Saint Nathys College

Subject Departmental Plan

Leaving Certificate Agricultural Science

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Subject Aims

- To develop scientific enquiry, curiosity and self-confidence in the student, through laboratory work, class assessment work and independently conducted project work.
- To provide a worthwhile educational experience for all students.
- To develop an appreciation of the significance of the Agricultural Industry to the Irish economy
- To enhance an interest/awareness of Agricultural Science
- To develop an appreciation of the importance of scientific principles and they're application to modern farming techniques and practices.

Subject Objectives

- The students should develop a knowledge and understanding of agricultural science, including practical laboratory skills
- To foster the development of an attitude of curiosity and scientific enquiry within the student.
- To develop an awareness of safe practices in the Laboratory
- The students should develop an understanding of
    - The scientific facts and principles underlying the nature and practices of Agricultural Science.
    - The scientific and management principles of crop and animal production.
    - The general structure, classification and function of plants and animals of agricultural importance.
    - The scientific principles of plant and animal breeding.
- The Syllabus should promote the utilisation of the scientific method in problem solving.
- To promote independent thinking and self directed learning abilities in students through active engagement in their own learning through project work.

Subject Co-ordinator
Mr. J. Guilfoyle

Subject Teachers
Mr. J. Dolan
Mr. J. Guilfoyle

Time Allocation
Five class periods per week in 4th Year and in Leaving Cert. Year.
Six class periods per week if tutor class.

Option Structure
Choice subject. All students would have taken science to Junior Cert. but not necessarily at higher level.

Timetabling
Usually 1 double class in laboratory and three single classes per week.

Grouping of Students
Mixed ability. Higher and Ordinary level students in class together.

Student Access to Subject
After Junior Cert, students are free to choose their senior subjects. All students are given the option of selecting to study Agricultural Science. Advice is available from career guidance and other teachers to assist in the selection process.

Class Organisation
Generally all do higher level in 4th Year, with some opting for Ordinary Level in Leaving Cert Year.

Textbooks and Course Materials

Year	Textbook	Course Materials
Fourth	• Agricultural Science Syllabus • Agricultural science course work guidelines • Leaving Certificate Agricultural Science • John Breen/Brendan Mullen • Pub. By Folens • Exam papers • Marking Schemes • Notes supplied by teacher • Teargas leaflets and handbooks • Agriaware/Farmers Journal supplements and handbooks.	• PowerPoint presentations • Notes copy • Coursework assessment folder for student project • Science equipment for experiment laboratory and fieldwork practical's. • Homework copy
Fifth	• Agricultural Science Syllabus • Agricultural science course work guidelines • Leaving Certificate Agricultural Science • John Breen/Brendan Mullen • Pub. By Folens • Exam papers • Marking Schemes • Notes supplied by teacher • Teagasc leaflets and handbooks • Agriaware/Farmers Journal supplements and handbooks.	• PowerPoint presentations • Notes copy • Coursework assessment folder for student project • Science equipment for experiment laboratory and fieldwork practical's. • Homework Copy • Weed collection

Planning for Students with Special Needs

Any students with problems in relation to dissections are excused.
Individual student problems are dealt with in a case-by-case basis.

Cross Curricular Planning

An effort is made to harmonise the timing of the tuition of certain topics with other subjects.

- Soil science in Geography
- Genetics/Physiology in Biology

Subject Planning for a Culturally Diverse Society

Any students with problems in relation to dissections are excused. Where animal and plant production methods differ, reference is made to the existence of these differing methods (e.g.: kosher, halal etc)
English language can be a problem for some non-nationals and this makes the learning of Agricultural Science more difficult for them. In as far as possible extra English lessons are given to these students.

Effective Teaching Methodologies

Many differing teaching methods and strategies may be explored depending on the topic and class dynamic with the aim being to create an environment of inquiry based cooperative learning.

- Direct instruction with lecture and explanation techniques with particular emphasis on the fundamental concepts
- Animations/DVD/Printouts are used to reinforce ideas
- Group/Paired work
- Investigative practical work – individually and in groups (usually of between 2-4 students).
- PowerPoint presentations on topics
- Animations from agricultural websites
- Use of Agriaware posters and Farmers Journal supplements
- Student DVDs containing notes, PowerPoint presentations, animations and marking schemes as a revision aid.

Range and Variety of Resources

- Agricultural Science syllabus
- Agricultural Science guidelines for coursework assessment
- Agricultural websites, agriaware and teagasc
- Posters

- DVD
- Video clips from various websites etc
- Laboratory equipment and chemicals
- Irish Farmers Journal Supplements

ICT Facilities

As often as possible technology is used to assist in information processing. All rooms are equipped with data projector, 100MB Internet link, laptop and sound system. These facilities are incorporated into tuition where possible.

Provision for Health and Safety requirements

- First Aid boxes in Prep. Room.
- School Science Safety Manual in Prep Room.
- Safety signs around classroom.
- Fire exit doors clearly marked and fire drills carried out yearly.
- Fire extinguishers in science laboratories.
- Eye wash bottles in Prep Room
- Goggles available/used in experiments
- Special bin for "Sharps" (broken glass etc.)
- School Health and Safety Statement in Staffroom
- Laboratory safety rules and specific precautions for particular experiments regularly discussed with students.
- Accident report sheets kept in Office and filled in and filed in the event of an accident.

Curriculum Content

Year 1

Grasslands

- Permanent and temporary leys
- Establishment – soil, seedbed, manuring, seed mixtures
- Management
- Measurement of output of grassland in terms of total weight, dry matter, meat and milk.
- Conservation of grassland products.
- Factors influencing the feeding value of pasture, hay and silage.
- Maintaining fertility.

Forestry

- Species of trees and types of forestry
- Silvicultural sequence
- Shelter belts in relation to farm animals and crops.

Peat Lands

- Formation of peatlands
- Blanket and basin bogs and their uses

Dairy Enterprises

- Common breeds and their general characteristics
- Milk Production- the udder. Yield measurement, milk composition, factors influencing yield and composition, bacteriology in relation to clean milk production. Milk products.
- Breeding principles
- The diary calf- rearing heifers for herd replacements. General study of nutrition, growth, health and housing from birth to at least 12 months.
- The cow in production- feeding standards for maintenance, milk production and reproduction with special reference to winter-feeding and grassland utilisation.
- Buildings- temperature, ventilation, insulation, planning for economy of labour.
- The common diseases- cause, symptoms, prevention and control.

Pig Production

- Nutrition, management, environmental conditions and welfare
- Sow- pregnancy and lactation
- Bonham- birth to weaning
- Pig- weaning to slaughter
- Breeding
- Factors affecting production costs
- Pig housing design
- Regulation of body temperature

Sheep Production

- Common breeds and characteristics
- Breeding principals
- Nutrition, growth and care of lambs from birth to 16 months
- Wool- types, growth, principal features

Beef Production

- Common breeds, general characteristics
- Breeding principles
- The Suckler cow in production- feeding standards, milk production, reproduction, winter-feeding and grassland utilisation.
- The calf- rearing for beef. Nutrition, growth, health and housing from birth to 24 months
- Farm buildings- temperature, ventilation, insulation, economy of labour.
- Regulation of body temperature.
- Growth- bone, muscle and fat deposition in relation to age.
- Composition of muscle and fat.

Portfolio

- Continuous monitoring of portfolio throughout the year.

Year 2

Crops
Cereals, potatoes and Root Crops

Cultivation of one cereal, potato and root crop in order to illustrate the agricultural importance of the following:

- Rotation
- Soil suitability
- Preparation of seed bed
- Nutrition
- Choice of variety
- Seed dressing
- Time, rate and method of seed sowing
- Establishment
- Disease, pests, weed control and health
- Harvesting, yield, storage, food value and final use.

Animal Physiology

- Diversity in animal life. Classification
- Study of one representative from each of the following phyla
  - Protozoa
  - Platyhelminthes
  - Nematoda
  - Annelida
  - Mollusca
  - Arthropoda
  - Chordata
- Classification of parasites studied elsewhere in the course
- Skeleton and muscle- simple anatomical treatment, composition of the bone, the skeleton as a storage organ.
- Circulation: the heart and blood vessels: composition and function of blood
- Respiration: breathing mechanism, respiratory function of the blood.
- Ingestion: structure of the mouth of a ruminant and non ruminant- relevance to feeding habits
- Digestion: study of the digestion system of the ruminant, horse, pig and fowl, the digestive juices, the digestive enzymes.

- Excretion: Structure of kidney and nephron function
- Nervous System and reflex mechanisms: the brain, nerve cells reflexes
- The reproductive system: structure and function
- The endocrine system: simple treatment of the pituitary, thyroid gland, parathyroid, thymus, pancreas, adrenals and gonads.
- Transport and storage: Blood and lymphatic systems, Liver, adipose tissue and skeleton as storage organs.

Plant Anatomy and Physiology

- The Plant cell
- Parts of the Flowering Plants
- The flower and seed production
- Structure of seed- monocot and dicot
- Germination and establishment
- Plant physiology: osmosis, respiration, photosynthesis, transpiration, translocation, food storage
- Test for food constituents
- Essential elements for normal growth
- Principals of classification of plants. Ability to classify plants in at least 6 natural orders

Soils

- Humus
- Local soil surveys
- PH
- Major and minor elements. Fertilisers and liming
- Living organisms and their effects on soil
- Decomposition of organic matter, carbon and nitrogen cycle
- Improving soil fertility

Genetics

- The cell- structure: mitosis: meiosis
- Mendel's Laws
- Sex determination, sex linkage
- Mutations
- Heritable characters and selection for breeding
- Propagation of plants by vegetative means

Portfolio

- Continuous monitoring of portfolio throughout the year.

Homework Procedures

Written homework given each night along with work to revise/learn.
Homework is written into students' homework journals. Homework monitored and feedback given to parents via journal e.g. comments written by teacher into journal if homework not done – to be signed by parents.
Examination papers are introduced in the first year of the course and are used for homework.

Assessment Procedures

Coursework
Marks will be awarded on the work of the candidate based on material and marking scheme set out in the department guidelines. Monitoring of coursework is on going.

- Identification of the plant and animal types associated with agriculture
- Practical experiences with crops, livestock, house and farmyard layouts.
- Investigations carried out relating to ecology, soil science, animal physiology, plant physiology, genetics and microbiology.

Examinations
Class tests given at teacher's discretion.
Formal tests:
4th Year: Tests at Christmas, Easter, and Summer. Christmas report has two results: one for midterm (Oct.) and one for Christmas. Summer report has two results: one for Easter and one for summer. 20% of summer mark in 4th Year given to laboratory notebook (practical work).
5th Year: Tests at Christmas and Leaving Cert mock exam in February/March. Report sent home at Christmas has result for midterm (Oct) and Christmas. Report sent home after Easter with Leaving Cert mock results.

Record Keeping Procedures

Daily attendance is recorded in the teachers' diary. All test results are recorded in teachers' diary. All incidents of no homework are recorded in the teachers' diary.

Reporting Procedures:

Minor problems are recorded in the students' diary. More serious misdemeanours or consistent transgressions may warrant a report sheet. Such serious problems are reported first to the class tutor. This information is then reported to the year head and then to Vice Principal and finally to the Principal.

Teacher In-Career Development

Name	Date	Topic
Mr. J. Dolan		
Mr J. Guilfoyle		

DES Subject Department Inspection