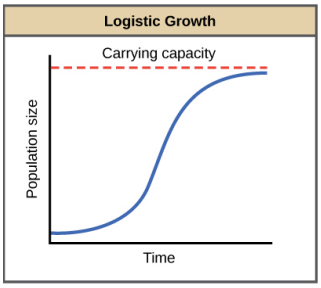
Week 11
Term 3
2019

HAWKER COLLEGE
Engage | Inspire | Achieve

Learning Brief
SM4

Goals



Source: https://goo.gl/KMmFbC

By the end of this unit, students:

- understand the concepts and techniques in applications of calculus and statistical inference
- apply reasoning skills and solve problems in applications of calculus and statistical inference
- communicate their arguments and strategies when solving problems
- construct proofs of results
- interpret mathematical and statistical information and ascertain the reasonableness of their solutions to problems.

This week:

Modelling motion:

- examine momentum, force, resultant force, action and reaction (constant and non-constant force)
- understand motion of a body under concurrent forces
- consider and solve problems involving motion in a straight line with both constant and non-constant acceleration, including simple harmonic motion and the use of expressions $\frac{dv}{dt}$, $v\frac{dv}{dx}$ and $\frac{d(\frac{1}{2}v^2)}{dx}$ for acceleration.

Theoretical Components

Read the notes and study the examples.
(Classroom/ABOUT/Resources/S2/Term3/WK09/10)

Further notes/examples:

- https://goo.gl/wuFhr
- https://goo.gl/y7omc7
- https://goo.gl/CghUJy
- https://goo.gl/TjH23H

Video Examples:

- https://goo.gl/3jYLqu
- https://goo.gl/Ot5itd
- https://goo.gl/tYWHU4
- https://goo.gl/T7OMZ4

Khan's Academy: https://goo.gl/4T2vps

Practical Components

Exercises: available in Google Classroom/ABOUT/Resources/S2/WK11

Investigation

A common class of mathematical models for dynamical systems is ordinary differential equations (ODEs). Mathematically, an ODE can take the following form:

$$\frac{dT}{dt} = k(T - T_0)$$

Present a scenario that can be represented by the above model. Be sure to have checked with your classmates to ensure that your chosen scenario is unique.

(3 -scenario, 4- uniqueness: 7 marks)

QFO

Quiz/Forum/Other

Keep checking G/Classroom for more resources.