**SACE Stage 1 Physics Program 1 – Semester One**

This program articulates with LAP 1

| **Week** | **Topic** | **Science Understanding and Activities** |
| --- | --- | --- |
| **Linear Motion and Forces** |
| 1 | Vectors and Scalars | * Compare vector and scalar quantities
	+ <https://phet.colorado.edu/en/simulation/legacy/maze-game>
* SI units and unit conversions
 |
| 1 | Constant velocity | * Speed and velocity
* Calculate velocity using equations and graphical means (SIS)
	+ <https://phet.colorado.edu/en/simulation/legacy/moving-man>
	+ Motion sensors (SIS)
* Instantaneous and average velocity
 |
| 2 | Acceleration | * Calculate acceleration using equations and graphical means (SIS)
	+ <https://phet.colorado.edu/en/simulation/legacy/moving-man>
	+ Motion sensors
 |
| 2-3 | Motion under constant acceleration | * Equations of motion
* Acceleration due to gravity
	+ Determine acceleration due to gravity experimentally (SIS)
* Rearranging equations
 |
| 4-5 | Newton’s Laws of Motion | * Introduce Newton’s Laws of Motion
	+ Investigate Newton’s Laws experimentally (SIS)
	+ <https://phet.colorado.edu/en/simulations/category/physics/motion>
* Friction (SHE)
 |
| 6 | **SHE Task** | * Transport
 |
| 7 | **SAT** | * Motion and forces test
 |
| **Electrical Circuits** |
| 8 | Electrical Charge | * Charge and forces between charged objects
	+ van der Graaf generator
* Conductors and Insulators (SHE)
 |
| 9 | Current and Potential | * Electrical Current
* Potential difference
	+ <https://phet.colorado.edu/en/simulations/category/physics/electricity-magnets-and-circuits>
 |
| 9 | Resistance | * Ohm’s Law
 |
| 10 | Circuits | * Using multimeters (SIS)
* Analysing series and parallel circuits
	+ Construct and analyse circuits (SIS)
* Ohmic and non-ohmic conductors
 |
| 11 | **Practical Investigation**  | * Ohmic and non-ohmic conductors
 |
| 12 | Power | * Power
* Power and energy units
	+ Home energy audit kit (SHE)
 |
| **Heat** |
| 13 | Heat Energy and Temperature | * Temperature (Particle model)
* Heat Energy
	+ Eureka! Heat video series (available on YouTube)
 |
| 13 | Heat transfer | * Heat (flow and equilibrium)
* Conduction
	+ Investigate conduction of heat through various metals (SIS/SHE)
* Convection
	+ Demonstrate convection using permanganate crystals (SIS)
* Radiation (SHE)
 |
| 14 | Thermal expansion | * Thermal expansion (Particle model)
	+ Demonstrate thermal expansion using ball and ring apparatus
* Bimetallic strips and thermostats
	+ Investigate various metal combinations in bimetallic strips (SIS)
 |
| 15 | Heat Capacity | * Heat Capacity
* Electrical heating (linking Electrical Circuits and Heat topic)
	+ Determine heat capacity of water using electric kettle (or calorimeter) (SIS)
 |
| 16 | **SAT** | * Electrical Circuits and Heat Energy Test
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