Welcome to Kerboodle

- Find out more about IB Science Kerboodle
- View sample content
- Learn how to order a free trial subscription

To navigate through this guide, click on the arrow buttons at the bottom of the page or use the contents list on the right.
What is Kerboodle?
What is Kerboodle?

Oxford IB Science Kerboodle is an online teaching, learning and assessment service:

- **Reinforce learning**: Colorful animations and worksheets develop comprehension
- **Track progress**: Auto-marked formative and summative quizzes measure understanding
- **Boost performance**: Practice papers and Internal Assessment support equip learners for exams
- **Teach with confidence**: Teacher notes and a digital copy of the Course Companion* help you fully deliver the IB approach

Supporting the latest DP Science syllabus, the IB Science Kerboodle includes material developed directly with the IB.

* for teacher use only
What is Kerboodle?

- Available for Biology, Chemistry and Physics
- Purchased as an annual subscription
- Suitable for an unlimited number of users
- Accessible online – anytime and anywhere
Resources
What resources are included?

IB Science Kerboodle provides a wide range of DP-specific teaching materials:

- **Editable **worksheets help to reinforce key concepts, skills and processes and develop a strong scientific vocabulary.

- **Colorful animations** bring theory to life, clarify challenging topics and support EAL learners.

- **Answers** for all activities in the worksheets, Course Companions and practice papers streamline the marking process.

You can also upload your own resources to share with colleagues, and direct students straight to specific resources via the new ‘Share Content’ function.
1.4 Animation: Transport across cell-surface membranes

Click play to start the animation.

Engage all learners with colorful and accessible explanations.
2 Mechanics

2.1 Motion

Name: ........................................ Date: ........................................

Motion worksheet

For this worksheet use \( g = 9.81 \text{ m/s}^2 \).

1. A ball rolls down a 445 m slope from rest. If it accelerates at a rate of 3.16 \text{ m/s}^2, determine the time it takes to reach the bottom of the slope and the ball’s final velocity.

2. How far does a car travel in 45 seconds if it has an acceleration of 0.32 \text{ m/s}^2? Assume that it starts from rest.

Download as a PDF or Word document and edit as you wish.
PRACTICAL WORKSHEETS

1 Stoichiometric relationships

1.2 The mole concept

Name: ............................................ Date: .............................................

Mole investigation

Materials
- Sulfur
- Distilled water
- NaCl
- CaCl₂
- Sucrose
- Balance
- 250 cm³ beaker (5 per station)
- 100 cm³ measuring cylinder

Safety
Sulfur is essentially non-toxic, but dust respirators should be worn for the comfort of students.
2 Atomic structure

2.1 The nuclear atom

Name: .............................................. Date: ................................................

How do we know?
There are three parts to this activity:
1 setting the scene
2 answering a focused question
3 a guided task that involves using a variety of texts to examine the focus question and assertions.

Setting the scene
Listen to this radio news report on the discovery of particles travelling faster than the speed of light:

Focus question
To what extent do you believe the claim that neutrinos can travel faster than the speed of light?
(Hint: extent means consider the merits of the claim - ways in which you can and cannot support the claim.)

Connect scientific study to TOK via suggestions for reflection, discussion and research.
VOCApULARY-BUILDING ACTIVITIES*

1.1 Crossword

Complete the crossword from the clues.

Across
2. genus of ciliate protozoans
4. keeping metabolites at a stable concentration
6. ____ cells retain the ability to divide
8. Stargardt’s disease causes ____ degeneration
10. created when a gene is expressed
11. how the SA:vol ratio changes with cell growth

Down
1. scientist who first used the term ‘cell’
3. sum of all chemical reactions in an organism
5. coordinated movement of a flock is an

*These activities are only available for Biology
Assessment
What’s included in the assessment module?

Written to match the style of IB assessments, the assessment resources included in the IB Science Kerboodle help you effectively build the knowledge, skills and confidence needed to succeed in IB exams.

- Provide learners with instant feedback on their understanding of a topic via dozens of auto-marked formative quizzes
- Efficiently measure students’ progress via auto-marked summative tests for every topic
- Offer extensive exam practice opportunities via IB-style assessment papers and answer files, covering a wide range of topics
2.2 Electron configuration quiz

In the electromagnetic spectrum, which will have the shortest wavelength and greatest energy?

<table>
<thead>
<tr>
<th>Shortest wavelength</th>
<th>Greatest energy</th>
</tr>
</thead>
<tbody>
<tr>
<td>A ultraviolet</td>
<td>ultraviolet</td>
</tr>
<tr>
<td>B infrared</td>
<td>infrared</td>
</tr>
<tr>
<td>C ultraviolet</td>
<td>infrared</td>
</tr>
<tr>
<td>D infrared</td>
<td>ultraviolet</td>
</tr>
</tbody>
</table>

- B
- C
- A
- D

Check answers

Instantly measure students’ progress
1 Cell biology quiz

What stage of mitosis is shown in the electron micrograph?

- Anaphase: centromeres have divided, allowing the pairs of sister chromatids to separate producing two genetically identical nuclei.
- Metaphase: the two attachment points on opposite sides of each centromere allow the chromatids of a chromosome to attach to microtubules.
- Telophase: tight group of chromosomes at each pole with a new cell wall forming.
- Prophase: chromosomes become shorter and fatter by supercoiling.
IB Physics
Assessment paper: 1 Measurements and uncertainties

1. Which of the following pairs contains one fundamental and one derived unit?
   A. ampere; kilogram
   B. ampere; coulomb
   C. joule; newton
   D. joule; coulomb
   (1)

2. The current, I, through a resistor is measured with a digital ammeter to be 0.10 A. The uncertainty in the calculated value of I will be
   A. 1 %
   B. 2 %
   C. 5 %
   D. 20 %
   (1)

3. Which of the following will reduce random errors in an experiment?
   A. Using an instrument having a greater precision
   B. Checking the calibration of the instrument used
   C. Checking for zero error on the instrument used
   D. Repeating readings
   (1)

4. A body accelerates from rest with a uniform acceleration a for a time t. The maximum error in a is 1% and the uncertainty in t is 2%. The uncertainty in the
Planning
What’s included in the planning section?

Fully incorporate the IB approach into your classroom with expert support for your teaching:

- Deliver all elements of the IB approach to learning, via detailed teacher notes, full of extra ideas and examples
- Confidently guide students through the Internal Assessment with ready-made, explanatory presentations
- Tailor presentations to your class and teaching style, using an accessible presentation-building tool
- Share best practice and save time by making your plans and presentations available to colleagues
1 Stoichiometric relationships

1.1 Introduction to the particulate nature of matter and chemical change

1. Lavoisier
2. How does scientific knowledge “grow”?
3. How is knowledge created?
4. Elements and compounds
5. Elements, molecules, and compounds
6. Heating water
7. Balancing chemical equations
8. Changing state
9. Temperature scales
10. Communication and collaboration
11. Additional resources

1. Lavoisier

Learning objectives

- Theory of knowledge: Lavoisier’s discovery of oxygen, which overturned the phlogiston theory of heat, is an example of a paradigm shift. How does scientific knowledge progress?

Links to: Topic 11.1 Nature of science: making quantitative measurements with replicates to ensure reliability – precision, accuracy, systematic, and random errors must be interpreted through replication.

Draw on a wealth of suggestions for additional strategies, resources and ideas
Planning for the IA

Student background

Students should have experienced a wide range of experimental work covering a number of syllabus topics. Data collection, analysis, and evaluation as well as the treatment of uncertainties should be taught before attempting the IA.

Students also need to have appropriate technology skills, such as working with a word processor, graphing programs, spreadsheets, and searching the Internet.

For these reasons it is expected that most schools will wait until the second year of the two year course before introducing the IA.
Streamline your teaching by building presentations with links to specific resources.
Markbook
What is the Markbook?

The Markbook allows you to efficiently record and share students’ progress:

- **Manage all work** submitted by students, including uploaded homework and answers to quizzes
- **Assign and store marks**, then run diagnostic, group and student reports to measure and compare achievement
- **Share evidence of progress** by exporting, saving and printing reports
## Diagnostic Reports

### Class 12 - Diagnostic Markbook Report

<table>
<thead>
<tr>
<th>Title</th>
<th>Due Date</th>
<th>Score</th>
<th>Average Group Score</th>
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<tbody>
<tr>
<td>1.3 Formative assessment</td>
<td>25/10/2013</td>
<td>Joanna Clarke: 35 %</td>
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<tr>
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<td></td>
<td>Jean Georgas: 68 %</td>
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<td></td>
<td>Mark Jones: 58 %</td>
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<tr>
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<td>25/10/2013</td>
<td>Average Group Score: 35 %</td>
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</tr>
<tr>
<td>Fully Submitted 1.2 Summative assessment</td>
<td>25/10/2013</td>
<td>Average Group Score: 72 %</td>
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## GROUP REPORTS

### Class 12 - Markbook Report

<table>
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<td>11 / 31</td>
<td>35 %</td>
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<tr>
<td>Jean Georges</td>
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<td>68 %</td>
</tr>
<tr>
<td>Mark Jones</td>
<td>18 / 31</td>
<td>58 %</td>
</tr>
<tr>
<td>Fully Submitted 1.3 Formative assessment</td>
<td>25/10/2013</td>
<td>35 %</td>
</tr>
<tr>
<td>Fully Submitted 1 Summative assessment</td>
<td>25/10/2013</td>
<td>72 %</td>
</tr>
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## STUDENT REPORTS

### Mark Jones - Markbook Report

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<th>MARKS %</th>
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<td>2.2 Formative assessment</td>
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<td>Incomplete Submission</td>
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<tr>
<td>2 Summative assessment</td>
<td>26 Jan</td>
<td>10 / 51</td>
<td>20 %</td>
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<td>1.3 Formative assessment</td>
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Online Course Books
What are the Online Course Books?

Online Course Books are digital versions of the print Course Books, which can be used as your core classroom texts.

The IB Science Kerboodle includes access to an Online Course Book to support your teaching:

- Display the Course Book at the front of the class
- Add extra information, reminders and examples via digital post-it notes
- Highlight, annotate and zoom in on specific features
- Jump straight to related resources from particular pages or chapters

Online Course Books are also available to purchase separately from Kerboodle for your students.
Antibiotic resistance

Evolution of antibiotic resistance in bacteria.

Antibiotic resistance is a key concern for healthcare and public health researchers. The evolution of antibiotic-resistant bacteria is a critical issue, as it threatens the efficacy of antibiotics. For instance, antibiotic-resistant bacteria can develop in response to the overuse or misuse of antibiotics in humans and animals. This can lead to an increased risk of infections and can affect the effectiveness of treatments. Antimicrobial resistance can develop in a variety of bacteria, and it can be caused by changes in the bacteria themselves or by changes in the environment. Understanding the evolution of antibiotic resistance is crucial for developing effective strategies to combat this problem. 

Natural selection and antibiotic resistance

The selectionist theories of evolution by natural selection were developed by Charles Darwin and Alfred Russel Wallace in the mid-19th century. These theories state that organisms with certain traits are more likely to survive and reproduce than those without these traits. This leads to the development of populations with greater fitness. The adaptation of antibiotic resistance in bacteria is an example of natural selection. 

Antibiotic resistance can develop in bacteria through two main mechanisms: 

1. Selection for resistance: 
   - Mutations occur in the bacteria that confer antibiotic resistance. 
   - Antibiotics select for these resistant bacteria, as they are less affected by the antibiotic. 
   - This leads to the selective advantage of antibiotic-resistant bacteria in populations.

2. Transmission of resistance:
   - Antibiotic-resistant bacteria can transfer their resistance genes to other bacteria through mechanisms such as plasmids or conjugation. 
   - This can lead to the spread of antibiotic resistance within populations of bacteria.

Figures and data show the distribution of antibiotic-resistant bacteria in different environments, including human and animal populations. These data are crucial for understanding the evolution of antibiotic resistance and for developing strategies to combat this issue. 

Data-based questions: Chlorothalidone resistance in soil bacteria

Resistance to chlorothalidone, a diuretic antibiotic, is an example of antibiotic resistance. Chlorothalidone is commonly used to treat hypertension, a condition characterized by high blood pressure. The evolution of chlorothalidone-resistant bacteria can be significant, as it can affect the effectiveness of treatment. Understanding the factors that contribute to the evolution of chlorothalidone resistance is crucial for developing effective strategies to combat this problem. 

- Discuss the factors that contribute to the evolution of chlorothalidone resistance.
- Predict how the distribution of chlorothalidone-resistant bacteria may change in the future.
- Develop a strategy to prevent the evolution of chlorothalidone resistance in soil bacteria.
ONLINE COURSE BOOKS

Navigate easily to related resources

IB Physics Online Course Book 2014 edition

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Personalization
How can I personalize Kerboodle?

IB Science Kerboodle can be customized to meet the unique needs of your class, and support your personal teaching style:

- **Upload** your own worksheets, presentations and lesson plans to share with your department
- Create class presentations and **insert links** to your choice of resources – streamlining your lessons
- **Add notes** to the pages of your digital Course Companion – ensuring any extra details or examples are covered in your lessons
- **Create student groups** within a course for bespoke assignments or reporting
- **Add your own folders** – storing your resources and reports in your own way
Find out more

Next steps

If you like what you see, we can arrange a trial subscription for your school.

This means we’ll give you free access to Kerboodle for one month. After a month, we’ll automatically send you an invoice for a year’s subscription, and you can continue using Kerboodle for the next 12 months.

If you decide Kerboodle isn’t for you, just email support@kerboodle.com within your first 30 days of access and we’ll cancel your trial subscription immediately.

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2. Call +44 1536 452620

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