Project No.: 244749
Project Acronym: ESTABLISH
Project Title: European Science and Technology in Action: Building Links with Industry, Schools and Home

D1.1: Framework for IBSE Teaching and Learning Units

Dissemination Level: Public

Thematic Priority: Science in Society

Funding Scheme: Coordination and Support Actions

Deliverable No.: D1.1
Due date of deliverable: June 2010
Actual submission date: 30/06/2010

Start date of project: 01/01/2010   Duration: 48 months

Name of Coordinator: Dr. Eilish McLoughlin
Name of lead partner for this deliverable: Dublin City University

Introduction to this document

This document presents ESTABLISH Deliverable 1.1 - The Agreed Framework for IBSE Teaching and Learning Units, which will be used as a template for creating the ESTABLISH Units in Work Package 3. Each unit template has two parts:

A. Teacher Information
B. Classroom Materials

Texts in *'italic'* give suggestions for the content of each section.

This document has been produced within the scope of the ESTABLISH Project. The utilisation and release of this document is subject to the conditions of the contract within the Seven[th] Framework Programme, project reference FP7-SIS-2009-1-244749.

For further information regarding ESTABLISH please contact:
Dr. Sarah Brady (ESTABLISH project manager)
Email: sarah.brady@dcu.ie
ESTABLISH website: http://www.establish-fp7.eu

UNIT TITLE

A. Teacher Information

I.   Unit description

Introduce the topic to capture the main idea behind the unit, include learning goals of the unit. List subunits.

Specify:
(In case the unit consists of subunits for different student/discipline level please specify per subunit).

Student level:

Discipline(s) involved:

Estimated duration:

For your national version please indicate links to curriculum.

II.   IBSE Character

Highlight the IBSE importance of this unit.
Specify the type of inquiry and types of IBSE skills involved.
   (For definitions and terminology which should be used see 'Guide for developing Establish Teaching and Learning Units, II. The science inquiry-based approach').

III.   Science Content Knowledge

Provide background to the science theory used in the unit and the science concepts developed in the unit.

IV.   Pedagogical Content Knowledge

Highlight pre-requisite knowledge required and possible students' cognitive difficulties.
Describe pedagogical methods and tools used in implementation of learning activities.

V. Industrial Content Knowledge

Highlight the relevance of/to industry. Specify the type of industry link(s) involved.
(For definitions and terminology which should be used see 'Guide for developing Establish Teaching and Learning Units, III. Industrial Content Knowledge').

VI. Learning Path(s)

Present a complete list of student learning activities included in the unit.

Describe way(s) in which Student Learning Activities are connected to each other, with references to the 5E model of the Learning Cycle.
  (For description of the 5E Learning Cycle see 'Guide for developing Establish Teaching and Learning Units, IV. Learning Paths').

VII. Assessment

Provide items and suggestions for student assessment.

VIII. Student Learning Activities

Give detailed descriptions for each Student Learning Activity.

The following elements should be included per activity:

Activity: *Activity title*

Learning Aim: *Specify what the learning goal of the activity is.*

Materials: *Specify materials needed and technology used (if any)*

Suggestions for use: *Give suggestions on:*
  - *how to carry out the activity,*
  - *how to use materials,*
  - *how to link to industry*
  - *how to make it inquiry-based*
  - *exemplary questions for this activity*

B. Classroom Materials

Provide materials which teachers can use with their students in implementing this unit in the classroom. The extent of these materials depends on the particular activity and student level. Suggestions for materials include (but are not limited to):
  – *student worksheets*
  – *background information*
  – *laboratory notes*
  – *assessment sheets*
  – *reference materials*