Year 11 ATAR Physics Checklist + Revision Exercises 2019

Linear Motion:

- Distinguish between scalar and vector quantities, and *add and subtract vectors in one dimension*
  Hamper p. 36
  WACE Study Guide pp. 89-92
- uniformly accelerated motion is described in terms of relationships between measurable scalar and vector quantities, including displacement, speed, velocity and acceleration —this includes *applying the relationships*:

$$v_{av} = \frac{s}{t}, \qquad a = \frac{v - u}{t}, \quad v = u + at, \quad s = ut + \tfrac{1}{2}at^2, \quad v^2 = u^2 + 2as$$

  Hamper p. 37-48
  WACE Study Guide pp. 93-95
  Exploring Physics Set 14: 14.2, 14.4, 14.6, 14.8; Set 15: 15.1; 15.4, 15.8, 15.10, 15.11, 15.14, 15.16
- representations, including graphs, vectors, and equations of motion, can be used qualitatively and quantitatively to describe and predict linear motion

  Hamper p. 37-48
  WACE Study Guide pp. 84-97

- vertical motion is analysed by assuming the acceleration due to gravity is constant near Earth's surface

  Hamper p. 44-45 – but do <u>not</u> use the value of 9.81 m s^{-2}; the value for g on your data sheet is 9.80 m s^{-2}
  WACE Study Guide pp. 99-100
- Newton's three Laws of Motion describe the relationship between the force or forces acting on an object, modelled as a point mass, and the motion of the object due to the application of the force or forces

  Hamper p. 56,61-69
  WACE Study Guide pp. 103-108, 112-113
  Exploring Physics Set 16: 16.6, 16.8, 16.10, 16.12, 16.14
- free body diagrams show the forces and net force acting on objects, from descriptions of real-life situations involving forces acting in one or two dimensions

  This includes applying the relationships

$$\text{resultant } F = ma, \qquad F_{weight} = m\,g$$

  Hamper p. 52-60
  WACE Study Guide p. 116-117 (not good on free body diagrams)
  Exploring Physics Set 16: 16.1, 16.3, 16.5
- momentum is a property of moving objects; it is conserved in a closed system and may be transferred from one object to another when a force acts over a time interval

  This includes applying the relationships

$$p = m\,v, \qquad \sum mv_{before} = \sum mv_{after}, \qquad m\,v - m\,u = \Delta p = F\,\Delta t$$

  Hamper p. 61-62
  WACE Study Guide pp. 106-111,114-116
  Exploring Physics Set 17: 17.1, 17.3, 17.5, 17.8, 17.9, 17.10, 17.12, 17.15, 17.19, 17.22
- energy is conserved in isolated systems and is transferred from one object to another when a force is applied over a distance; this causes work to be done and changes the kinetic (E_k) and/or potential (E_p) energy of objects

  This includes applying the relationships

$$E_k = \tfrac{1}{2}m\,v^2, \qquad E_p = m\,g\,\Delta h, \qquad W = F\,s, \qquad W = \Delta E$$

  Hamper p. 69-72
  WACE Study Guide pp. 118-119
- collisions may be elastic and inelastic; kinetic energy is conserved in elastic collisions

  This includes applying the relationship

$$\sum \tfrac{1}{2}m\,v^2_{before} = \sum \tfrac{1}{2}m\,v^2_{after}$$

Hamper p. 82-83
WACE Study Guide p. 120
Exploring Physics Set 18: 18.1, 18.2, 18.3

- power is the rate of doing work or transferring energy

  This includes applying the relationship

$$P = \frac{W}{t} = \frac{\Delta E}{t} = F v_{av}$$

Hamper p. 84-85
WACE Study Guide pp. 121-123
Exploring Physics Set 18: 18.6, 18.8, 18.12, 18.13, 18.15, 18.19, 18.21

Science as a Human Endeavour:

Safety for motorists and other road users has been substantially increased through application of Newton's laws and conservation of momentum by the development and use of devices, including:

- helmets
- seatbelts
- crumple zones
- airbags
- safety barriers

WACE Study Guide has Linear Motion Review Questions pp. 124-128 and a Trial Test pp. 175-181