

Getting Started

Double-click on **Start** to open the case study – a detailed lesson guide can be found in the **Teacher's Area** of the application.

Bowland Maths materials are free for educational use in the UK only. You may install the software on multiple computers or a school network provided it is only accessible to pupils and staff at your school.

Overview

In the **AstroZoo** case study, pupils use computer software to try to save a space borne tourist attraction, AstroZoo, which has various exotic space creatures, but has fallen on hard times. The zoo was once a great success, but bad management has seen oxygen reserves exhausted, creature enclosures overpopulated, power supplies depleted and temperatures soaring.

Pupils must use mathematics to discover how many creatures each dome can support with the available oxygen, find the right balance between food- and oxygen-producing plants, stabilise the temperature by optimising the numbers of power-producing panels and heat shields, and, finally, solve a predator/prey problem for a new dome.

The pupils' task is to try to find sustainable solutions for the creatures in each case so that they can do well – and so attract space tourists back to the zoo.

Note

To view the case study at its best, we recommend setting your screen resolution to 1280 x 1024 pixels. If your display does not support this resolution, or higher, we suggest that you run the application in full-screen mode: start AstroZoo then click on the **Full Screen** button near the top of the screen. Press the escape key to return to the normal screen layout.

Organisation and pedagogy

The AstroZoo case study supports 4-5 one hour lessons of classroom activity with the option for related homework activities.

A mixture of whole class and small group work is involved. An interactive whiteboard or computer and data projector are essential for demonstration purposes.

In keeping with the ethos of the Bowland approach, your role as teacher is to set pupils realistic targets, challenge pupils to think and reason for themselves and manage discussions and plenary reporting sessions. You should only demonstrate techniques as a last resort. Throughout, the goal is to develop pupils' ability to work and think independently.

Mathematical Content

This case study provides opportunities for pupils to work on Key Concepts and Key Processes in the KS3 National Curriculum Programmes of Study. Pupils are expected to consider how mathematics is represented by identifying the mathematical aspects of the situation and selecting the mathematical information, methods and tools to use. They use the software to explore the effects of varying values and look for invariance, taking account of feedback to support them to work logically towards results and solutions. In reporting their outcomes to the Zoo managers, they consider the best way to present their findings.

The mathematical content that pupils are likely to engage with will be determined by the pupils' existing knowledge and this might include the following:

Number and algebra:

- Rules of arithmetic applied to calculations and manipulations with both rational and decimal numbers
- Applications of ratio and proportion, including calculations of percentages
- Accuracy and rounding
- Substitution into algebraic formulae - for example, to calculate areas

Geometry and measures:

- Units, compound measures and conversions
- Perimeters, areas, surface areas and volumes

Resources provided

This Case Study is presented as a browser-based application containing a collection of printable and ICT resources, including:

- **Audio/visual introduction** – which introduces the scenario to the pupils, sets the challenges and presents the data they need
- **Simulation tools** – allowing pupils to explore the problem and test their solutions
- **Lesson Guide** – with lesson plans, teacher guidance and solutions
- **Pupil worksheets and data sheets** – to print and hand out

Resource requirements (including hardware & software)

- The teacher will need a computer with data projector (or interactive whiteboard), sound output and speakers. The software is suitable for a Windows PC or an Apple Mac.
- Preferably, each small group of pupils should have access to a computer running the AstroZoo software.

The software can be run directly from the Bowland Maths website, or you can download the case study and copy it to the computer(s) you will be using during the lesson, or to the school network.

The software requires a modern web browser with [Adobe Flash Player](#) installed. Windows users will also need [Adobe Reader](#) to view and print resources. These are both available for free download from <http://www.adobe.com/downloads/>.

- Pupils will need calculators, graph paper, graphics calculators (optional), rulers, compasses, stiff card and squared paper.
- Each pupil, or pair of pupils, will need a printed copy of the resource sheets.

Note: When printing PDF files, Please make sure that 'page scaling' is set to 'none', 'no scaling' or '100%' to ensure that diagrams are printed to scale.

Technical details

Minimum machine and software specifications

PC Windows 7, Windows Vista®, Windows XP, Windows Server® 2008, Windows Server 2003, Windows 2000 Intel® Pentium® II 450MHz, AMD Athlon® 600MHz or faster processor or equivalent 128MB of RAM 128MB of graphics memory Internet Explorer 6.0 and above, Mozilla Firefox 2.0 and above, Google Chrome 2.0 and above, Safari 3.0 and above, Opera 9.5 and above, AOL 9.0 and above.

Mac Mac OS X 10.6, Mac OS X 10.5, Mac OS X 10.4 (Intel), Mac OS X 10.4 (Power PC) Intel Core™ Duo 1.33GHz or faster processor Power PC G3 500MHz or faster processor 128MB of RAM Safari 3.0 and above, Mozilla Firefox 3.0 and above, Google Chrome 2.0 and above, Opera 9.5 and above, AOL Desktop for Mac 1.0 and above.

Linux & other systems – we do not officially support this, and the software has not been tested on Linux. However, it should work on systems with Adobe Flash Player installed. Note that although the download is a PC '.exe' it is actually a self-extracting ".zip" file which many Linux systems will be able to unpack.

Screen size: 1280x1024 recommended - if you have a smaller screen, use the 'Full Screen' facility to fit to the available space.

Installing on a Web Server

If needed, the case study can be placed on an Intranet server: copy the complete 'astrozoo' folder to the server and, if necessary, rename "Start.html" to "index.html" or whatever name your server uses for index pages. To comply with the licensing terms, please ensure that access is limited to staff and pupils at your school.