A Hive of Activity

Eco-systems

Sustainability

Pollination

Cross Curricular

Collaborative Learning

Practical Woodwork

Cognitive Apprenticeship

Context

Bees have been in the news this year, if not back in the fields pollinating this summers crops. The plight of the honeybee has received national media coverage and has led to the Scottish Government implementing policies to promote their health and increase their numbers. This has led to an increase in the popularity of beekeeping as a hobby and to an increase in small enterprises producing, and selling, bee related products.
In this project the learners will be asked to develop an understanding of the importance of the honey bee in relation to the world that we live in and to take an active role in the sustainable future of the species. The unit is developed in partnership with the Forestry Commission and can be further enhanced through the involvement of local bee keeping trusts. The culmination of this unit will be the manufacture of a workable beehive and its set up, and maintenance, as a honey producing colony. This will take place within a SQA National 4 Practical Woodwork project and will involve small task skill building lessons leading on to the big task of manufacturing the working beehive. Once the manufacture stage is complete the opportunity is there, in collaboration with the Forestry commission, to introduce a colony of bees, and once mature, sustainably farm the honey with a view to setting up a small enterprise in an SQA National 4 Business project.

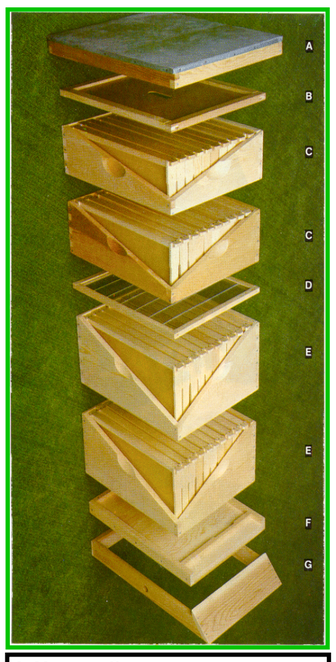
Project Outline

Cross Curricular Learning

Within the setting of an SQA National 4 Biology class the learners will begin to learn about the importance of maintaining a healthy honey bee population in Scotland. . The SQA National 4 Biology unit 'Life on Earth' will direct the learning about the eco systems, animal and plant species that are dependent on the honey bee for their survival. The pollination cycle will also be a main focus of this learning as it also leads on to the specific learning about how a man made bee hive functions, how its sections are interdependent and how the hive can be sustainably maintained and farmed given the right care. The forestry commission will be involved in this project at this point through relating the project to the implementation of working beehives within a forest environment to promote the health and well being of the forest are in which the hives are situated. By utilising guest speakers (forestry commission or local bee keeping enthusiasts) the context of learning about these systems can be reinforced in an authentic and relatable way. The forestry commission have recently introduced a viewable model of a working bee hive in the Glentress Visitors centre and the opportunity to utilise this in the learning is available on arrangement. Given the successful manufacture of the hive and the understanding of how the hive works, as a system, the opportunity will exist to set up, and introduce, a colony of bees into the hive in the hope that it will establish itself as a working hive. The forestry commission will have a major role to play in this part, as they will provide the location and the expertise to maintain the hive. Further interdisciplinary learning opportunities will now present themselves to the school as the hive could produce the means of establishing a small enterprise utilising the farmed bee related products. The SQA National 4 Business Course have the opportunity to meet the targets of the Business in Action unit through learning and 'developing the skills and knowledge relating to the role of business and entrepreneurship within society' (Scottish Government, 2012) and setting up a small enterprise related to the bee products.

Craft Design and Technology

Once the learners have a good understanding of the importance and value of a healthy honeybee population the learning can then be taken into the context of an SQA National 4 Practical Woodwork course. Feedback received from practicing CDT teaches has led to the implementation of this project at this level. It can be related to all of the mandatory units for this course as the manufacture, from plans, of a working man made beehive will include 'Flat frame construction', 'Carcass construction' and 'Machining and Finishing', all to within a tolerance of between +/- 2 mm in each individual item and +/- 5 mm overall. The manufacture of the hive must be a class project due to time constraints, with each learner taking on the responsibility of manufacturing a minimum of two individual parts of the hive as there can be up to, or even over, 50 individual component parts. This will introduce a social constructivist aspect to the learning as the learners will have to work in cooperation with one another to ensure that all tolerances are maintained for the finished item. The teaching and learning will consist of small task skill builders (individual joint construction) prior to the big task of the manufacture, to plan, of a workable beehive.
Cognitive apprenticeship task can been considered then the one of the most appropriate teaching and learning method for this project, It will give the learners an opportunity to learn new skills from an expert in the field and then practice these skills to take the learner from the point of being a novice, to the point of being very proficient at the skills that they have learned.



Hive Components
A. Outer Lid
B. Inner Cover
C. Shallow Super
D. Queen Excluder
E. Deep Super
F. Landing Board
G. Hive Stand

Unit Structure

Context Setting

Lesson 1 Context Setting
Biology. Field trip to Glentress Forest visitors centre to view their working beehive or an in school visit from a local beekeeper to discuss the job of maintaining a beehive.

Lesson 2
Biology. Case study, threats to the honeybee population in Scotland. Introduction to eco-systems and the pollination cycle. The dependence of the environment on the Honey bee.

Lesson 3
Biology. A working beehive. The interdependence of each section of the hive. Hive hierarchy and the role of each bee in producing honey

Lesson 4 Intro to Plans and Cutting List Plans for construction reviewed, cutting lists complete

Small Task

Lesson 5
Practical Woodwork. Frame Construction. Practical demonstration and skill builder. Half lap joint demonstration and practice joint.

Lesson 6
Practical Woodwork Frame Construction. Practical demonstration and skill builder. Corner rebate joint demonstration and practice joint.

Lesson 7
Practical Woodwork Carcass construction. Practical demonstration and skill builder Finger joint demonstration and finger joint demonstration and practice joint.

Big Task

Lesson 8 to completion of manufacture (8 lessons max)
Practical Woodwork. The learners will, with guidance from the class teacher, distribute responsibility for the manufacture of the component parts and work until the manufacture is completed. Practical demonstrations will need to be conducted, as needed, to consolidate prior learning regarding the woodworking joints required for project.

Extension (post manufacture)

Upon successful manufacture of the beehive it will now be suitable to introduce a colony into it. This will be done in conjunction with the Forestry Commission and will include instruction on hive maintenance and ultimately lead on to the setting up of a small enterprise selling bee related products.

Learning Intentions

In this unit of work the learners will learn how to work collaboratively to achieve a common goal.

They will learn how to work to tolerances and to follow plans to produce a final product that is of a very high standard.

They will learn how to manufacture items out of wood that are fit for purpose.

They will learn about biological eco-systems and how they have a direct influence on the world in which we live.

The learners will develop an understanding of the plight of the honey bee, how they contribute to our lives and how the population can be sustainably managed.

Learning Outcomes

SQA National 4 Practical Woodwork, Unit Code H25V 74 Flat Frame Construction, Outcome 1, 2 and 3

SQA National 4 Practical Woodwork, Unit Code H25W 74 Carcass Construction, Outcome 1, 2 and 3

SQA National 4 Practical Woodwork, Unit Code H25X 74, Outcome 1, 2 and 3

SQA National 4 Biology, Unit code H209 74, Life on Earth Outcomes 1 and 2

SQA National 4 Business, Unit Code H280 74 Business in Action Outcome 1, 2 and 3

Building the Curriculum

This unit of work will enable learners to develop Skills for Learning, Skills for Life and Skills for Work

Literacy *"... the set of skills which allow an individual to engage fully in society and in learning, through the different forms of language, and the range of texts, which society values and finds useful."*

Numeracy *"...developing a confidence and competence in using number that allows individuals to solve problems, interpret and analyse information, make informed decisions, function responsibly in everyday life and contribute effectively to society."*

Health and wellbeing *"...children and young people develop the knowledge and understanding, skills, capabilities and attributes necessary for mental, emotional, social and physical wellbeing now and in the future.*

Enterprise "*... a knowledge and practical understanding of the world of work – organisations across the private, public and third sectors, entrepreneurship (including social entrepreneurship) and volunteering – and the skills and positive attitudes required to support sustained economic growth.*

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