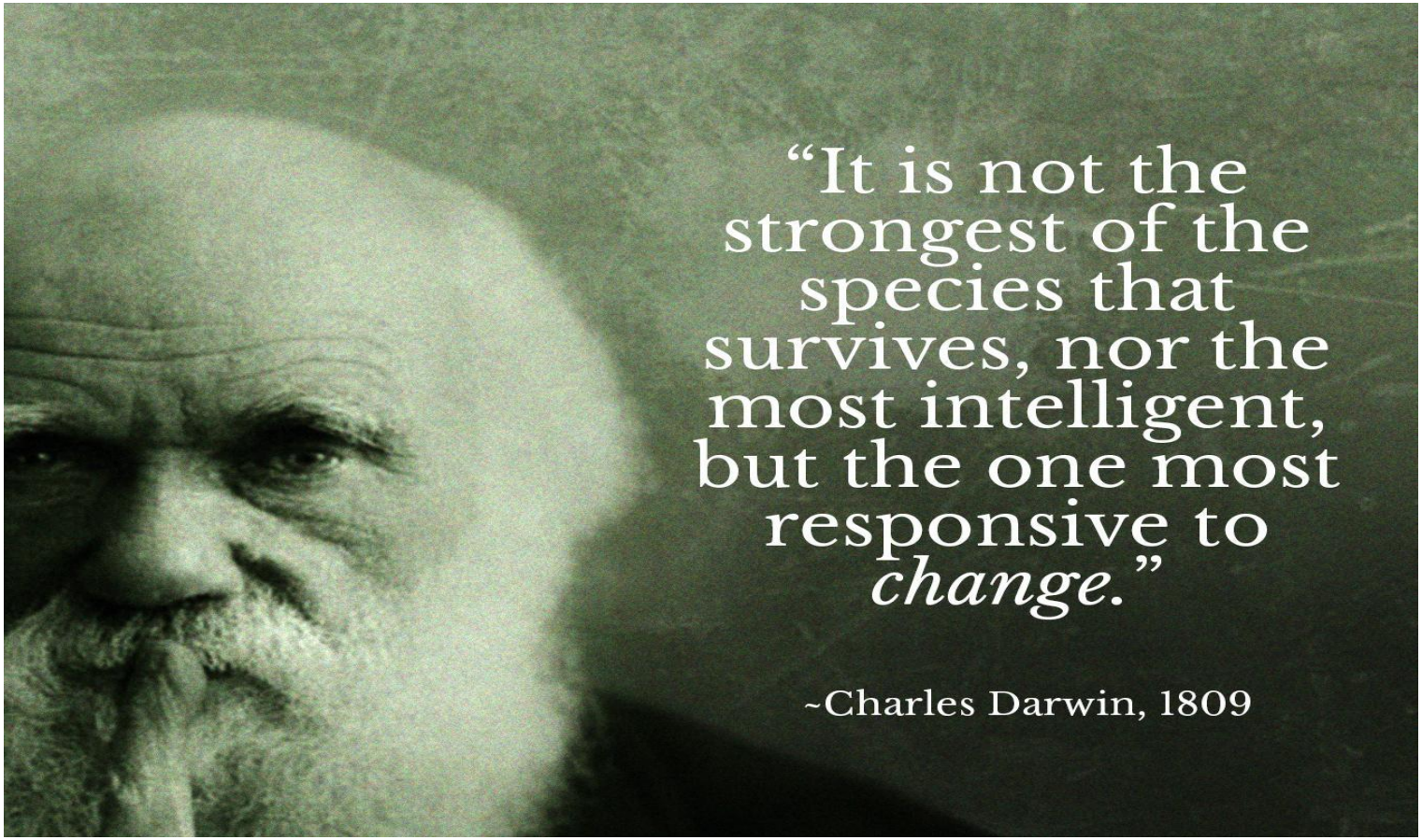
Further Education SUSTAINABILITY SUMMIT

24 March
University of Leeds

Workshop 1: Developing STEM and English skills through a sustainability focus

Cerain Ayres, Head of Quality, CPD & Teacher Education, Petroc

PETROC™



Developing English and STEM skills through a Sustainability Focus

"*Education at all levels can shape the world of tomorrow…*" **UNESCO**

Cerian Ayres- South West STEM Adviser, Head of Quality, Teacher Education , CPD:Petroc

March 2015

PETROC™

A Commitment to Developing Excellence in Science, Technology, Engineering and Mathematics

PETROC™

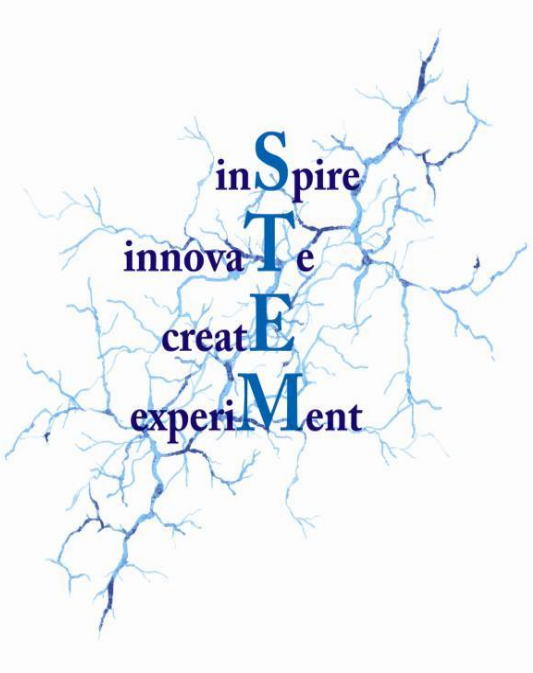
What is STEM?

Science

Technology

Engineering

Mathematics



Education for sustainability

Education is a prime ingredient in sustainability, both in challenging the present situation to enable it to become more eco-sensitive and in establishing new ways of thinking and behaviour which will stem from that.

Central to EFS are the principles of:

Engagement- realisation!

Empowerment- we can make a difference!

Ownership- this is all of our responsibility!

Sustainable development

‘Development that meets the needs of the current generation without compromising the ability of future generations to meet their own needs’

(Brundtland Report, 1987)

Sustainable development is the process by which we achieve sustainability.

PETROC™

Decisive moves towards
Sustainable Development

PETROC™

A ‘Sustainability Literate’ Person…

would be expected to:

- understand the need for change to a sustainable way of doing things, individually and collectively
- have sufficient knowledge and skills to decide and act in a way that favours sustainable development
- be able to recognise and reward other people’s decisions and actions that favour sustainable development

- Higher Education Partnership for Sustainability www.heps.org.uk
  Forum for the Future

PETROC™

National Framework for Sustainable Schools/Colleges-2020

Supporting the delivery of the STEM Cohesion Programme on behalf of DCSF and BIS

National Framework for Sustainable Schools/Colleges- Present-2020

Three interlocking parts:-

A Commitment to Care

A caring learning environment that extends this commitment into new areas:-
Energy and Water , Waste it Produces, Food it Serves, Traffic it Attracts, Difficulties faced by people living in its community and in other parts of the world

An Integrated Approach

A sustainable learning place would take an integrated approach to its improvement:-
It explores Sustainable Development through:-

Teaching and Learning- **Curriculum**
Values and Ways of Working- **Campus**
Engagement with local people and partners- **Community**

A Selection of 'Doorways' or Sustainability Themes

The Doorways are entry points where an organisation can establish or develop its sustainability practices
Each Doorway draws its inspiration from a range of national priorities around sustainable development.

PETROC™

What does this mean for us and what can we do?

- **Curriculum: What we learn**
- **Campus: Where we learn**
- **Community: Who we learn with**
- **Culture: How we learn**

PETROC™

8 Doorways to Sustainability

- Food and Drinks
- Buildings and Grounds
- Energy and Water
- Inclusion and Participation
- Travel and Traffic
- Local well being
- Purchasing and Waste
- Global Dimension

Sustainability Strategy- Learning Places- DCSF

PETROC™

Pride

Local Produce

Global citizenship

Tradition

Climate Change

Tourism

Health

Education & Learning

Kudos

Landscape

Biodiversity

Agriculture

New Rural Development

Participation

Business development

Art & Culture

PETROC™

Petroc Vision and Mission Statements

To be an outstanding College at the heart of an outstanding learning community;economically, culturally and socially'

To raise aspirations, knowledge and skills of individuals, communities and businesses through prioritisation of the STEM agenda and STEM workforce development contributing towards a sustainable local and regional economy.

PETROC™

Regional STEM Networks until July 2013

Science Learning Centre North East:
Durham University in partnership with Framwellgate School

Science Learning Centre North West:
Manchester Metropolitan University

National Science Learning Centre:
University of York (WRUC)

Science Learning Centre Yorkshire and the Humber:
Sheffield Hallam University (WRUC)

Science Learning Centre East Midlands:
The University of Leicester

Science Learning Centre East of England:
The University of Hertfordshire

Science Learning Centre London:
Institute of Education, University of London

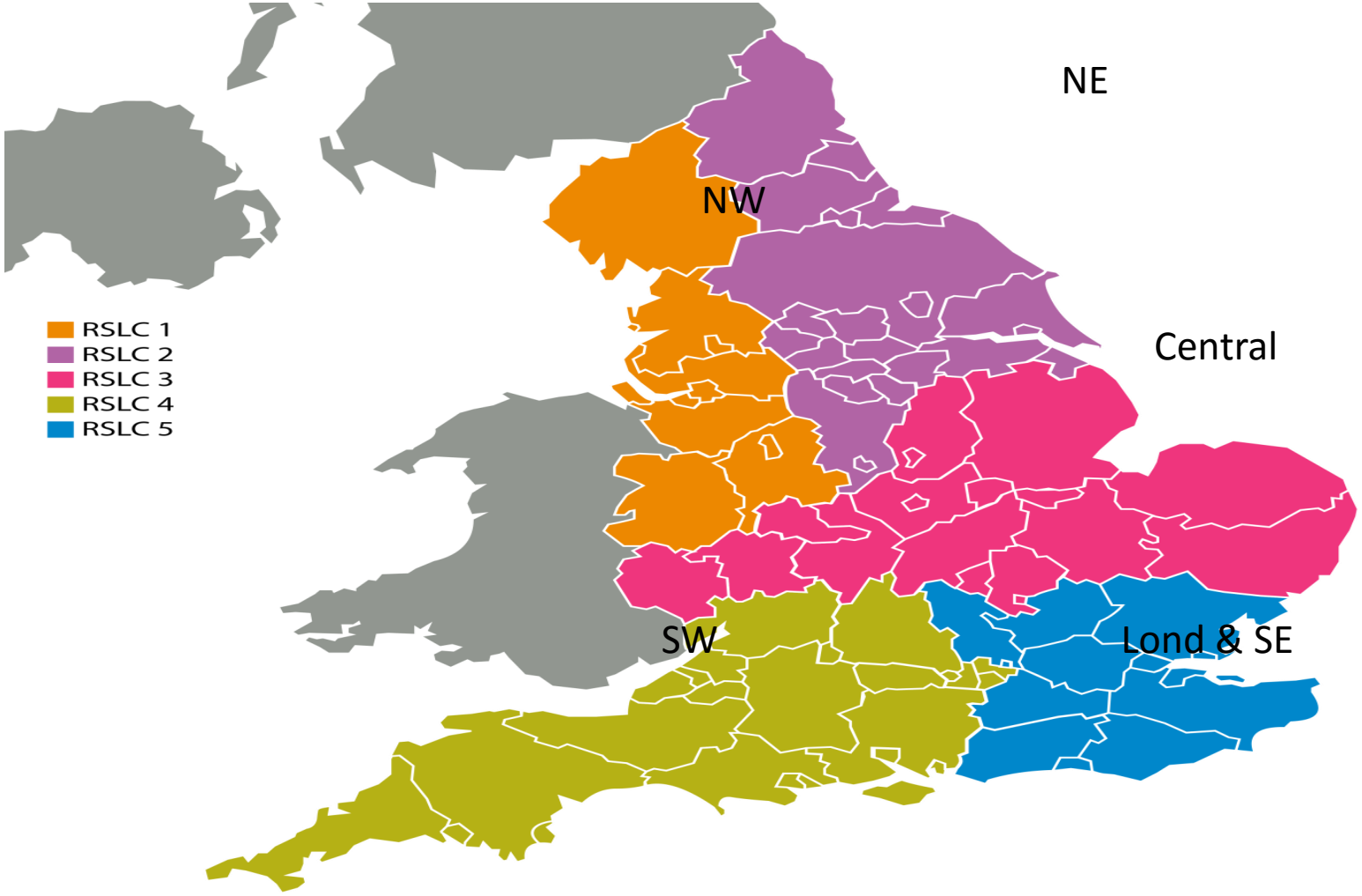
Science Learning Centre West Midlands:
Keele University

Science Learning Centre South East:
The University of Southampton

Science Learning Centre South West,
At-Bristol in partnership with University of Bristol & Plymouth University

PETROC™

Current FE STEM Landscape



PETROC™

One of the Leading Colleges in the South West

Recognised Centre of Excellence in STEM

Large sized General Further Education College

STEM provision facilitated over 5 main college sites

Annual budget of £39 million

Employs 900 Full Time Staff serving over 20,000 learners annually to include 3,000 employers across the spectrum of STEM industry

PETROC™

Investment in STEM Learning Spaces

10.8 Million at Petroc Barnstaple Campus
3.5 Million at Petroc Mid Devon Campus

PETROC™

High Quality Learning Spaces

PETROC™

Recent Investment in Specialist STEM Learning Spaces

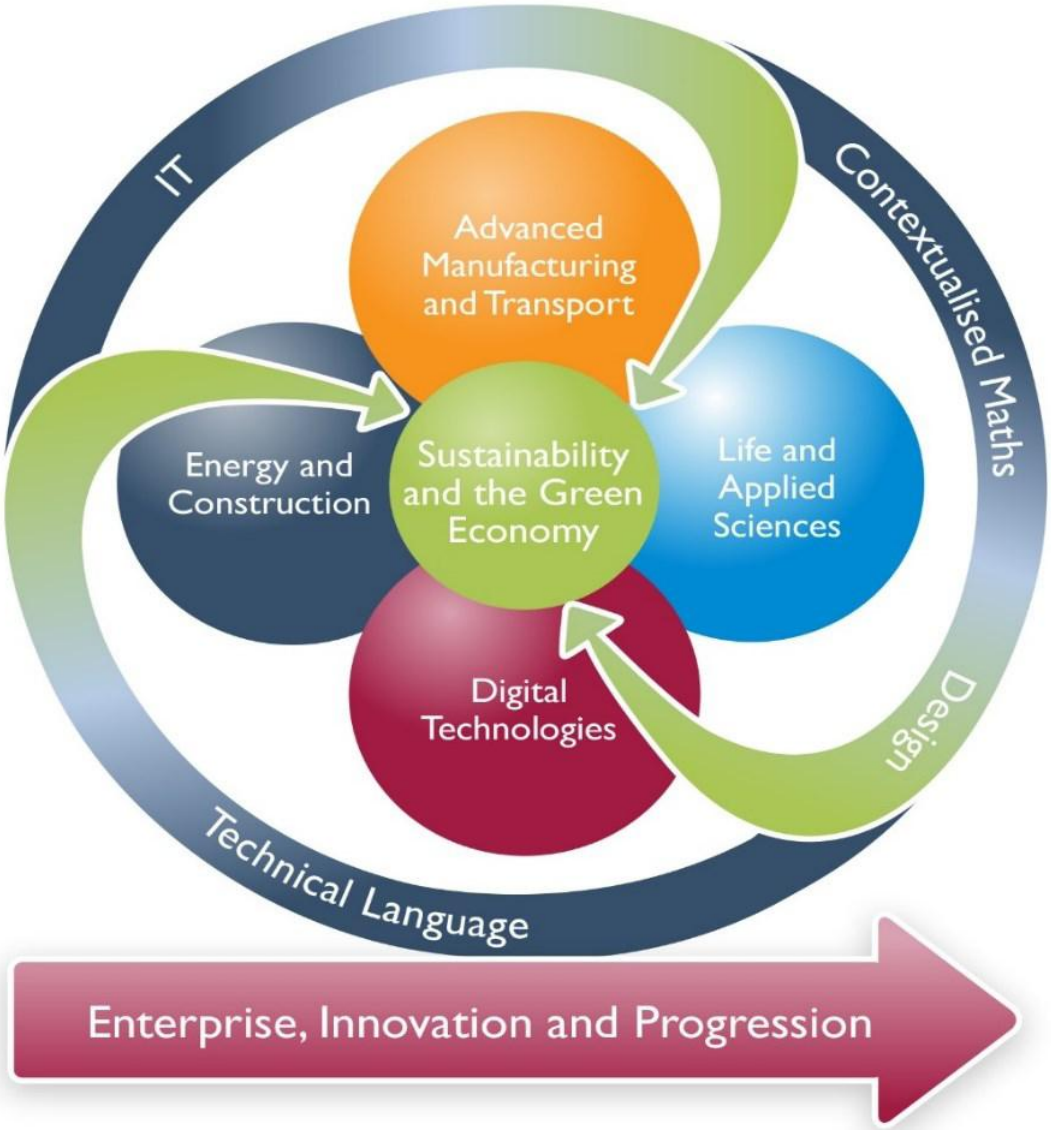
PETROC™

The Four Faces of Petroc Learners

PETROC™

The Four Faces of Petroc Learners

STEM Strategy Overview



PETROC™

Linking the Green Economy to the recommended curriculum clusters

The Green Economy			
Life and Applied Sciences	**Advanced Manufacturing and Transport**	**Energy and Construction**	**Digital Technologies**
▪ Animal care and management	▪ Electric vehicles and biofuels	▪ Carbon capture and storage	▪ Cloud computing
▪ Sport and wellness	▪ Offshore, marine and wind energy	▪ Smart glass	▪ E-commerce
▪ Horticulture and agriculture	▪ Low carbon and alternative materials	▪ BREEAM	▪ Business improvement techniques
▪ Ecology and conservation studies	▪ Wholefood manufacturing	▪ Renewables (retrofitting and new build)	▪ Resource management software

PETROC™

Potential Areas of Competitive Advantage

Cross-cutting themes

Sustainable Technology

Motor vehicle
Construction trades
Mechanical engineering
Marine engineering
Electrical engineering
Sustainable resources management
Manufacturing

CAD/ 3D CAD modelling specialist course
Rapid prototyping
Electric vehicles
Energy efficiency and new energy
Distance learning
Logistics
Aesthetic design
Power electronics
Sustainable design and construction
Retrofit
Civil engineering
Product design
Smart Materials

Applied and Life Sciences

Sports and fitness
Anatomy, physiology and pathology
Forensics
Animal Care
Animal management
GCSE Sciences
A Level Sciences
Catering

HE pathway for healthcare
Promotion of local health issues
Nutrition
Science apprenticeships
L2-3 pathways into A level science
Emerging technology courses for A-level
Foundation degree in Applied science
Agriculture
Horticulture
Digital fitness
Rapid food testing
Veterinary nursing
Materials science
Food science

Digital Design and Technology

CAD
Graphic design
Sound engineer
Theatre technician
Apprentice in technical theatre
Multi-media production
Applied computing for business
A Level ICT

Aesthetic and ergonomic design
Gaming and app design
CAD specialist programmes
IT vendor qualifications
Honours degree programmes
Web development for SME
Social media and e-marketing
E-commerce
Sustainable design
Product design
Smart materials

Green Economy

IT, Literacy and Maths/ STEM Enhanced Curriculum

Enterprise, Innovation and Progression

PETROC™

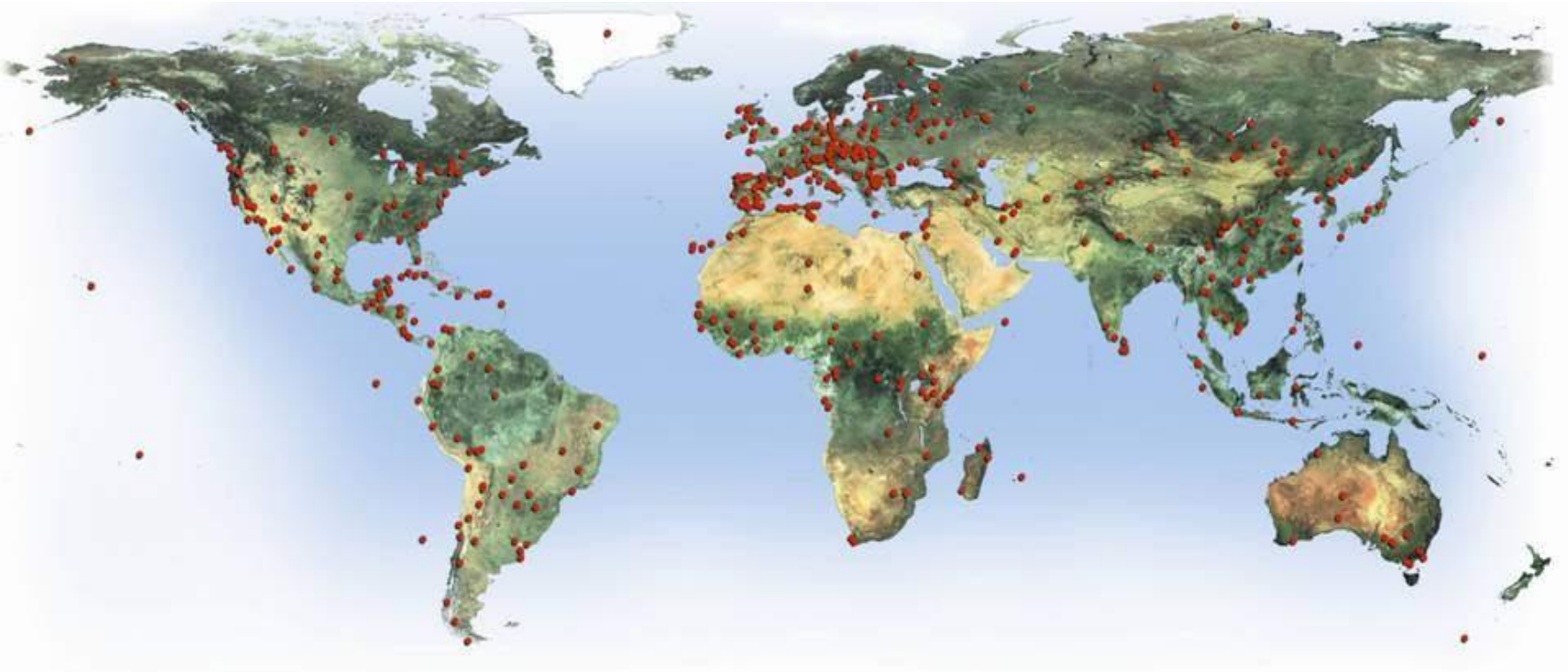
UNESCO World Biosphere Reserves

United Nations
Educational, Scientific and
Cultural Organization

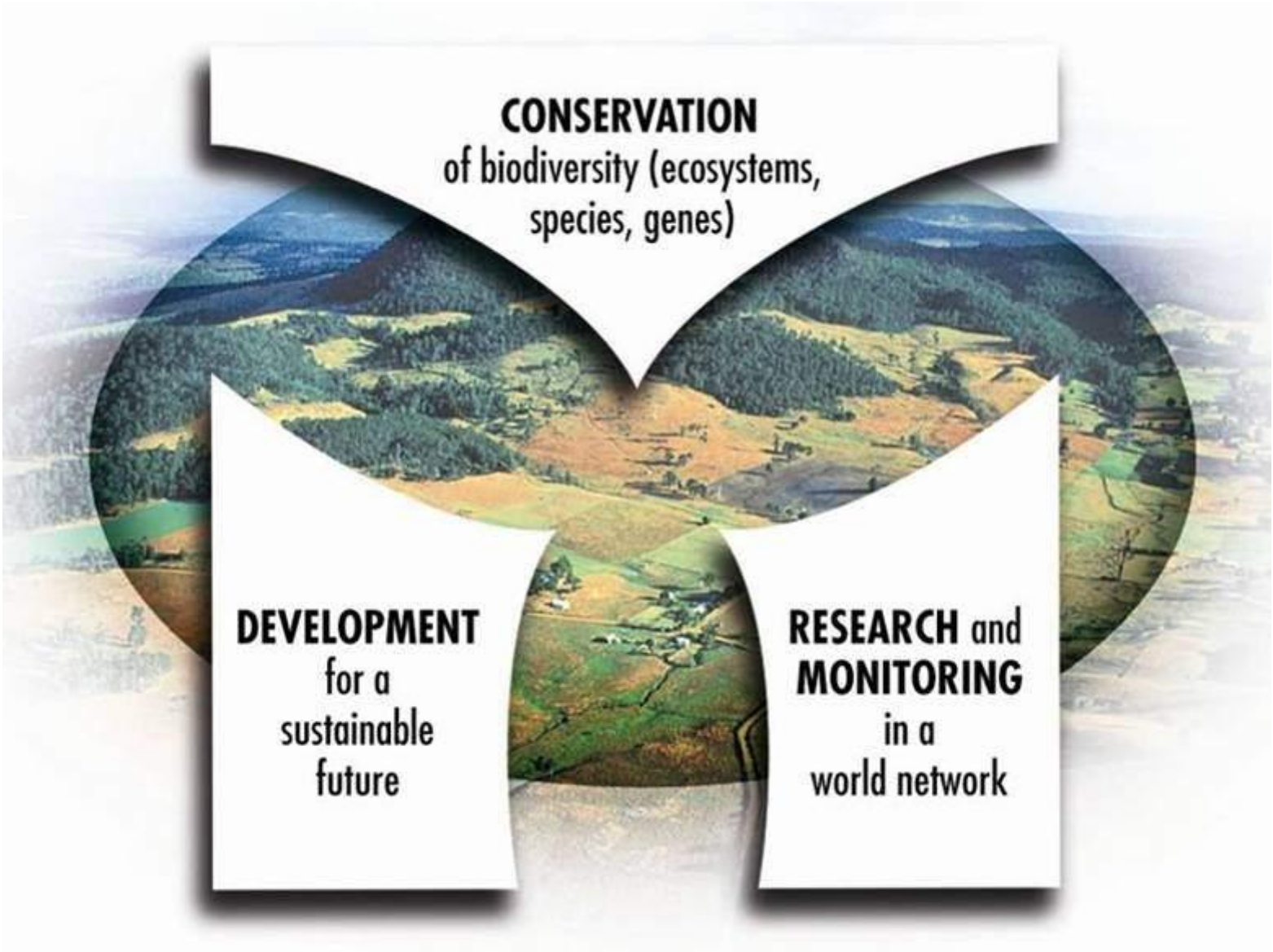
Special Places for People and Nature
Living Laboratories for Sustainable Development

PETROC™

A Network of over 500 sites worldwide



PETROC™


CONSERVATION
of biodiversity (ecosystems, species, genes)
DEVELOPMENT
for a sustainable future
RESEARCH and MONITORING
in a world network

PETROC™

Living, working & learning in The Biosphere Reserve of North Devon

‘Sustainability’

Thinking Globally

Acting Locally

North Devon's UNESCO Biosphere Reserve

A fit-for-purpose designation

Modern and forward looking

- 1st for UK and one of a rapidly growing global network
- World class by nature
- Appropriate "ecosystem" scale
  - Core and Buffer Areas
  - Transition Area
- 3850 sq km (30.6% marine)
- Links designations into wider environment (SSSI, AONB etc)
- Living laboratory for sustainable development - innovation
- Framework for action (Designation - not institution)
- A unique opportunity for North Devon to lead

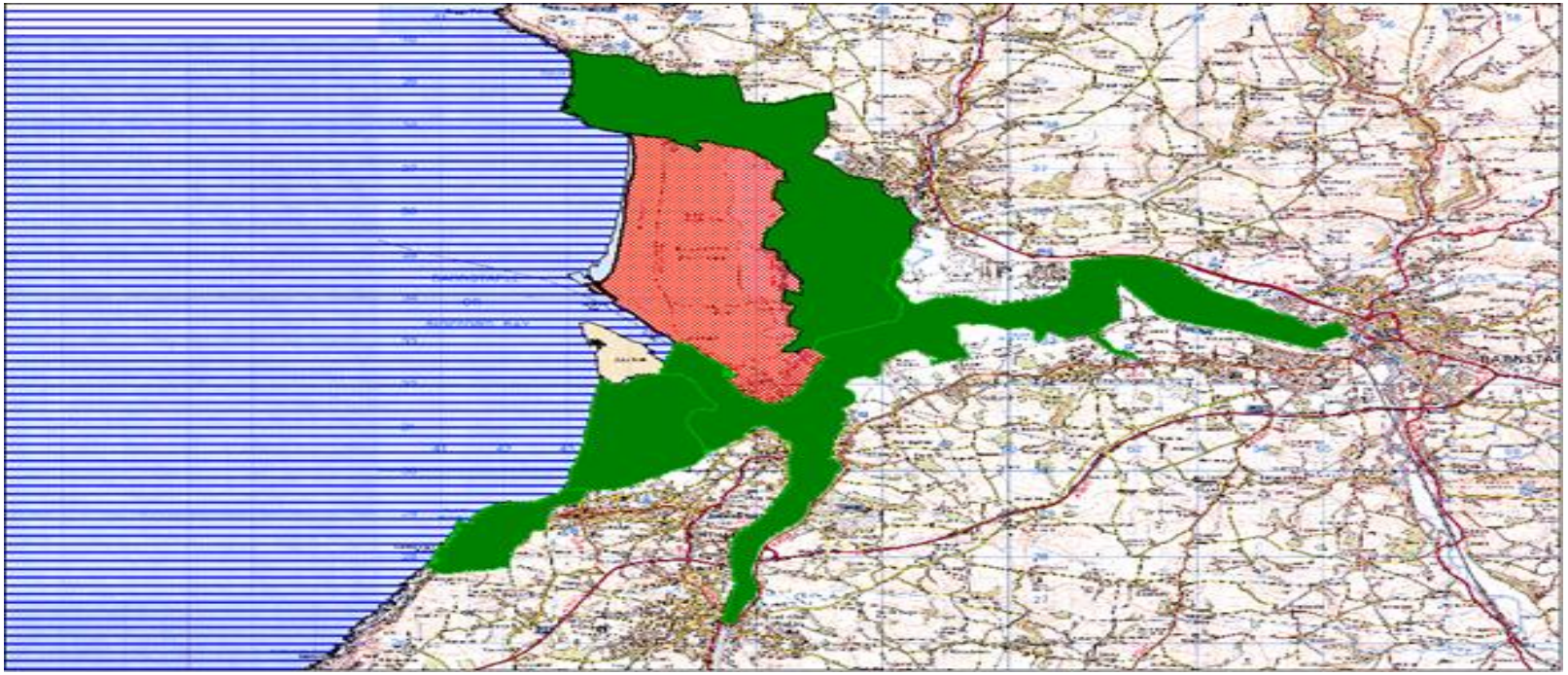
PETROC™

Our Biosphere Reserve

- **The Core Area** - Braunton Burrows

PETROC™

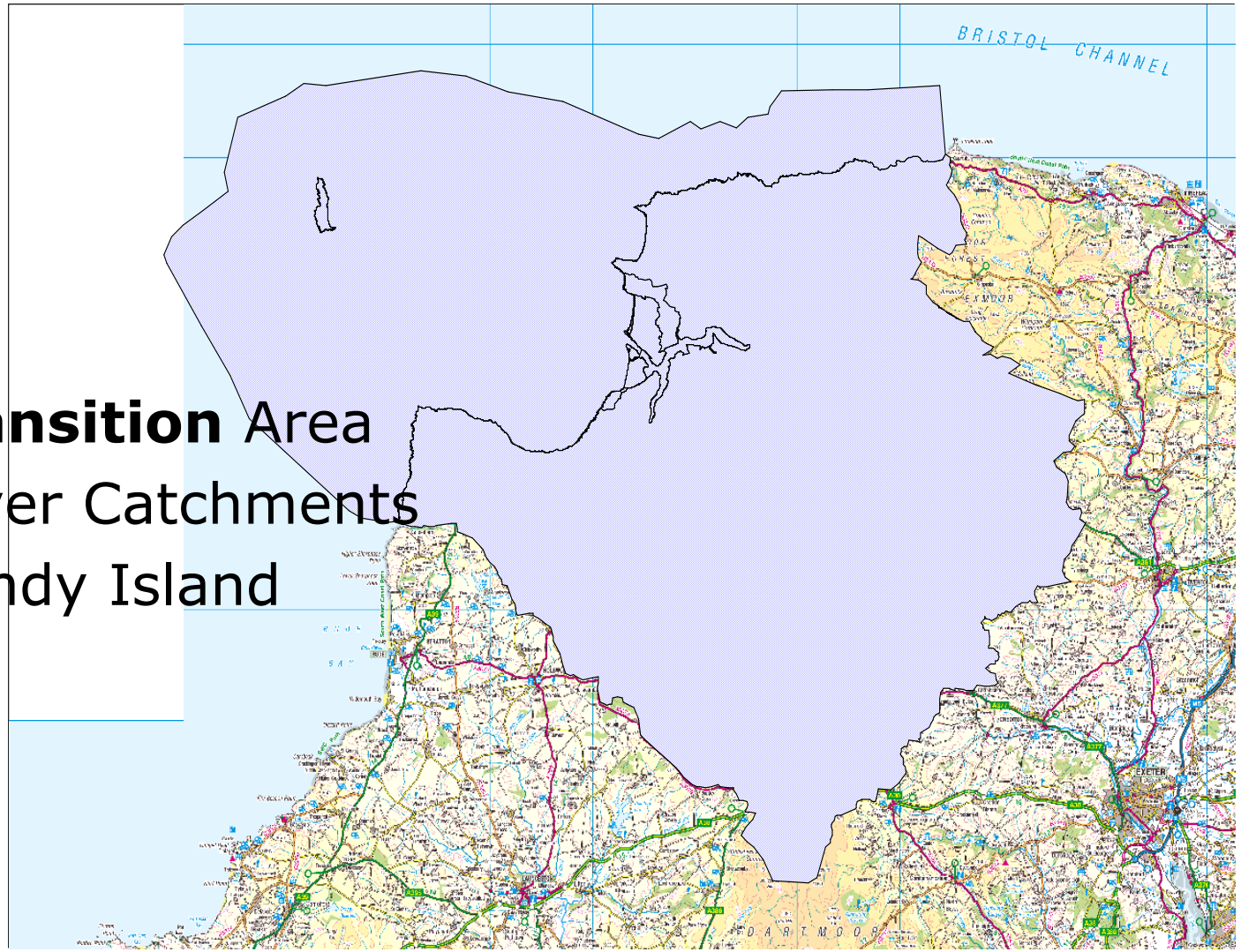
- the **Buffer Area**
  - The Taw/ Torridge Estuary - Northam Burrows, Braunton Great Field, Braunton Marsh, Saunton Down, Croyde.
  - Also has some statutory protection (SSSI / AONB).



PETROC™

The **Transition** Area

- River Catchments
- Lundy Island



PETROC™

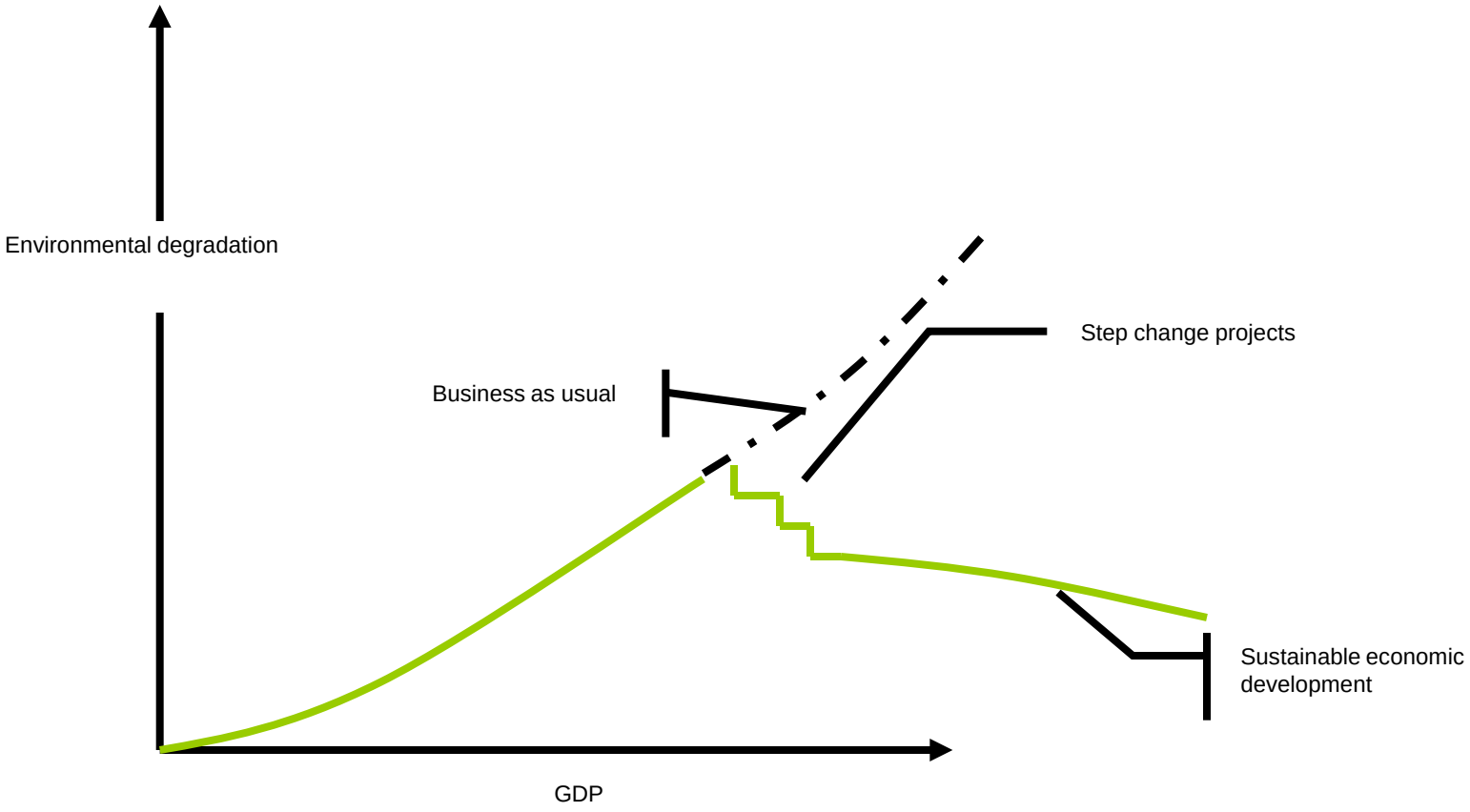
Biosphere Reserve Strategy and Action Plan

- To reverse the decline in biodiversity:
- To conserve our best landscapes and enhance the other areas where it is compatible with sustainable development:
- To use our natural resources wisely:
- To tackle on a local, national and international basis the issues relating to climate change:
- To develop and strengthen a robust economy for the entire Biosphere Reserve that enhances the environment:
- To have a safe, strong, proud and healthy community in North Devon:
- To be a community of learning for the wider world:
- To ensure organisation arrangements for the Biosphere Reserve remain fit for purpose and integrates fully with the MAB Programme

PETROC™

UNESCO Biosphere Reserve

North Devon Sustainable Economic Strategy



However, …

- … sustainability and development are contradictory concepts and 'sustainable development' is just economic growth dressed up in the language of deliberate obfuscation, used knowingly or not by those who care nothing for the Earth in order to fool us into thinking that they are taking her concerns seriously.
  (Harding, 2006: 232)

- Selby (2007: 249) is also concerned about the concept of ESD and argues that "the heating is happening" and calls for "education for sustainable contraction" in which we accept the climate change threat, move away from the current denial or "business as usual" mindset (Selby, 2007: 265) and respond to the need for transformation.

PETROC™

Developing a Charter and accreditation for the Biosphere Reserve

PETROC™

North Devon's Biosphere Reserve
world class by nature

Become a Biosphere Reserve Business Partner and Let a Natural Asset Boost Your Business Potential and Success.

Our special global accolade can be a business opportunity and we want to develop the solutions with you.

We are offering you a unique marketing opportunity that could provide you with an untapped business niche.

Engage with new customers and clients who are increasingly committed to operating sustainably in an environmentally and socially responsible manner through accreditation.

Business Accreditation linked to the values of the Biosphere Reserve and Benefit from the Exclusive use of Licensed Logos demonstrating your commitment towards Sustainable Development.

No other Businesses in the UK can OWN this Accreditation as ONLY your Business is situated within the North Devon Biosphere Region; the only UNESCO designated Reserve in the UK and one of only 534 in the World.

PETROC™

Current sustainability thinking.....

The Triple Bottom Line

Sustainability

Society

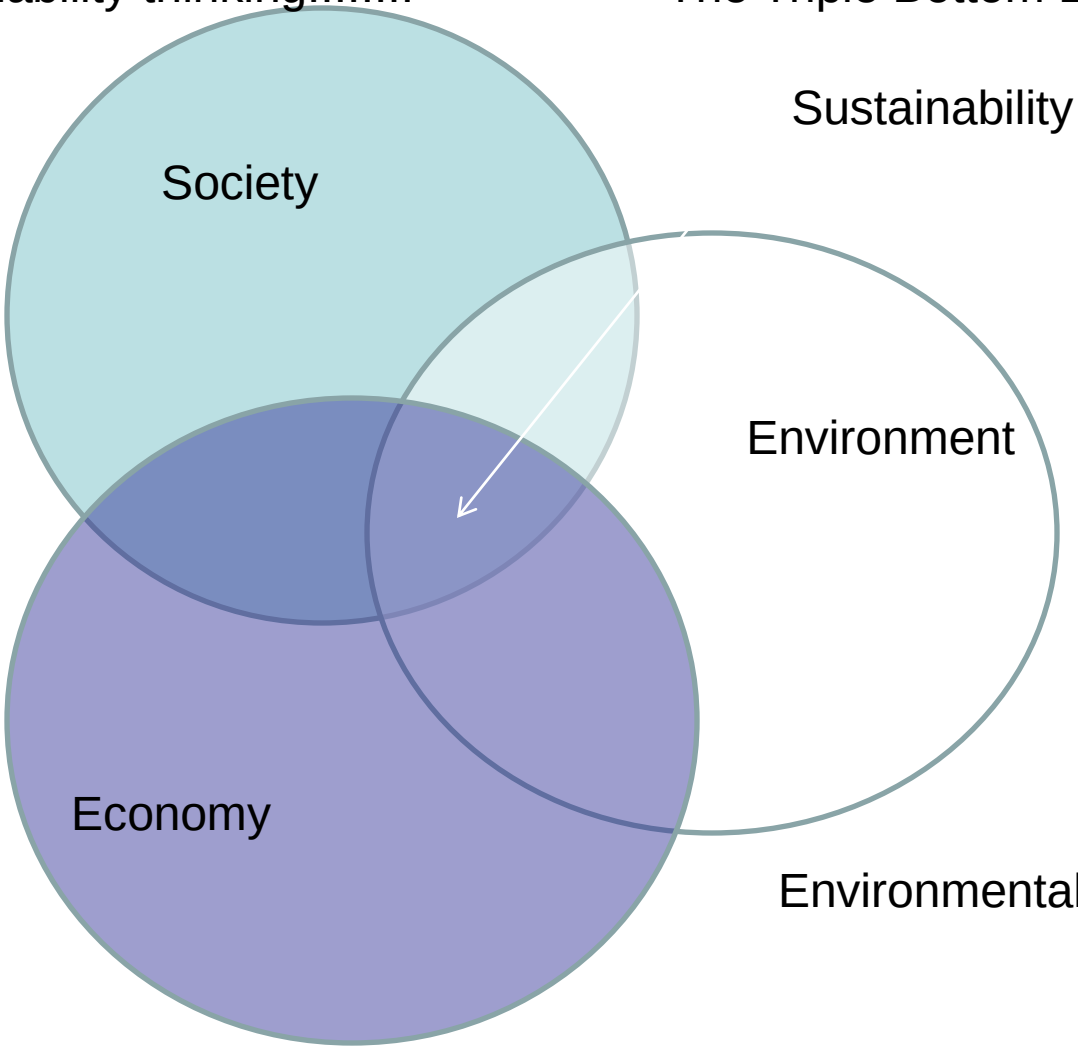
Socially Acceptable

Environment

Economically Viable

Economy

Environmentally Sound



PETROC™

Soloist vs. Whole Systems

Can identify one part of a system

OR
sees no connection between the parts of the system

OR
lives life through a "zoom lens" without benefit of a "wide angle" lens

Makes choices and decisions and takes actions that maximize the health of the whole system upon which the specific parts depend.
Able to work well in diverse groups which enable them to recognize interdependencies in systems

Adapted from material from the Sustainability Education Center, New York www.sustainabilityed.org

PETROC™

STEM

Partnership Working

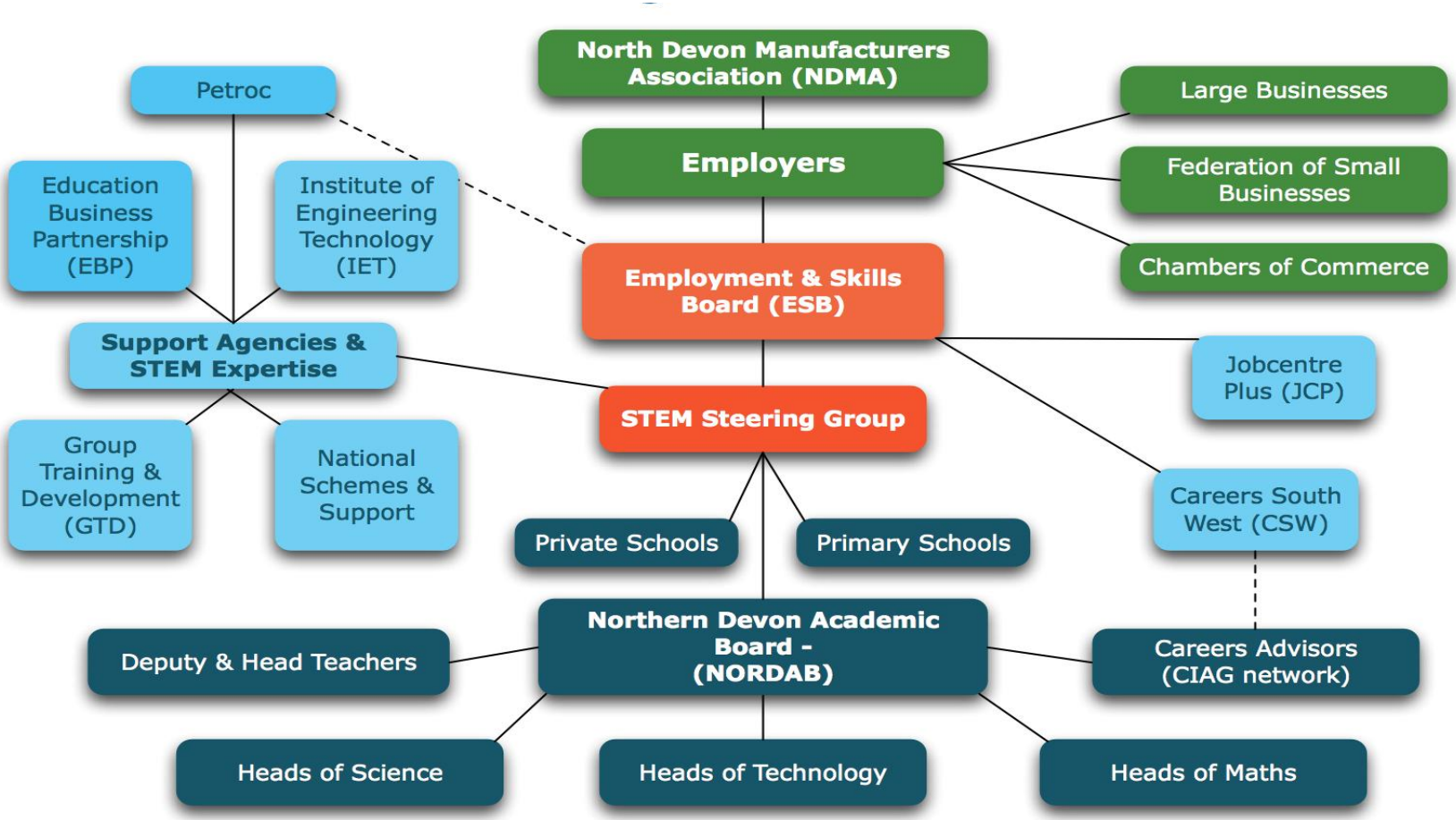
PETROC™

The LEP Business plan identifies THREE main objectives, one of which addresses skills needs

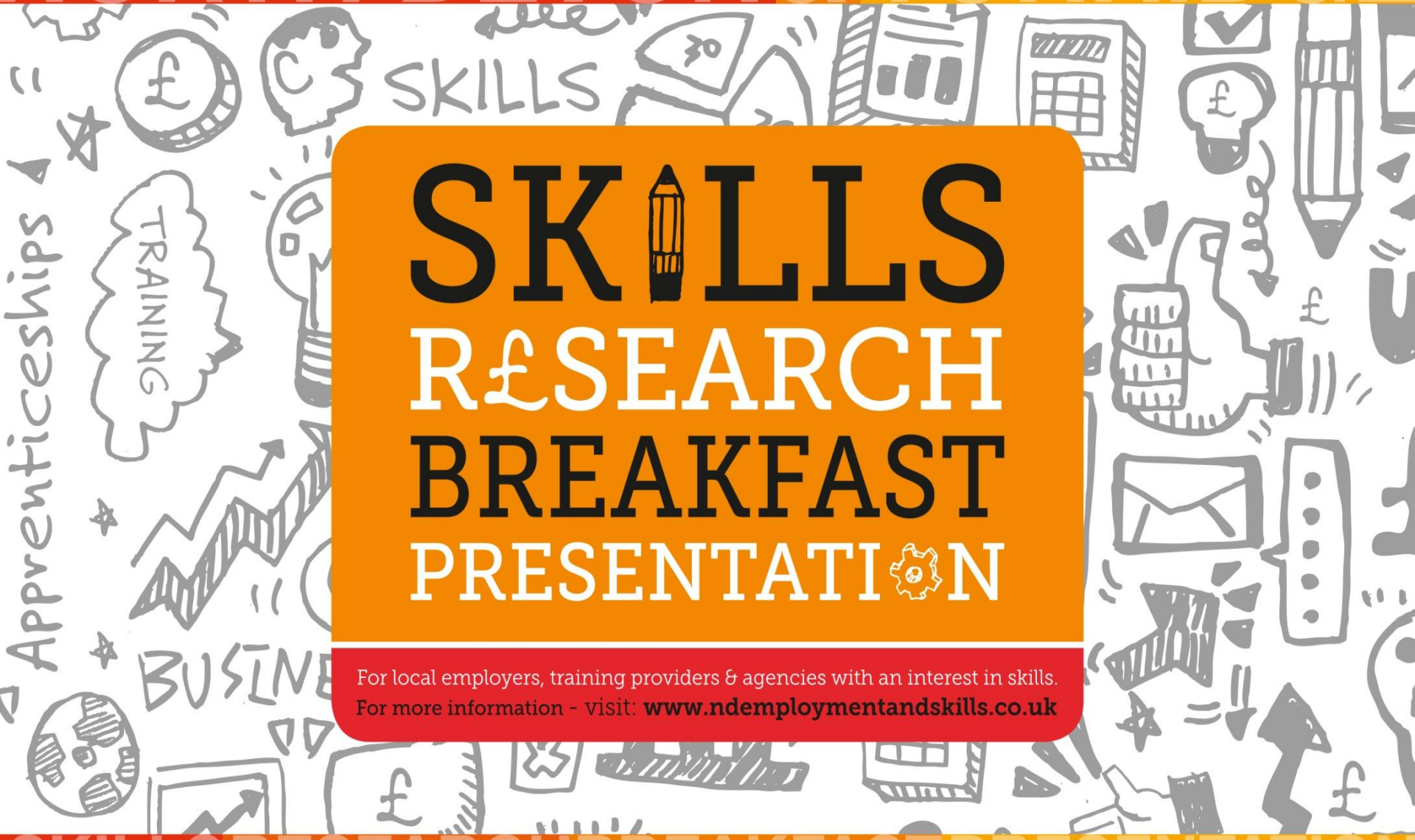
- **Opportunity 1: Develop a high quality workforce to meet business needs**
- **Opportunity 2: Increase the availability and take up of apprenticeships**
- **Opportunity 3: Instil a culture of enterprise, life-long learning and career progression across all business sectors**

PETROC™

ESB STEM Network in North Devon



NORTH DEVON & TORRIDGE



SKILLS RESEARCH BREAKFAST PRESENTATION

For local employers, training providers & agencies with an interest in skills.
For more information - visit: **www.ndemploymentandskills.co.uk**

SKILLS RESEARCH BREAKFAST PRESENTATION

Northern Devon Employment & Skills Board

INSIGHT WITH PLYMOUTH UNIVERSITY

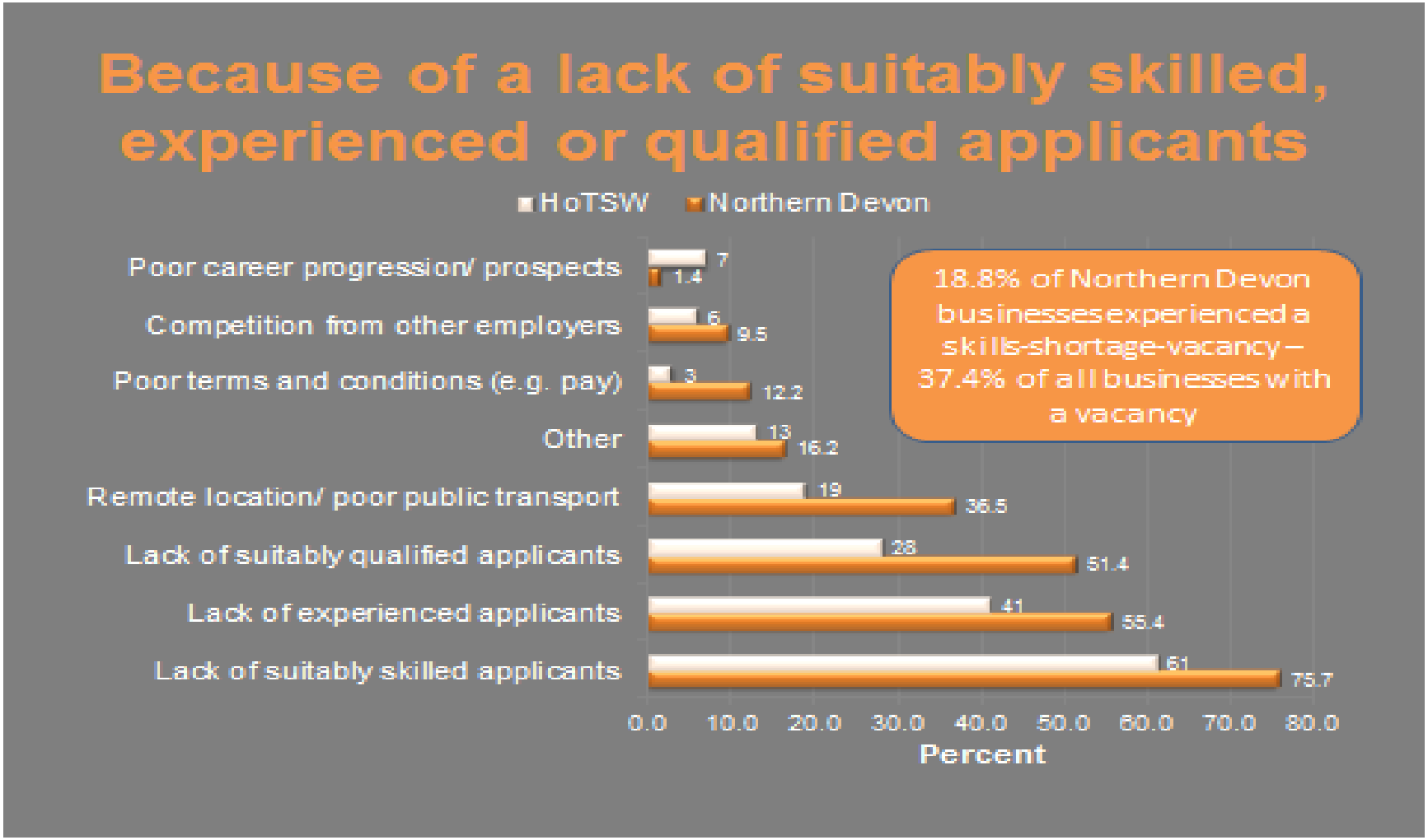
SERIO

north DEVON

Part financed by the European Agricultural Fund for Rural Development 2007 - 2013: Europe Investing in Rural Areas

PETROC™

Working with Employers



PETROC™

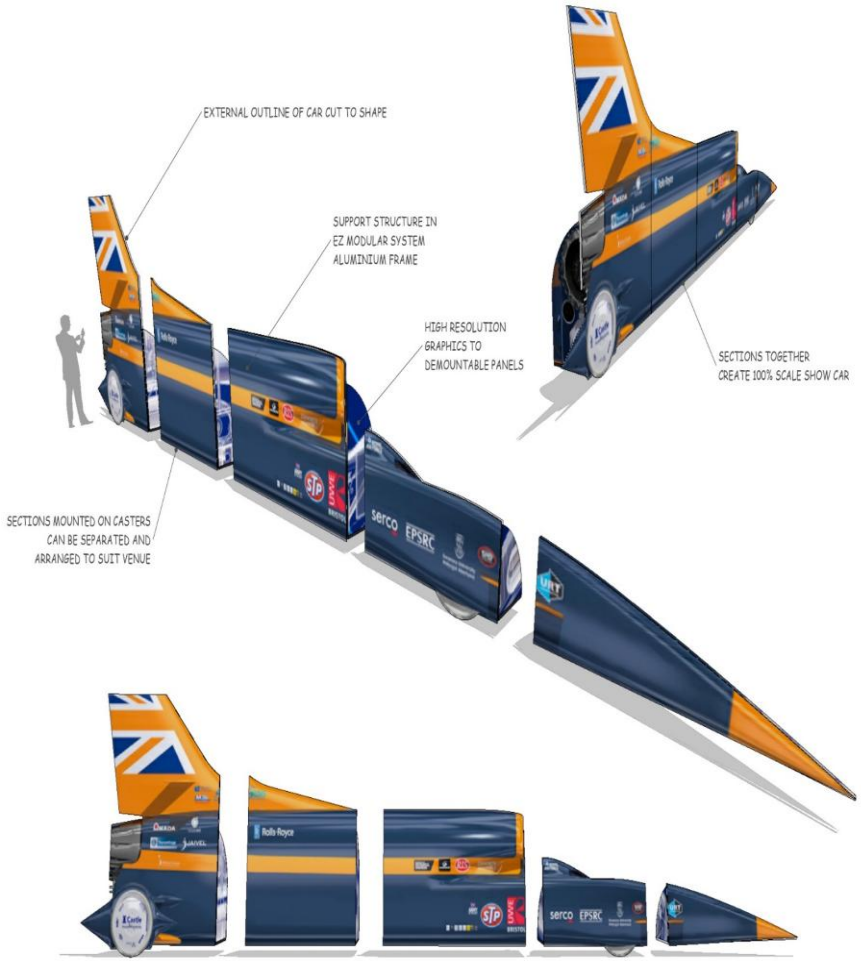
Partnership Working

THE STEM ALLIANCE

GREATER TOGETHER

SCIENCE TECHNOLOGY ENGINEERING MATHEMATICS

BLOODHOUND SSC - Education Footprint for DFE delivery in 2014/15 as of January 2014



PETROC™

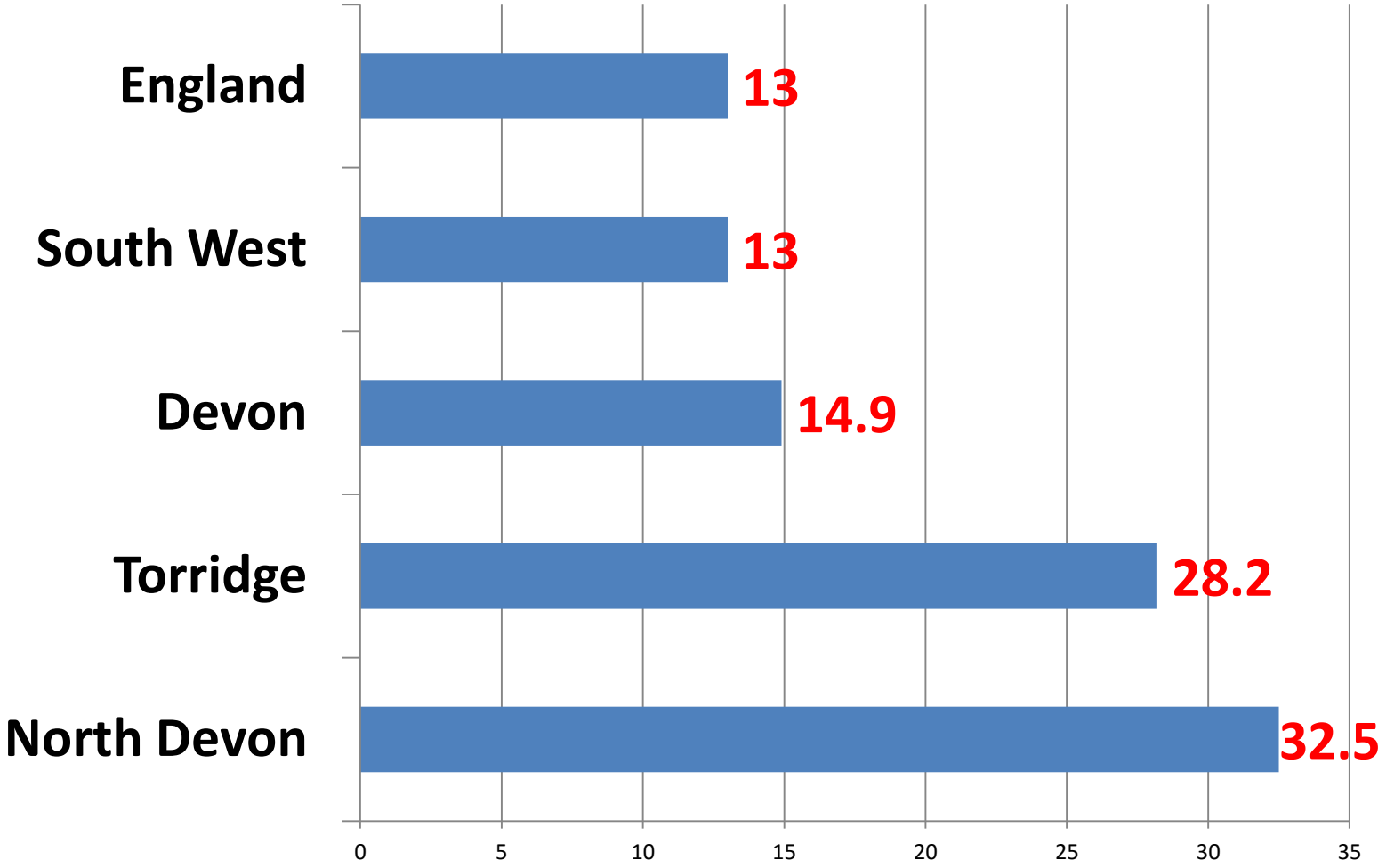
Northern Devon Employment & Skills Board

Northern Devon Employment and Skills Board (ESB)

Apprenticeships

PETROC™

Percentage growth in apprenticeship starts - 2011/12



PETROC™

101

PETROC™

1395

636 = Torridge

759 = North Devon

PETROC™

1. Promotion and improvement of basic education;

2. Reorienting existing education at all levels to address sustainable development;

Action Areas

3. Developing public understanding and awareness of sustainability;

4. Training the workforce with knowledge and skills to perform their work in a sustainable manner.

PETROC™

Global Action Programme

It is intended to make a substantial contribution to the post-2015 agenda.

The overall goal of the GAP is to generate and scale up action in all levels and areas of education and learning to accelerate progress towards sustainable development.

The GAP focuses on five priority action areas:

Advancing policy;

Integrating sustainability practices into education and training environments (whole-institution approaches);

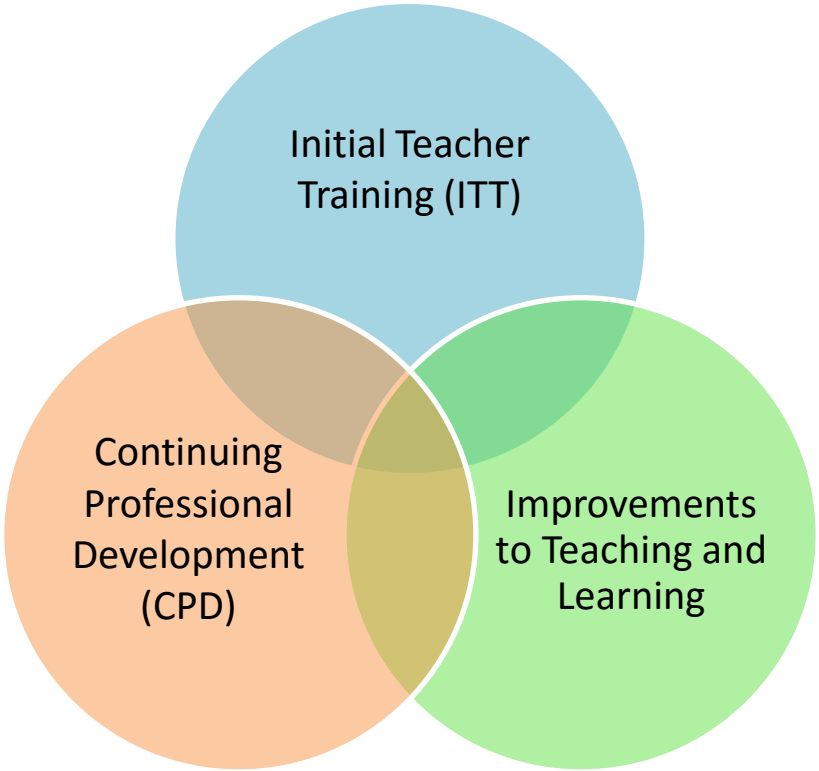
Increasing the capacity of educators and trainers;

Empowering and mobilizing youth;

Encouraging local communities and municipal authorities to develop community-based ESD programmes

PETROC™

FE workforce strategy



- Incentivise recruitment via the FE Initial Teacher Training (ITT) route
- Fund new continuing professional development courses (CPD) and the re-training of teachers from vocational backgrounds
- Develop and disseminate improved teaching and learning practice

PETROC™

FE workforce strategy

- £9m in 2013-14 and £6m in 2014-15 to support the introduction of a new English and maths FE ITT Bursary Scheme.
- £1m in grants to support existing FE teachers to undertake CPD to develop their specialist skills and knowledge to support learners with SEN.
- NCETM maths enhancement programme for existing teachers of numeracy/functional skills – only £100 per person thanks to ETF subsidies.
- English CPD programme in development and planned for autumn 2014 roll-out.
- Identify innovative and best practice in teaching English and maths to post-16 students.

PETROC™

What's the problem?

- Some students were being denied broad academic knowledge and skills which are fundamental to employment and education prospects.
- Vocational qualifications were of poor quality, lacked robust assessment or did not provide progression to further education, training or employment.
- Skills shortages holding back competitiveness and growth - **39% of employers struggle to recruit workers with the advanced, technical and STEM skills** - and acute concerns in manufacturing, construction and engineering (CBI, 2013).
- **Employers say school and college leavers lack basic literacy and numeracy (32% and 31% respectively) and the right work experience (55%)** (CBI, 2013).
- Many vocational qualifications do not prepare a young person for a specific job: **only 7% of students take vocational qualifications at level 3 which prepare them for a specific job**, most take more 'general' vocational qualifications (DfE analysis, 2012).

PETROC™

AstraZeneca

The company has real problems in getting people with the right maths skills - Grade C in maths. They feel that teachers need a new approach to teaching maths in young people.

- They would like to see chemical engineering promoted at school level and subsequently FE.
- AstraZeneca is happy to use colleges to deliver specialist training e.g. ex-apprentice working towards degree qualifications.
- The company supports the UTC concept for 14 -19 year olds – with its strong focus on bringing various aspects of provision together on one site.

PETROC™

CAVTL Report:

Four Characteristics of Excellent Adult Vocational Teaching and Learning

- A clear line of sight of work on all programmes
- Dual Professionals, teachers/trainers who combine occupational and pedagogical expertise who are trusted and given the time to develop partnerships
- Access to industry-standard facilities and resources reflecting the ways in which technology is transforming work
- Clear escalators to higher level vocational learning, developing and combining deep knowledge and skills

PETROC™

The Education & Training Foundation

Foundation Delivery Plan

PRIORITIES

- Professional Standards for Teaching
- STEM support for teaching and trainers
- Quality improvement in English, Maths, SEN Teaching
- Higher Level teaching and Learning
- Support for LLDD
- ITE/ITT Improvement
- HE in FE

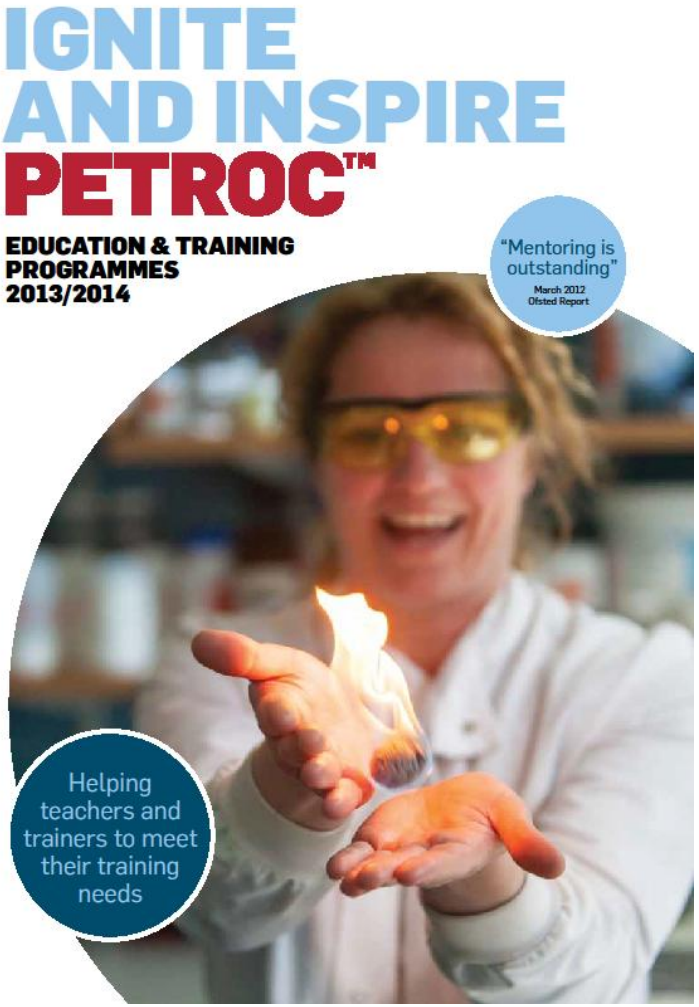
Approach

- Commissioned
- Informed by employers and stakeholders
- Evaluated
- Customer driven with intervention

IMPACT – on learner and learner outcomes

PETROC™

STEM Enhanced ITE



PETROC™

National Priorities

- Improve teaching and learning in the STEM subjects
- Communicate the STEM agenda and it's priorities
- Support providers to address priority areas covered by the STEM agenda
- Contribute to a coherent regional STEM teaching and learning support offer
- Manage the process of STEM self improvement activity, supplying funding to the sector

Science Learning Centres

The Royal Academy of Engineering

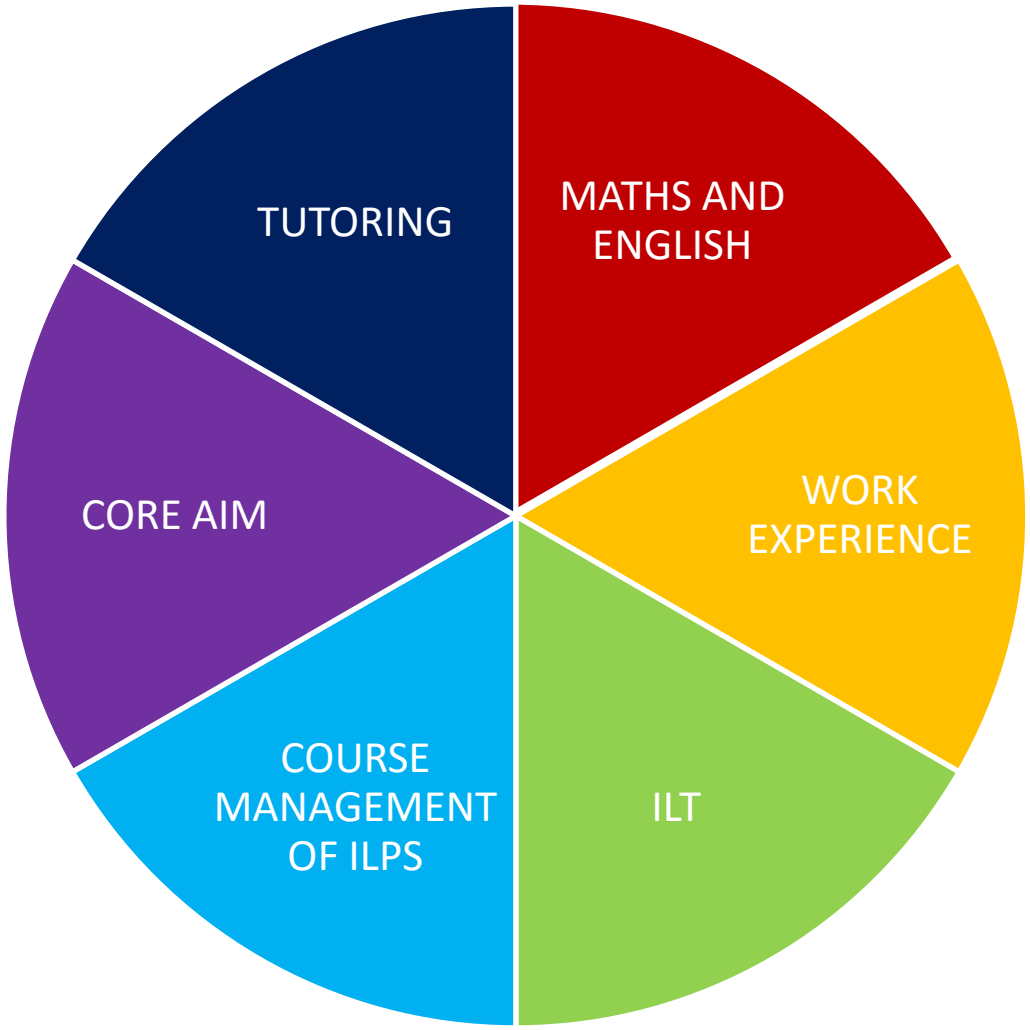
National Centre for Excellence in the Teaching of Mathematics

PETROC™

Leading Learning in STEM

PETROC™

The Lecturer as a Facilitator of Learning



PETROC™

Critical Success Factors

- Promoting a positive agenda for STEM
- Developing an effective curriculum model for STEM
- Ensuring quality of delivery of STEM
- Promoting a positive learner experience of STEM

PETROC™

Promoting a Positive STEM Agenda

'There are two areas of improvement required in the STEM initiative: one is attainment, we want those taking the STEM subjects to do better in them and the other is engagement, we want more young people to take STEM subjects particularly Post-16 and beyond'

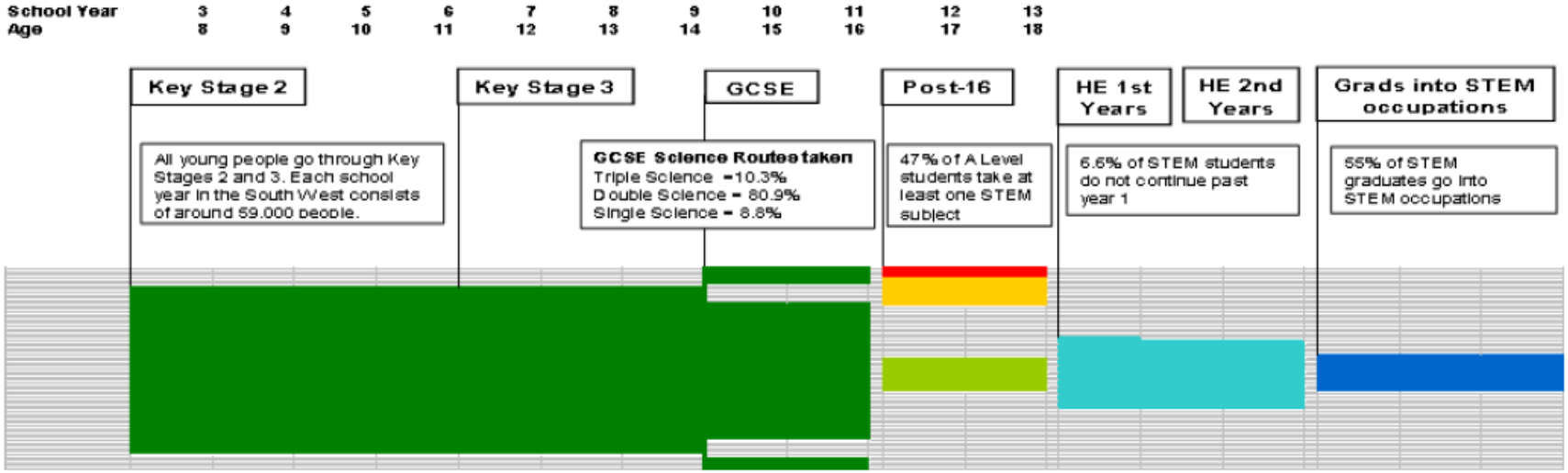
John Holman

Recruitment, Retention and Achievement of STEM learners are key considerations for Senior Managers

PETROC™

STEM Skills – leaky pipeline

STEM Skills Pipeline in the South West[54]



Key Leaks	No leaks as such, as all go through Key Stages 2 and 3	No individual taking single science GCSE, went on to do STEM A Levels.	Only 40% of those taking triple science go on to take any STEM A Levels	Over 9,000 STEM A level students going into HE do not apply for STEM subjects	Over 4,100 of 7,500 STEM graduates surveyed went into employment in STEM occupations
Notes	Achievement levels in maths and science are higher than the national average at Key Stage 2 and Key Stage 3	The proportion of young people taking single science is increasing in some areas	Just over 12,300 STEM A level students, approx 10,000 FE students and 3,500 Apprentices in STEM subjects	Rates of non-continuation in STEM subjects are lower than for all subjects, but are highest in Computer Science, where 10% do not progress past year one	

Source: STEM - Demand and Supply of Skills in the South West, SLIM, June 2009

Where are the job?

Services sector

Top ten sectors

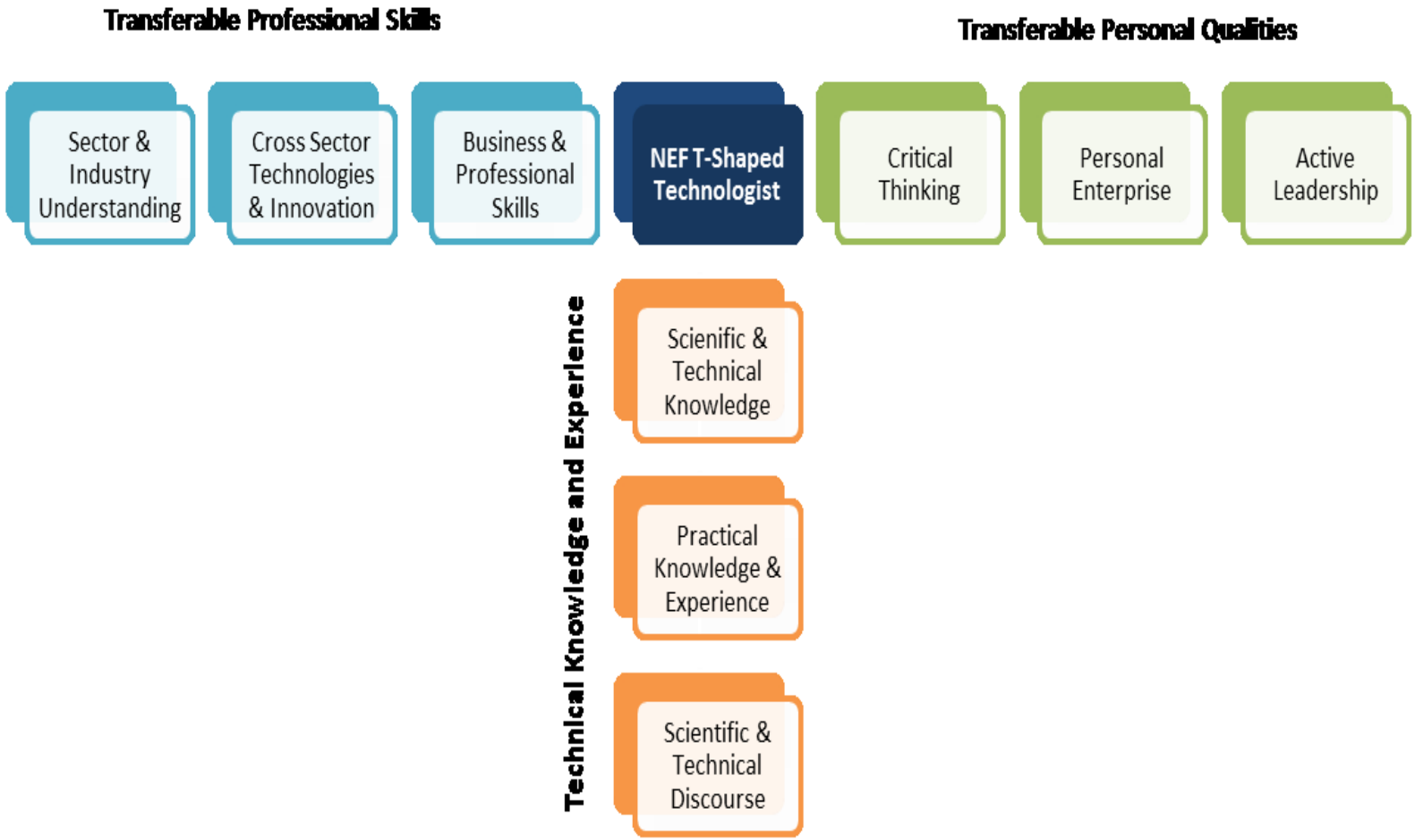
1. Business services
2. Health and care
3. Retail
4. Hospitality and Catering
5. Personal services
6. Construction
7. Computing
8. Education
9. Banking and Finance
10. Transport and Storage

Hi-tech industry

Top ten sectors

1. Aerospace
2. Electronics
3. Renewable energy
4. Nuclear energy
5. Plastics
6. Composites
7. Nano technology
8. Robotics &AI
9. Space
10. Biotechnology

PETROC™



T-Shaped Technologist © NEF

PETROC™

Two-thirds of employers who express a preference prefer STEM degrees

STEM	69%
Business	23%
Social sciences	5%
Humanities	2%

CBI Education and Skills survey

PETROC™

CBI Education & Skills Survey 350 employers

66% of employers reported difficulties recruiting STEM skilled staff, particularly at graduate and post-graduate level

PETROC™

Supply and demand in the processing industries by 2022

Employee group	Forecast demand	Forecast supply	
Manager and professionals	55,000	68,000	Over supply of 13,000
Technicians and skilled operators	72,000	31,600	Short fall of 40,400

PETROC™

What do employers want?

Skills (team work, problem solving etc)	**78%**
Positive attitude	**72%**
Relevant work experience	**54%**
Specific degree subject	**41%**
High degree result	**28%**
University attended	**8%**
Foreign language capability	**2%**

CBI Education and Skills Survey

PETROC™

What do they agree on?

We need good achievement **and** good engagement:

more young people doing well in STEM subjects **and** more wanting to continue studying them

Progression Through STEM

Careers Review, Holman and Finegold (2010)

- Careers activities should occur naturally
- Academic routes to STEM qualifications well known - England weak in guidance on vocational routes
- Careers guidance - in flux and mixed reputation
- Urgent need for STEM careers training
- Impartiality is still an issue
- Employers and universities should be clear about what qualifications they value
- Accurate labour market information essential

Progression Through STEM

Careers Review, Holman and Finegold (2010)

KS 3 pupils get careers information from

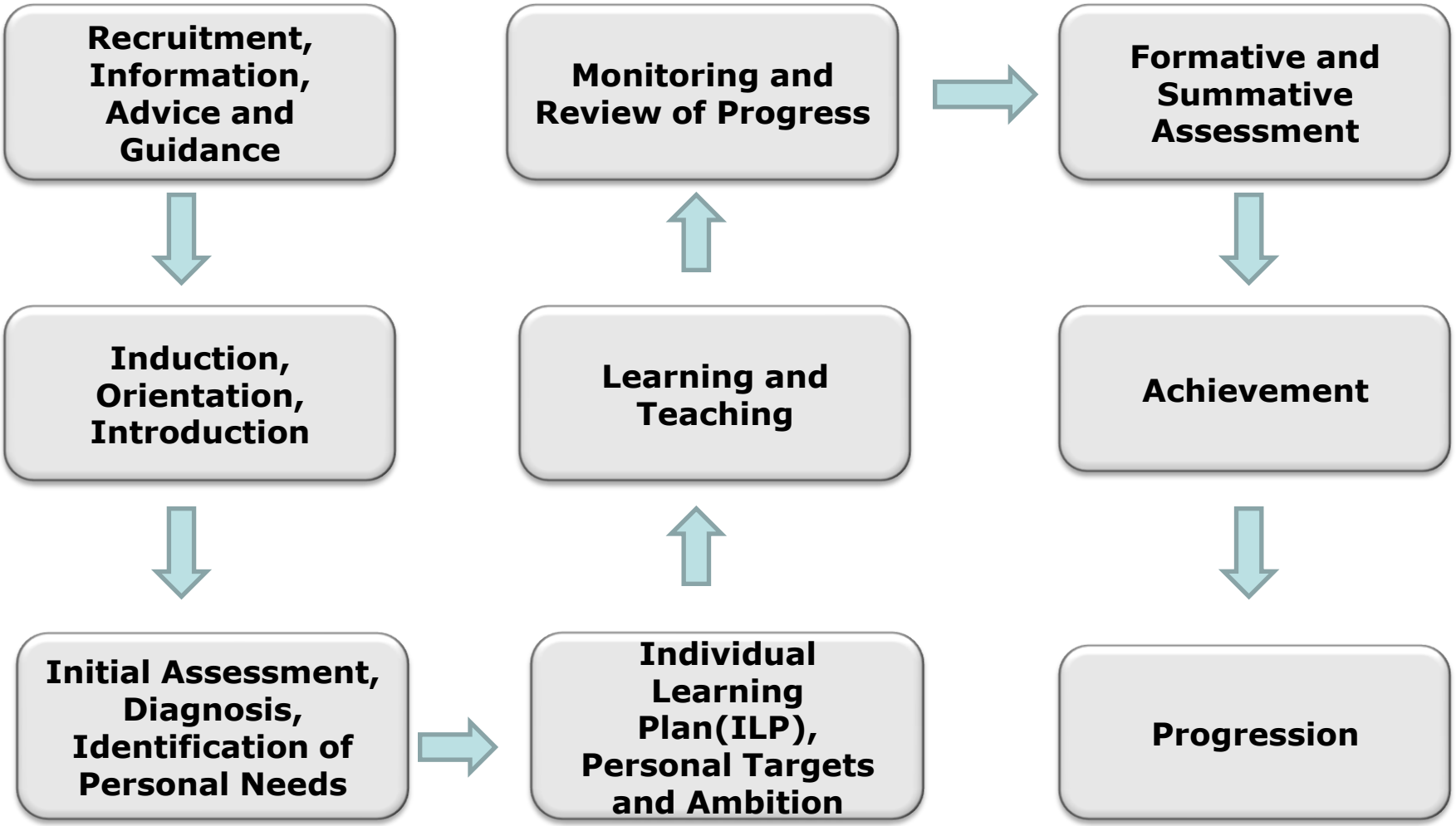
Family	78%
Careers teachers	50%
Subject teachers	48%
Form teachers	23%
Careers advisers	20%

Huge CPD implications for careers staff and STEM teachers in schools and FE

Quality of the Learner Experience

Teaching ,Training and Assessment Supporting Learning and Development at Petroc College

All Aspects of the STEM Learner Journey will be Prioritised



PETROC™

Common Inspection Framework

Learners develop personal, social and employability skills

To make this judgement, we will consider:

- The development of English, Mathematics and Functional Skills required to complete learners' programmes and progress
- The achievement of additional qualifications and/or experience gained in the workplace
- Broader skills relevant to learner's progression and career aims, such as communication, teamwork, leadership, taking responsibility, reflective thinking, problem solving, independent enquiry and employability.

PETROC™

Demonstrating Impact

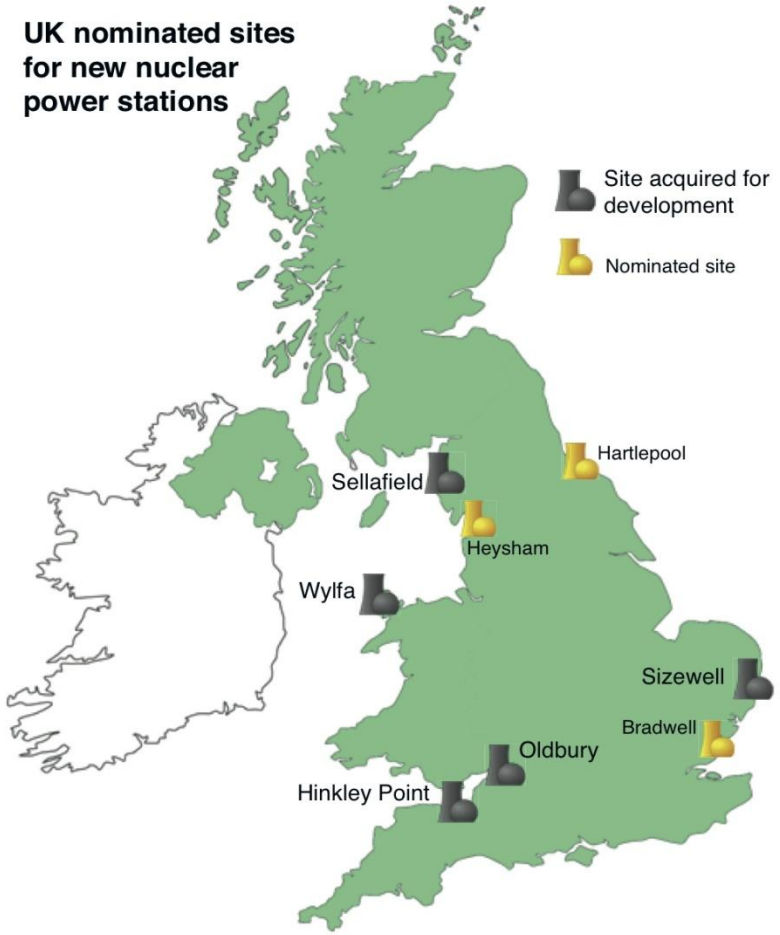
Working with Employers

PETROC™

PETROC™ Apprenticeships Good for our Business

Example 1

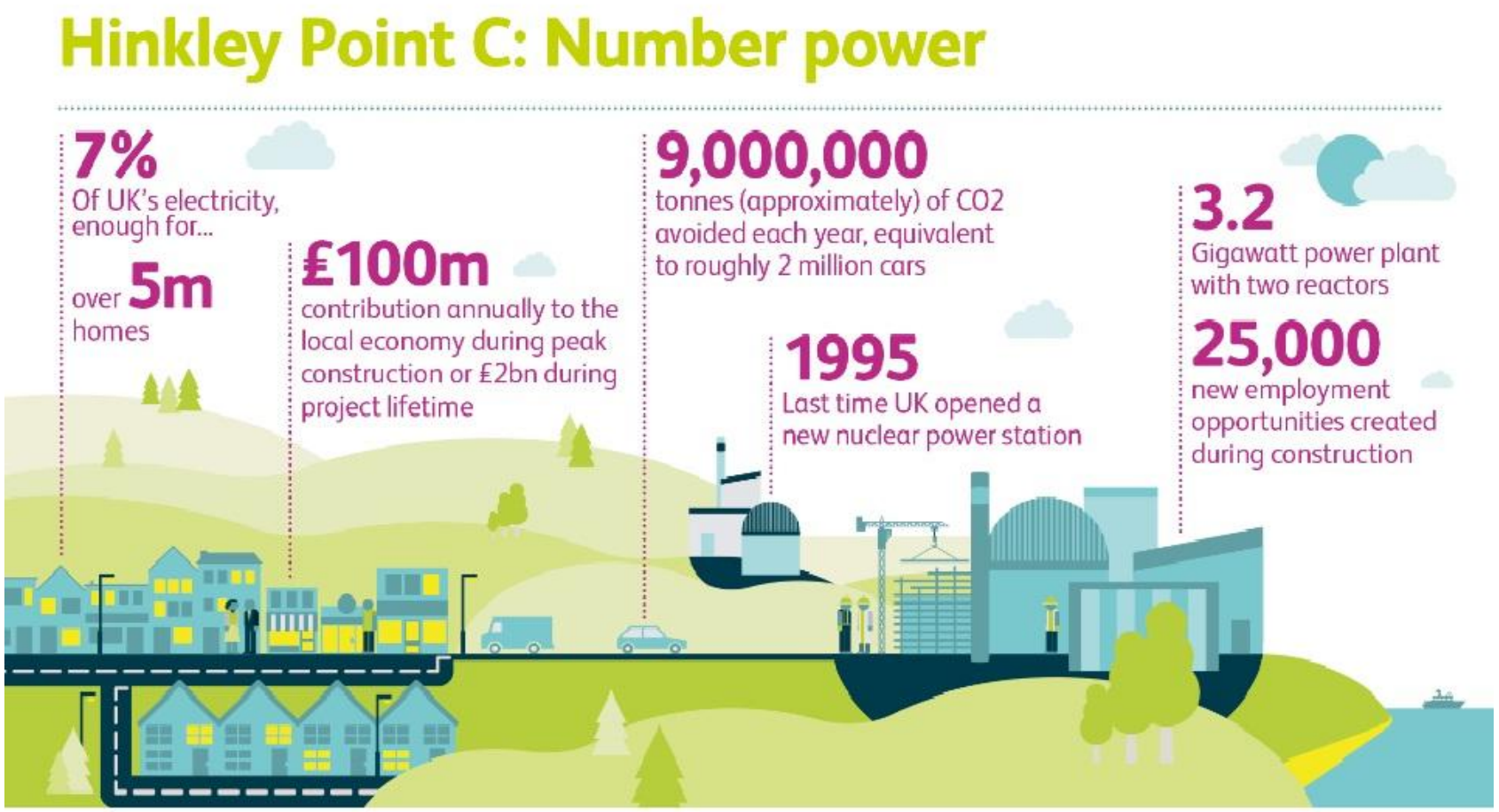
HPC EDF ENERGY



PETROC™

HPC
EDF ENERGY

Hinckley Point C Coalition



Delivering Locally, Through Training, to Employment

Education > Skills > Employment

Inspire Programme

Over **60,000** students engaged to date.

WORK READY

- •HPTA and Coalition
- •Talent Pool Development
- •Aligned to ESPs
- • Pre Training
- •Apprenticeship and graduate programmes
- • FE/NVQ Short Coursest

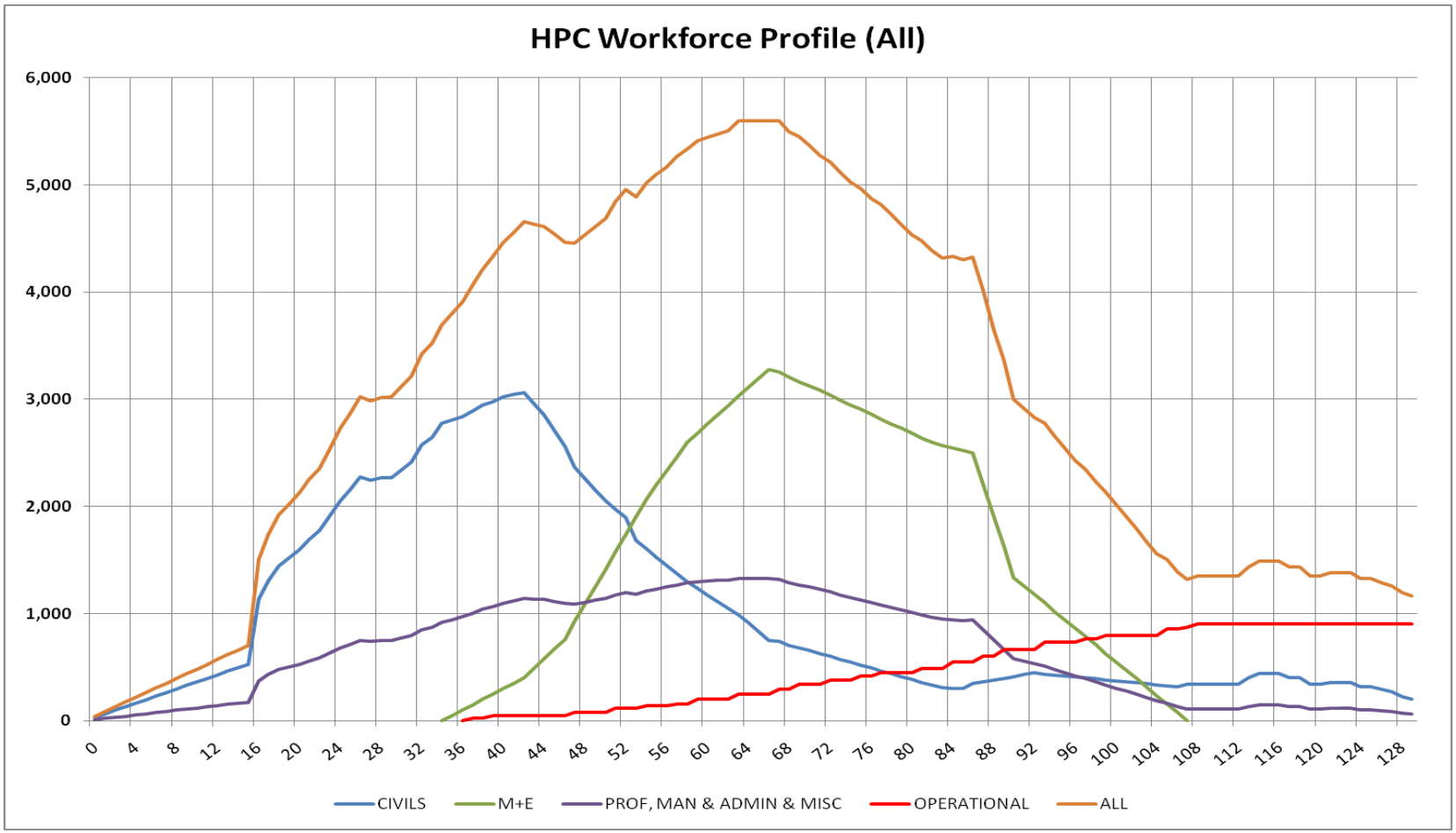
JOB READY

Sustainable Employment Opportunities

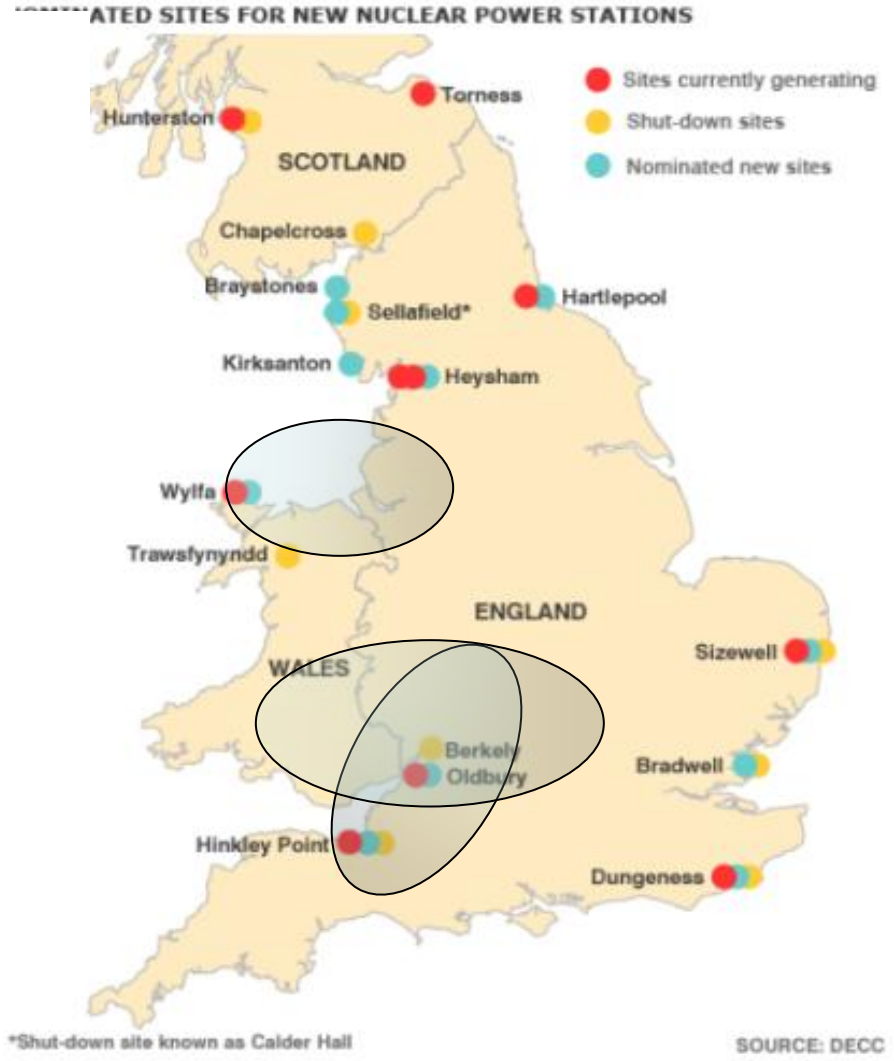
Over **2000** registered
Over **180** People placed into sustainable jobs

PETROC™

HPC workforce profile

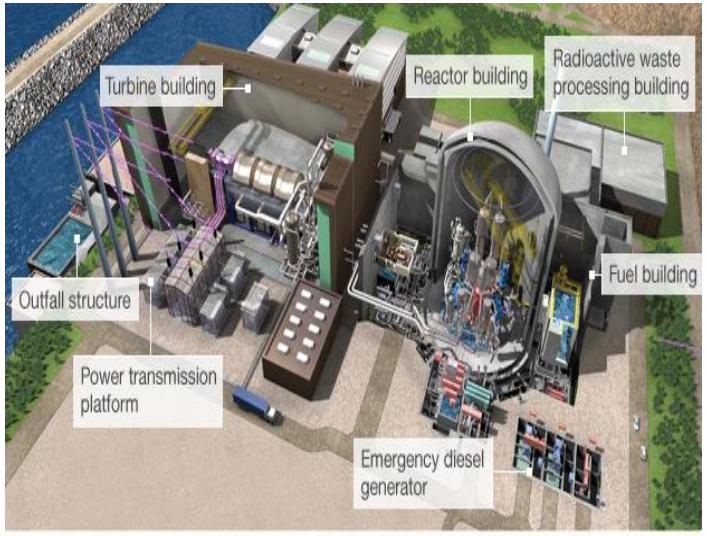


PETROC™


ATED SITES FOR NEW NUCLEAR POWER STATIONS
Sites currently generating
Shut-down sites
Nominated new sites
Torness
Hunterston
SCOTLAND
Chapelcross
Braystones
Sellafield*
Hartlepool
Kirksanton
Heysham
Wylfa
Trawsfynydd
ENGLAND
WALES
Sizewell
Berkeley
Oldbury
Bradwell
Hinkley Point
Dungeness
*Shut-down site known as Calder Hall
SOURCE: DECC

PETROC™

Science for Public Understanding



Source: EDF Energy

Note: Image shows generic EPR reactor layout

PETROC™

BAM Nuttall

- In common with most contractors, we recruit:
  - graduate engineers and quantity surveyors
  - Technical Apprentices (engineers, planners and QSs)
  - Craft Apprentices (carpenters, steel fixers)
  - Operatives

PETROC™

John Byrne

- Staff roles (Grads/TA) require the following. We are the muddy boot side of the construction industry, so technical reports are uncommon.
  - Clear spoken communication to provide the workforce with clear instructions, HSE information, direction on working methods.
  - Written communication to formulate risk assessments that fulfil legal requirements
  - Written communication to Client on technical queries and requests for information
  - Written records that will be used to back up applications for payment and in dispute resolution
  - All are steered towards professional qualifications so need to formulate technical reports and presentations for formal review. Also documenting progress against a list of formal development objectives.
  - Even at this stage of HPC, documents may be subject to Regulatory review (Office for Nuclear Regulation) as HS and Quality now and throughout the programme are intrinsic to nuclear safety during the plant's operation. There is a concept of 'document hygiene' where getting SPaG and formatting wrong create the impression that the work being planned or recorded by a particular document will also be poor with a potential effect on nuclear safety.

PETROC™

STEM

- STEM resources used elsewhere for English include:
  - Ethical discussions or report on the nuclear industry (environmental, safety and commercial impacts).
  - Accident investigations using real incidents to evaluate comprehension, identification of problems and solutions.
  - Compilation of method statements for real works to assess ability to describe work clearly and communicate constraints to the workforce.

PETROC™

What I’m not suggesting..

http://www.youtube.com/watch?v=c3y0CD2CoCs

PETROC™


LOST
CONFUSED
UNSURE
UNCLEAR
PERPLEXED
DISORIENTED
BEWILDERED

PETROC™

Stem4Plymouth

Example 2

Aim:

To champion the provision and uptake of STEM-related education and skills across all educational settings in Plymouth to help young people and adults fulfil their potential and to meet the needs of local employers dependent on STEM skills.

sq consulting
providing effective solutions

pmg Plymouth Manufacturers' Group

Example 3

National STEM Programme

- Support the development of STEM provision that is more flexible, accessible and responsive to the needs of employers
- Encouraging those currently within the workforce to develop enhanced knowledge and skills.

The Partners

- Bath University
- Exeter University
- Petroc
- Plymouth University
- University of the West of England
- Weymouth College

http://www.hestem-sw.org.uk/

Progression to higher level skills

- Collaboration between further and higher education
- Streamlining engagement for employers
- Provide pathways to higher level skills for students

Why are higher level skills important?

- Improve productivity
- Improve competitiveness
- Economic growth
- Maximise innovation, creativity and enterprise

PETROC™

National HE STEM Programme

Why employers invest in higher level skills?

- Increased innovation
- Raised productivity
- Improved quality of work / products
- Improved client satisfaction
- Worker Satisfaction
- Reduced absenteeism
- Better staff retention

Employer engagement

- Continuing professional development
- Course design and delivery
- Small consultancy projects
- Student projects and work placements
- Research support
- Knowledge Transfer partnerships
- Bespoke Training

PETROC™

Robert Coombes – Petroc

Working with Industry

Robin Jeffery – TDK Lambda

How universities should work with industry

SHARE CELEBRATE SUCCEED PETROC

LOCAL COMPANY DONATES EQUIPMENT TO PETROC

Ilfracombe-based electronics firm TDK-Lambda has generously donated over £5,000 worth of electronics equipment to help students in their studies at Petroc.

The company is one of the world's largest designers and manufacturers of electronic power supplies, used in important high end equipment such as body scanners, broadcast transmitters and motorway signs. Every year TDK Corporation, the Japanese based owner, award technology prizes in a monetary form and the local winners decided to purchase specialist equipment that would help students develop their skills.

"It was a wonderful gesture from our design team to donate this cash award to benefit Petroc and TDK-Lambda was happy to match the amount," said TDK-Lambda's EMEA Marketing Director, Martin Southam.

"There is a shortage of electronics engineers in North Devon and the UK and we are pleased to help develop local talent."

"We are very grateful for TDK Lambda's support," added Engineering Lecturer, Robert Coombes.

"This equipment will help all our students' progress and widen their knowledge. Having this link with industry gives our students great experience and a real advantage when entering the work place."

PETROC™

Example 4
STEMNET

- **STEMNET** creates opportunities to inspire young people in Science, Technology, Engineering and Mathematics (STEM)
- STEM Ambassador

  Recruitment and Training

PETROC™

STEM Ambassadors Typical Activities

- Supporting schools with in class activities
- Develop a longer term link with a school or group of schools
- Assist with STEM competitions, events and awards
- Help to provide work based placements for teachers and students
- Offer mentoring support for students
- Offer careers guidance and role model examples deliver careers talks
- Provide resources to support the curriculum, directly linked to your work
- Support after schools science and engineering clubs (STEM Clubs)

PETROC™

STEM Ambassadors Typical Activities

- Supporting schools with in class activities
- Develop a longer term link with a school or group of schools
- Assist with STEM competitions, events and awards
- Help to provide work based placements for teachers and students
- Offer mentoring support for students
- Offer careers guidance and role model examples deliver careers talks
- Provide resources to support the curriculum, directly linked to your work
- Support after schools science and engineering clubs (STEM Clubs)

PETROC™ Project | SEARCH Adding to Life pluss

Example 5

Sterile Services

Skills I've learned

1. I learnt how to sort out the instruments.
2. I have learnt how to find my way around the hospital.
3. I learnt how to replace the out of date instruments.

Tasks I performed

1. I packed the sterilised instruments.
2. I did the distribution run.
3. I did stock taking.

STEM Subject Choice and Careers

Strategy for Teaching

- Teaching and Learning
- Teacher awareness of STEM careers
- **Pupils' personal skills and capabilities**
- Enhancement and enrichment
- Equality and diversity
- Communication about STEM careers
- Leadership and management
- **Partnerships**

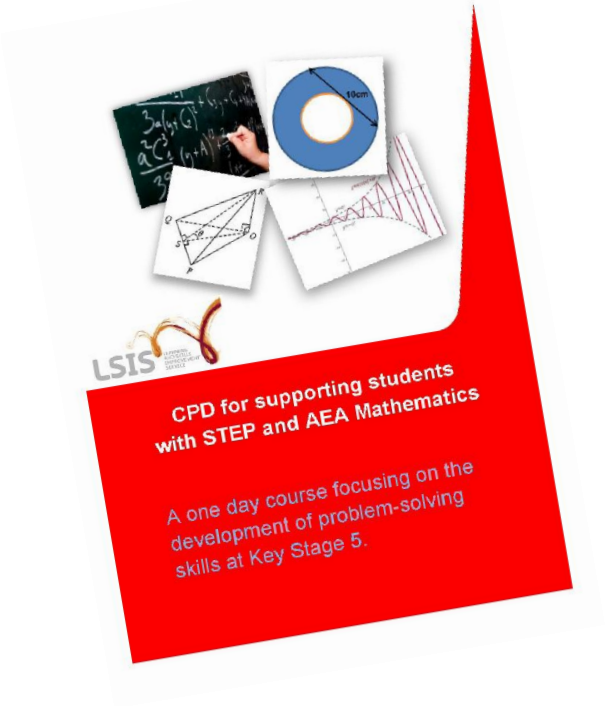
Enthusing Students

Equipping Professionals

Supporting Employers

PETROC™

CPD Flyers



Science Learning Centres | PETROC | Ofsted raising standards improving lives

IMPROVING SCIENCE IN FURTHER EDUCATION

Friday 13th June 2014, 10am – 4pm

Petroc – Mid Devon Campus
Bolham Road, Tiverton, Devon, EX16 6SH

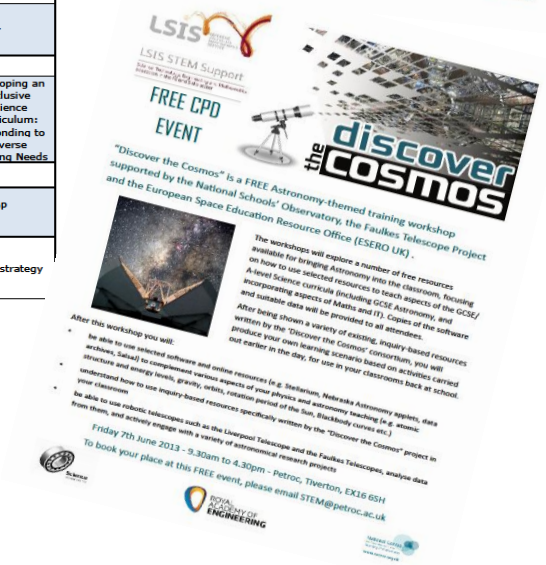
Pre-course task – Consider your own organisation and Science department:

- What do you do well?
- What are the identified areas for improvement for your team emerging from lesson observations?
- What steps are already taken? What are the barriers to improvement?

Science in FE – the National Picture	Alex Falconer, HMI (National Lead on Post-16 STEM)			
How to Improve – In Theory	Activity, led by Alex Falconer, HMI			
Reality Check	Quality Improvement Activity			
Ofsted's Myths	Alex Falconer, HMI			
Collaborative Improvement: - Addressing regional priorities - Funding opportunities to facilitate quality improvement in teaching & learning	Cerian Ayres, South West Regional STEM Advisor			
Lunch, Networking & Resource Bank Building				
Hot Topic Workshops	Effective Use of Technology in Classroom Teaching & Learning	Developing Learners' Employability Skills: Addressing the Skills Gap	Embedding English & Maths Explicitly in Classroom Teaching & Learning	Developing an Inclusive Science Curriculum: Responding to Diverse Learning Needs
Lesson observations and effective practice	Quality Improvement Activity			
Supporting Improvement	Science Learning Partnerships, NSLC Accessing regional and national support – RSC, IOP FE STEM toolkit from the National STEM Centre Helen Roberts, FE STEM Support			
Planning for action: - 10 Top Tips for Improving Science in the FE & Skills Sector - Exploring resources to aid strategy development and create an effective STEM manifesto	Action planning for developing your organisational STEM strategy			

To register for this FREE event, please email STEM@petroc.ac.uk

THE LEARNING CONSORTIUM



PETROC™

STEM Enrichment and Enhancement

PETROC™ STEM Enrichment & Enhancement

Harry Hart

Harriet Knight

PETROC™

F1™ IN SCHOOLS

Georgia, Jack and Johnathan won Best Engineered Car, Fastest Car & 1st Place in South West Regionals and 4th place in UK National Finals!

PETROC™

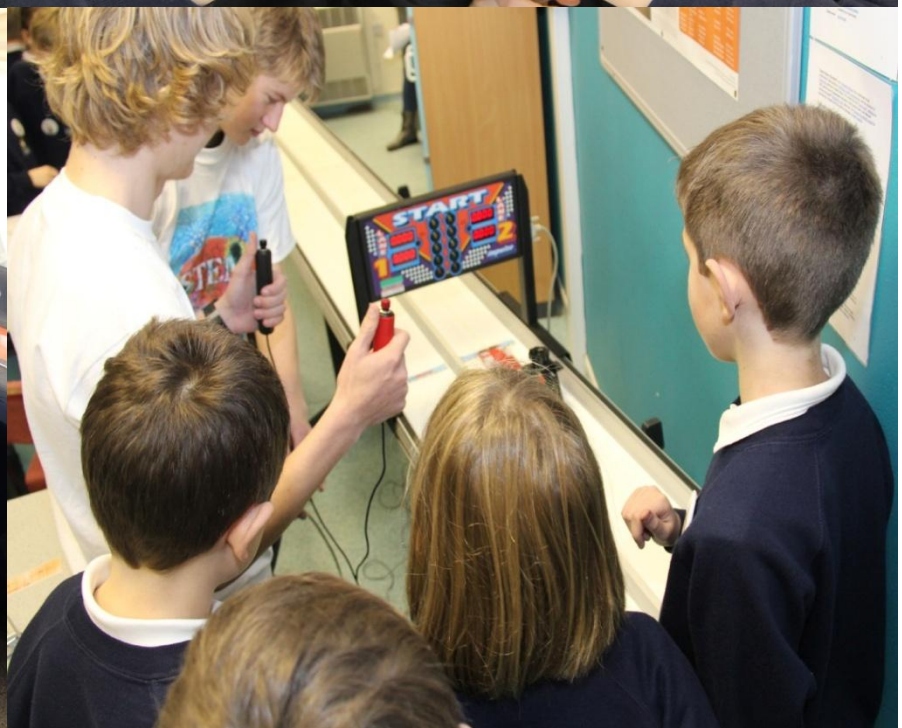
RSC | Advancing the Chemical Sciences

Alex, Vashti and Sabrina won

First Place in the Regional Finals of the Royal Society of Chemistry's Young Analyst Competition!

Well Done!!!

PETROC™



PETROC™

PETROC™

Why?

PETROC™

UK

1% of the world's population, we produce nearly 10% of the world's scientific research and science lies at the bedrock of the economy.

But you can't have world class science teaching in schools to inspire and prepare the new generation of scientists and engineers and to ensure that **ALL citizens** have the basic science literacy need to make sense of the world in which science and technology shapes our lives without-

Tailoring STEM Professional Development to be responsive to the needs of STEM teachers/ practitioners.

Focusing on developments in the curriculum, in teaching technologies and in Science itself.

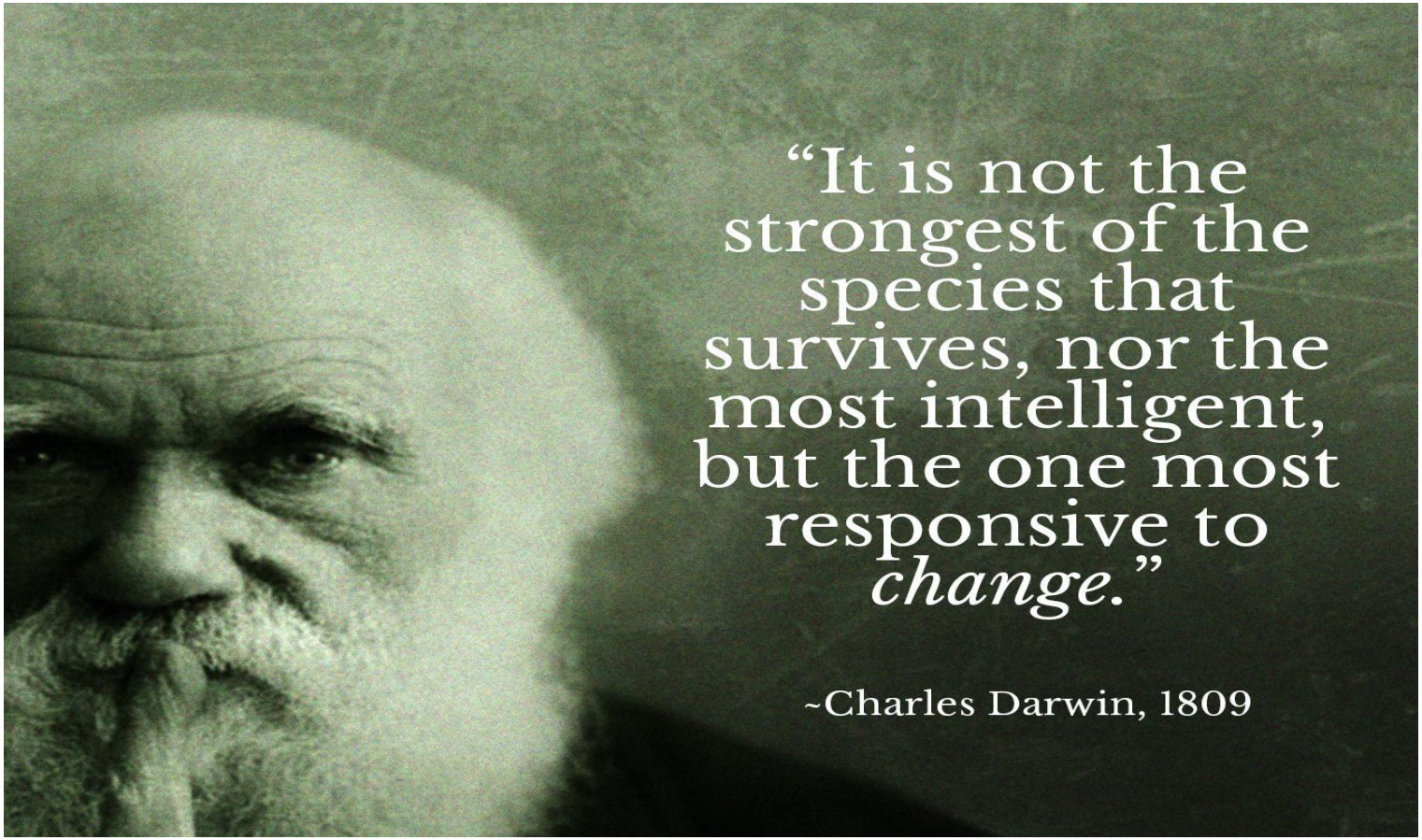
(Professor Sir John Holman)

Science Learning Centres

The Royal Academy of Engineering

National Centre for Excellence in the Teaching of Mathematics

PETROC™



Developing English and STEM skills through a Sustainability Focus

"*Education at all levels can shape the world of tomorrow…*" **UNESCO**

Cerian Ayres- South West STEM Adviser, Head of Quality, Teacher Education , CPD:Petroc

March 2015

PETROC™

Supporting STEM Learner Progression

Exploring the idea of Progression

Developing learners and teachers to enhance progression

Partnership approaches to support progression

PETROC™

Critical Success Factors in Supporting Learner Progression

- Bringing learning to life
- Developing aspirations
- Information, advice and guidance
- Individual learning plans
- Pastoral support
- Effective teaching and learning
- Independent learning
- Curriculum planning

PETROC™

The Learner Journey

Exploring the idea of progression

1.1 What does the term progression mean to you?

1.2 Why is progression important:

. to individual learners?

. to your organisation?

. nationally?

1.3 What are the challenges to progression for your learners?

PETROC™

The Learner Journey

Developing learners and teachers to enhance progression

2.1 How can we use teaching and learning approaches to support learner progression?

2.2 How can we build learner motivation and persistence?

2.3 How can we support and develop interprofessional teams and individual teachers in order to enhance progression for all learners?

PETROC™

The Learner Journey

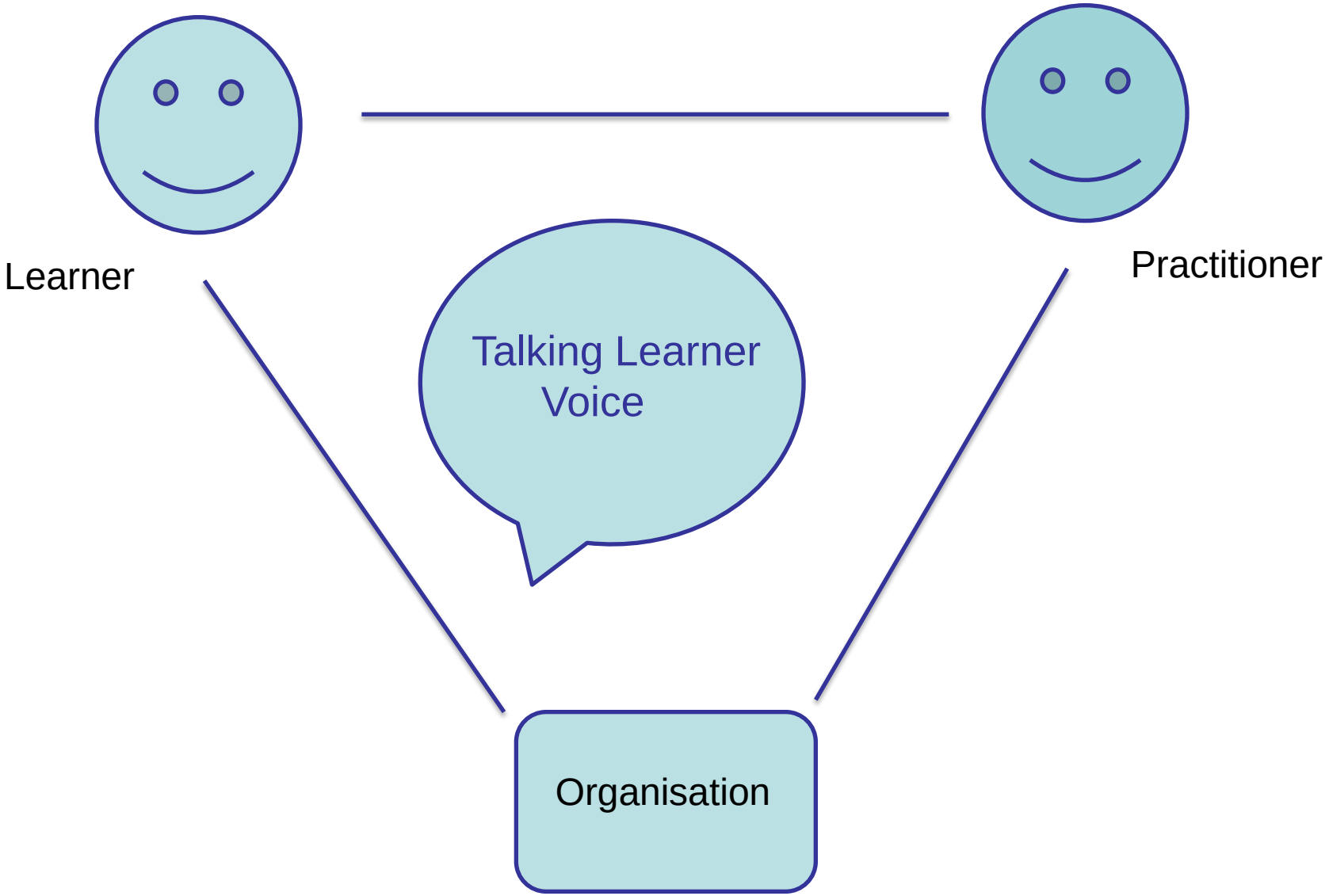
Partnership approaches to support progression

5.1 Who are our progression partners?

5.2 How can we establish a shared ethos and approach to progression?

5.3 What practical steps can we take with partners to enhance learners' progression opportunities and outcomes?

Talking learner voice: three viewpoints ….



PETROC™

Talking learner voice: strategic discussion activity Outstanding teachers, trainers and organisations…..

EMPOWER
Develop knowledge skills and abilities to control and develop own learning. Learners work together, set agenda for change and have responsibility for some management decisions.

COLLABORATE
All aspects of decision making are done in partnership with learners. All parties sign up to a common goal and share a determination to reach it.

INVOLVE
Staff and learners work closely together to make sure that all views are understood and taken into account.

CONSULT
Seek the views of learners and provide feedback on any decisions taken

INFORM
Keep learners informed about their rights and ways to participate in the organisation.

Ladder of engagement'*
- stepping stones
- continuum
- overlap/complementarity
- increasing maturity (individual and organisational)