

## Overall Expectations:

**SIV.01** demonstrate scientific investigation skills (related to both inquiry and research) in the four areas of skills (initiating and planning, performing and recording, analysing and interpreting, and communicating);

**FRV.01** analyse and propose improvements to technologies that apply concepts related to dynamics and Newton's laws, and assess the technologies' social and environmental impact;

**FRV.02** investigate, in qualitative and quantitative terms, net force, acceleration, and mass, and solve related problems;

**FRV.03** demonstrate an understanding of the relationship between changes in velocity and unbalanced forces in one dimension.

## Specific Expectations:

**SI1.07** select, organize, and record relevant information on research topics from a variety of appropriate sources, including electronic, print, and/or human sources, using suitable formats and an accepted form of academic documentation;

**FR1.02** evaluate the impact on society and the environment of technologies that use the principles of force [AI, C];

**FR2.01** use appropriate terminology related to forces, including, but not limited to: *mass, time, speed, velocity, acceleration, friction, gravity, normal force, and free-body diagrams* [C];

**FR2.03** conduct an inquiry into the relationship between the acceleration of an object and its net force and mass, and analyse the resulting data [PR, AI];

**FR2.04** analyse the relationships between acceleration and applied forces such as the force of gravity, normal force, force of friction, coefficient of static friction, and coefficient of kinetic friction, and solve related problems involving forces in one dimension, using free-body diagrams and algebraic equations [AI, C];

**FR2.06** analyse and solve problems involving the relationship between the force of gravity and acceleration for objects in free fall [AI];

**FR3.01** distinguish between, and provide examples of, different forces (e.g., friction, gravity, normal force), and describe the effect of each type of force on the velocity of an object;

**FR3.04** describe, in qualitative and quantitative terms, the relationships between mass, gravitational field strength, and force of gravity.