

Onderzoekend leren

Hoe zien opdrachten voor
onderzoekend leren bij wiskunde er
uit?

Tool IE-1: Het verkennen van
onderzoeksoopdrachten en -
activiteiten



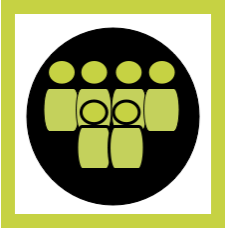
Overzicht

Doel:

Verkennen van opdrachten die gebruikt kunnen worden om onderzoekend leren te ondersteunen.

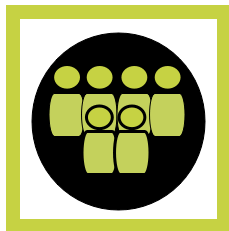
We zullen:

- Onderzoekend leren bespreken;
- Twee opdrachten onderzoeken en bespreken
- In beschouwing nemen hoe deze opdrachten gebruikt kunnen worden om onderzoekend leren te ondersteunen.



Over onderzoeken

- Hoe ziet onderzoek eruit?
- Wat doen leerlingen die onderzoekend leren?
 - Situaties verkennen;
 - Onderzoek plannen;
 - Systematisch experimenteren;
 - Interpreteren en evalueren;
 - Resultaten bespreken.



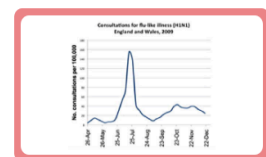
Twee opdrachten

Epidemics: modelling with mathematics

Understanding the use of vaccination in preventing the spread of epidemics.

| Home | 854 views |
| About Mascil Materials |

Classroom materials,
motivating pupils for
math and science



Abstract

Maths in context (mathematical modelling, interpreting graphs). Students will develop mathematical models which help government and other bodies to predict how diseases will spread, and how that spread can be minimised.

Documents

Inquiry Learning

Inquiry Learning Dimensions

- Exploring situations
- Planning Investigations
- Experimenting systematically
- Interpreting and evaluating
- Communicating results

Copyright/Creative Commons

Mascil partner: GB

Materials are published under the
CC BY-NC-SA 4.0 license.



Discipline

- Mathematics ✓
- Biology
- Physics
- Chemistry
- Engineering

Target group

- Primary Education
- Lower Secondary Education ✓
- Upper Secondary Education

Age range

11-15

Duration

50 min.

World of Work

Becoming a(n)... Mathematician

World of Work Dimensions

Context

The mathematician's profession is explicitly exemplified, wherein epidemics are used as a phenomenon to legitimize the WoW beforehand.

Role

The student remains a student and is not asked to empathize with the profession of a mathematician.

Activity

Recommended computer program is an analogy of an authentic modeling program. Modeling is an authentic practice.

Product

Sports physiology and statistics

Imagine you are a sports physiologist and you have to interpret measures

| Home | 771 views |
| About Mascil Materials |

Classroom materials,
motivating pupils for
math and science



Abstract

Draft (part) of a chapter from 'Statistics as a bridge between Mathematics and Science'. In this module you will learn how to do this and how to represent such a relation mathematically and calculate how strong a correlation is. In many professions people perform statistical tasks that use the statistical techniques from this module to solve science problems

Documents

- Student: [PDF](#) and [WORD](#)

World of Work

Becoming a(n)... Physiologist



World of Work Dimensions

Context

To be able to help someone to improve their condition, a sports physiologist takes measurements (heart rate) before and after a training program.

Role

Students are not placed explicitly in the role of physiologist. However, they are introduced to techniques that are regularly used by sports physiologists.

Activity

Students measure heartbeats in order to make predictions about the level of physical fitness using the Ruffier-Dickson-test and the Ruffier-Dickson index.

Product

The product is an investigation of different relationships between the Maximum Heart Rate, the age of a person, and advise for a training program.

Inquiry Learning

Inquiry Learning Dimensions

- Exploring situations
- Planning Investigations
- Experimenting systematically
- Interpreting and evaluating
- Communicating results

Discipline

- Mathematics ✓
- Biology ✓
- Physics
- Chemistry
- Engineering

Target group

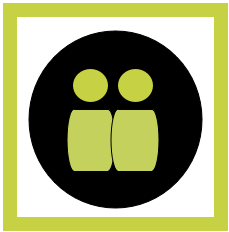
- Primary Education
- Lower Secondary Education
- Upper Secondary Education ✓

Age range

15-18

Duration

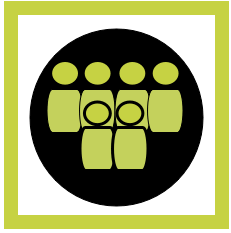
120 min.



Gedetailleerd de opdrachten bekijken

Onderzoek de opdrachten en bespreek:

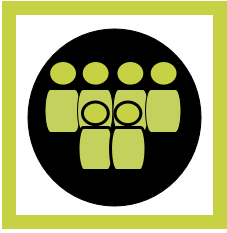
- Welke leerlingactiviteit is het waarschijnlijke gevolg van de opdracht?
- Waar past de opdracht binnen de dimensies van onderzoekend leren?
- Hoe houdt de opdracht verband met de beroepscontext?



Delen - Denken

Presenteer en bespreek de resultaten met elkaar. Bespreek ook de volgende punten:

- Wat zou je wel of niet doen om onderzoekend leren te ondersteunen?
- Op welke manier kun je de opdracht veranderen, om hem beter te laten aansluiten aan een beroepscontext?



Finishing off

Stel een onderzoeksvraag over het gebruik van ondersteunende onderzoekend leren opdrachten.



Kies een opdracht en voer deze uit in een van je klassen. Observeer de gevolgen. De volgende sessie bespreken we de bevindingen.