



ASDAN SCIENCE SHORT COURSE

LEARNER HANDBOOK & CHALLENGE GUIDE

Module Overview, Challenges & Assessment Guide



Welcome to the ASDAN Science Short Course.

You will be able to explore this subject by doing a range of practical challenges that should help you develop several important transferable skills along the way.

This course may differ from others you have done before because it is designed to be very flexible.

You only need to select a fraction of the challenges on offer to complete the course, and you can do them in any order.

I have selected core challenges that I have developed supporting videos and resources for. These are listed below but if you would prefer to do alternative challenges on the E portfolio instead please do message me.

Each one is designed so that you can approach it in a variety of different ways, with flexibility around how you show you have completed the challenges.

The journey in doing the challenges – including how you plan them and how you reflect on what you learned afterwards – is just as important as what you create.

Completing challenges

All the ASDAN challenges are based around the core concept that there are three stages to any project: *Plan, Do and Review*.

For most challenges, you only need to make brief notes about planning what you will do and reflecting on how well the challenge went, what you learned and what you might do differently another time.

For some challenges you should complete Skills sheet.
I will let you know when you need to complete these.



Module: Human Machine

Learners must complete at least FOUR challenges over 10 hours.

This module explores the human body as a biological machine, investigating how it responds to light, temperature, sound and infection. Learners will carry out practical investigations to complete the challenges

Core Challenges

Challenge 1: Skin Temperature Mapping

Use an infrared thermometer to map the skin temperature of either:

A person's face

or

A person's arm and hand

Present your findings as:

A coloured diagram

With clear labels explaining temperature differences

Explain:

Why some areas may be warmer or cooler

What this tells us about circulation and heat regulation

Challenge 2: Pupil Response to Light

Measure the diameter of a person's pupil in:

Different light intensities

With one eye completely covered

Record your measurements carefully.

Describe:

The patterns you notice

How the pupil responds to light changes

Why covering one eye may affect both pupils

Suggest a scientific explanation for your findings.

Challenge 3: Sound Insulation Investigation

Measure the effectiveness of at least three different materials at insulating against sound.

Record results in a clear table.

Then:

Design a pair of ear defenders capable of reducing sound by 10 decibels.

Provide:

A labelled design

Test evidence

A written explanation justifying your material choices

Challenge 4: The Immune System & Bacterial Growth

Learn about:

The role of the immune system

How the body defends itself against infection

Then:

Investigate bacterial growth at home using bread as a simple “petri dish”.

Record:

Observations over time

Changes in mould growth

Environmental factors that may affect growth

Explain:

Why bacteria and fungi grow

How hygiene and immune responses help prevent infection

! *Follow safe hygiene procedures and dispose of materials carefully.*



Module: Forces and Motion – Section B: Projects

Learners must complete ONE challenge over 10 hours (1 credit).

This module explores forces, motion and energy transfer through practical design and investigation. Learners will apply scientific understanding to build, test and evaluate a working model.

Challenge 2: Elastic Band Powered Vehicle

Construct a simple vehicle using materials such as:

Wood

Card

Plastic

Recycled materials

The vehicle must be powered by an elastic band.

Use the Internet to research and explore different design ideas before beginning construction.

Test multiple prototypes)to find out:

Which design travels the furthest

Which design travels in the straightest line

Which design is most consistent

Record:

Distance travelled

)



Module: Chemical Change – Section A: Tasks

Learners must complete FOUR challenges over 10 hours

This module explores chemical reactions, changes in mass, reactivity, acids and alkalis, and biological catalysts. Learners will observe, record and explain chemical changes using scientific understanding.

Core Challenges

Challenge 1: Candle Combustion & Change in Mass

Investigate the change in mass of a candle as it burns.

Measure:

The mass before burning

The mass after burning

Record your results carefully.

Present your findings as:

A poster

Including a graph

Challenge 4: Reactivity of Alkali Metals

Watch online videos showing potassium, lithium, sodium and caesium being added to water.

Record your observations, including:

Speed of reaction

Vigour of reaction

Any flames or colour changes

Identify any patterns in your observations.

Use the periodic table to explain:

Why reactivity changes

How position in Group 1 affects behaviour

Challenge 6: Natural Indicators Investigation

Make three different indicator solutions using:

Red cabbage

Spinach

Turmeric

Test each indicator using dilute acids and alkalis.

Record:

Colour changes

Strength of colour change

Clarity of results

 Other Agreed Challenge: Enzymes & Catalase Investigation

Learn about:

What enzymes are

How enzymes work in the human body

The role of catalase

Undertake an experiment investigating catalase activity (using the provided science kit).



🌌 **Module: Space Physics – Section A: Tasks**

Learners must complete FOUR challenges over 10 hours.

This module explores astronomy, observation, planetary science and space investigation. Learners will develop observational skills, interpret astronomical data and present findings creatively and scientifically.

🧩 **Core Challenges**

★ **Challenge 1: Star Watch Investigation**

Take part in a star watch over three successive nights.

Keep a detailed observation log including:

Date and time

Weather conditions

Objects observed (eg constellations, planets, Moon)

Changes noticed over time

Use:

A star atlas

or

Astronomy software to help identify what you see

🌙 **Challenge 2: Phases of the Moon Animation**

Create a stop-motion animation to demonstrate the phases of the Moon.

🪐 **Challenge 3: Solar System Top Trumps**

Research data about the planets in our Solar System.

Collect at least eight pieces of data for each planet

(eg diameter, gravity, temperature, number of moons, distance from Sun, orbital period).

Use your findings to create a Top Trumps-style card game

Other Agreed Challenge: Telescopes & Observations

Learn about:

*The basic principles of how different telescopes work
(eg refracting, reflecting, radio telescopes)*

Take part in at least two investigations using the school's observatory.

Record:

What was observed

Equipment used

Data collected

Any difficulties encountered

Present your findings as:

A poster

or

A PowerPoint presentation



Module: Biological Challenges project

Learners must complete one project over a minimum of 10 hours.

This module explores plant biology, life cycles and experimental investigation. Learners will develop understanding of key biological processes and apply scientific methods to practical experiments.

Core Challenges

Challenge 1: Structure of a Flower & Plant Reproduction

Learn about:

The basic structure of a flower

The plant life cycle

Pollination

Fertilisation

Create:

A labelled diagram of a flower

A flow diagram showing the plant life cycle

Explain:

The function of each part of the flower

How pollination leads to fertilisation

The role of insects and other pollinators

Challenge 2: Investigating Photosynthesis

Learn about:

The process of photosynthesis

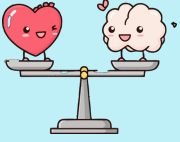
The role of sunlight, carbon dioxide and chlorophyll

Why photosynthesis is essential for life on Earth

Take part in an experiment to investigate photosynthesis (eg testing a leaf for starch or observing oxygen production in aquatic plants).

Challenge 3: Plant Growth Investigation - "Talking to Plants"

Investigate whether talking to plants affects their growth



Module: Performance in Sport – Section B: Projects

Learners must complete TWO challenges over 10 hours

This module explores how the human body responds to exercise, focusing on the cardiovascular system and the brain.

Learners will investigate how physical activity affects performance, health and wellbeing.

Challenge 1: Heart and Exercise

Learn about:

The structure of the heart

How the heart functions

The role of the heart in circulation

How oxygen and nutrients are transported around the body

Investigate how the heart changes with exercise.

Challenge 2: Thinking Caps – The Brain and Exercise

Learn about:

The basic structure and function of the brain

How the brain controls movement and coordination

The link between exercise and cognitive performance

Investigate how exercise affects brain performance



🌟 Final Steps

As learners come to the end of their short course, they complete a Summary of Achievement and a Personal Statement.

There are supportive videos and resources available to guide learners through this section, making it clear, manageable and confidence-building.

📝 Summary of Achievement

Learners complete a short form giving specific named examples of challenges where they have demonstrated the following skills:

🤝 Working with Others

📈 Improving Own Learning and Performance

🧠 Problem Solving

🌟 Optional: Additional Skills

Learners may also include evidence of:

💬 Communication

Presentations, posters, interviews, discussions, leaflets.

📊 Use of Maths

Budget planning, cost comparisons, survey charts, data tables.

💻 ICT

PowerPoints, digital posters, research tasks, recorded presentations.

Personal Statement

Learners also complete a short reflective statement covering:

Achievements (Things I Am Good At)

This is a chance to celebrate strengths — practical skills, research ability, creativity, teamwork, empathy or responsibility.

Things I Need to Improve

A gentle reflection on areas for growth — such as confidence speaking in front of others, organisation, time management or written detail.

Future Plans

This might include:

GCSE Science

Future college opportunities

Considering a specific science related career