



Otava
Learning

Physics and chemistry materials from Finland

Titanium Physics and Chemistry

The Titanium series for lower secondary school physics and chemistry inspires learning. The series covers a variety of different topics and the exercises are suitable for different kinds of learners. Pupils are motivated through experiential and functional learning. The series encourages personal thinking and insight. Informative videos, pictures, illustrations and infographics promote multiliteracy. Titanium takes advantage of ICT, and simulations are also used in studying the different phenomena.

Textbooks

The textbook contains the whole theory of physics or chemistry for the whole lower secondary school. The sections can be learned in a convenient order according to the school's curriculum and distribution of lessons. The clear structure offers natural opportunities for differentiation.



Workbooks

Different learners are taken into account in the diverse exercises. The exercises proceed from the easiest to the most difficult ones, so the workbooks are also well suited for differentiation. There are practical experiments for pupils as well as tests and simulations to be carried out with digital tools. The answers can be found in the teacher's digital teaching material.



Easy-to-read books

Titanium Easy-to-Read books contain the theory and exercises all in the same book. Each year has a book of its own. They have been written in plain Finnish, which means that the language has been simplified. In addition, special attention has been paid to placing the images and texts on the pages in a manner that makes learning easier. The book is suitable for pupils who experience reading difficulties and for pupils whose mother tongue is not Finnish.

Digital teaching materials

Digital teaching material for teachers

The material covers all years of lower secondary school. The digital teaching material supports the teacher in the planning, realisation and evaluation of the lessons. It makes it possible to teach in a suitable way in each situation and to use different working methods.

The material includes:

- The videos, including the commentaries
- Background information about the experiments in the textbook for the teacher
- The equipment and substances required for the experiments
- Safety instructions
- Pupil's digital book (including the texts of the chapters read aloud)
- Answers to all exercises
- Model tests and modifiable test questions



Digital book for pupils

The pupil's digital book contains a large number of teaching videos recorded for the Titanium series. It is also possible to listen to all the texts of the textbook. The digital book contains the same texts, pictures and exercises as the printed version. Pupils can answer the exercises in writing or by downloading a separate file. Mathematical formulas are easy to write and modify with the help of a text and equation editor.



Digital exercises for pupils

Digital exercises can be answered in writing or by downloading a separate file. Mathematical formulas are easy to write and modify with the help of a text and equation editor. The pupil's digital exercises correspond to the exercises in the printed workbooks.

The Titanium product family for lower secondary school physics and chemistry

- Textbook
- Workbook
- Easy-to-Read books
- Digital book
- Digital exercises
- Digital book and digital exercises (package)
- Digital teaching material

Pupil's material can be combined in various ways

Printed textbook + digital exercises

Printed textbook + printed workbook

Digital book + printed workbook

Digital book + digital exercises

Experienced award-winning authors

Titanium Physics authors:

PhD. Martti Heinonen

- Has worked as a head master (principal) in upper secondary school
- Has written several best-selling physics, chemistry and mathematics text books
- Has received several significant awards in teaching and writing non-fiction books

M.Sc. Jukka Kohtamäki

- Teacher in Hakkari lower secondary school
- Member of the National Physics Curriculum Team organized by Finnish National Board of Education
- Received the Distinguished Science Teacher Award in 2013 from the Technology Industries of Finland Centennial Foundation

M.Sc. Mikko Korhonen

- Teacher in Mikkeli upper secondary school
- Received the Fulbright Distinguished Award in Teaching 2010
- Received the Distinguished Science Teacher Award in 2013 from the Technology Industries of Finland Centennial Foundation



Titanium Chemistry authors:

Lic.Phil. Helena Muilu

- Teacher in The University of Jyväskylä Teacher Training School
- Has written several best-selling chemistry and physics textbooks
- Has guided students for several years to become physics and chemistry teachers

M.Sc. Tommi Virtanen

- Teacher in Karakallio lower secondary school
- Mathematics, chemistry and physics teacher and a chemist
- Chemistry and physics Advisory teacher in Espoo



Illustrations: Tommi Kovala and Grafimer/Katja Kimpimäki

Videos: Rockway

Titanium Physics

Sections and Chapters

The World of Physics

1. Physics – the Science of Solutions
2. Achievements of Technology
3. About Physical Science
4. Quantities and Units
5. Formulas and Graphs
6. Energy

Sound and Light

7. Sound
8. Noise, Echo and Resonance
9. Light
10. Lenses
11. Mirrors
12. Wave Motion

Power and Motion

13. Interactions
14. Forces
15. Velocity
16. Acceleration
17. Pressure
18. Balance and Leverage
19. Work and Force

Heat

20. Temperature and Heat
21. Heat transfer
22. Thermal Expansion
23. Changes in Physical State
24. Storage of Thermal Energy
25. Heaters at Home
26. Energy Production and Energy Sources

Electricity and Magnetism

27. Electromagnetic Interaction
28. Electric Current and Voltage
29. Resistance and Ohm's Law
30. Household Appliances
31. Electromagnetic Induction
32. Generation and Transmission of Electricity

Universe

33. Electromagnetic Radiation
34. Radioactivity
35. Nuclear Reactions
36. Sun and Solar System
37. Earth and Moon
38. Stars and Star Systems



Titanium Chemistry

Sections and Chapters

The World of Chemistry

1. Chemistry – the Science of Studying Substances
2. Achievements of Chemistry
3. Laboratory Work Safety
4. Substances Around Us
5. Separating the Components of Mixtures
6. Elements and Compounds

Water and Air

7. Water – the Source of Life
8. Water as a Solvent
9. Acidity and Basicity
10. Slow and Fast Reactions
11. Characteristics of Air
12. Combustion and Fire Safety

From Atoms to Compounds

13. Atom Structure Model
14. The Periodic System
15. Ionic Bonding and Metallic Bonding
16. Covalent Bonding and Molecules

The Chemistry of Carbon

17. Carbon – a Diverse Element
18. Hydrocarbons
19. Alcohols
20. Carboxylic Acids

Chemistry at Home

21. Nutrients
22. Proteins
23. Carbohydrates
24. Fats
25. Chemistry of Cooking
26. Detergents
27. Waste Processing and Recycling

Salts and Metals

28. Acids and Bases
29. Salts and Neutralisation
30. From Ores to Metals
31. Properties of Metals
32. Galvanic Series of Metals
33. Electrochemistry

Applications of Chemistry

34. Plastics and the Petroleum Industry
35. Paper and Natural Fibres
36. Medicines
37. Cosmetic Substances
38. New Materials
39. Chemistry and the Environment



