

Agriculture Science

Leaving Certificate

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ONLINE GRINDS

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Subject : Agriculture Science

Teacher : Ms. Harrahill

LESSON 1

Intro and Farm Safety

Overview of MainTopics Covered

The Structure of the Course

Assessment Component	Percentage
► Written ► Short answer questions ► Structured questions ► Synoptic qustion	75
► Coursework ► Individual investigative study	25

1. Written Componen

a. **Short questions**: these address core topics across the entire specification. The short questions are made up of both multiple choice and short answer questions and focus on concepts and skills.

b. **Structured questions**: each structured question will be drawn from one area of the specification; each structured question may include a variety of scientific ideas in the context of one agricultural science topic.

c. **Synoptic questions**: these questions will require students to collate knowledge across a number of agricultural science topics. The questions are based on a context but draw from across different areas of the



2. Portfolio of Specified Practical Activities

You will write up these experiments into a copy.
No marks are awarded for these but the experiments come up in the paper and the skills developed are transferred to your IIS (Individual Investigative Study)

Topics for these experiments are:

Soil Science

Plant Growth

Milk Quality

Plant and Animal Health





3. Individual Investigative Study = 25%

A topic of agricultural significance is investigated in greater depth (will be based on a thematic brief which is set by the State Examinations Commission)

The title changes every year.

2021: *Improving Sustainability in Irish Agriculture*

2022: *Supporting conservation of the environment through Irish Agricultural practice*

2023: Exploring nutrition and nutrients - the importance to Irish Agriculture of their effective use and management

You must use this theme to develop a research question, devise experimental investigations and research existing information in relation to this theme.

Layout of the Exam

2 Hours and 30 Minutes – 300 Marks

Section A – 100 Marks – 50 Minutes

Answer 10 questions (10 marks each) – there is internal choice in two These questions tend to be short and structured

Soil can become compacted over time due to both animal and machinery traffic, resulting in poor drainga. A framer collected and sent soil samples testing. The laboratory carried out tests comparing the capillarity and infliltration rate of a compacted soil and an un-compacted soil.



a. State a possible hypothesis and prediction for this investigation.

Hypothesis:
Prediction:

b. Suggest one suitable variable for this investigation.

c. Describe briefly how the inflitration rate of both the comacted and un-compacted soil was determined by the laboratory.

Section B – 200 Marks – 100 minutes

Answer any 4 questions out of 5 ***(50 marks each)***
These questions are more synoptic in nature and require analysis and informed opinion

(a) The rhizosphere is an important biological characteristic of soil.

i. Describe the rhizosphere.

ii. Explain the importance of the rhizosphere to the root system of a plant.

(b) Nitrogen gas(N2) is the most abundant element in our planet's atmosphere. The nitrogen cycle ahs symbiotic relationship in its biochemical process.

i. Define the underlined term.

ii. The presence of deniterifying bacteria can be an idication of poor quality soil.
Suggest a tecnique farmers could carry out to improve the quality of the soil.

iii. Sketch a labelled diagram to illustrate the nitrogen cycle.

Learning Intentions

We will learn to

✓ Identify health and safety hazards associated with agricultural practices and discuss controls and precautions necessary to prevent accidents, injury and ill health

✓ Discuss the health and safety considerations of using agricultural machinery and equipment

✓ Recognise the need for safe work practices in all agricultural activities.





What is the difference between a hazard and an risk?



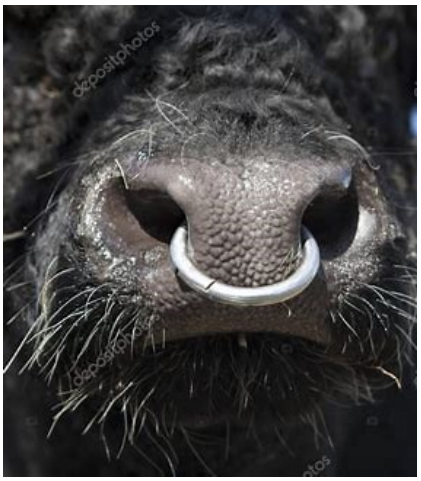
Hazard – anything that can cause harm e.g. – a chemical, electricity.

Risk – how great a chance that someone will be harmed by the hazard.

Think of any day-to-day activities where you assess risks before taking action.





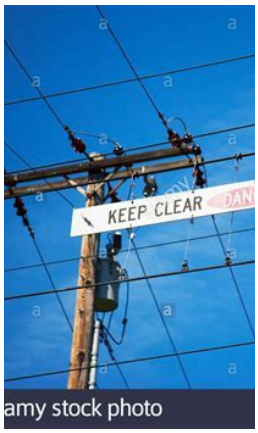




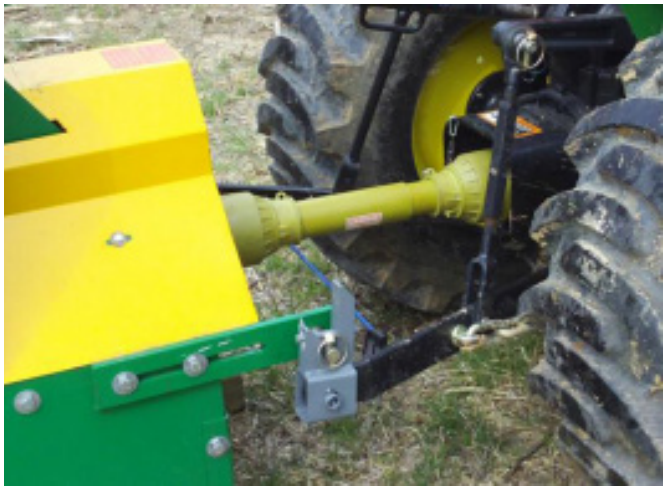












Slurry = FAECES and URINE

Risk = Drowning and Gas Poisoning



Gas = Odourless and flammable
4 main gases present:

1. Carbon Dioxide
2. Ammonia
3. Methane
4. Hydrogen Sulfide (Most dangerous – like rotten eggs)



CONTROL:

- Always cover slurry pit
- Agitate on windy day with good ventilation
- Agitate with someone else

Corner off houses so no one can enter

Tractor

Risk	Control
Being struck, crushed, pinned, thrown or falling from tractor	◎ Know how to operate tractor safely and have appropriate license and insurance ◎ Don't drive with speed and never carry passengers unless seat fitted ◎ Ensure engine stop control and brakes are working ◎ Ensure PTO guard in place and that PTO can be turned on and off ◎ Don't leave the tractor while its running ◎ Avoid steep slopes ◎ NEVER stand in crush zone



Risk		Control
Being struck, crushed, pinned, thrown or falling from tractor	Driver lack of experience, overturning and crashing	⊙ Protective equipment and a helmet should be worn ⊙ Appropriate training and don't allow under 14s ⊙ Keep it well maintained
Bales	Crushed/rolled over by bale, fall from tractor, crushed by handling equipment	⊙ Chose location for safe stacking and removal with level and hard surface ⊙ Keep away from overhead power lines ⊙ Round bales stored on flat end, one bale high ⊙ If stacked place on curved side in pyramid shape, max 3 bales high
Livestock	Being trampled/ crushed	⊙ Always have escape route planned ⊙ Work in pairs ⊙ Use crush for dosing
Falls and Collapsing Buildings	Falling from roof/ ladder/bales, collapsing walls and falling objects	⊙ Ask someone to foot a ladder and secure the top of the ladder to part of the building. ⊙ If extensive work has to be done at height, use scaffolding/ mobile operated platform ⊙ Check for overhead electrical wires
Silage Pit	Tractor overturning Suffocating	⊙ Never overfill ⊙ Machinery operators trained ⊙ Never go underneath silage cover once in place (oxygen is used up quickly) ⊙ Designed in accordance with DAFM (Department if Agriculture Food and the Marine)
Agrochemicals = Pesticides, Herbicides and Fertilisers	Skin and Eye irritation Sickness/death if consumed	⊙ The handling, storage, application and disposal of chemicals should be carried out by a competent person. Pesticide should be applied in such a way as to avoid drift, run-off and volatilisation. ⊙ Chemicals must be stored in dry, well ventilated area that cant combust and warning sign should be placed at entrance to store

Keyword:
Agrochemical – a chemical used in agriculture e.g. pesticide, herbicide or fertilizer. They are used on a daily basis on the farm.

Vital that they are stored and kept correctly.

In a secure, dry and well ventilated area.



Important Definitions

Volatilisation-Evaporation of a substance into a gas

Drift-Unintentional movement of a pesticide from an area of application to any unintended site. Can cause accidental exposure to people, plants and animals

Pesticide run off-Caused by rain washing the pesticide off plants and carrying into streams, drains and rivers or washing it through the soil into the groundwater. Pesticide run-off contributes to water pollution

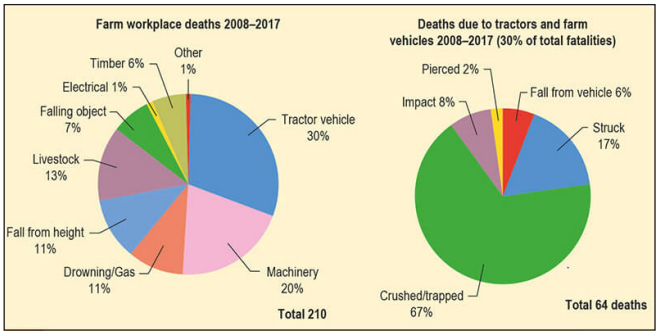
Analysis of graphs – Typical Question

Questions:

What percentage of farm deaths were tractor and vehicle related?

What was one of the lowest percentage of deaths due to farm accidents?

What was the highest risk of death due to farm vehicles?



Farming as an occupation:

According to the Health and Safety Authority farming is one of the most dangerous occupations in Ireland.

Over a third of work place accidents happen on the farm.

Main causes:

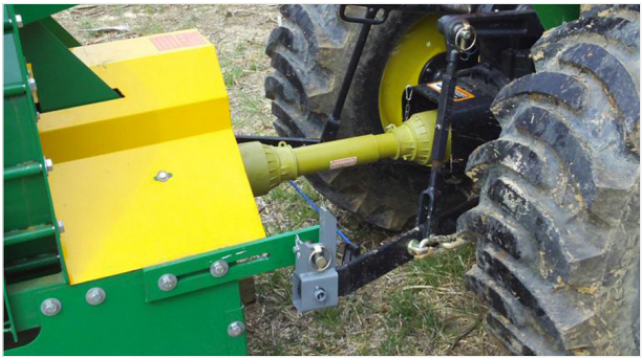
Vehicles and machinery

In the last 10 years they account for 50% of farm fatalities. Children and elderly farmers (>65) are most at risk.

HEALTH AND SAFETY AUTHORITY

Types of accidents with Machinery

Crushing
Struck with machinery
Pinned under vehicle
Falling from vehicle
Crushing between vehicles
PTO (Power Take-off) mechanism
Caught under a machine part.



Activity 1.1

Based on your knowledge of farm safety, name 5 hazards and risks on farms and think of a way that you can prevent each from causing harm

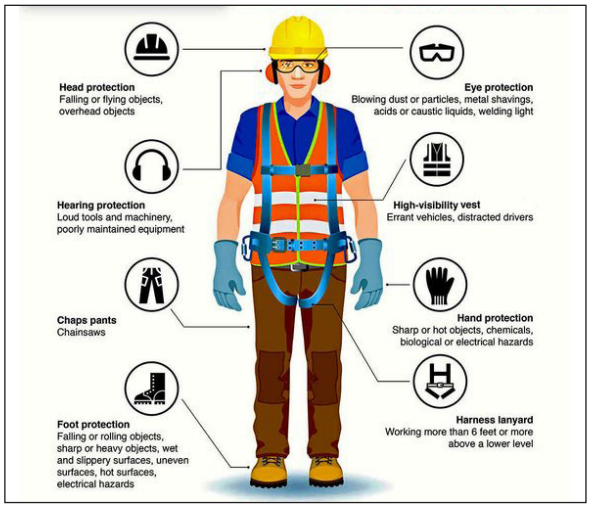
Hazards	Risks	How can I prevent harm?

Fuels/Oils/Paints

Wear PPE
Avoid spraying
Good ventilation

Acids and Bases

Wear PPE



Vetinary Medicines

Proper handling and administration facilities for injections

Use needle guards

Wear PPE



What has been implemented to try and protect farmers?

2005 –Safety, Health and Welfare Act (All farmers must prepare and implement a safety statement). This contains a **safety policy** and a **risk assessment**.

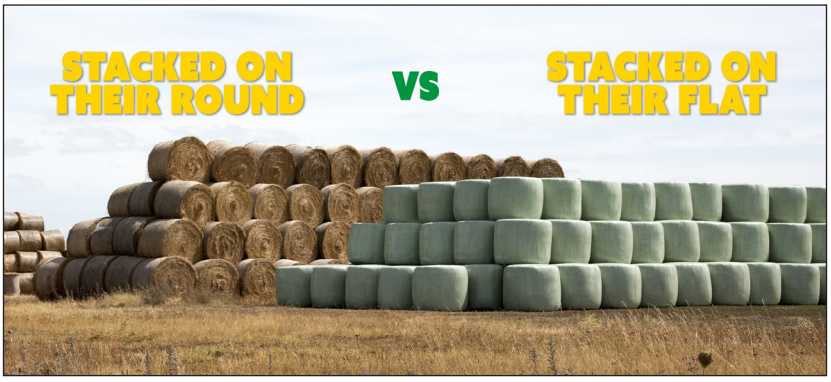
Risk assessment is central to all work activities. It involves the following four steps:

1. Identification of hazards
2. Assessment of the risk
3. Identification and implementation of controls
4. Regular review and update of the hazards and rish assessment.

Do you know?



Which of these is correct?



What is this and how is it dangerous?









Do you know what these symbols mean?



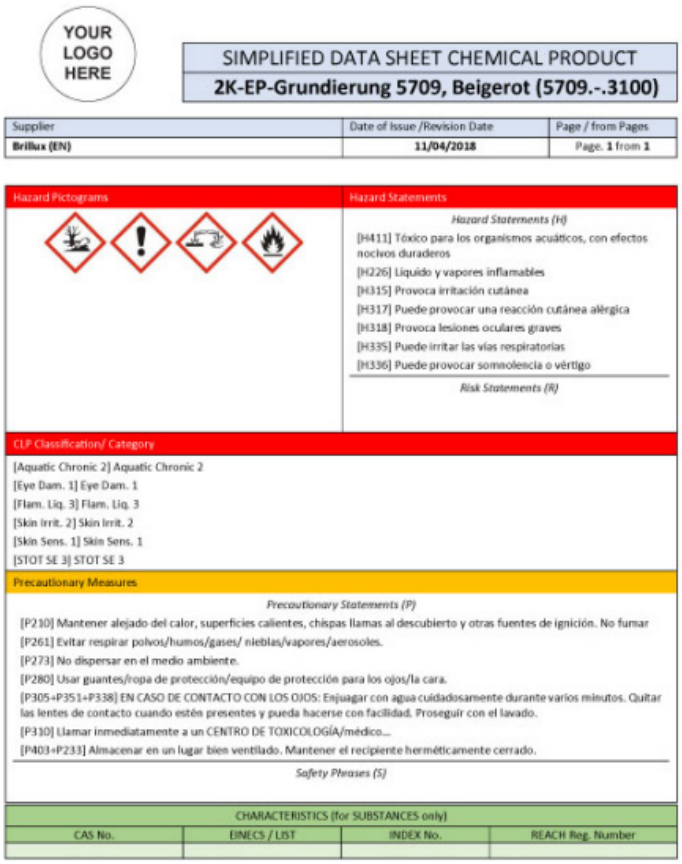
Symbols and Safety





Safety Data Sheet (SDS)

A sheet that provides information on chemicals describing hazards, handling, storage and disposal of the chemical, as well as emergency measures in case of an accident.



YOUR LOGO HERE

SIMPLIFIED DATA SHEET CHEMICAL PRODUCT

2K-EP-Grundierung 5709, Beigerot (5709.-.3100)

Supplier	Date of Issue /Revision Date	Page / from Pages
Brillux (EN)	**11/04/2018**	Page. **1** from **1**

Hazard Pictograms

Hazard Statements

Hazard Statements (H)

[H411] Tóxico para los organismos acuáticos, con efectos nocivos duraderos
[H226] Líquido y vapores inflamables
[H315] Provoca irritación cutánea
[H317] Puede provocar una reacción cutánea alérgica
[H318] Provoca lesiones oculares graves
[H335] Puede irritar las vías respiratorias
[H336] Puede provocar somnolencia o vértigo

Risk Statements (R)

CLP Classification/ Category

[Aquatic Chronic 2] Aquatic Chronic 2
[Eye Dam. 1] Eye Dam. 1
[Flam. Liq. 3] Flam. Liq. 3
[Skin Irrit. 2] Skin Irrit. 2
[Skin Sens. 1] Skin Sens. 1
[STOT SE 3] STOT SE 3

Precautionary Measures

Precautionary Statements (P)

[P210] Mantener alejado del calor, superficies calientes, chispas llamas al descubierto y otras fuentes de ignición. No fumar
[P261] Evitar respirar polvos/humos/gases/ nieblas/vapores/aerosoles.
[P273] No dispersar en el medio ambiente.
[P280] Usar guantes/ropa de protección/equipo de protección para los ojos/la cara.
[P305+P351+P338] EN CASO DE CONTACTO CON LOS OJOS: Enjuagar con agua cuidadosamente durante varios minutos. Quitar las lentes de contacto cuando estén presentes y pueda hacerse con facilidad. Proseguir con el lavado.
[P310] Llamar inmediatamente a un CENTRO DE TOXICOLOGÍA/médico...
[P403+P233] Almacenar en un lugar bien ventilado. Mantener el recipiente herméticamente cerrado.

Safety Phrases (S)

CHARACTERISTICS (for SUBSTANCES only)

CAS No.	EINECS / LIST	INDEX No.	REACH Reg. Number

WARNING
This document contains some data of the Safety Data Sheet, which remains the official source of information.
This document does NOT replace the Safety Data Sheet.







Activity 1.2

Name the following safety symbols:



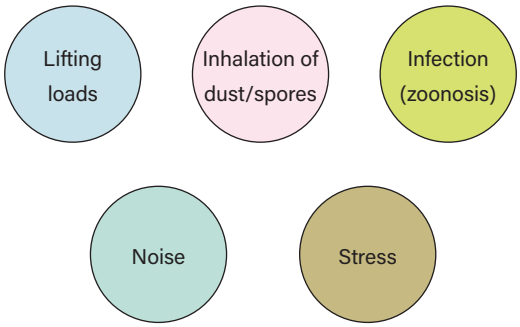








Ill Health in Farmers



>50kg must have at least 2 people
Use front loader

Break down load to smaller size
Calving jack

Improve farm layout to have mobile storage units
Meal bin instead of meal bags



Power Take Off (PTO) Drive Shaft

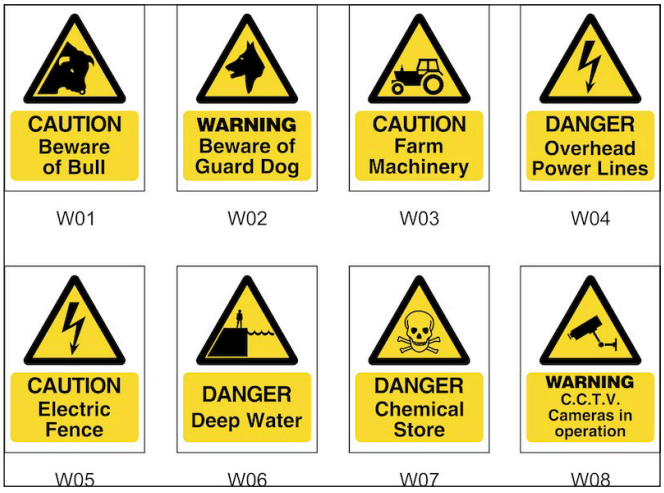


PTO shafts are a source of power for many machines that are attached to a tractor and powered by the tractor's engine

PTOs rotate at 1000rpm and if ungarded can cause serious injury or death

Avoid wearing loose clothing and jewellery and tie back long hair

Must be made visible to all visiting personnel
Emergency routes and exits
Working at height danger area
Risk of falling objects
Area of excessive noise (>85dBA)
Bull present







Safety when visiting a farm

Keep away from machines in operation	Stay clear of any stacked baled	Give animals lots od space
If working ensure that you COMPLETELY understand all instruction given	You must be 14 to operate a tractor on a farm but 16 to drive on public road	Wear PPE
Wash hands regularly after dealing with chemicals and animals	Pay attention to warning signs	Report unsafe practices

Safe work practice in agricultural activities.

Signage

Emergency routes and exits marked

Bull in field

Risk of falling objects

Area of excessive noise (>85 dBA) = Decibel: noise levels are measures in dBA, considering the ears response to sound.



Link to Animal Management

Use a CATTLE CRUSH

- Gates squeeze the animal from the sides, CANT MOVE
- A sliding entrance gate, operated from the side of the crush, is set a few feet behind the captured animal to allow for clearance and prevent other animals entering.



Homework

PTO stands for?

What does SDS stand for?

What measures could be taken to reduce the risk of children accidently drowning in a slurry pit or water source.

How should chemicals be stored?

Who is most at risk on farms and why?

(a) The following is an example of a farm safety notice displayed at the entrance to a farm.



(i) State the meaning of symbols **A** and **B** on the sign.

A:
B:

Learning Intentions Revisited

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