INDUSTRY IN THE CLASSROOM
RESOURCE CATALOGUE
CYBER SECURITY EDUCATION

DIGITAL
SKILLS
EDUCATION

Skills
Development
Scotland

Industry In The Classroom Resource Catalogue Cyber Security Education

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Introduction

The web is filled with educational resources that can be used to bring cyber security to life. But it can be difficult to know which ones will work well for young learners, and which are suitable to be delivered in classrooms.

This document brings together examples of high quality cyber security material suitable for highschool age students. These tried-and-tested resources are great for industry volunteers to use in the classroom.

By using one of these resources you know you're going to be using something interesting, educational, and relevant to the classroom.

For each resource we've included a summary of the activity, along with a list of the educational materials provided. We've also given an indication of the age group this activity would best suit.

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About this project

This guide is produced on behalf of Skills Development Scotland's Discover Cyber Programme, which aims to encourage more young people to consider a career in the cyber industry. This work is funded by the Scottish Government in partnership with the UK Government's National Cyber Security Programme.

This document is designed to be used by industry volunteers in order to find suitable activities for *industry in the classroom* virtual engagements. Teachers may also find it useful as a catalogue of high quality material suitable for one-off lessons.

Cyber Skills Live

Interactive Online Activities

https://cyberskillslesson.com/

Cyber Skills Live are a series of interactive cyber security activities designed to give a taste of different cyber security roles. Live sessions are run throughout the academic term, but the activities can be played anytime standalone. Each is designed to last around 30 minutes, and learners only need a web browser to use them. These activities may be used to support the teaching and delivery of learning outcomes for the NPA Cyber Security qualification.

Start with these:

> *How To Rob A Bank*:
>> Hack into and steal money from a fictional bank while learning *ethical hacking* techniques and *red team thinking*.
>
> *How To Solve A Murder*:
>> Solve the case of a murder in Bishopbriggs by sifting through the evidence. This introduces some of the basics of *digital forensics*.
>
> *How To Steal A Pizza*:
>> Perform *open source intelligence* by looking closely at a pizza takeaway's website then conduct a *penetration test* using a vulnerability you find.
>
> *Defend The Power Stations*:
>> Act as an *incident response* team while learning about *firewalls* to halt an attack on a power station.

What you get:
- 12 x Standalone interactive activities

Suitable for: S1-S4 (ages 11-16) secondary school students.

Skills Level: 🛡️ Suitable for Beginners.

Need to know: These are really popular with learners and a fun activity to do in the classroom. They're a great way to introduce cyber security topics in a way that feels like a game. The best part is you don't need to prepare anything in advance, it's all built into the website.

CyberFirst

CyberFirst Adventurers Teaching Pack

https://content.cyberhub.uk/224-cyberfirst-adventurers-teaching-pack

CyberFirst, a Government programme aimed at young people to increase cyber security participation, have produced a series of introductory lessons.

The Adventurers Teaching Pack contains materials for 5x 1 hour long modules which cover topics such as *open source intelligence* and *password cracking*. The lessons can be delivered standalone, or in sequence. These activities may be used to support the teaching and delivery of learning outcomes for the NPA Cyber Security qualification.

Start with these:
> *Patient Zero*:
>> Use leaked information from multiple sources to try and identify the originator of an infection. This lesson focuses on *open source intelligence*.
>
> *Password Recovery*:
>> Learn about authentication while solving puzzles. This lesson would suit outreach as it discusses different careers.

What you get:
- Lesson plans
- Slides
- Worksheets

Suitable for: S1-S4 (ages 11-16) secondary school students.

Skills level: 🛡️ 🛡️ Suitable for Intermediate Learners.

Need to know: These lesson plans are created by the National Cyber Security Centre and are also delivered at in-person events which are extremely popular. Adventurers is set at a good level for getting started. You can direct keen pupils to the CyberFirst website where they'll find events and other activities at various levels up to university study.

Cyber Security Challenge UK

Lesson Plans

https://www.cybersecuritychallenge.org.uk/resources/teachers#

Cyber Security Challenge UK has 12 lesson plans prepared for GCSE Computer Science which cover a range of cyber security topics. These are equally applicable for other Computer Science or Cyber Security qualifications at a similar level. The lesson plans are designed to last around one hour.

Start with these:

> *Social Engineering Techniques*:
>> Learn about the *social engineering* techniques used by cyber criminals such as blagging, phishing, and pharming.
>
> *Methods to detect and prevent cyber security threats*:
>> Learn about CAPTCHAS, biometrics, and passwords.
>
> *Carousel of Cyber Activities*:
>> This activity is suitable for younger learners (S1-S2) and introduces some of the basics of cyber security through a series of short carousel activities. This would be a good outreach activity.

What you get:
- 12 x Lesson plans

Suitable for: S3-S6 (ages 13-18) students completing a module or unit covering cyber security.

Skills level: 🛡️🛡️ Suitable for Intermediate or 🛡️🛡️🛡️ Advanced learners.

Need to know: These activities are technically rich and cover lots of relevant topics for learners who have learned the basics already. They are well constructed lesson plans and would be best delivered by a teacher as part of a course. Cyber Security Challenge UK run a national competition called CyberCenturion which is well worth a look if you have an extracurricular club.

The Royal Institution

Cryptography Masterclass

https://www.rigb.org/education/masterclasses/masterclass-resources/off-the-shelf-resources/ots-masterclass-codebreaking-ciphers

The Royal Institution has a codebreaking & Ciphers lesson plan complete with materials. The lesson plan is designed to last around two hours but is formed of shorter tasks so a shorter lesson can be delivered.

What you get:
- Lesson plan
- Slides
- Worksheets

Suitable for: All secondary school students.

Skills level: 🛡️ Suitable for Beginners.

Need to know: This activity is part of a wider set of mathematics masterclasses prepared by The Royal Institution. You get everything you need, even down to session leader notes. Note that the codewheel templates will need to be printed out to allow the students to complete some activities. This would be a great outreach activity for a volunteer to come in and deliver.

Barefoot Computing

Code Cracking

https://www.barefootcomputing.org/resources/code-cracking

Barefoot Computing has a series of six 1-hour lessons on code cracking. The first two would be suitable for standalone lessons.

Start with these:
1. *WWII Code Crackers*

   Learners have to work together in teams to solve ciphers and encode secret messages of their own.
2. *Computer History*

   Learners walk around the room learning facts about Alan Turing and the development of computers and cyber security. They then have to create a fact file in a medium of your choosing such as a vlog or presentation.

What you get:
- Slides with videos
- Worksheets

Suitable for: S1-S2 (ages 11-14) secondary school students.

Skills level: 🛡️ Suitable for Beginners.

Need to know: This resource was developed for industry volunteers to deliver, as such the activity plan is readable, offers helpful advice, and is of excellent quality. It would be ideal for an industry visitor to deliver. You'll need to print out the ciphers and fact cards to run these activities. Note that you will need to create a free account to access the learning materials.

Key skills index

Ciphers
- Cryptography Lesson Plan - Royal Institute
- Code Cracking - Barefoot Computing

Digital forensics
- How To Solve A Murder - Cyber Skills Live

Ethical hacking
- How to Rob a Bank - Cyber Skills Live

Firewalls
- Defend The Power Stations - Cyber Skills Live

Open source intelligence
- CyberFirst Adventurers

Password cracking
- CyberFirst Adventurers
- Cyber Security Challenge UK

Penetration testing
- How To Steal A Pizza - Cyber Skills Live

Red team thinking
- How To Rob A Bank - Cyber Skills Live

Social engineering
- Cyber Security Challenge UK

Skill level matrix

🛡 Beginners	Learners of all abilities, no knowledge of computer science necessary.	Cyber Skills Live CyberFirst Adventurers The RI Cryptography Masterclass Barefoot Computing Code Cracking
🛡🛡 Intermediate	Learners completing a qualification or course in computer science or security.	Cyber Security Challenge UK CyberFirst Adventurers
🛡🛡🛡 Advanced	Learners who have surpassed the level of the curriculum and are looking for a challenge.	Cyber Security Challenge UK

Appendix and credits

Authors:

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digitalskillseducation.com

Bibliography:

https://cyberskillslesson.com/

https://www.barefootcomputing.org/resources/code-cracking

https://www.rigb.org/education/masterclasses/masterclass-resources/off-the-shelf-resources/ots-masterclass-codebreaking-ciphers

https://www.cybersecuritychallenge.org.uk/resources/teachers#

https://content.cyberhub.uk/224-cyberfirst-adventurers-teaching-pack?jjj=1602516893582

Other links:

https://www.digitalworld.net/

https://digitalskillseducation.com/

https://cyberscotlandweek.com/

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