**SACE Stage 1 Physics Program 4**

This program articulates with LAP 4

| **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 | Velocity | * Speed and velocity
* Calculate velocity using equations and graphical means
	+ <https://phet.colorado.edu/en/simulation/legacy/moving-man>
	+ Motion sensors
* 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
* 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
 |
| 6 | **SHE Task** | * Transport
 |
| 7 | **SAT** | * Motion and forces test
 |
| **Energy and Momentum** |
| 8 | Work, energy and power | * Work and Energy
* Power
 |
| 8 | Potential and kinetic energy | * Gravitation potential energy
* Kinetic energy
 |
| 9 | Conservation of energy | * Conservation of energy
	+ Experimentally investigate conservation of energy using motion sensors and falling objects of inclined tracks. (SIS)
	+ <https://phet.colorado.edu/en/simulation/legacy/energy-skate-park>
 |
| 10 | Momentum | * Momentum
 |
| 11 | Conservation of momentum | * Conservation of momentum
	+ Investigate collisions of explosions using air track or motion carts (SIS)
	+ <https://phet.colorado.edu/en/simulation/legacy/collision-lab>
* Elastic and inelastic collisions
 |
| 12 | **SAT** | * Energy and momentum test
 |
| **Waves** |
| 13 | Wave Model | * Wave model
* Transverse and longitudinal waves
	+ Demonstrate using slinky spring
* Frequency, period, wavelength, and amplitude
* Wave equation
 |
| 14 | Mechanical Waves | * Sound Waves
	+ Bell jar demonstration
* Resonance (SHE)
* Superposition and interference
	+ Ripple tank
	+ https://phet.colorado.edu/en/simulation/legacy/wave-interference
 |
| 15-16 | Light | * Electromagnetic waves
	+ Mobile phone in bell jar demonstration
* Electromagnetic spectrum
* Reflection and refraction (Snell’s Law)
	+ Optics experiments using light box (SIS)
* Diffraction
* Polarisation
	+ Polaroid filters (or sunglasses) (SHE)
 |
| 17-18 | **Practical Investigation** | * Pendulum investigation
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