Where now for School Biology in Scotland?

Jim Stafford
Drivers of change in the future

*Curriculum change*
(refinement and development of CfE)

*Subject change*
(what we know about Biology and how we think about biology)
Drivers of change in the future

The common denominator between *Curriculum* and *Biology* Subject drivers is:

*A Skills Agenda*
Should Science be part of the core curriculum in Scotland?

*Core Curriculum*
- Literacy
- Numeracy
- Health and well being

*Missing Core Skill*
- Problem Solving
Characteristics of the scientific process of problem solving

*Science*  
Conclusions  
Evidence  
Critical analysis of data and research methods

*Rather than*  
Opinions  
Persuasion and influence  
Critical analysis of argument and debate

*Collected at first hand in real time*
CfE as a driver of curriculum change

To enable all young people to become

**successful learners**
- with
  - enthusiasm and motivation for learning
  - determination to reach high standards of achievement
  - openness to new thinking and ideas
- and able to
  - use literacy, communication and numeracy skills
  - use technology for learning
  - think creatively and independently
  - learn independently and as part of a group
  - make reasoned evaluations
  - link and apply different kinds of learning in new situations

**confident individuals**
- with
  - self respect
  - a sense of physics, mental and emotional wellbeing
  - secure values and beliefs
  - ambition
- and able to
  - relate to others and manage themselves
  - pursue a healthy and active lifestyle
  - be self aware
  - develop and communicate their own beliefs and view of the world
  - live as independently as they can
  - access risk and take informed decisions
  - achieve success in different areas of activity

**responsible citizens**
- with
  - respect for others
  - commitment to participate responsibly in politics, economic, social and cultural life
- and able to
  - develop knowledge and understanding of the world and Scotland's place in it
  - understand different beliefs and cultures
  - make informed choices and decisions
  - evaluate environmental, scientific and technological issues
  - develop informed, ethical views of complex issues

**effective contributors**
- with
  - an enterprising attitude
  - resilience
  - self reliance
- and able to
  - communicate in different ways and in different settings
  - work in partnership and in teams
  - take the initiative and lead
  - apply critical thinking in new contexts
  - create and develop
  - solve problems
CfE as a driver of curriculum change

“If the Broad General Education does not provide learners with a more secure foundation on which to build to achieve higher levels of attainment in national qualifications, Curriculum for Excellence will have failed.”
Bloom’s Revised Taxonomy
CfE as a driver of curriculum change
Changing nature of Biology as a driver of curriculum change

*Scientific Literacy sets the context for change:*

- What we know about biology
- How we do biology
- What we do with biology
How we do Biology

• First hand practical work in laboratory and field
• Practical work with a clear learning purpose
• Collaborative enquiry
• Designing experiments and field observations
• Process data to present results and draw valid conclusions
• Research information and make informed comment
• Evaluate results and experimental methods
• Report findings clearly and without bias
What we do with Biology

• Critically evaluate the presentation of biological science in the media
• Discuss issues involving biology and justify a point of view based on evidence
• Make personal life style choices involving biology based on evidence
• Make informed moral and ethical judgements on the application of biology in everyday life, economic and social change and the environment
What do we need to know about Biology?

Knowledge that is important and powerful to learn:

• How Biology is done

• Key concepts and big ideas
Key concepts and big ideas

• Develop understanding of events and phenomena relevant to learners’ lives
• Allow learners to explain observations and suggest hypotheses
• Allow learners to make predictions and generalisations about biology
Key concepts and big ideas

*How do we identify the key concepts and big ideas of Biology?*

*How do we map the key concepts so that the curriculum develops the big ideas of Biology?*