

List of SEP Experiments

No	Name	Targeted Students	Description	Topic
1	Who Can Jump	P5-P6	Introduce the concept of velocity and acceleration. Use accelerometer to show the relationship between force and acceleration. <u>Game:</u> Find the student who can jump vertically with the largest recorded acceleration.	Force and Motion
2	Who Can Balance	P5-P6	Introduce the concept of gyroscope and use it to estimate the rotational motion of the body. <u>Game:</u> Identify the student who can show the best balancing skills in a race.	Force and Motion
3	Who Can Breathe	P5-P6	Introduce the concept of respiration. Use CO ₂ gas sensor to measure CO ₂ concentration in breath before and after exercises. <u>Game:</u> Identify the student who can exhale the highest concentration of CO ₂ after exercise within a given period.	Heat and Gases
4	Reflection of Light	P5-P6	Introduce the concept of reflection of light using mirrors. <u>Game:</u> Reflect the laser beam from the source to the detector using mirrors in the shortest time possible	Wave Motion (Light)
5	Sound Generation	P5-P6	Introduce the concept of sound frequency (pitch). <u>Game:</u> Generate a sound at a frequency that closely matches the set value.	Wave Motion (Sound)
6	Detection of Temperature	P5-P6	Introduce the concept of temperature and temperature scale. <u>Game:</u> Identify the student who can achieve the largest temperature difference by rubbing a rod in a given period.	Heat and Gases
7	Strongest Magnetic Field	P5-P6	Introduce the concept of producing a magnet field by passing current along a solenoid. <u>Game:</u> Build a solenoid and maximize its magnetic field by inserting different metal rods into the solenoid.	Electricity and Magnetism
8	Creating a Resistor Using Pencil and Paper	P5-P6	Introduce the concept of current, voltage and resistor. <u>Game:</u> Create a resistor of specific resistance using pencil and paper clip to achieve a desired current in a simple circuit.	Electricity and Magnetism

9	Demonstration of Internal Reflection of Light	F1-F3	Perform practical work about total internal reflection of light. Investigate a “light bending” water jet.	Wave Motion (Light)
10	Introduction to Decibel (dB)	F1-F3	Learn about the decibel as a unit for measuring sound loudness. Find out how the loudness of a note changes with distance from the source. <u>Game</u> : Create a sound with a desired dB level.	Wave Motion (Sound)
11	Difference between Series and Parallel Circuits	F1-F3	Measure the current and voltage in a series circuit and parallel circuit consisting the same number of resistors. Compare the difference of their equivalent resistance values.	Electricity and Magnetism
12	Thermal Conductivities of Different Materials	F1-F3	Introduce the concept of thermal conductivity. This activity will compare the thermal conductivities of various materials.	Electricity and Magnetism
13	Thermal Conduction in Iron	F1-F3	Introduce the concept of thermal conductivity in metal. Heat the iron rod and plot a temperature time graph to show the temperature change during the process. Different dimensions of iron rods will be used to see the effects of the cross-section areas and length of the rod on the temperature change profile.	Electricity and Magnetism
14	Electro-magnetism	F1-F3	Use sensors to measure solenoid's magnetic field strength. Investigate the factors affecting the strength and the polarity of the electromagnet (e.g. number of turns of the coil, length of iron bar).	Electricity and Magnetism
15	Factors Affecting the Resistance of a Resistor	F1-F3	Create resistor with different resistance values using pencil. Investigate the factors (for example, the length and cross-section area of the resistors) that will affect the resistance of the resistor.	Electricity and Magnetism

16	Boyle's Law	F4-F6	Investigate air pressure-volume relationship to determine Boyle's Law for gases	Heat and Gases
17	Charles's Law	F4-F6	Explore Charles's Laws by investigating the relationship between volume and temperature	Heat and Gases
18	Lussac's Law	F4-F6	Explore Lussac's Law by investigating the relationship between temperature and pressure	Heat and Gases
19	Ohm's Law	F4-F6	Verify Ohm's Law by analysing the V-I relationship to determine resistance	Electricity and Magnetism
20	Circular Motion	F4-F6	Use an accelerometer to investigate circular motion equations	Force and Motion
21	Simple Harmonic Motion	F4-F6	Use an accelerometer to investigate the simple harmonic motion of a pendulum	Force and Motion
22	Apparent Weight in Elevator	F4-F6	Use App to study acceleration effects on apparent weight	Force and Motion
23	Study of Friction Force Using Block Sliding on Inclined Plane	F4-F6	Use App to study friction's effect on different surfaces	Force and Motion
24	Impact upon Collision	F4-F6	Fix devices on carts, collide them, and observe relationship between momentum changes and impacts	Force and Motion
25	Light Intensity over Distance	F4-F6	Use sensor and App to measure light intensity from a single source at various distances	Wave Motion (Light)
26	Using a Resonance Tube to Find Speed of Sound in Air	F4-F6	Use mobile devices as sound analysers and generators to study standing waves inside a tube and measure sound speed	Wave Motion (Sound)
27	Young's Fringes of Sound Waves	F4-F6	Use device to observe interference pattern of sound waves, determine their wavelengths and speed	Wave Motion (Sound)