseph's Institution | Investigating the characteristics of the conducting line |

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| **GROUP E** | |  | |
| Group Code | Awards | School Names | Project Titles |
| E1 | Silver | St. Joseph's Institution | Bimetallic ammeter: Novel method of Current Measurement |
| E2 | Silver | Maris Stella High School | Ultrasonic Walking Stick For The Visually Impaired |
| E6 | Merit | Holy Innocents' High School | Bubble Tea Toppings? That’s sweet |
| E7 | Bronze | Singapore Chinese Girls' School | Investigation on how the language used when thinking affects the decisions made by the person |
| E8 | Merit | Chung Cheng High School (Yishun) | Investigating the Effects of Solutions on the Rate of Browning in Fruits |
| E9 | Merit | CHIJ St Nicholas Girls' School | Investigation on Bacteria Growth in Straws made of different materials |
| E10 | Merit | Yio Chu Kang Secondary | To investigate the amount of electricity produced by the photosynthesis of different water plants |
| E11 | Bronze | Catholic High School | Effect of desalination brine on growth of Artemia salina |
| E12 | Gold | Hwa Chong Institution (Sec section) | Fabrication of Microbial Fuel Cells Powered by Organic Waste and Wastewater to Generate Bioelectricity |

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| **GROUP F** | | |  | | |
| Group Code | Awards | School Names | | Project Titles |
| F1 | Gold | School of Science and Technology, Singapore | | Determination of the mass of Saturn |
| F2 | Merit | Fuhua Secondary School | | Investigating whether there is nutritional loss in cut fruits over time. |
| F3 | Gold | Hwa Chong Institution (Sec section) | | Hydrogen functionalization of graphene using RF plasma for photodetection |
| F4 | Silver | Kranji Secondary School | | Investigating the venturi effect |
| F5 | Merit | Singapore Chinese Girls' School | | Investigating the ability of subliminal messages to influence thoughts and behaviours |
| F6 | Silver | Maris Stella High School | | Acquiring Potable Water through Systematic Filtration |
| F7 | Bronze | CHIJ St Nicholas Girls' School | | Comparing sugar levels in different types of tea beverages |
| F8 | Merit | Pasir Ris Crest secondary school | | Comparing the Impact of Acid Rain on Acid-Resistant Paint versus Normal Paint |
| F10 | Merit | Yishun Secondary School | | Investigation of generating electricity using biodegradable materials |
| F11 | Bronze | Assumption English School | | The Cost Benefit Analysis of Renewable Energy Infrastructures for Public Housing |

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| **GROUP G** | |  | |
| Group Code | Awards | School Names | Project Titles |
| G1 | Gold | Raffles Girls' School (Secondary) | Evaluating the Effect of Lactobacillus casei on Parkinsons’ Disease in Caenorhabditis elegans |
| G3 | Merit | Singapore Chinese Girls' School | Comparing the properties of SAP |
| G4 | Merit | Yio Chu Kang Secondary | Chemical fertilizers vs Natural fertilizers |
| G5 | Bronze | Bui Thi Xuan High School, Ho Chi Minh City, Viet Nam | Cytotoxic activity and phytochemical investigation of the ethyl acetate extract from *Macrosolen bidoupensis Tagane* & V.S. Dang |
| G6 | Merit | Edgefield Secondary School | Study of superhydrophobic coatings on the anti-corrosion of guitar strings. |
| G7 | Silver | Catholic High School | Investigating the factors affecting the power output of Microbial Fuel Cells |
| G8 | Merit | Woodlands ring secondary school | Using Sound Waves to Identify Fake Wine |
| G9 | Silver | Holy Innocents' High School | Modelling Wi-Fi Propagation in a HDB Flat |
| G10 | Silver | Maris Stella High School | Natural Air Filter Using *Sansevieria trifasciata* |
| G11 | Bronze | CHIJ St Nicholas Girls' School | How organic materials that contain 5-HMF can remove stench of durian |
| G12 | Gold | Hwa Chong Institution (Sec section) | Synthesis of Magnetic Carbonised Banana Peel as a Versatile and Reusable Adsorbent for Water Purification |

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| **GROUP H** | |  | |
| Group Code | Awards | School Names | Project Titles |
| H1 | Merit | Singapore Chinese Girls' School | Comparing the effectiveness of substances on removing stains |
| H2 | Merit | Chung Cheng High School (Yishun) | Investigating the effects of different mixture of soil ingredients on the growth of plant |
| H3 | Bronze | Catholic High School | Effect of prebiotics on recovery rate of gut bacteria |
| H4 | Silver | Raffles Girls' School (Secondary) | Assessing TCM effects on cell division using garlic roots |
| H6 | Gold | Compassvale Secondary School | Investigating an alternative energy source from fruit peels |
| H7 | Gold | Yio Chu Kang Secondary | Is Soapnut an effective organic washing agent? |
| H9 | Silver | Riverside Secondary School | Investigating the strength of different starch based bioplastics |
| H10 | Merit | Montfort Secondary School | The effect of Wifi on the growth of plants. |
| H11 | Silver | Edgefield Secondary School | Study of superhydrophobic coatings for applications in anti-slip tiles. |
| H12 | Merit | Pasir Ris crest secondary school | To investigate the effectiveness of removing fish blood |

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| **GROUP I** | |  | |
| Group Code | Awards | School Names | Project Titles |
| I1 | Bronze | Princess Chulabhorn Science High School Chiang Rai | The Study of the Concentration of Sodium Chloride Solutions and Duration on the Efficiency of Chromosome Dye from *Tachardia lacca* , *Vigna unguiculata* *subsp.sesquipedalis* , *Kaempferia parviflora* and *Eleutherine palmifolia*. |
| I2 | Silver | River Valley High school | Genome-Wide Study of Gene-Diet Interaction Effects on Leukocyte Telomere Length in the Singapore Chinese Population |
| I3 | Bronze | Mahidol Wittayanusorn School | Development of molecular markers to identify Thai herbs at species level authentication |
| I4 | Merit | Nguyen Tat Thanh high school | Evaluation of Larvicidal Effect of the extract of Latana Camara against mosquito larvae Anopheles dirus |
| I5 | Silver | Millennia Institute | Impact of seagrass habitat on bivalve population |
| I6 | Merit | Nguyen Tat Thanh high school | Air quality measurement system and survey results on the concentration of CO2 gas and fine dust Pm2.5 in 3 areas |
| I7 | Gold | Hwa Chong Institution (College Section) | Investigating different stress-relief methods using electroencephalogram (EEG) |
| I8 | Merit | Anderson Serangoon Junior College | Testing the effects of the exposure to magnetic fields for zebrafish |
| I9 | Merit | Princess Chulabhorn Science High School Chiang Rai | Electricity Monitoring system with IoT. |
| I10 | Silver | Mahidol Wittayanusorn School | Prediction of concentration using K-Nearest Neighbor process |
| I11 | Bronze | Anderson Serangoon Junior College | Investigate the efficacy of natural disinfectants against common bacteria |
| I12 | Bronze | River Valley High School | Fake News Detection on Twitter: A Content Based Approach |
| I13 | Merit | Anderson Serangoon Junior College | Using *Bacillus thuringiensis* to control cockroach population in households |
| I14 | Gold | Nguyen Tat Thanh high school | Study on creating synthetic materials Fe3O4 / go orientations for applications in the renewable energy fields |
| I15 | Merit | Anderson Serangoon Junior College | Modelling of Lasers |

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| **GROUP J** | | |  | |
| Group Code | | Awards | School Names | Project Titles |
| J1 | | Merit | Princess Chulabhorn Science High School Chiang Rai | RGB Spectrophotometer |
| J2 | | Merit | Anderson Serangoon Junior College | Building a Model to Provide Optimal Travel Routes for Commuters in Singapore |
| J4 | | Silver | Mahidol Wittayanusorn School | Electronic structures and the nature of the bonding of Ni6-x Fex (x = 0 – 6) clusters using DFT calculation |
| J5 | | Gold | River Valley High School | Design and Development of 3D-Printed Functionally Graded Structures for Broadband Sound Absorption |
| J6 | | Silver | Mahidol Wittayanusorn School | Alcoholic fermentation enhancement using Flammulina velutipes stipe |
| J7 | | Bronze | Anderson Serangoon Junior College | Compare Stock Investment Strategies Involving Financial Indicators |
| J8 | | Merit | Nguyen Tat Thanh high school | Developing birds deterrent devices in takeoff-landing area in Vietnamese airports |
| J9 | Merit | Princess Chulabhorn Science High School Chiang Rai | The efficiency of inhibition the growth of weeds by allelopathy extract from Little ironweed in different solvents |
| J10 | Merit | Anderson Serangoon Junior College | Artistic Transformation of In2O3 Nanowires via Focused Laser Painting |
| J11 | Gold | Vinschool Education System | Solar panels |
| J12 | | Bronze | Dunman High School | What motivates our judgment of Eloquence? Application of Face Recognition Techniques |
| J13 | | Silver | Anderson Serangoon Junior College | Investigating the growth of *Clitoria ternatea* in cell suspension culture |
| J14 | | Bronze | River Valley High School | Impacts of Growing Media on Productivity and Nutritional Quality of *Raphanus sativa* Microgreens and Baby Greens |