**SACE Stage 1 Physics Program 2**

This program articulates with LAP 2

| **Week** | **Topic** | **Science Understanding and Activities** |
| --- | --- | --- |
| **Linear Motion and Forces** | | |
| **Energy and Momentum** | | |
| 1 | Work, energy and power | * Work and Energy * Power |
| 1 | Potential and kinetic energy | * Gravitation potential energy * Kinetic energy |
| 2 | 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> * Energy efficiency |
| 3 | Momentum | * Momentum |
| 4 | 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 |
| 5 | **Practical Investigation** | * Conservation of energy |
| 6 | **SAT** | * Energy and momentum test |
| **Waves** | | |
| 7 | Wave Model | * Wave model * Transverse and longitudinal waves   + Demonstrate using slinky spring * Frequency, period, wavelength, and amplitude * Wave equation |
| 8 | Mechanical Waves | * Sound Waves   + Bell jar demonstration * Resonance * Superposition and interference   + Ripple tank   + <https://phet.colorado.edu/en/simulation/legacy/wave-interference> |
| 9 | 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) |
| 10-11 | **SHE Task** | Communication |
| **Nuclear Models and Radioactivity** | | |
| 12 | Nucleus | * Structure of the atom   + <https://phet.colorado.edu/en/simulation/build-an-atom> * Atomic symbols * Forces within the nucleus   + <https://www.youtube.com/watch?v=mpDDQ4uEH6M> |
| 13 | Radioactive decay | * Unstable nuclei * Alpha decay   + <https://phet.colorado.edu/en/simulation/legacy/alpha-decay> * Beta decay   + <https://phet.colorado.edu/en/simulation/legacy/beta-decay> * Gamma decay |
| 14 | Radioactive half-life | * Random nature of decay * Constant probability of decay and half-life   + Simulate decay using dice * Activity   + Use Geiger counter to test activity of various samples (SIS/SHE) * Estimating age using radioisotopes   + <https://phet.colorado.edu/en/simulation/legacy/radioactive-dating-game> |
| 15 | Properties of ionising radiation | * Penetrating ability   + Use Geiger counter to investigate penetration of various radiation through various materials * Ionising ability |
| 15 | Radioactivity and health | * Somatic effects (SHE) * Genetic effects * Medical applications   + ANSTO website |
| 16-17 | Extension –Standard Model | * Introduce fundamental particles of Standard Model * Structure of proton and neutron * Fundamental forces * Anti-particles and annihilation/pair production * Beta decay (introduce neutrino/antineutrino)   + <http://www.particleadventure.org/index.html> |
| 18 | **SAT** | * Nuclear Models and Radioactivity test |