## Introduction to the new PSOW

Practical skills will be essential for the assessed individual investigation. This investigation is the "Internal Assessment" and one single piece of work will have a weighting of 20% of the final marks. There are no other assessed pieces of practical work.

The great strength of being able to design your own programme, most of which does not have to be assessed, is that practical work can be fully integrated into good biology teaching. The new PSOW allows the teacher to choose the most suitable experiments for their students. There are no specified protocols to use and teachers are encouraged to allow students to design their own investigations through an inquiry-based approach. Students will not become Rosalind Franklyn or Louis Pasteur over-night. The PSOW will need to introduce practical skills step by step. There is a wide range of practical skills identified in the guide under "skills" and there are many examples on this website.

It would be wise to cover as many of these experiments as possible too. Together this makes quite a full practical scheme of work.

**The seven prescribed experiments**

P1 1.1 Calculation of magnification of drawings, actual size of structures from drawings or micrographs

P2 1.4 Estimation of osmolarity in tissues

P3 2.5 Investigation of a factor affecting enzyme activity

P4 2.9 Separation of photosynthetic pigments by chromatography

P5 4 Attempting to create a sealed mesocosm

P6 6.4 Monitoring of ventilation at rest and after mild and vigorous exercise

P7 9.1 Measurement of transpiration rates using photometers

**Details of practical skills mentioned in the new guide.**

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| **Topic** | Labs referred to in the "Skills" section of the SL topics of the new guide |
| 1,1 | Microscopy of tissues (magnification) |
| 1,1 | Electron micrographs, identify organelles/function |
| 1,6 | Mitosis stages/Mitotic index/root squash |
| 2,3 | Molecular visualisation software of cellulose, starch & glycogen |
| 2,3 | Calculate BMI |
| 2,4 | Denaturation of proteins |
| 2,5 | Effect of pH/temp/conc on enzyme activity (Design) |
| 2,5 | Immobilised lactase |
| 2,6 | Isolation of DNA |
| 2,8 | Respirometer/germinating seeds/invertebrates |
| 2,9 | Limiting factors of photosynthesis |
| 3,1 | Genbank database for base sequence differences |
| 3,2 | Karyogram activity/Trisomy |
| 3,2 | Use of databases to identify the locus of a human gene and its polypeptide product |
| 3,3 | Observation of meiosis |
| 3,4 | Predicted/actual outcomes of genetic crosses |
| 3,5 | Design of an experiment to assess one factor affecting the rooting of stem cuttings. |
| 4 | Quadrats and use of Chi-squared test |
| 4 | Analysis of air monitoring data |
| 5,3 | Classification of one species |
| 5,3 | Plant and animal group recognition features |
| 5,3 | Construction of a dichotomous key |
| 6,1 | Dialysis tubing gut model |
| 6,1 | Identification of tissue layers in transverse sections of small intestine microscope slides or micrographs |
| 6,2 | Blood vessel histology |
| 6,2 | Heart dissection |
| 6,5 | Analysis of oscilloscope traces for resting and action potentials |
| Topic | Labs referred to in the "Skills" section of the AHL of the new guide |
| 7,1 | Using molecular visualisation software to analyse the association of DNA/Histone in nucleosomes |
| 7,3 | Using molecular visualisation software to analyse the structure of tRNA & eukaryotic ribosomes |
| 8 | Use of databases to identify anti-malarial drugs |
| 9,1 | Xerophyte/Halophyte adaptation |
| 9,1 | Transpiration stream modelling |
| 9,1 | Xylem/Phloem/Stem/Root histology |
| 9,1 | Design an experiment to test hypotheses about the effect of temperature or humidity on transpiration rates |
| 9,3 | Micropropagation of plant tissues on nutrient gels with plant hormones |
| 9,4 | Seed structure |
| 9,4 | Flower structure |
| 9,4 | Factors affecting germination |
| 10,2 | Chi squared test on data from dihybrid crosses |
| 11,1 | Measurement of sarcomere from microscope slides or micrographs |
| 11,4 | Gonad histology |
| Topic | Labs referred to in the "Skills" section of the option of the new guide |
| Opt A 3 | Eye dissection |
| Opt A 4 | Invertebrate behaviour labs |
| Opt B 1 | Grams staining |
| Opt B 1 | Zone of inhibition due to bactericides |
| Opt B 1 | Fermenter |
| Opt B 5 | Use of software to align two protein sequences |
| Opt C 1 | Transect |
| Opt C 2 | Investigate the effect of an environmental disturbance on an ecosystem |
| Opt C 4 | Simpson's Index |
| Opt C 5 | Capture-mark-release |
| Opt C 6 | Nutrient content of soil sample |
| Opt D 1 | Determination of food energy content by combustion |
| Opt D 1 | Dietary analysis using databases |
| Opt D 4 | Heart Rate lab |
| Opt D 4 | Analysis of epidemiological data on CHD |
| Opt D 6 | Identification of pneumocytes, capillary endothelium and blood cells in light micrographs |

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| Topic | Labs referred to in the "Application" section of the option of the new guide |
| 1,4 | Gelatin cube cell model |
| 2,2 | Calorimetry to investigate thermal properties of water / methane |
| 2,8 | Yeast/Yoghurt fermentation |
| 2.3, 2.4 | Nutrient tests |
| 4 | Counting frames |
| 5,2 | Simulation of natural selection |
| 6,4 | Peak flow meter |
| 6,4 | Recovery rate |
| 6 | Heat loss modelling |
| 6 | Reaction timer |
| 9 | Shallot onion root growth |