



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

ECAD5008

**Gwyddoniaeth a Thechnoleg
2**

**Science and Technology
2**

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Bwriadau Dysgu

Learning Intentions

- Sut i gynllunio'n effeithiol er mwyn sicrhau cynnydd mewn Gwyddoniaeth a Thechnoleg
- Ystyried technegau cwestiynu effeithiol (AagD)
- Cynllunio ymchwiliad gwyddonol
- How to plan effectively to make progress in Science and Technology
- Consider effective questioning techniques (AfL)
- Plan a scientific investigation

Cam cynnydd 2 & 3
Progression Step 2 & 3

Pa fath o ymchwiliadau?
What kind of investigations?



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Ymholiad gwyddonol . Ydych chi'n cofio?

BI6

Prawf teg/ Prawf cymharol	Adnabod a dosbarthu	Arsylwi dros amser	Chwilio am batrymau	Ymchwil
Pa fath o ymarfer corff sy'n cael yr effaith fwyaf ar guriad y galon?	Pa organau sy'n ffurfio'r system gylchrediad? Ble maen nhw?	Sut mae fy nghuriad calon yn newid yn ystod y dydd?	Oes patrwm rhwng beth rydyn ni'n bwyta i frecwast a pha mor gyflym rydyn ni'n gallu rhedeg?	Sut maen ein syniadau am foddion ac afiechydon wedi newid dros amser?

BI5

Prawf teg/ Prawf cymharol	Adnabod a dosbarthu	Arsylwi dros amser	Chwilio am batrymau	Ymchwil
Sut mae nifer o oriau o olau dydd yn newid yn ôl y tymhorau?	Sut allwch chi grwpio bob gwrthrych yng nghysawd yr haul?	Allwch chi arsylwi ac adnabod bob cyfnod yng nghylch y lleuad?	Oes cysylltiad rhwng maint planed a'r amser mae'n ei gymryd i deithio o amgylch yr haul?	Pa wrthrychau anarferol a ddarganfyddwyd gan Jocelyn Bell Burnell ?

BI4

Prawf teg/ Prawf cymharol	Adnabod a dosbarthu	Arsylwi dros amser	Chwilio am batrymau	Ymchwil
Yn ein dosbarth ydy'r hollysyddion yn dalach na'r llysieuwyr?	Beth yw enw bob organ yn y system dreulio?	Sut mae plisgyn wŷ yn newid os ydyn ni'n ei adael mewn gwydraid o cola?	Ydy bwydydd sy'n cynnwys llawer o egni bob tro yn cynnwys llawer o siwgr?	Sut mae deintyddion yn trwsio dannedd sydd wedi torri?

BI3

Prawf teg/ Prawf cymharol	Adnabod a dosbarthu	Arsylwi dros amser	Chwilio am batrymau	Ymchwil
Sut mae hyd coesyn y blodyn yn effeithio ar amser y lliw bwyd i gyrraedd y petalau?	Sawl ffordd wahanol allwch chi grwpio eich casgliad o hadau?	Beth sy'n digwydd i seleri wrth ei adael mewn gwydraid o ddwr lliw?	Pa liw blodau sydd orau gan bryfed peillio?	Beth yw bob ffordd i wasgaru hadau?

Scientific Enquiry

Do you remember?

Y6

Fair-Testing / Comparative Tests	Identifying & Classifying	Observation over time	Pattern-seeking	Research
Which type of exercise has the greatest effect on our heart rate?	Which organs of the body make up the circulation system, and where are they found?	How does my heart rate change over the day?	Is there a pattern between what we eat for breakfast and how fast we can run?	How have our ideas about disease and medicine changed over time?

Y5

Fair-Testing / Comparative Tests	Identifying & Classifying	Observation over time	Pattern-seeking	Research
How does the length of daylight hours change in each season?	How could you organise all the objects in the solar system into groups?	Can you observe and identify all the phases in the cycle of the Moon?	Is there a pattern between the size of a planet and the time it takes to travel around the Sun?	What unusual objects did Jocelyn Bell Burnell discover?

Y4

Fair-Testing / Comparative Tests	Identifying & Classifying	Observation over time	Pattern-seeking	Research
In our class, are omnivores taller than vegetarians?	What are the names for all the organs involved in the digestive system?	How does an egg shell change when it is left in cola?	Are foods that are high in energy always high in sugar?	How do dentists fix broken teeth?

Y3

Fair-Testing / Comparative Tests	Identifying & Classifying	Observation over time	Pattern-seeking	Research
How does the length of the carnation stem affect how long it takes for the food colouring to dye the petals?	How many different ways can you group our seed collection?	What happens to celery when it is left in a glass of coloured water?	What colour flowers do pollinating insects prefer?	What are all the different ways that seeds disperse?

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 wylidwrus o dynnu unrhyw beth oddi ar y cyfryngau cymdeithasol heb asesiad risg.
- Mae pob AALI 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?

Geirfa a Therminoleg Sgiliau Llythrennedd

Diffiniadau o Eirfa a Therminoleg Wyddonol Cyfnod Allweddol 2

Geirfa allweddol i'w defnyddio trwy gydol Lefelau Dau i Bump:

- **Tystiolaeth** – unrhyw beth a all gael ei ddefnyddio i brofi rhywbeth.
- **Gwybodaeth** – rhywbeth yr ydych yn ei ddysgu wrth astudio, ymchwilio i neu brofi rhywbeth.
- **Syniad** – pan fyddwch chi'n gwybod yn sydyn beth i'w wneud
- **Canfyddiad** – darganfyddiad, yn enwedig gan ysgolheigion neu wyddonwyr. Canfod yw'r weithred o ymchwilio i rywbeth neu ei ddodansoddi.
- **Cofnod** – rhywbeth sydd wedi cael ei ysgrifennu.
- **Ymholiad** – gofyn cwestiynau er mwyn cael gwybodaeth.
- **Arsylwi ar** – edrych ar rywbeth, sylwi ar ffeithiau neu gymryd mesuriadau.
- **Trefnu** – dosbarthu pethau yn ôl rhyw fath o nodwedd.
- **Grwpio** – trefnu yn ôl trefn dosbarthiadau neu categorïau.
- **Cymharu** – edrych ar ddau neu ragor o bethau, a nodi sut y maent yn debyg/wahanol.
- **Disgrifio** – adrodd am fanylion rhywbeth, naill ai ar lafar neu yn ysgrifenedig.
- **Llunio** – creu trwy drefnu a chysylltu syniadau, dadleuon a chysyniadau.

Vocabulary and Terminology: Literacy Skills

Key Stage 2 Science Vocabulary and Terminology Definitions

Key vocabulary to be used throughout Levels Two – Five:

- **Evidence** - anything that can be used to prove something.
- **Information** - knowledge you gain from studying, investigating, or experiencing something.
- **Idea** - when you suddenly know what to do
- **Finding** - a discovery, especially by scholars or scientists. Finding is the act of researching or analysing something.
- **Record** - something which is written down.
- **Enquiry** - to ask questions to gain information.
- **Observation** - to look at something, noticing facts or taking measurements.
- **Sort** - to categorise things by some sort of characteristic.
- **Group** - to arrange by order of classes or categories.
- **Compare** - to look at two or more things and see how they are similar / different.
- **Describe** - to report details about something either out loud or in writing.
- **Construct** - to create by organising and linking ideas, arguments and concepts.

Gweler y ddogfen word
Geirfa a Therminoleg

Word document:
Vocabulary and Terminology

Rhifedd ?

Cam cynnydd 2	Cam cynnydd 3
Rwy'n gallu echdynnu a dehongli gwybodaeth a gyflwynir mewn siartiau, amserlenni, diagramau a graffiau.	Rwy'n gallu echdynnu a dehongli gwybodaeth o amrywiaeth gynnyddol o ddiagramau, amserlenni a graffiau (gan gynnwys siartiau cylch).
Rwy'n gallu dod i gasgliadau o ddata ac rwy'n cydnabod y gall rhai casgliadau fod yn gamarweiniol neu'n ansicr.	Rwy'n gallu dod i gasgliadau o ddata ac rwy'n cydnabod y gall rhai casgliadau fod yn gamarweiniol neu'n ansicr. Rwy'n gallu defnyddio cymedr i ddehongli set data syml.

Cam cynnydd 2	Cam cynnydd 3
Rwy'n gallu casglu gwybodaeth drwy bleidleisio neu drefnu.	Rwy'n gallu casglu data perthnasol i ateb cwestiynau a ofynnwyd.
Rwy'n gallu didoli a dosbarthu gwrthrychau gan ddefnyddio mwy nag un maen prawf.	Rwy'n gallu dewis a llunio siartiau, diagramau a graffiau priodol sydd â graddfeydd addas.
Rwy'n gallu cyflwyno gwaith ar lafar, mewn gwrthrychau, yn ddarluniadol ac yn ysgrifenedig, a defnyddio amrywiaeth o ffyrdd i gynrychioli'r data a gasglwyd sydd â graddfeydd addas gan gynnwys: • rhestrau, siartiau cyfrif, tablau a diagramau • siartiau bar a graffiau llinell bar wedi'u labelu fesul 2, 5 a 10 • pictogramau lle mae un symbol yn cynrychioli mwy nag un uned gan ddefnyddio allwedd • diagramau Venn a Carroll.	Rwy'n gallu cynrychioli data gan ddefnyddio: • rhestrau, siartiau cyfrif, tablau, diagramau a thabiau amlder • siartiau bar, siartiau data wedi'u grwpio, graffiau llinell a graffiau trawsnewid • pictogramau lle mae un symbol yn cynrychioli mwy nag un uned gan ddefnyddio allwedd • diagramau Venn a Carroll.

Fframweithiau'r
sgiliau
trawsgwricwlaidd -
Hwb (gov.wales)

Defnyddiwch enghreiffitiau o'ch sesiynau Mathemateg a'u cymhwyso i wyddoniaeth.

Numeracy?

Progression step 2	Progression step 3
I can extract and interpret information presented in charts, timetables, diagrams and graphs.	I can extract and interpret information from an increasing range of diagrams, timetables and graphs (including pie charts).
I can draw conclusions from data and recognise that some conclusions may be misleading or uncertain.	I can draw conclusions from data and recognise that some conclusions may be misleading or uncertain. I can use mean to interpret a simple data set.

[https://hwb.gov.wales/](https://hwb.gov.wales/curriculum-for-wales/cross-curricular-skills-frameworks/)
[curriculum-for-](https://hwb.gov.wales/curriculum-for-wales/cross-curricular-skills-frameworks/)
[wales/cross-curricular-](https://hwb.gov.wales/curriculum-for-wales/cross-curricular-skills-frameworks/)
[skills-frameworks/](https://hwb.gov.wales/curriculum-for-wales/cross-curricular-skills-frameworks/)

Use examples from your Maths sessions and apply them to science.

Progression step 2	Progression step 3
I can collect information by voting or sorting.	I can collect relevant data to answer posed questions.
I can sort and classify objects using more than one criterion.	I can select and construct appropriate charts, diagrams and graphs with suitable scales.
I can present work orally, in objects, pictorially and in written form, and use a variety of ways to represent collected data with suitable scales including: • lists, tally charts, tables and diagrams • bar charts and bar line graphs labelled in 2s, 5s and 10s • pictograms where one symbol represents more than one unit using a key • Venn and Carroll diagrams.	I can represent data using: • lists, tally charts, tables, diagrams and frequency tables • bar charts, grouped data charts, line graphs and conversion graphs • pictograms where one symbol represents more than one unit using a key • Venn and Carroll diagrams.

Progression step 2	Progression step 3
I can use non-standard units to measure.	I can read and interpret scales or divisions on a range of measuring instruments.
I can progress to use standard units of measure: • length: I can measure on a ruler to the nearest 0.5cm • weight/mass: I can use 5g, 10g and 100g weights to measure and compare the mass of objects • capacity: I can read scale to the nearest 100ml.	I can record measurements in different ways, e.g. $1.3\text{kg} = 1\text{kg } 300\text{g}$, $4.2\text{cm} = 4\text{cm } 2\text{mm}$.
	I can convert metric units of length to smaller units, e.g. cm to mm , m to cm , km to m .
	I can use the language of imperial units in daily use, e.g. <i>miles</i> , <i>pints</i> .

Fframwaith Cymhwysedd Digidol ?

Dinasyddiaeth	Rhyngweithio a chydweithredu	Cynhyrchu	Data a meddwl cyfrifiadurol
• Hunaniaeth, delwedd ac enw da • Iechyd a llesiant • Trwyddedu a pherchenogaeth hawliau digidol • Ymddygiad ar-lein a seiberfwlio	• Cyfathrebu • Cydweithio • Storio a rhannu	• Cynllunio, cyrchu a chwilio • Creu • Gwerthuso a gwella	• Datrys problemau a modelu • Llythrennedd gwybodaeth a data

Fframwaith Cymhwysedd Digidol - Hwb
(gov.wales)

Cam Cynnydd 2 :
Rwy'n gallu creu, golygu a threfnu cydrannau aml-gyfrwng (testun, delweddau, sain, animeiddiad a fideo) mewn meddalwedd benodol fel sy'n briodol

Cam Cynnydd 2:
Rwy'n gallu casglu, cofnodi a threfnu data yn wahanol grwpiau neu fformatau, e.e. tablau, siartiau, cronfeydd data a thaenlenni.

Digital Competence Framework?

Citizenship	Interacting and collaborating	Producing	Data and computational thinking
• Identity, image and reputation • Health and well-being • Digital rights licensing and ownership • Online behaviour and cyberbullying	• Communication • Collaboration • Storing and sharing	• Planning, sourcing and searching • Creating • Evaluating and improving	• Problem solving and modelling • Data and information literacy

<https://hwb.gov.wales/curriculum-for-wales/cross-curricular-skills-frameworks/digital-competence-framework>

Progression Step 2:
I can create, edit and organise multimedia components (text, images, sound, animation and video) in selected software as appropriate

Progression Step 2:
I can collect, enter, organise and analyse data into different groups or formats, *e.g. tables, charts, databases and spreadsheets.*

AagD - Cwestiynu

- Defnyddio cwestiynau penagored a chaeedig i weld beth mae disgyblion yn ei wybod, yn ei ddeall, ac yn gallu'i wneud.
- Cynllunio cwestiynau penagored i brocio dealltwriaeth dysgwyr.
- Darparu amser meddwl.
- Darparu cyfleoedd i ddysgwyr drafod cyn ymateb er mwyn cynnwys pob dysgwr.
- Adeiladu ar atebion dysgwyr i ymestyn y drafodaeth.
- Parchu ymatebion dysgwyr a gwneud defnydd adeiladol o'u camsyniadau.
- Annog disgyblion i holi cwestiynau trwy fodelu beth yw cwestiynau da.



AFL - Questioning

- Use open-ended and closed questions to find out what pupils know, understand, and can do.
- Design open-ended questions to probe learners' understanding.
- Provide thinking time.
- Provide opportunities for learners to discuss before responding to include all learners.
- Build on learners' answers to extend discussion.
- Respect learners' responses and make constructive use of their misconceptions.
- Encourage pupils to ask questions by modeling what are good questions.

<https://www.nfer.ac.uk/publications/aas02/aas02.pdf>

Cwestiwn gyda 'Gallai'

Pan yn cwestiynu, mae'r athrawon yn gosod y gair 'gallai' i roi mwy o gyfle i ddisgyblion feddwl ac archwilio atebion posibl.

E.e.

Beth yw ystyr grym magnetig?

Beth alla allai ystyr grym magnetig fod?

Mae'r cyntaf yn cynnwys un ateb sy'n hysbys i'r athro tra bo'r ail yn fwy agored ac yn caniatáu i ddisgyblion drafod a chwestiynu eu hunain beth allai'r ateb fod, gan dynnu ar eu gwybodaeth a'u dealltwriaeth wyddonol eu hunain.

Question with 'Might'

When questioning, the teachers inserts the word 'might' to provide pupils with greater opportunity to think and explore possible answers.

E.g.

What is the meaning of magnetic force?

What might the meaning of magnetic force be?

The first infers a single answer known by the teacher whereas the second is more open and allows pupils to discuss and question themselves to as what the answer may be, drawing upon their own scientific knowledge and understanding.

Beth ydych chi'n ei wybod am.....?
Allwch chi gael gwybodaeth am.....?
Ble mae'n dweud.....?
Am bwy mae o? Pwy wnaeth o?
Beth yw ei enw.....?
Faint....?
Pa fathau o yw'r rhain ...?
Allwch chi gofio...?

GWYBODAETH

What do you know about.....?
Can you find out about.....?
Where does it say.....?
Who is it about.....? Who did it....?
What is it called.....?
How Many.....?
What types of....are there...?
Can you remember...?

KNOWLEDGE

Cam cynnydd 3 Progression step 3

Prawf Teg *Fair test*



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Prawf teg *Fair test*



The Ogden Trust
making physics matter

Age 7-11 years

Working scientifically

Developing children's skills in fair tests

Introduction

Like comparative tests, fair test enquiries are an opportunity for children to explore cause and effect relationships in science. Children find the answers to 'big questions' in fair test enquiries by planning tests to collect data through changing, measuring and controlling variables. Fair tests involve making systematic changes and analysing data to identify how one variable influences another. Due to the increased challenge in this type of enquiry they are introduced in KS2.

Big questions

Here are some examples of 'big questions' that pupils can explore through fair tests in KS2. There is almost one for every area of the curriculum so it is easy to plan opportunities for children to revisit this type of enquiry regularly and develop their skills.



Year 3	Year 4	Year 5	Year 6
How does the length of the carnation stem affect how long it takes for the food colouring to dye the petals?	Does the amount of light affect how many woodlice move around?	How does the level of salt affect how quickly brine shrimp hatch?	How does the temperature affect how much gas is produced by yeast?
How does the angle that your elbow/knee is bent affect the circumference of your upper arm/thigh?	How does the mass of a block of ice affect how long it takes to melt?	How does age affect a human's reaction time?	How does the length of time we exercise for affect our heart rate?

<https://www.ogdentrust.com/about-us/news/working-scientifically>

Helping children's development of inquiry skills

Wynne Harlen

Inquiry in primary science education (IPSE) 1: 5-19, 2014 © 2014
PRI-SCI-NET

Action that teachers can take

- Stimulate curiosity through classroom displays, posters, and inviting questions through a question board or box.
- Help children to refine their questions and put them into investigable form.
- Provide opportunities for planning by starting from a question to be answered by inquiry without giving instructions.
- Scaffold planning a fair test using a planning board.
- Talk through an inquiry that has been completed to identify how it could have been better planned.

Teachers' questions:

- 'what would you like to know about ...?'
- 'what do you think will happen if your idea is correct?'
- 'what do you think will happen if... or when...?'
- 'why do you think that will happen?'
- 'what will you need to do to find out...'
- 'how will you be make it 'fair'

<https://ipsejournal.files.wordpress.com/2015/03/3-ipse-volume-1-no-1-wynne-harlen-p-5-19.pdf>

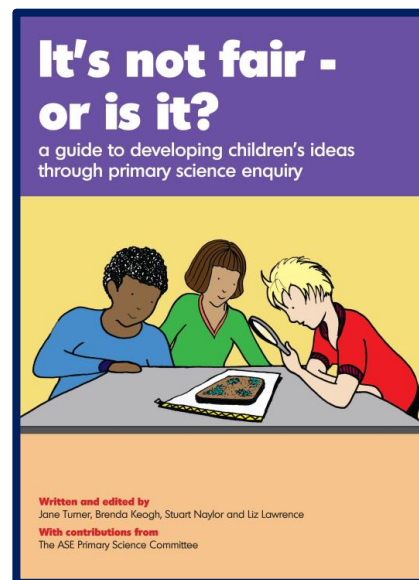
<https://www.youtube.com/watch?v=chkaMLc21EI>



Prawf teg

- ▶ **Mae cwestiynau prawf teg yn gwneud cymariaethau, yn aml maen nhw'n ceisio darganfod beth yw'r "gorau" neu'r "mwyaf".**
- ▶ Mae profi'n deg yn rhoi'r cyfle i ddisgyblion ymchwilio'r berthynas achosol rhwng dau newidyn. E.e. ydy uchder y llethr yn effeithio ar gyflymder y car yn rholio lawr os yw popeth arall yn aros yr un peth?
- ▶ Mae profion cymharol yn rhoi'r cyfle i ddisgyblion gymharu un digwyddiad gydag un arall E.e. ydy'r car coch yn teithio'n gyflymach na'r car gwyrdd?

Addaswyd y diffiniad o 'It's not fair - or is it?' (Turner, Keogh, Lawrence & Naylor, 2011)



Mae profi'n deg a gwneud cymariaethau yn rhoi cyfleoedd i ddisgyblion:

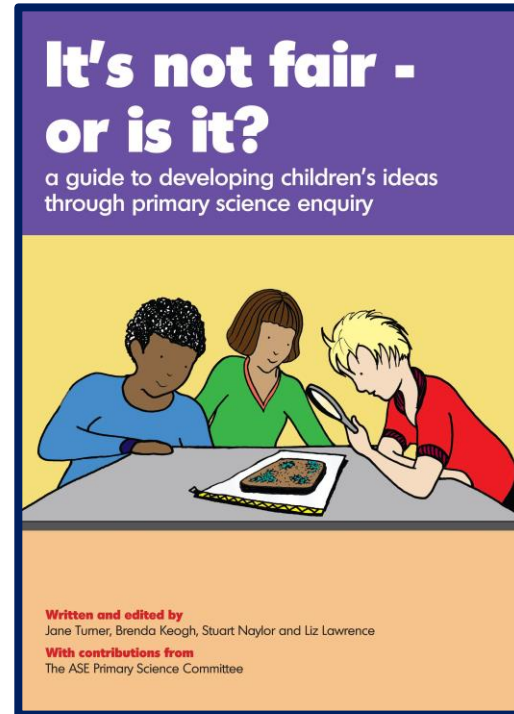
- Adnabod a deall bod un peth (newidyn) yn effeithio ar rywbeth arall
- Adnabod pan fod profion yn deg
- Creu cwestiynau prawf teg eu hunain
- Archwilio'r newidynnau a allai gael effaith
- Adnabod newidynnau
- Adnabod y gwahaniaethau maen nhw wedi'u harsylwi
- Deall sut i fesur neu arsylwi'r effeithiau

Fair test

Fair test questions make comparisons, often trying to find out which is the 'best' or 'most.'

- Fair tests allow pupils to explore relationship between variables. A fair test identifies the causal relationship between two variables e.g. does the height of the ramp affect how quickly the toy car rolls down the ramp and everything else remains the same.
- Comparative tests allow pupils to compare one event with another e.g. does the red car go faster than the green car?

Definition adapted from 'It's not fair - or is it?' (Turner, Keogh, Lawrence & Naylor, 2011)



Fair testing & making comparisons provides pupils with opportunities to:

- Recognise that one thing has an effect on another
- Recognise when tests are fair
- Generate fair test questions themselves
- Explore all the variables that may have an effect
- Identify variables.
- Identifying the differences they have noticed
- Know how to measure or observe the effects

Prawf Teg Newidynnau

Newid
(Newidyn annibynnol)

Mesur
(Newidyn dibynnol)

Cadw'r un fath
(newidynnau rheoli)

Fair Test Variables

Change
(Independent variable)

Measure
(Dependent variable)

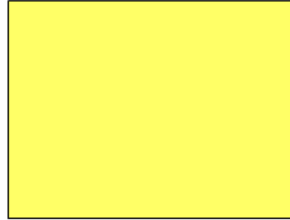
Keep the same
(control variables)



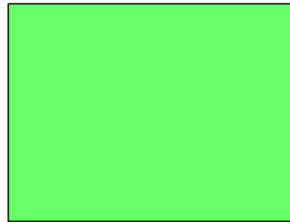
Cynllunio Prawf Teg

Ein bwrdd cynllunio ar gyfer Prawf Teg

Byddwn yn newid



Byddwn yn mesur neu'n
arsylwi'r effaith a gaiff ar

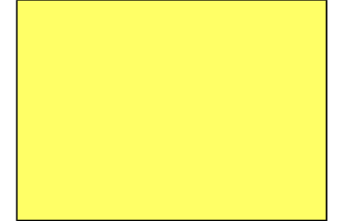


Byddwn yn cadw'r pethau hyn yr un fath i'w
gwneud yn deg

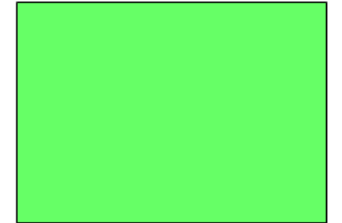
: *Planning a Fair Test*

Our Planning Board for a Fair Test

We will change



We will measure or observe
the effect it has on



We will keep these things the same to make it fair

1. Plant growth and water

Adding different amounts of water to a plant could affect its growth. To investigate this, plant some seeds and water each plant with different amount over time.

Independent variable?

Dependent variable?

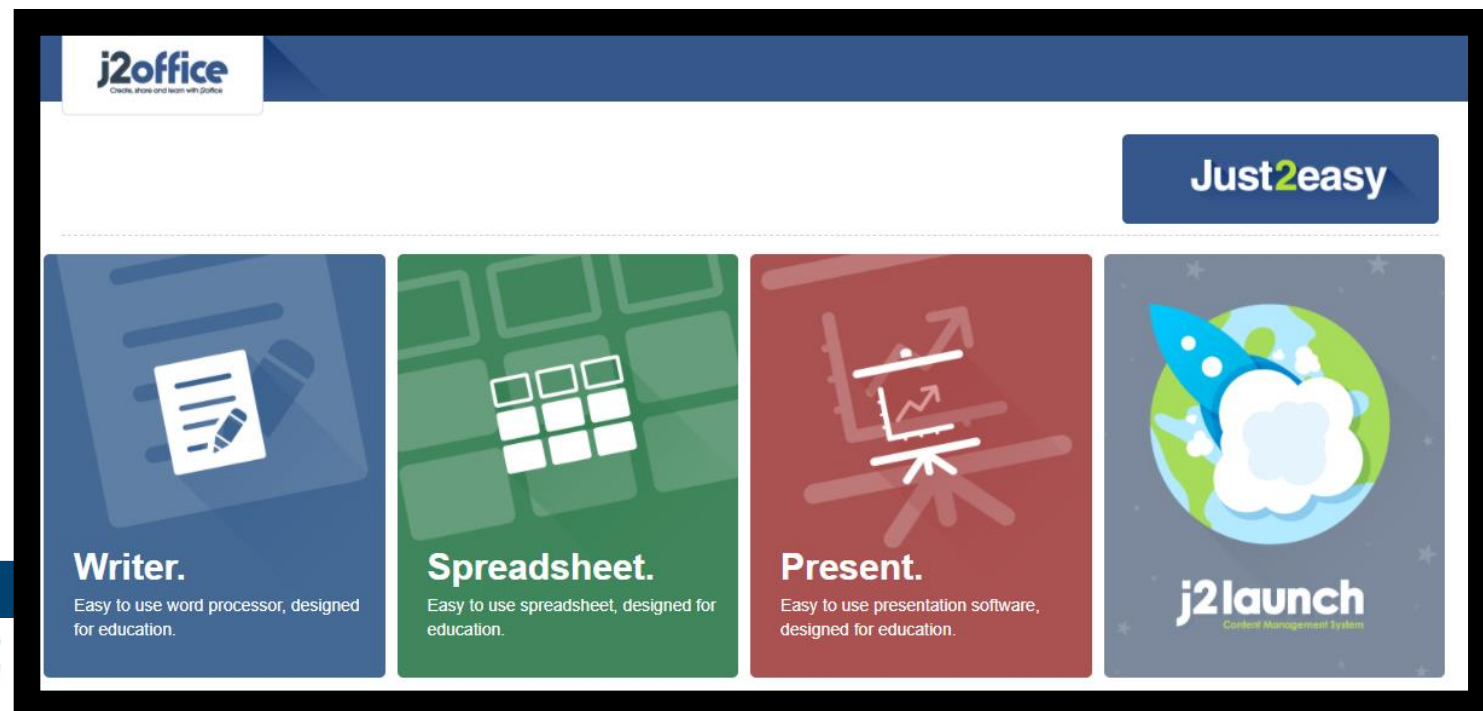
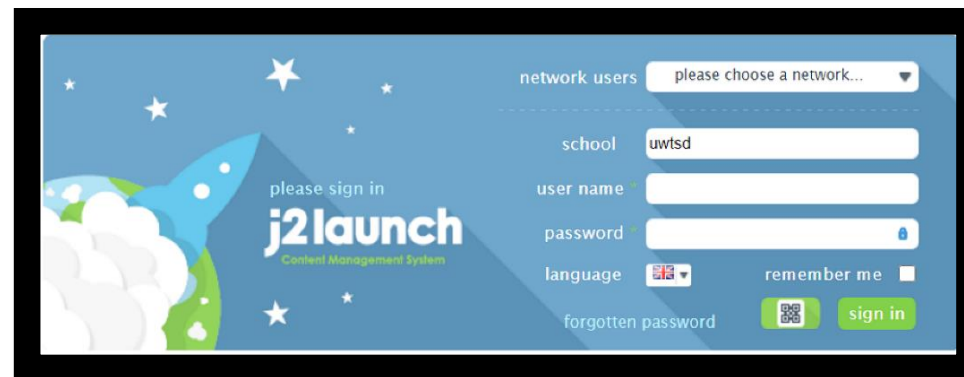
Control variables?



Cynrychioli Data

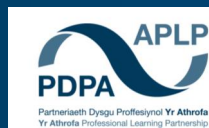


Representing Data



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Cynllunio Ymchwiliad Planning an *Investigation*



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Y Cwestiwn

The Question

Beth sy'n digwydd i faint pyped cysgod wrth iddo symud yn agosach at y ffynhonnell goleuni?

What happens to the size of a shadow puppet when it moves closer to the light source?



Tasg Grŵp

Sut allech chi gynllunio ymchwiliad:

Beth sydd yn digwydd i faint pyped cysgod wrth symud yn agosach at y ffynhonnell goleuni?

1.Syniadau: Ymchwil?

2.Dull: Beth ydym yn mynd i'w wneud?

3.Cynllun:

- Pa gyfarpar?
- Rhagfynegiad?
- Prawf teg?
- Mesur?
- Cynrychioli data?
- Casgliad?
- Myfyrio?

Cofiwch! Strategaeth AagD?

Group Task

How could you plan an investigation:

What happens to the size of a shadow puppet when it moves closer to the light source?

1.Ideas : Research?

2.Method : What are we going to do ?

3.Plan :

- What apparatus?
- Prediction?
- Fair test?
- Measure?
- Represent data?
- Conclusion?
- Reflection?

Remember ! AfL Strategy?

Y Cwestiwn

The Question

Pam fod pengwiniaid yn cwtsio?
Why do penguins huddle?

Cam cynnydd 3
Progression step 3



Tasg

Sut allech chi ymchwilio i pam mae pengwiniad yn cwtsio, yn eich ystafell ddosbarth?

1.Syniadau: Ymchwil?

2.Dull: Beth ydyn ni'n mynd i'w wneud? 3.Cynllun:

- Pa gyfarpar?
- Rhagfynegiad?
- Prawf teg?
- Mesur?
- Cynrychioli data?
- Casgliad?
- Myfyrio?

Cofiwch! Strategaeth AagD?

Task

How could you investigate why penguins huddle, in your classroom?

1.Ideas : Research?

2.Method : What are we going to do ?

3.Plan :

- What apparatus?
- Predictions?
- Fair test?
- Measure?
- Represent data?
- Conclusion?
- Reflection?

Remember ! Afl Strategy?

Llyfrau /Books

Gwyddoniaeth a Thechnoleg / Science and Technology

[Allen, J. et al \(2012\), Primary ICT: Knowledge, Understanding and Practice, London: Learning Matters.](#)

[Loxley, P. et al. \(2014\) Teaching Primary Science, Promoting Enjoyment and Developing Understanding. Oxon. Routledge](#)

[Futurelab \(2008\) Digital Literacy across the Curriculum](#)

[Byron, T. \(2008\) Safer Children in the Digital World](#)

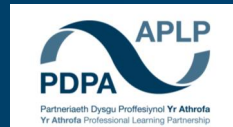
[Weavers, G., Keogh, B., & Naylor, S. \(2008\). Made you look, made you think, made you talk. Sandbach: Millgate House. WELSH](#)

[Russell, T. & McGuigan, L. \(2016\) Exploring science with young children : a developmental perspective 1st ed.](#)



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