



Prifysgol Cymru
Y Drindod Dewi Sant
University of Wales
Trinity Saint David

Yr Athrofa
Centre for Education
Addysg i Gymru | Education for Wales

**Trawsnewid Addysg,
Trawsnewid Bywydau**

**Transforming Education,
Transforming Lives**

*Trawsnewid Addysg, Trawsnewid Bywydau
Transforming Education, Transforming Lives*

www.uwtsd.ac.uk

ECAD4008

**Gwyddoniaeth a Thechnoleg
Darlith 2**

**ECAD4008
Science and Technology
Lecture 2**

**Helen Williams
h.williams1@uwtsd.ac.uk**



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Bwriadau Dysgu:

- Adolygu: Gwyddoniaeth a Thechnoleg o fewn Dysgu Sylfaen (h.y. Beth ydw i'n ei addysgu?)
- Ystyriaethau addysgeg wrth addysgu Gwyddoniaeth a Thechnoleg (syniadau am sut ydw i'n addysgu)
- Cynllunio gweithgaredd



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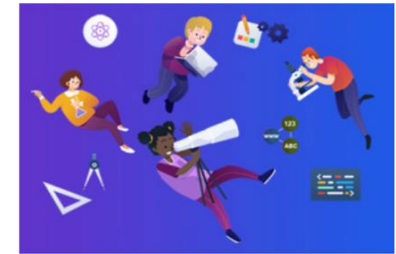
Aims:

- Revision: Science and Technology within Foundation Learning (i.e., What am I teaching?)
- Pedagogical considerations in the teaching of Science and Technology (Ideas about how I teach)
- Planning an engaging activity

Cwricwlwm i Gymru 2022

Datganiadau o'r Hyn sy'n Bwysig : Y sail i gynnydd dysgwyr gydol y continwrm 3-16

- MDaPh Gwyddoniaeth a Thechnoleg - Yr Hyn sy'n Bwysig
- **Mae bod yn chwilfrydig a chwilio am atebion yn hanfodol i ddeall a rhagfynegi ffenomenau.**
- **Mae meddylfryd dylunio a pheirianeg yn cynnig ffyrdd technegol a chreadigol i ddiwallu anghenion a dymuniadau cymdeithas.**
- **Mae'r byd o'n cwmpas yn llawn pethau byw sy'n dibynnu ar ei gilydd i oroesi.**
- **Mae mater, a'r ffordd y mae'n ymddwyn, yn diffinio ein bydysawd ac yn ffurfio ein bywydau.**
- **Mae grymoedd ac egni yn gosod sail i ddeall ein bydysawd.**
- **Mae cyfrifiaduraeth yn gosod sail i'n byd digidol.**



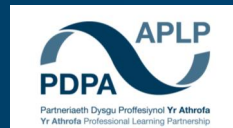
Gwyddoniaeth a Thechnoleg

[Disgrifiadau dysgu - Hwb \(gov.wales\)](https://gov.wales)



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Curriculum for Wales 2022

The statements of what matters are the basis of learners' progression

- AoLE Science and Technology - What Matters

- **Being curious and searching for answers is essential to understanding and predicting phenomena.**
- **Design thinking and engineering offer technical and creative ways to meet society's needs and wants.**
- **The world around us is full of living things which depend on each other for survival.**
- **Matter and the way it behaves defines our universe and shapes our lives.**
- **Forces and energy provide a foundation for understanding our universe.**
- **Computation is the foundation for our digital world.**



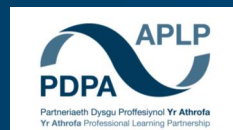
Science and Technology

[Descriptions of learning - Hwb \(gov.wales\)](https://gov.wales/learning-descriptions)



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Outdoor Learning is.....

<https://padlet.com/hwilliams124/outdoor-learning-is-yugp4wakyv09ffyj>



Mae dysgu yn yr awyr agored yn...



<https://pstt.org.uk/resources/bright-ideas/>



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Dysgu Sylfaen: Gwyddoniaeth a Thechnoleg

Datblygu sgiliau

Mae'r sgiliau canlynol yn hanfodol ar gyfer y Maes Dysgu hwn a gellir eu datblygu ar draws y cwricwlwm hefyd.

- Arsylwi
- Cymharu
- Dosbarthu
- Ymholi
- Archwilio ac arbrofi
- Gwranddo
- Gwneud penderfyniadau
- Rhagfynegi a phrofi
- Myfyrio
- Disgrifio
- Didoli a grwpio
- Trefnu
- Gofyn/ateb cwestiynau
- Ymchwilio
- Meddwl
- Datrys problemau
- Cofnodi
- Cyfathrebu
- Gwerthuso

Engbrefftau o gwestiynau effeithiol:

Beth allwch chi ei weld?

Beth mae'n eich atgoffa ohono?

Beth ydych chi'n meddwl bydd yn digwydd nesaf?

Sut gallwn ni newid hyn?

Beth ydych chi'n ei wybod yn barod am...?

Beth sy'n debyg/gwahanol?

Tybed pam...

Tybed pryd...

Tybed sut...

Tybed beth...

Beth fyddai'n digwydd pe bai...?

Foundation Learning: Science and Technology

Development of skills

The following skills are essential to this Area of Learning and can also be developed across the curriculum.

- Observing
- Comparing
- Classifying
- Enquiring
- Exploring and experimenting
- Listening
- Making decisions
- Predicting and testing
- Reflecting
- Describing
- Sorting and grouping
- Sequencing
- Asking/answering questions
- Investigating
- Thinking
- Solving problems
- Recording
- Communicating
- Evaluating

Examples of effective question prompts:

- What can you see?
- What does it remind you of?
- What do you think will happen next?
- How can we change this?
- What do you already know about...?
- What is the same/different?
- I wonder why...
- I wonder when...
- I wonder how...
- I wonder what...
- What would happen if...?

Addysgu tu allan i'r ystafell ddosbarth

- ▶ Coedtiroedd
- ▶ Pyllau dwr
- ▶ Buarth
- ▶ Y Parc
- ▶ Amgueddfeydd
- ▶ Y Traeth
- ▶ Techniquest
- ▶ ?

Getting pupils out of the classroom

- ▶ Woodland walks
- ▶ Pond dipping
- ▶ Playground
- ▶ Park
- ▶ Museums
- ▶ Beach
- ▶ Techniquest
- ▶ ?

The benefits of outdoor learning on science teaching



https://www.ase.org.uk/system/files/Grimshaw%20et%20al_0.pdf



Rhestr Wirio

- ▶ Diogelwch:
 - ▶ Y Tywydd
 - ▶ Cymhareb
 - ▶ Staff cynorthwyol
 - ▶ Rieni
 - ▶ Ffurflenni
 - ▶ Disgyblion (Angnenion ychwnegol?)
- ▶ Cyllid
 - ▶ Costau?
 - ▶ Trafnidiaeth?
- ▶ Gweinyddol
 - ▶ Caniatad? Y Pennaeth. Pennaeth Adran Ffurflenni ychwanegol?
 - ▶ Unrhywbeth arall?

Checklist

- ▶ Safety:
 - ▶ Weather
 - ▶ Ratio
 - ▶ Support staff
 - ▶ Parents
 - ▶ Forms?
 - ▶ Pupils (Additional needs?)
- ▶ Financial
 - ▶ Cover?
 - ▶ Transportation?
- ▶ Admin
 - ▶ Permission? Head. Line manager. More forms
 - ▶ Anything else?

Arhoswch!

► CLEAPSS <https://www.cleapss.org.uk/>

Supporting practical work in science,
D&T and art

CLEAPSS
primary

- Dylech chi bob amser wirio CLEAPSS cyn i chi wneud unrhyw beth allai fod yn beryglus gyda'ch dosbarth.
- Byddwch yn wyliadwrus o dynnu unrhyw beth oddi ar y cyfryngau cymdeithasol heb asesiad risg.
- Mae pob AALL yn ymrwymo i CLEAPSS i'w diogelu. Os ydych chi'n gwneud rhywbeth peryglus ac nad yw wedi'i gynnwys yn CLEAPSS, does dim yswiriant gennych!

Meddyliwch bob amser:

- Beth yw'r gwaethaf allai ddigwydd?
- Allwch chi ei osgoi?
- Allwch chi leihau'r tebygrwydd?
- Beth fydddech chi'n ei wneud pe bai'n digwydd?

Wait!

► CLEAPSS <https://www.cleapss.org.uk/>

Supporting practical work in science,
D&T and art

CLEAPSS
primary

Always check [CLEAPSS](https://www.cleapss.org.uk/) before you do anything with risky with your class.

Be wary of taking anything off social media without a risk assessment.

All LEAs sign up to CLEAPSS as a way of insurance. If you do something risky and it is not covered in CLEAPSS, then you are not covered!

Always think:

What is the worse that could happen?

Can you avoid it?

Can you reduce the chance?

What would you do if it happened?

Yr
eithriad?

Odd one
out?

<https://pstat.org.uk/?s=odd+one+out>



Amser Gweithgarwch!

- Cynhaliwch arbrawf syml

Tyrrau Papur:

<https://www.youtube.com/watch?v=GfVdtAe8JL0>

Pypedau Cysgod:

<https://www.youtube.com/watch?v=Ldhez31P5VU>

Amseryddion Pendil:

<https://www.youtube.com/watch?v=EQrFF4Cv8wM>

- Gweithgaredd –Cartref i Froga



<https://pstt.org.uk/resources/curriculum-materials/resources-overview>

Activity Time!

- Participate in an experiment/investigation

Paper Towers:

https://www.youtube.com/watch?v=X_e_7bWetGI

Shadow Puppets:

<https://www.youtube.com/watch?v=qoDQXrq2wsc>

Pendulum Timers:

<https://www.youtube.com/watch?v=X4GrDn90uKg>

- Activity - Home for a Frog

STARTERS FOR SCIENCE

- ✱ Short videos to get started with practical science enquiry
- ✱ Can be used in school or at home
- ✱ Minimal resources needed

<https://pstt.org.uk/resources/curriculum-materials/Starters-for-Science>

Ymchwilio, Arbrofi, Creu, Darganfod Cam Cynnydd 1&2



<https://primarylibrary.crestawards.org/all-star-challenges-in-welsh/64363075>

Investigate, Experiment, Create, Discover Progression steps 1&2



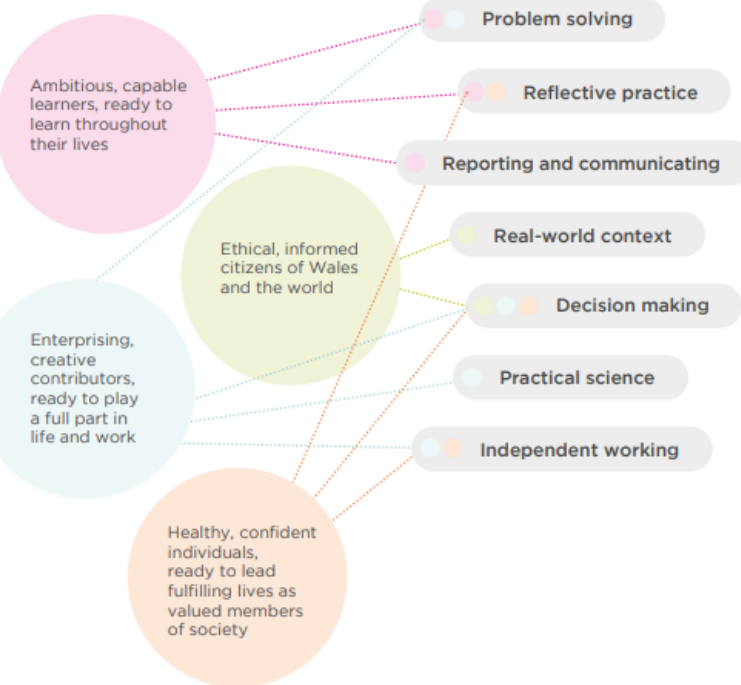
<https://primarylibrary.crestawards.org/all-star-challenges/61746949>

Curriculum for Wales

The four principles of the Curriculum for Wales match well with the CREST guiding principles.

The curriculum for Wales aims to help children develop into:

CREST guiding principles:



We suggest the following CREST Star challenges for the six science content areas in the Curriculum for Wales for ages 5-7:

Curiosity

- Brilliant bubbles
- Discovery bag
- Muddy mess
- Music maker
- Sneaky shadow

Design thinking and engineering

- Testing timers
- Starting sounds
- Music maker

Living things

- Animal adventure
- Plant detectives

Matter and its behaviours

- Scrapyard scraps
- Sniffley sneezes
- Teabag trouble
- Useless umbrella

Computation and the digital world *

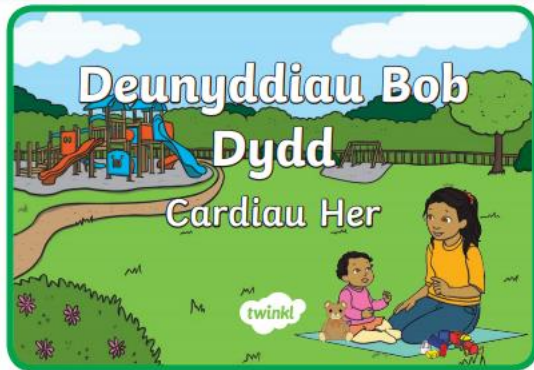
- Slippery slidey shoes
- Speedy scooters
- Music maker

* You can use digital tools such as cameras and microphones to record results in these challenges

Forces and energy

- Confusing cans
- Slippery slidey shoes
- Speedy scooters

Cardiau Her



Deunyddiau Bob Dydd

Pam ydych yn meddwl fod llwy a phowlen
babi yn cael ei wneud o blastig?



Deunyddiau Bob Dydd

Allwch chi ddod o hyd i 5 gwrthrych garw a
5 gwrthrych llyfn?



Deunyddiau Bob Dydd

Allwch chi ddod o hyd i 5 gwrthrych caled a
5 gwrthrych meddal?



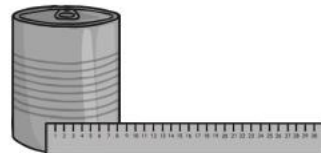
Deunyddiau Bob Dydd

Edrychwch o'ch cwmpas. Sawl peth welwch
chi sydd wedi ei wneud o blastig?



Deunyddiau Bob Dydd

Edrychwch o'ch cwmpas. Sawl peth welwch
chi sydd wedi ei wneud o fetal?



Gweithgaredd Y Tri Mochyn Bach

Gwellt

Ydych chi'n gallu helpu'r mochyn bach cyntaf i wneud tŷ allan o wellt?

Byddwch angen

Gwellt

Cyfarwyddiadau

- Edrychwch a theimlwch y gwellt.
- Ydy'r gwellt yn ddigon cryf ar gyfer tŷ?
- Hoffech chi fyw mewn tŷ wedi ei wneud allan o wellt?
- Pa mor gryf yw'r gwellt?
- Ydych chi wedi gweld tai allan o wellt?
- Ydych chi'n meddwl bod gwellt yn dal dŵr?
- Beth fyddai'r peryg o gael tŷ gwellt?

Arbrofwch gryfder y gwellt.

Daliwch fwndel o wellt. Tynnwch y gwellt. Troellwch y gwellt. Gwasgwch y gwellt. Torrwch y gwellt. Nawr daliwch fwndel mwy a gwneud yr un arbrawf eto.



Challenge Cards



Everyday Materials

Why do you think babies' spoons and bowls are made from plastic?



Everyday Materials

Can you find 5 rough objects and 5 smooth ones?



Everyday Materials

Can you find 5 hard objects and 5 soft ones?



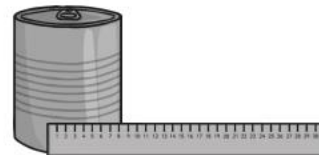
Everyday Materials

Look around. How many things can you see that are made from plastic?



Everyday Materials

Look around. How many things can you see that are made from metal?



The Three Little Pigs Activity

Straw

Can you help the first little pig make a house of straw?

You will need

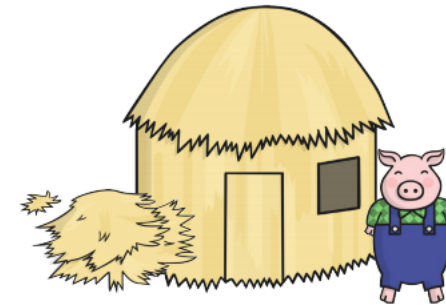
Straw

Instructions

- Look at, and feel the straw.
- Would straw be strong enough for a house?
- Would you like to live in a house made of straw?
- How strong is the straw?
- Have you seen any houses made of straw?
- Do you think straw is waterproof?
- What would be the dangers of having a straw house?

Test the strength of the straw.

Take a small bundle of straw. Pull it. Twist it. Squash it. Cut it. Now take a thicker bundle and do the same tests.



twinkl visit [twinkl.com](https://www.twinkl.com)

Sut :

- Gweithgareddau hwylus
- Cwestiynu pwrpasol
- Ei wneud yn gyffyrddadwy
- Annog gwaith grwp
- Creu amgylchedd diogel i alluogi chwilfrydedd
- Peidio ac ofni mentro

Cynllunio:

Y wers / Y dasg ffocws :

- Amcan y dysgu?
- Beth mae'r plant yn dysgu?
- Sut maent yn dysgu?
- Beth sydd angen i'r plant wneud er mwyn llwyddo?



How?

- Keep it fun
- Increase demand through questioning
- Make it tactile
- Encourage group work
- Create a safe environment to be curious
- Don't be afraid to try

Planning:

Focus group task:

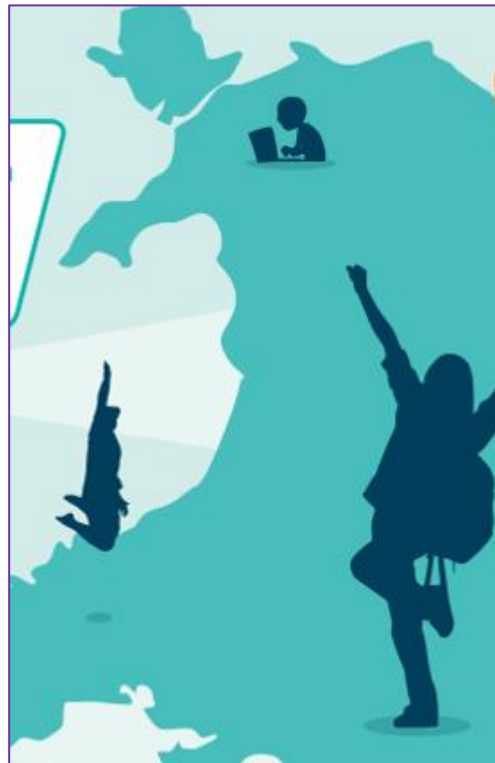
- Learning objective?
- What are the pupils learning?
- How are they learning?
- What do the pupils need to do to succeed?

3 Egwyddor Addysgeg

Mae addysgu a dysgu da yn galw am ddefnyddio cymysgedd o ddulliau sy'n cynnwys addysgu uniongyrchol.

Mae addysgu a dysgu da yn golygu gosod tasgau a dewis adnoddau sy'n adeiladu ar wybodaeth a phrofiad blaenorol ac yn ennyn diddordeb.

Mae addysgu a dysgu da yn ymestyn oddi mewn ac ar draws Meysydd Dysgu a Phrofiad.



3 Pedagogical Principles

Good teaching and learning means employing a blend of approaches including direct teaching.

Good teaching and learning sets tasks and selects resources that build on previous knowledge and experience and engage interest.

Good teaching and learning ranges within and across Areas of Learning and experience.

Testunau diddorol : An interesting read:

Trainee teachers, Toni Cain, Jemima Davey, Georgi Colliety, Maddy Hayward, Camilla Robinson, Regan Kerr and Rob Shaw, talk about science and explore their reasons for becoming science specialists

The trainee teacher journey



The trainees get to grips with making birdfeeders

Sally Hardman and Sue Luke develop opportunities for channelling children's curiosity

**HOW CAN YOU
MAKE THE MOST
OF THOSE 'WOW
MOMENTS'?**



“Rydym yn cynnig ystod o gynhyrchion a gwasanaethau sy'n cefnogi addysgu a dysgu pynciau STEM yng Nghymru yng nghydestun y byd go iawn.”

<https://www.gweld-gwyddoniaeth.co.uk/>



“We offer a range of products and services that support the teaching and learning of STEM subjects in Wales within a real world context.”

<https://www.see-science.co.uk/>

Syniadau?



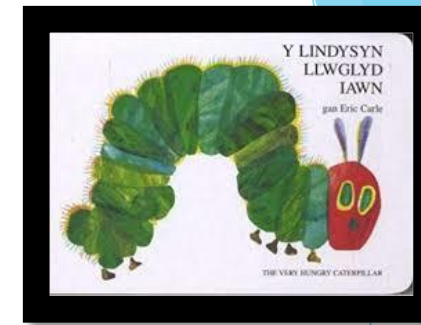
<https://hwb.gov.wales/parthau/rhwydwaith-rhagoriaeth-y-cyfnod-sylfaen/>



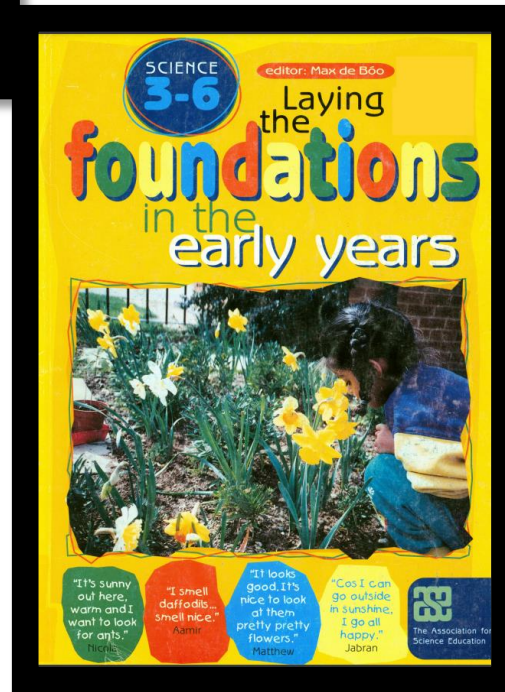
Gaynor Weavers
(MYL Worksheets PDF)
Ffeil Adnoddau Sesiwn 1 a 2



Jackie Clegg
Nature Walk
Ffeil Adnoddau Sesiwn 1 a 2



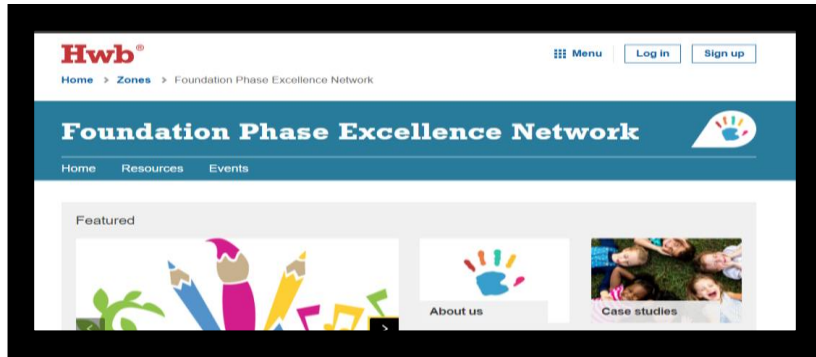
Jackie Clegg
Ffeil Adnoddau Sesiwn 1 a 2



ASE
Ffeil Adnoddau Sesiwn 1 a 2

<https://www.stem.org.uk/resources/collection/3485/teaching-primary-science>
<https://www.ase.org.uk/resources/primary-science>
<https://wowscience.co.uk/>
<https://www.tes.com/teaching-resources>
<https://www.farmvention.com/>
<https://explorify.wellcome.ac.uk/>
<https://pstt.org.uk/>

Ideas?



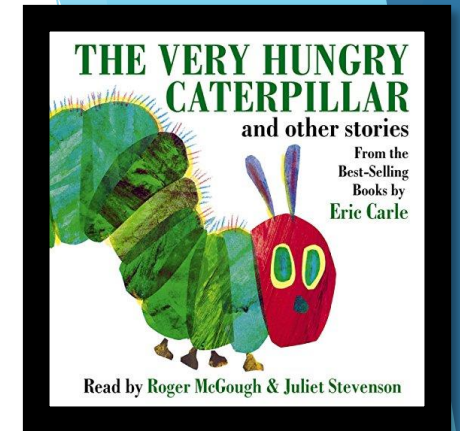
<https://hwb.gov.wales/zones/foundation-phase-excellence-network/>



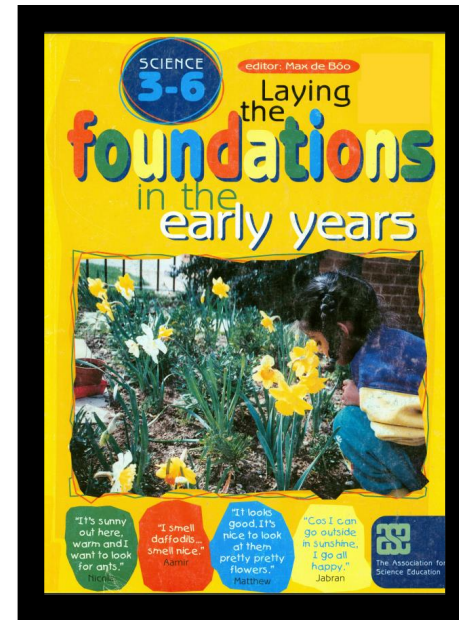
Gaynor Weavers
(MYL Worksheets PDF)
Resources File



Jackie Clegg
Nature Walk
Resources File



Jackie Clegg
Resources File



ASE
Resources File

<https://www.stem.org.uk/resources/collecti>
[on/3485/teaching-primary-science](https://www.stem.org.uk/resources/collecti)
<https://www.ase.org.uk/resources/primary-science>
<https://wowscience.co.uk/>
<https://www.tes.com/teaching-resources>
<https://www.farmvention.com/>
<https://explorify.wellcome.ac.uk/>
<https://pstt.org.uk/>