

Goals

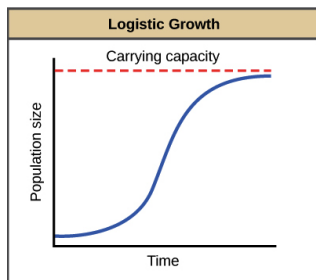
By the end of this unit, students:

- 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.



Source: <https://goo.gl/KMmFbC>

Theoretical Components

Read the notes and study the examples.
(Classroom/WK11)

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/S2/WK11

Investigation

Investigate about Newton's law of cooling and describe the following relationship:

$$\frac{dT}{dt} \propto (T - T_s)$$

The temperature inside a refrigerator is maintained at 5°C . An object at 100°C is placed in the refrigerator to cool. After 1 minute its temperature drops to 80°C .

How long would it take for the temperature to drop to 10°C ?

Show full working out.

Do you see any drawbacks for this model?

(20 marks)

QFO

Quiz/Forum/Other

Keep checking G/Classroom for more resources.