Isaac Biology

Lewis Thomson

This symposium is generously funded by

The Ogden Trust

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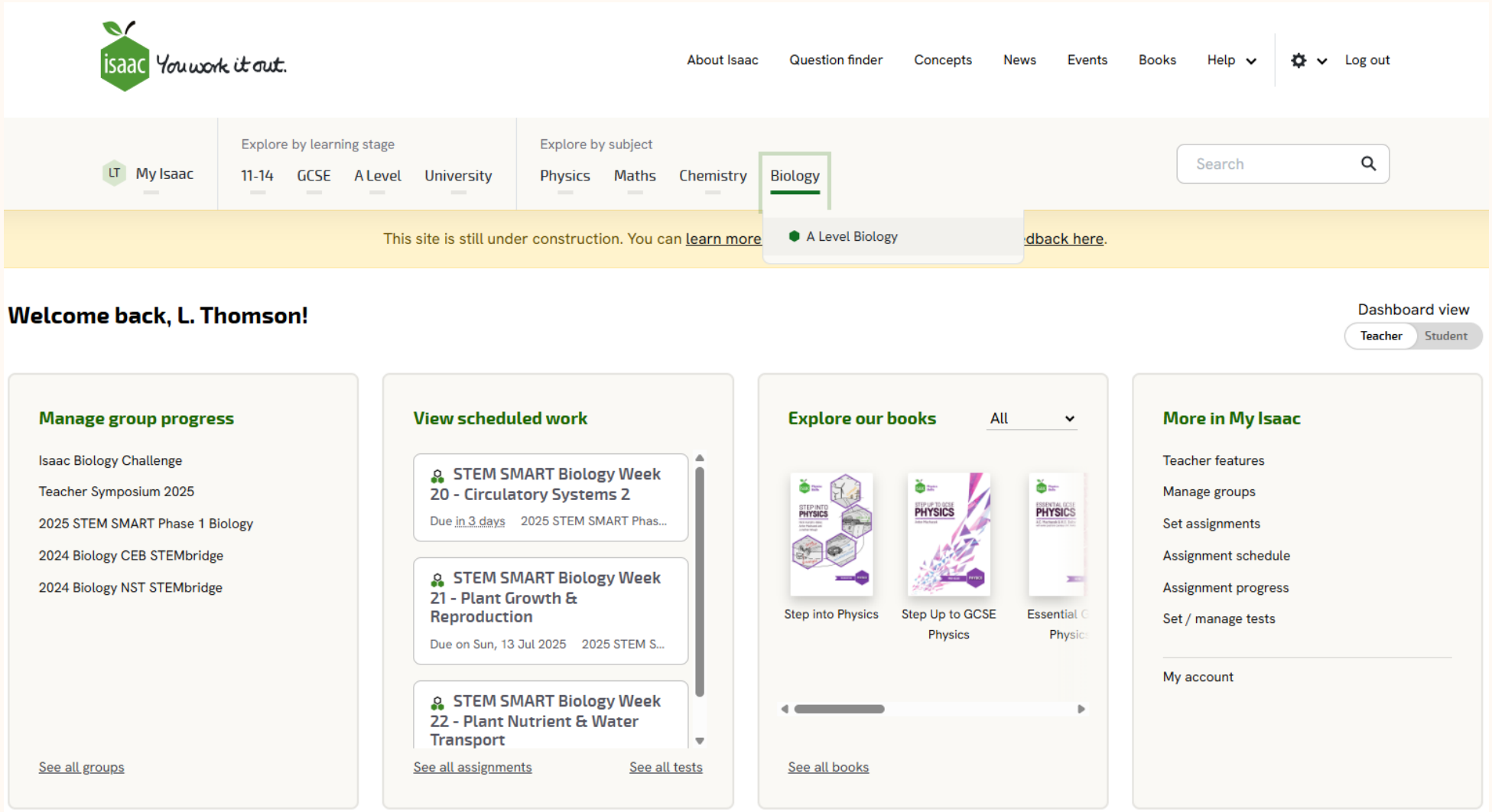
Session plan

- Overview of Isaac Biology resources
- Try some tricky problems
- Worked example(s)

Isaac Biology resources



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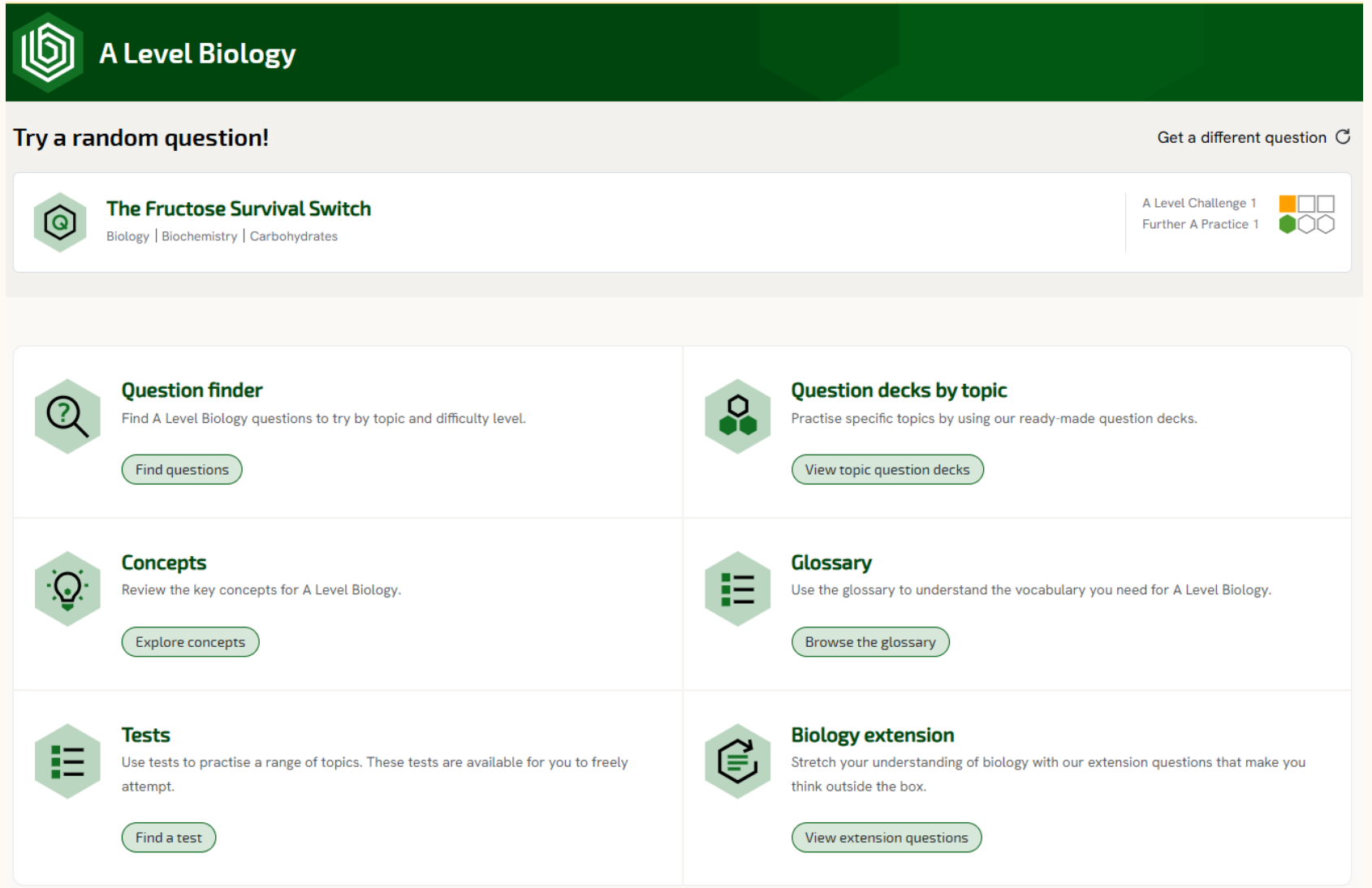
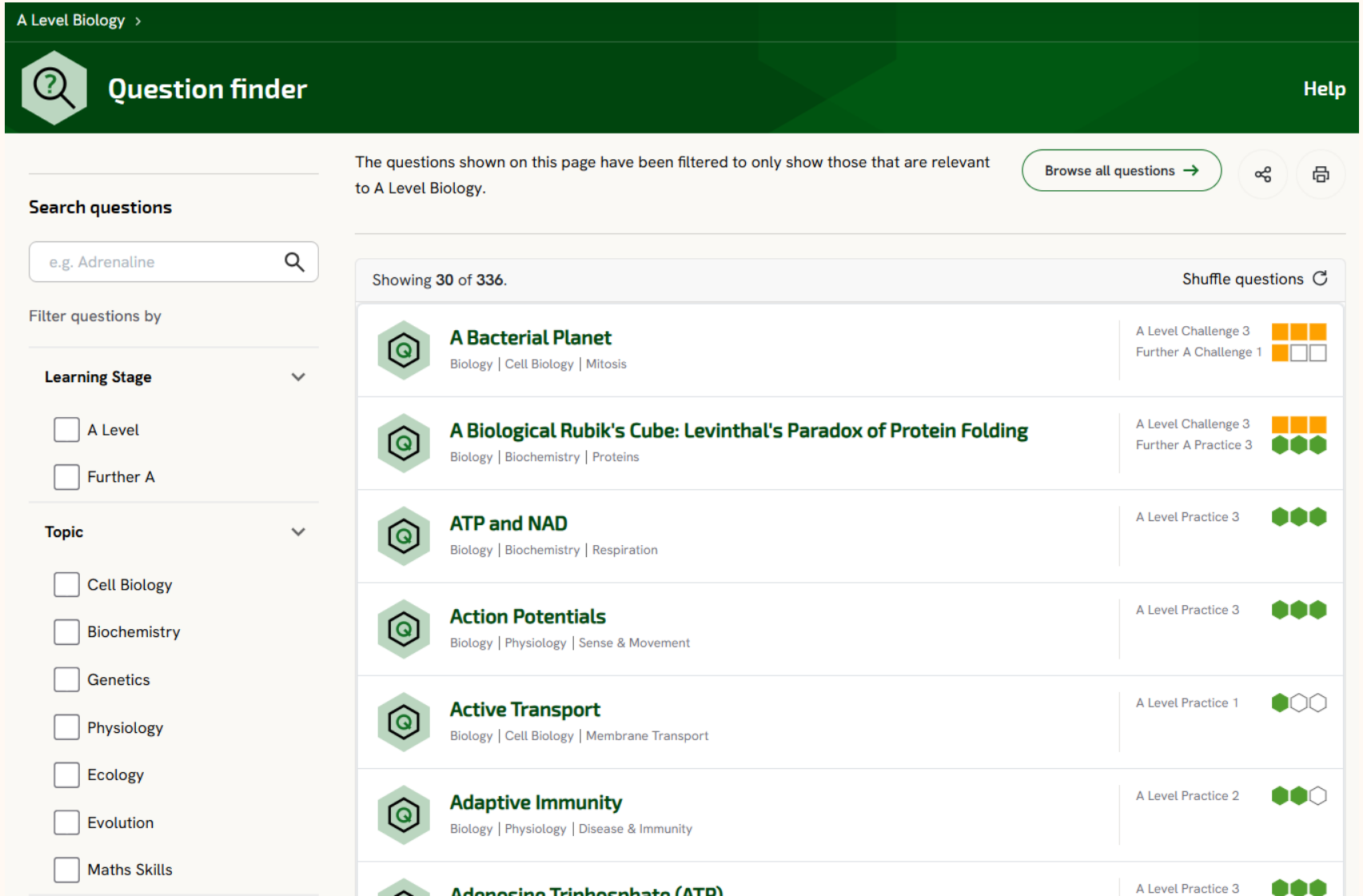
A Level Biology homepage



Question finder



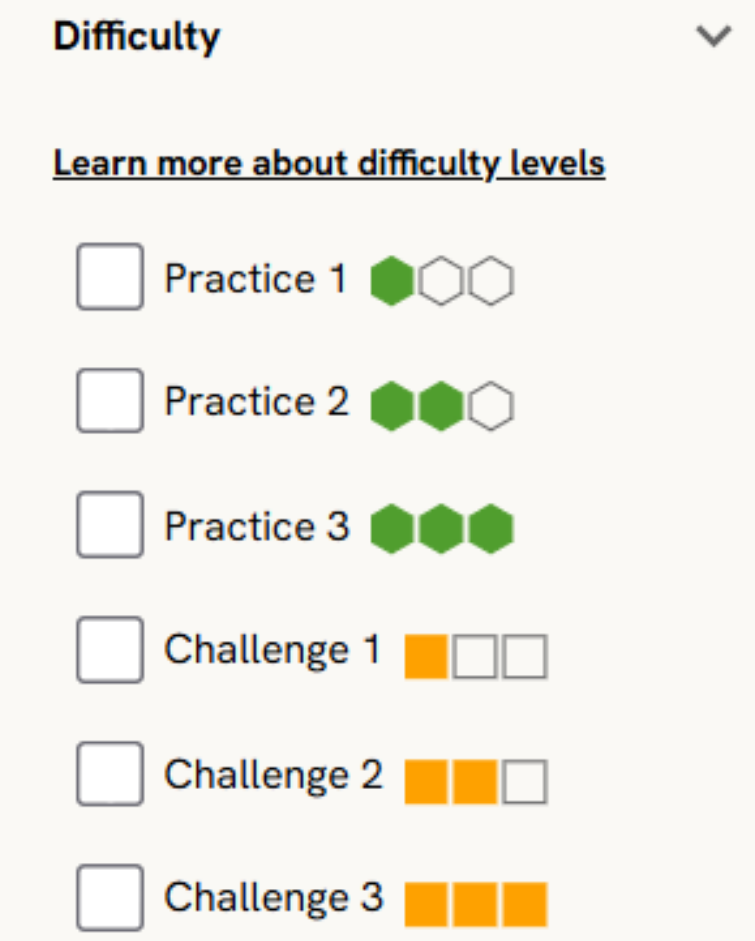
Questions

- Original questions (majority)
- Exam past papers (OCR, CIE)
- Natural Sciences Admissions Assessment (NSAA) past papers

Questions: topics

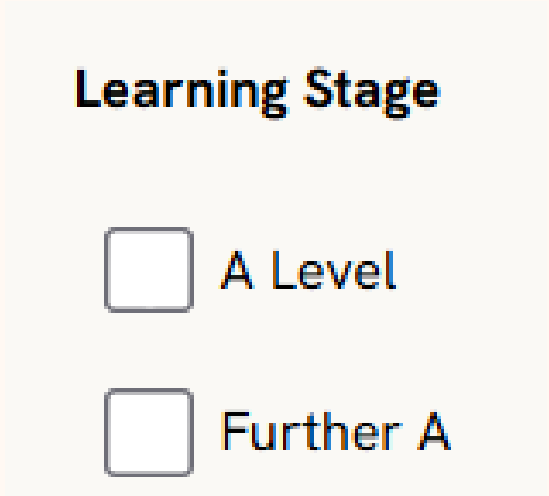
- [x] Cell Biology
  - [ ] Cell Structure
  - [ ] Mitosis
  - [ ] Meiosis
  - [ ] Viruses
  - [ ] Membrane Transport
  - [ ] Tissues
- [x] Biochemistry
  - [ ] Proteins
  - [ ] Carbohydrates
  - [ ] Lipids
  - [ ] Respiration
  - [ ] Photosynthesis
- [x] Genetics
  - [ ] DNA replication
  - [ ] Transcription
  - [ ] Translation
  - [ ] Genes & Alleles
  - [ ] Inheritance
  - [ ] Biotechnology
- [x] Physiology
  - [ ] Plants
  - [ ] Breathing & Circulation
  - [ ] Hormones
  - [ ] Digestion & Excretion
  - [ ] Sense & Movement
  - [ ] Disease & Immunity
- [x] Ecology
  - [ ] Populations
  - [ ] Ecosystems
  - [ ] Nutrient Cycles
  - [ ] Biodiversity
- [x] Evolution
  - [ ] Variation
  - [ ] Theory
  - [ ] Phylogenetics
- [x] Maths Skills
  - [ ] Statistical Tests

Questions: difficulty



- Practice:
  - Recall of information, basic calculations
  - Common question types
    - Drag & drop
    - Short answer (1 or 2 word)
    - Reorder
- Challenge
  - Application, logic & reasoning, problem-solving
  - Common question types
    - Item (multiple choice with multiple correct options)
    - Calculation

Questions: learning stage



- More than just A Level biology required
- May require A Level maths or chemistry

*This question involves using **exponentials and logarithms**, which are part of A Level Maths. For more information please check with your teacher.*

Question decks by topic

Question decks by topic

Decks by stage

A Level

Decks by subject

Physics

Chemistry

Maths

Biology

Published

The Biology topics below are ordered to allow for progression of ideas from one question deck to the next (within each section). To find a question deck on a specific topic, use `Ctrl+F` in your browser. You can also click on the links below to jump to the relevant section.

The "**What it contains**" column lists the difficulty levels of the questions and how many there are: for example, "3×P, 6×C" means three "Practice" questions and six "Challenge" questions. Generally, "Practice" questions are recall-based questions that test basic knowledge of a topic, while "Challenge" questions are application-based questions that test the ability to apply that knowledge to an unfamiliar scenario. Some ratings are preliminary and subject to change, so feedback from teachers is very welcome. The table also shows which question types are used in each question deck:

- **MCQ**: multiple-choice with only one correct answer
- **Item**: multiple-choice with multiple correct options to select
- **Numeric**: enter a number (with or without units)
- **Symbolic**: enter an algebraic expression
- **Chemistry**: enter a chemical formula or chemical equation
- **Short-answer**: type a word or combination of words
- **Drag-and-drop**: drag pre-loaded options into gaps in text or a table
- **Reorder**: drag pre-loaded options into the correct order

Biochemistry

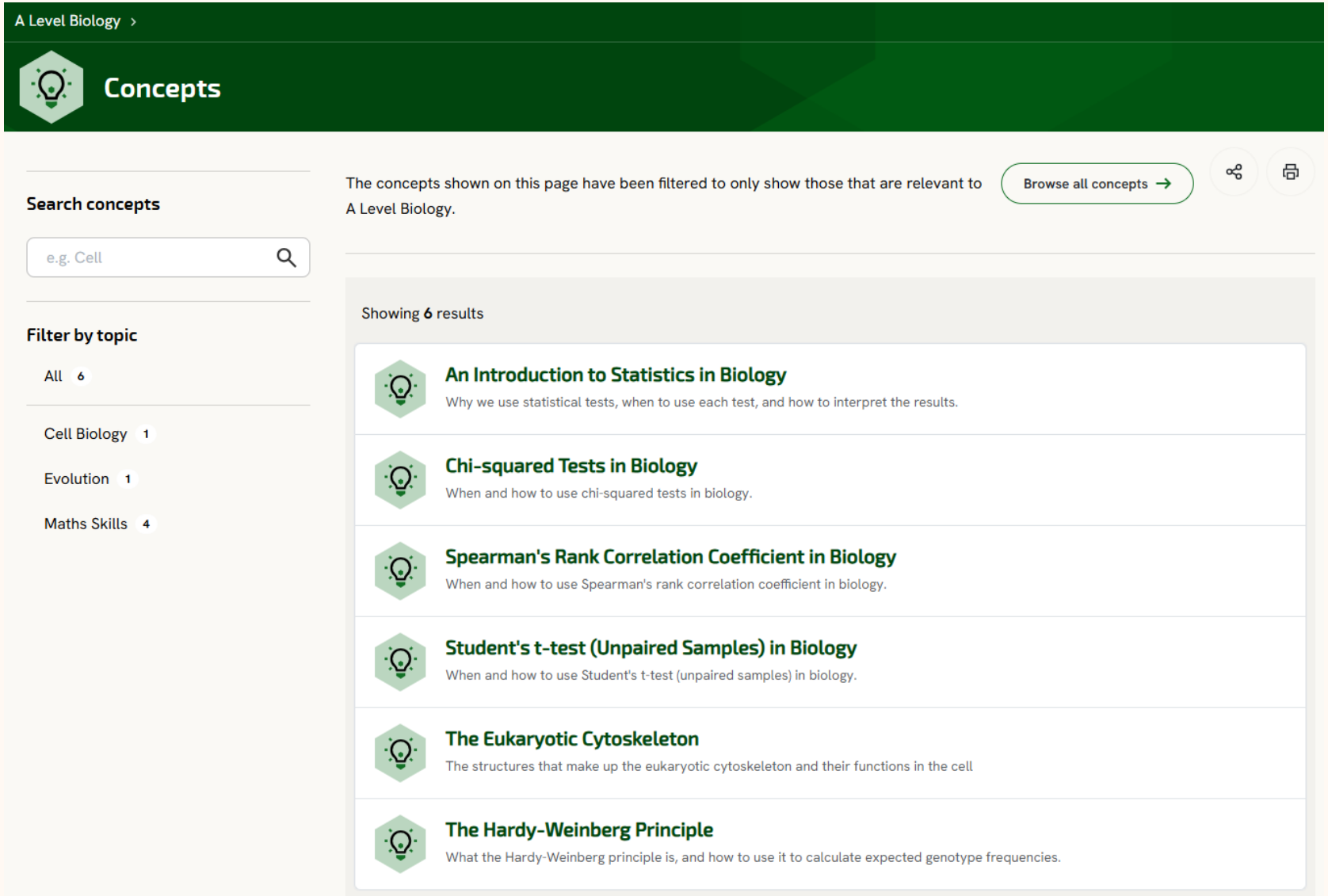
Biochemistry

Topic	What it contains	Link
Proteins	2×P, 5×C	View question deck
Enzymes	1×P, 5×C	View question deck
Carbohydrates	6×P	View question deck
Lipids	2×P, 5×C	View question deck
Respiration 1	7×P	View question deck
Respiration 2	6×P, 1×C	View question deck
Photosynthesis 1	5×P, 1×C	View question deck
Photosynthesis 2	5×P, 2×C	View question deck

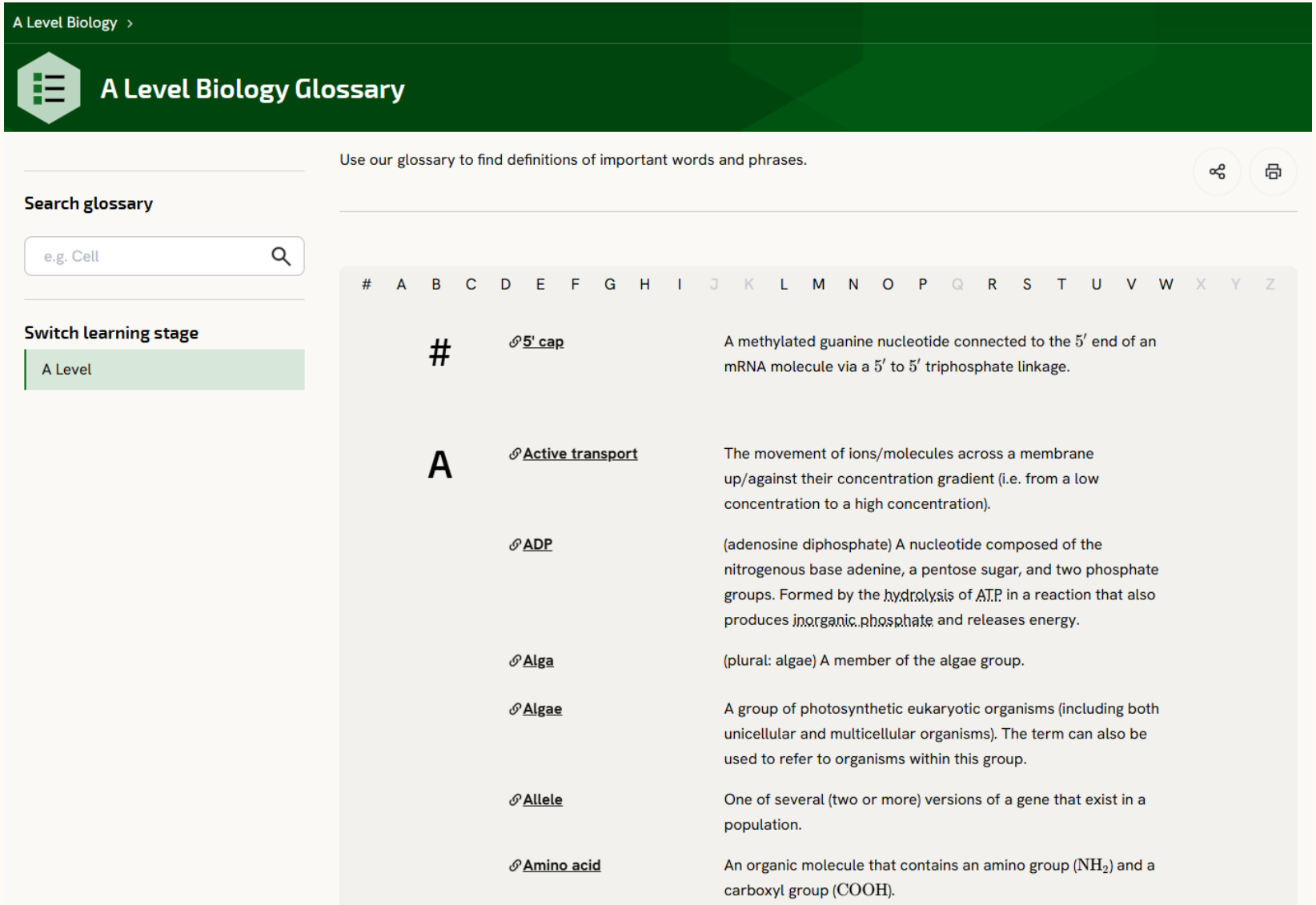
Cell Biology

Topic	What it contains	Link
Cell Structure 1	10×P	View question deck

Concept pages



Glossary



A Level Biology ›

A Level Biology Glossary

Use our glossary to find definitions of important words and phrases.

Search glossary

e.g. Cell

Switch learning stage

A Level

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

#

5' cap — A methylated guanine nucleotide connected to the $5'$ end of an mRNA molecule via a $5'$ to $5'$ triphosphate linkage.

A

Active transport — The movement of ions/molecules across a membrane up/against their concentration gradient (i.e. from a low concentration to a high concentration).

ADP — (adenosine diphosphate) A nucleotide composed of the nitrogenous base adenine, a pentose sugar, and two phosphate groups. Formed by the hydrolysis of ATP in a reaction that also produces inorganic phosphate and releases energy.

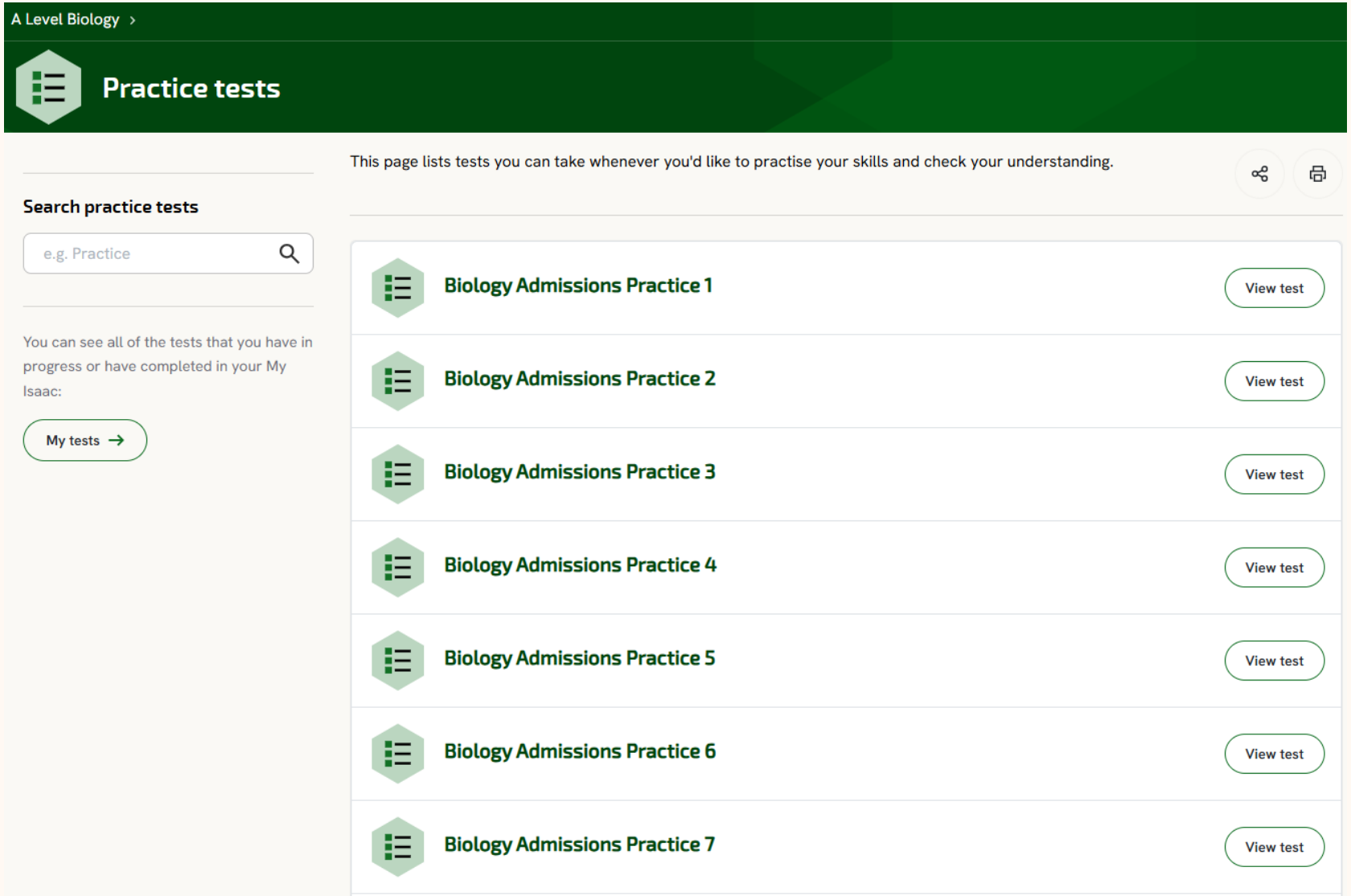
Alga — (plural: algae) A member of the algae group.

Algae — A group of photosynthetic eukaryotic organisms (including both unicellular and multicellular organisms). The term can also be used to refer to organisms within this group.

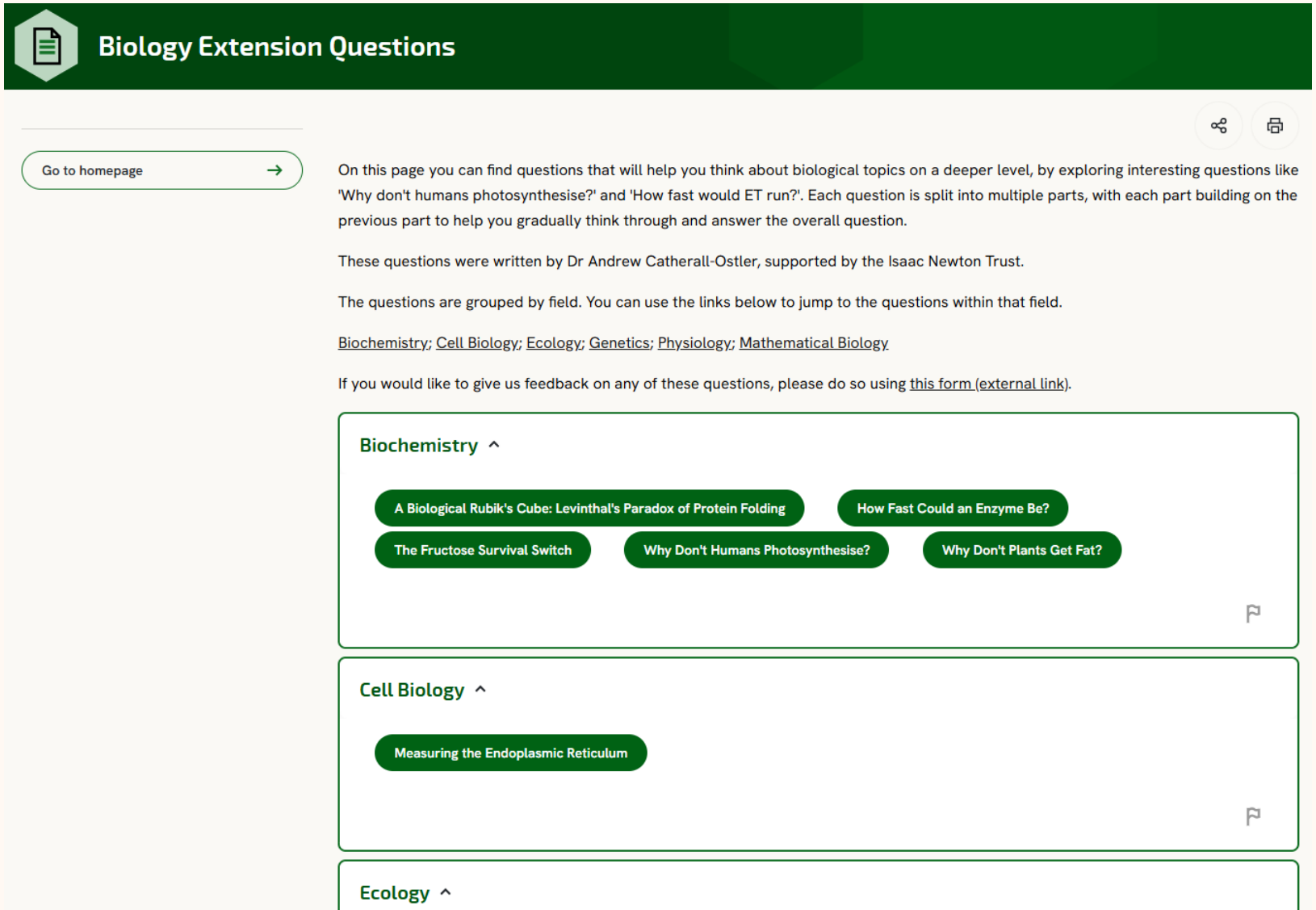
Allele — One of several (two or more) versions of a gene that exist in a population.

Amino acid — An organic molecule that contains an amino group (NH_2) and a carboxyl group ($COOH$).

Tests



Extension questions



Biology Extension Questions

Go to homepage →

On this page you can find questions that will help you think about biological topics on a deeper level, by exploring interesting questions like 'Why don't humans photosynthesise?' and 'How fast would ET run?'. Each question is split into multiple parts, with each part building on the previous part to help you gradually think through and answer the overall question.

These questions were written by Dr Andrew Catherall-Ostler, supported by the Isaac Newton Trust.

The questions are grouped by field. You can use the links below to jump to the questions within that field.

Biochemistry; Cell Biology; Ecology; Genetics; Physiology; Mathematical Biology

If you would like to give us feedback on any of these questions, please do so using this form (external link).

Biochemistry

- A Biological Rubik's Cube: Levinthal's Paradox of Protein Folding
- How Fast Could an Enzyme Be?
- The Fructose Survival Switch
- Why Don't Humans Photosynthesise?
- Why Don't Plants Get Fat?

Cell Biology

- Measuring the Endoplasmic Reticulum

Ecology

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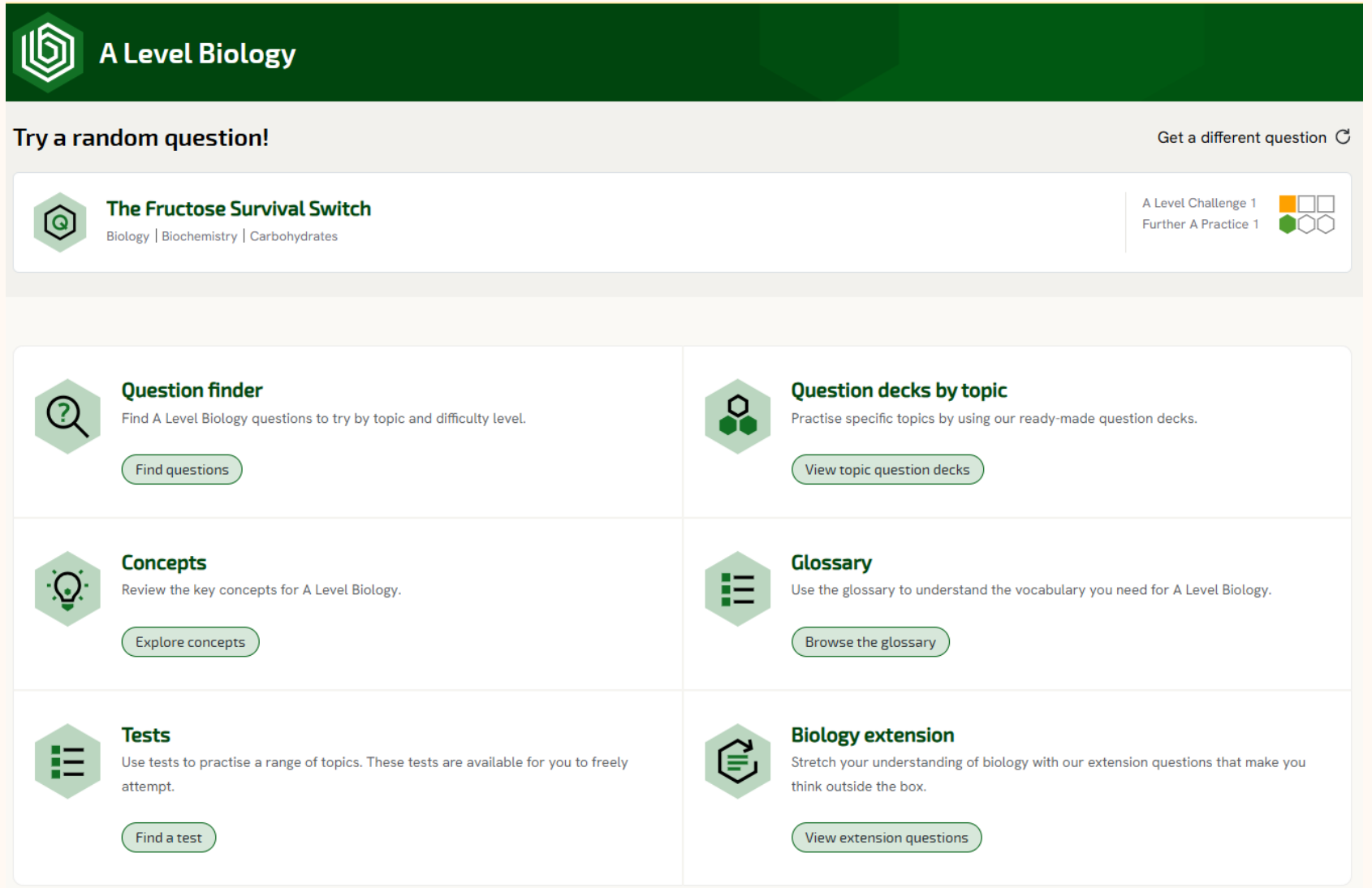
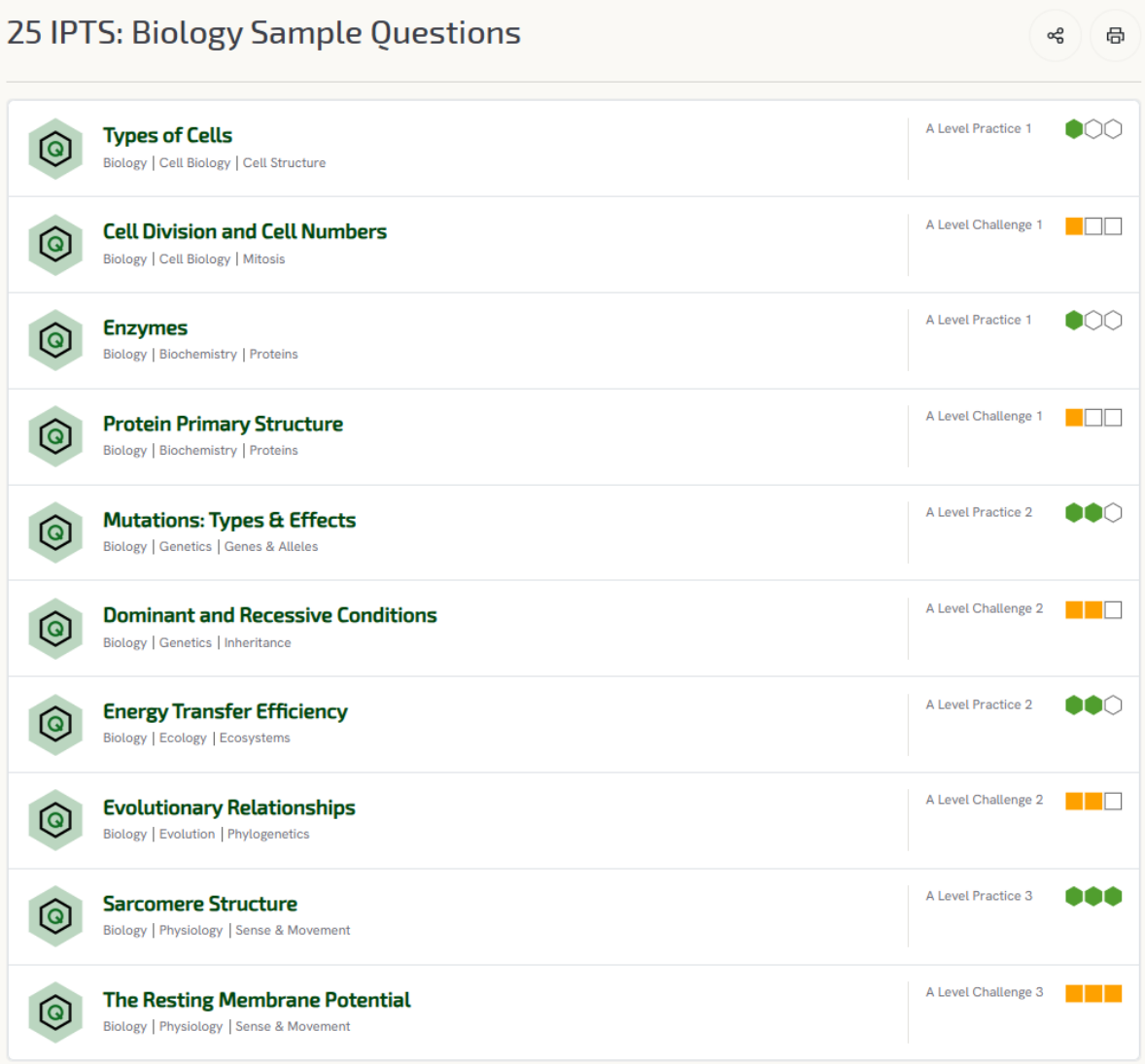


Biology Sample Questions



Biology Tricky Problems

slido.com
#3229 470

25 IPTS: Biology Tricky Problems

- **Sexual Reproduction & Genetic Variation**
  Biology | Evolution | Variation
- **Virus vs Host Cell Comparisons**
  Biology | Cell Biology | Viruses
- **SA:V Ratio and Gas Exchange**
  Biology | Physiology | Breathing & Circulation
- **Human Antibody Diversity**
  Biology | Physiology | Disease & Immunity
- **Premature Stop Codons**
  Biology | Genetics | Genes & Alleles
- **Plotting Exponential Growth**
  Biology | Ecology | Populations
- **Tertiary Structure Interactions 1**
  Biology | Biochemistry | Proteins
- **Tertiary Structure Interactions 2**
  Biology | Biochemistry | Proteins
- **DNA Packaging**
  Biology | Genetics | DNA replication
- **Cardiovascular Physiology in Space**
  Biology | Physiology

- Quantifying the variation that meiosis produces
- Quantifying the differences between viruses and host cells
- Quantifying the relationship between size and SA:V ratio
- Quantifying the number of possible antibodies
- Investigating the consequences of mutations
- Understanding the need for logs (and how to use them)
- Identifying amino acids that will form particular bonds/interactions
- Identifying amino acids that will form particular bonds/interactions
- Understanding how DNA is packed into small nuclei
- Understanding the effects of zero gravity on human physiology

Next steps for Isaac Biology

1. A Level book

2. Expanding to include GCSE content

3. Expanding to include KS3 content

Biology WhatsApp group

Thank you!

Lewis Thomson
lewis@isaacphysics.org

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