**SACE Stage 1 Physics Program 4**

This program articulates with LAP 4

| **Week** | **Topic** | **Science Understanding and Activities** |
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| **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 |