

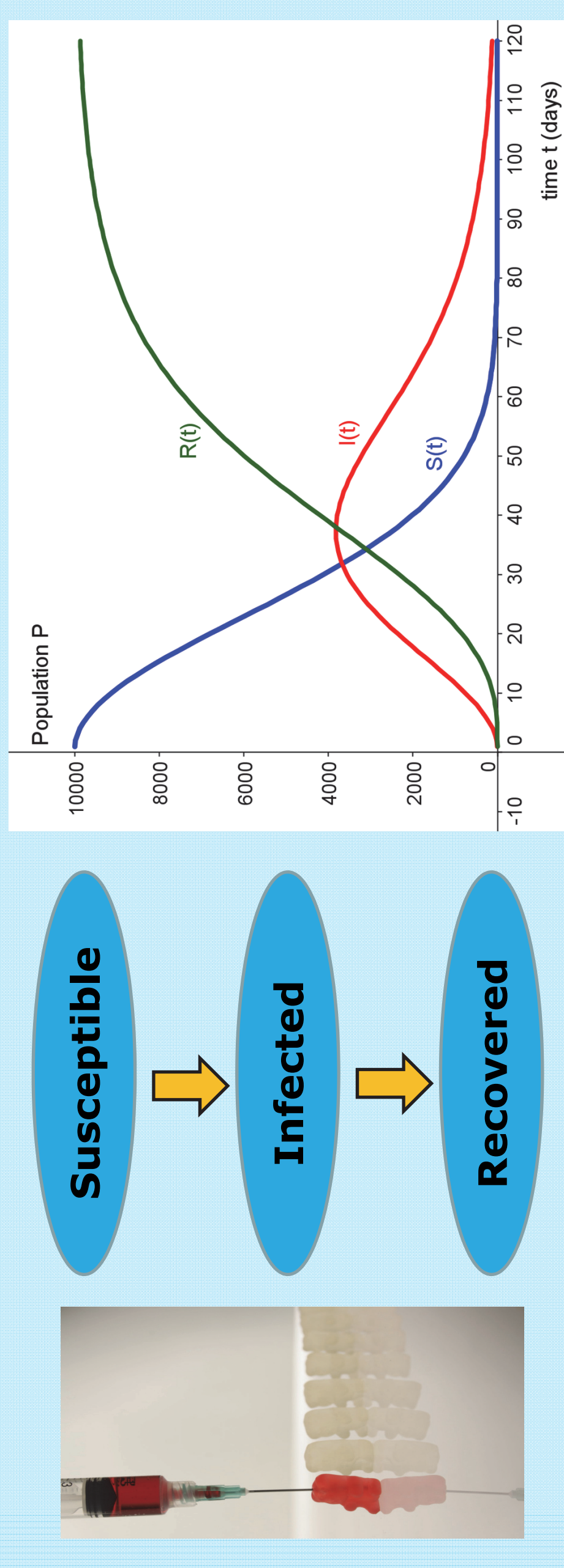
Improving students' views on the role of Mathematics for their future

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Research Questions

- What are the VWO students' views on the role of mathematics for their future study and career?
- What are the VWO students' views on the role of differential equations for their future study and career?
- How can we classify the interest and attitude of wiskunde D students towards science and mathematics?
- Do students with different interests have different views on the role of mathematics for their future study and career?
- What is the effect of differentiating by interest within a wiskunde D topic on students' views on the role of mathematics for their future study and career?

SIR model of epidemics (Biology / Biomedical engineering)

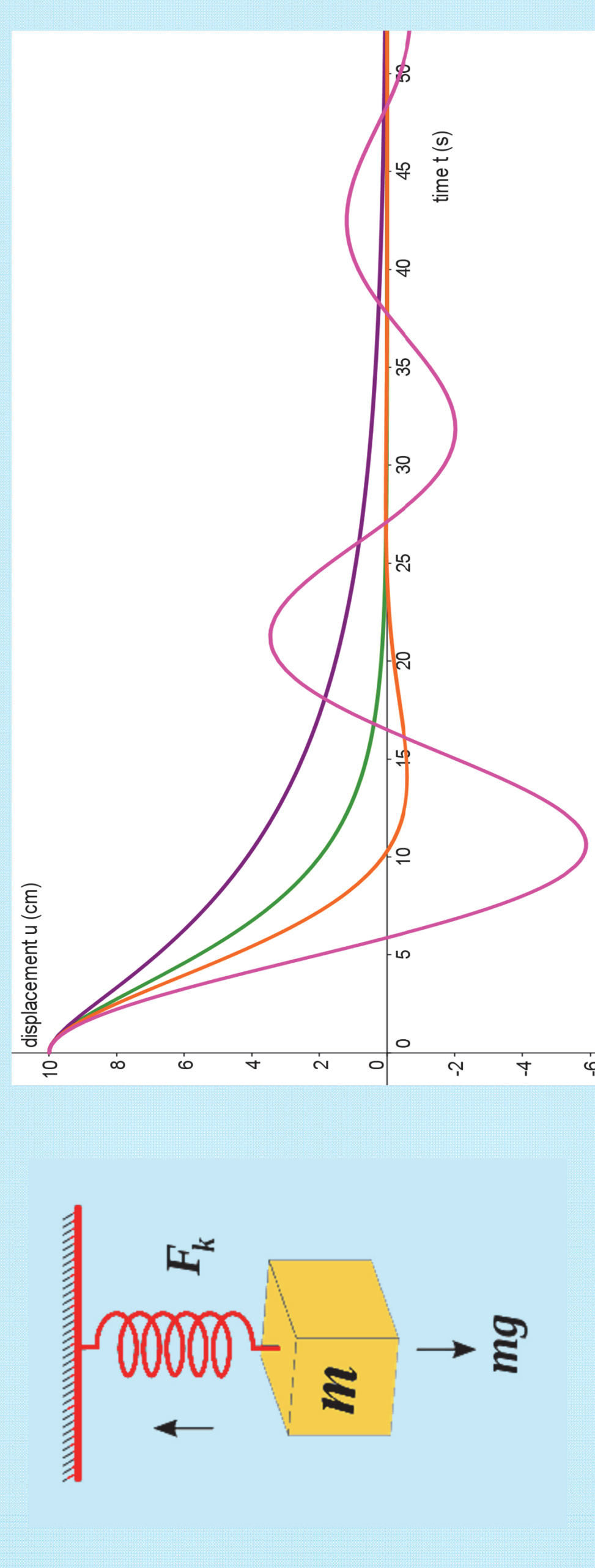


Susceptible population $S(t)$
 $\frac{dS}{dt} = -0.002 \cdot S(t) \cdot I(t)$

Infected population $I(t)$
 $\frac{dI}{dt} = 0.002 \cdot S(t) \cdot I(t) - 0.05 \cdot I(t)$

Recovered population $R(t)$
 $\frac{dR}{dt} = 0.05 \cdot I(t)$

Mass-spring-damper model (Physics / Engineering)

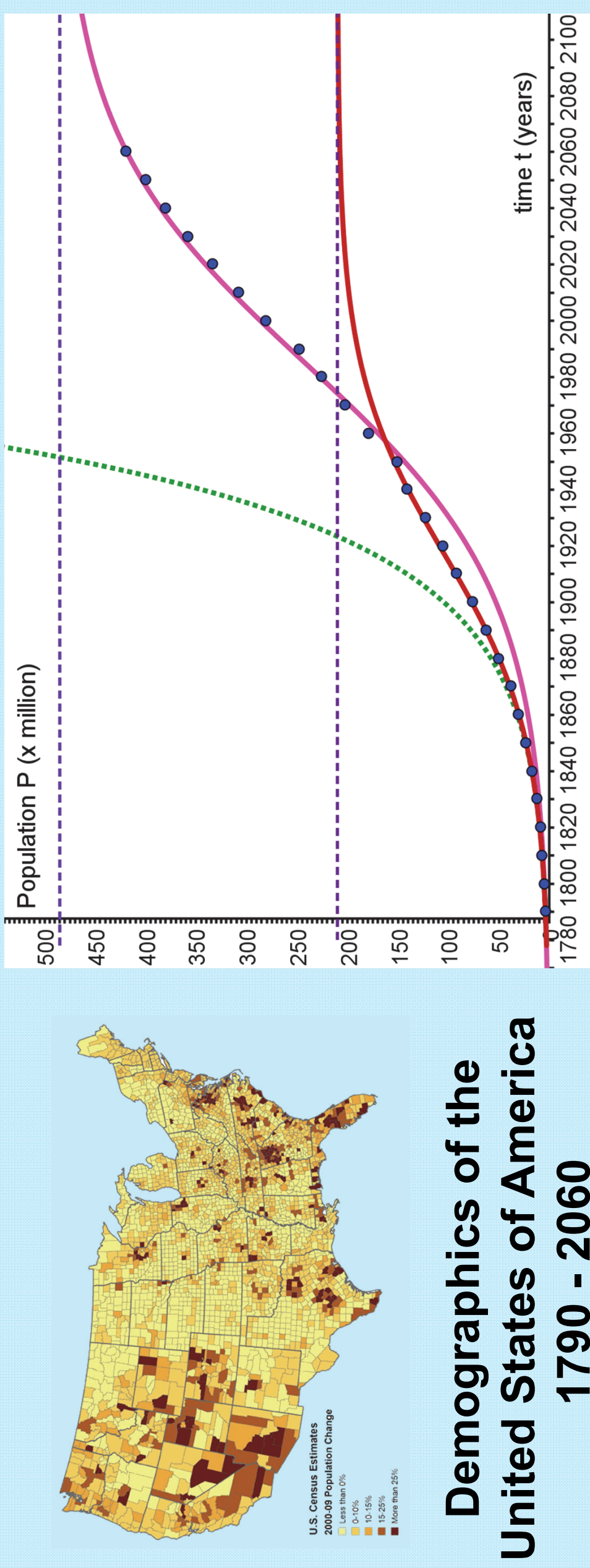


Wiskunde D

In 2010, a SLO survey of the implementation of wiskunde D showed that this new mathematics curriculum proved successful in improving the mathematical and algebraic skills of the students. Unfortunately, wiskunde D did not improve the view of students on the role and relevance of mathematics for their future study and career. Wiskunde D gives students a deeper understanding of high school mathematics and teaches some topics of university mathematics but it fails to show how this relates to the students' personal future study and career.

Furthermore, it is important to get more students interested in wiskunde D as in most schools the number of wiskunde D students is low with an average group size smaller than 7.

Population growth model (Economics / Econometrics)



Malthus population model
 $\frac{dP}{dt} = 0.0298 \cdot P(t)$

Verhulst population model 1
 $\frac{dP}{dt} = 0.031 \cdot P(t) \cdot (1 - \frac{P(t)}{210})$

Verhulst population model 2
 $\frac{dP}{dt} = 0.0246 \cdot P(t) \cdot (1 - \frac{P(t)}{485})$

Perceptions of the relevance of Mathematics... What is it good for?

Differentiating by interest

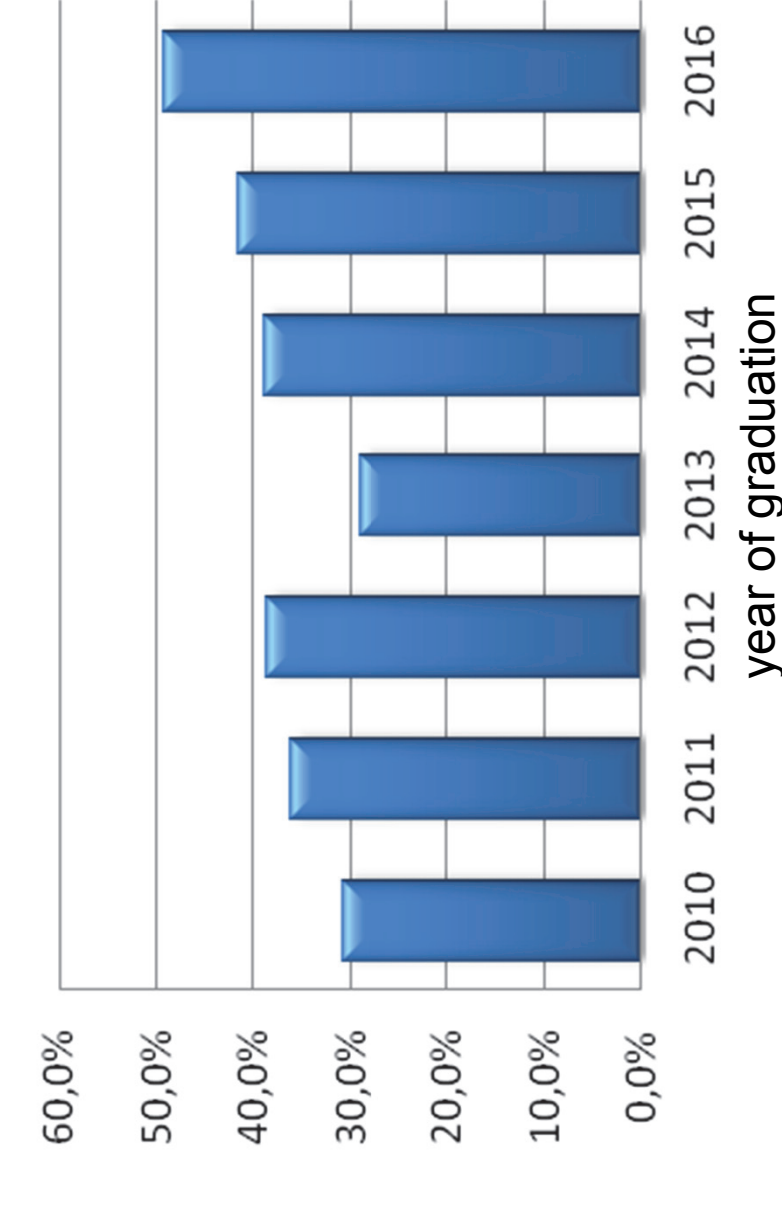
Providing students simply with contexts might not be sufficient to show them how mathematics will be applied in their future study and career. To show the students what the role is of mathematics in THEIR future, the education should connect to THEIR interests and attitude towards science and mathematics. A teaching intervention which differentiates between the students' interests will be designed, in order to relate the subject directly to their future study and career.

Differential Equations

The topic of the intervention is the study of differential equations, one of the required subjects of the wiskunde D curriculum. This mathematical topic has applications in a wide variety of studies and research areas which makes it extremely useful for differentiating by interest. Moreover, the modelling of context-based problems, computer analysis and algebraic problem solving techniques also provide tools to address the students' attitude towards scientific inquiry and problem solving.

A successful case

Gymnasium Beekvliet:
Percentage of N-profile students with wiskunde D

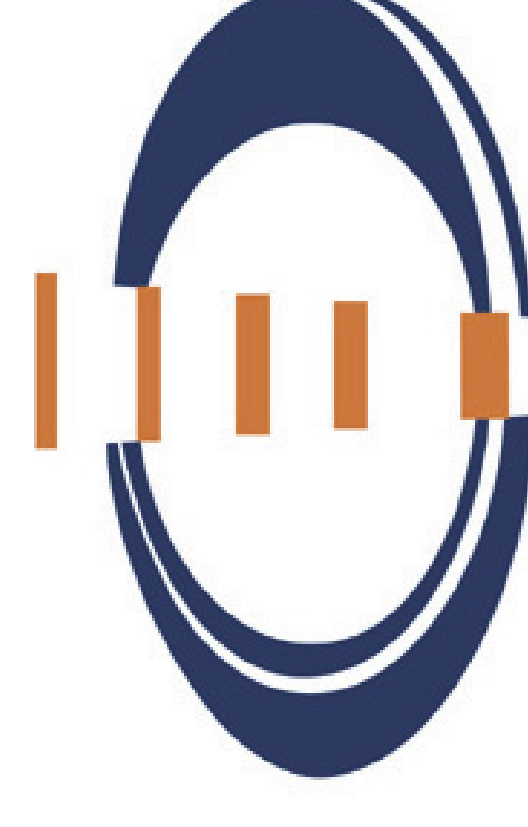


Average wiskunde D group size: 25,9

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