

## Objective

Learn about the various types of farm machinery and equipment that are commonly used on a farm and how the farmer must be responsible and safe when using tractors, quad bikes and Power Take Off, (PTO) equipment.

We will also take a look at the history of farm machinery and why 'horse power' is still in use today.

### Curriculum links:

- **Science** Energy and forces  
Environmental awareness and care
- **Geography** Human environments  
Natural environments
- **SPHE** Myself  
Myself and the wider world

**Keywords:** trapped drawbar ignition handbrake loaders trailers Power Take Off ATV Blind spot

**Resources:** Lesson Plans | Spot the Dangers | Webinars | Useful Links webpage | Dig In!

## Topic 1: MACHINES USED BACK IN TIME

### Horse Power

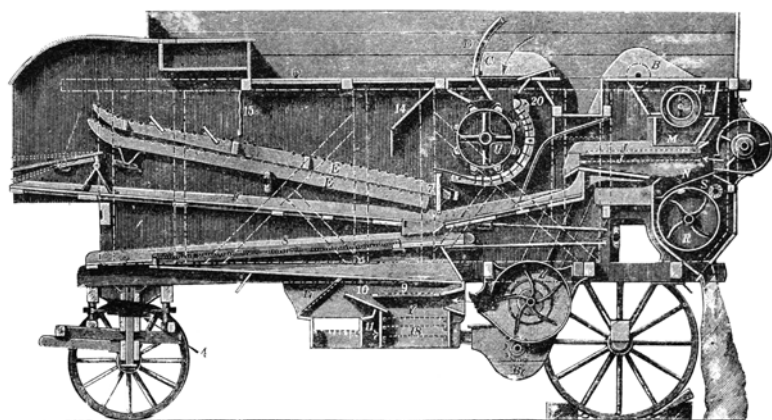
In olden times before mechanised machines, horses were used to 'power' the various tools. Which is why today we still talk about the speed of a tractor as its 'horse power'.

Trailers, ploughs (pictured) and the earliest combine harvesters were horse drawn.

Horses were also used to transport the farmer and their family, farm produce such as milk and eggs and to clear areas of the farm of scrub and overgrowth.

It would be a huge status symbol to own a horse and much of the time neighbouring farmings shared their horses, this practice was known as 'Comhar', the Irish for partnership.

Over time as mechanisation came about and the safety of tractors improved, the use of horses began to decline from the mid 1940's and throughout the end of the 20th century.



**Threshing** is the process of removing the grain from the stalk. With horses to feed, more grain was needed. The early threshing machines were horse powered with the stalks hand fed. From the late 1800's steam powered machines became more available and rapidly replaced this once very laborious task. Steam threshers were a commonly used up to time when combustion engine tractors became more common place and combine harvesters became available. But steam engines revolutionised agriculture and inspired a young Henry Ford in later life to design and manufacture automobiles.

### Safety concerns

Where safety around horses and avoiding a kick, a bite or been trodden on considered the key dangers, the introduction of machinery gave way to a new wave of safety concerns. Entanglements in machinery became a new problem. Ask the class to talk about what kind of dangers may have been on farms in these olden times.

## Topic 2: MACHINES FARMERS USE III

### Getting Started

Ask the class to name different types of farm machinery and what each piece of machinery does on the farm. Use the below grid as a prompt guide. Write the answers on the board. If the following are mentioned underline them:

**Tractors - Combines - Trailers - Quad Bikes (ATV's) - Power Take Off (PTO).**

If they are not mentioned add them as we will be discussing these in greater detail below.

Ask the children if the machinery they mention are:

1. Vehicles: ie. driven by the farmer
2. Machinery: ie. powered by a tractor

## Farm Machinery & Vehicles

### Tractor - Vehicle

Used on farms to pull equipment such as ploughs, harrows, slurry agitators, etc.



### Plough

Digs up the earth to loosen the soil or before the farmer sows the next crop in their field.



### Trailer

Normally pulled by a tractor and used to carry a variety of products around the farm, such as grain and food crops.



### Combine Harvester - Vehicle

Cuts and harvests grain and cereal crops.



### Slurry/Muck Spreader

Spreads slurry across the farmer's fields.



### Cultivator/Tiller

Used after ploughing to break down the soil and prepare it for sowing seed.



### Slurry Agitator

A slurry agitator is used to mix (agitate) slurry which is kept in the slurry tank/pit.



### Mower

Cuts grass when making hay, silage, haylage. Can also be used to keep fields tidy.



### Topper

Used to keep fields tidy by cutting weeds and long grasses, rushes, etc.



### Sprayer

Sprays pesticides on crops to keep them healthy.



### Diet Feeder

A diet feeder weighs, mixes and shares out animal feed. Mostly used for cattle feeding and in particular dairy cattle.



### Quad Bike - Vehicle

4 wheel motorised bike used to drive across fields. They are **NOT** suitable for passengers and safety equipment must be worn.





### Hay Turner

When grass has been cut, the turner is used to turn the grass so it can dry in the sun and be baled for hay.



### Baler

Used to bale hay and straw. Bales can be round, small rectangle or larger rectangle.



### Sower

Used to sow crop seeds such as barley, oats and wheat.



### Gator - Vehicle

Gators are an off-road vehicle used on farms and many industries where all-terrain ability and versatility is required. Designed to help property owners haul material and travel across terrain ranging from smooth to very rough.

## TRACTORS

### Tractor Brands

John Deere New  
Holland Massey  
Ferguson Deutz  
McCormick Fendt  
Claas  
Ford  
Case  
David Brown  
Landini  
Zetor  
Fiat  
Valtra International

### Topic 3: TRACTOR RULES III

Tractors are essential on the farm and they are the most useful machine that farmers use to carry out many of the jobs they do each day.

Farmers use tractors to pull trailers, to spread fertiliser on fields and to check their animals. Tractors are big, powerful machines and is important the farmer makes sure that children do not go near them. Farmers must drive at a safe speed around the farm and be on the lookout for children and adults or anything unexpected.

### Tractor Blind Spots – *You cannot be seen*

Visibility can be limited for farmers when sitting high up in tractors, diggers, combine harvesters, etc. Never play near a tractor or any other type of farm machinery as you may not be visible.

Look at the pictures below and note where the blind spots are located.



## The Blind spots - What the farmer sees!



## WHAT AGE ARE YOU?

**Under 7 Years:** You are not permitted in Ireland to be a passenger in a tractor\*.

**7 years:** The age you are permitted in Ireland to be a passenger in a tractor as long as there is a passenger seat and seat belt.

**14 years:** You may drive a tractor on the farm only and only after completing a tractor safety training course.

**16 years:** You may drive a tractor on the road but only after completing a tractor safety training course.

*\* In Northern Ireland the permitted age is 13*

## WHAT TO WEAR

### Seat belts – The Safety Zone



Most tractor cabs have Roll Over Protective Systems (ROPS) in place. These ROPS create a 'Safety Zone' inside the tractor cab. By wearing their seat belt farmers are kept inside the 'Safety Zone' and have greater protection from being thrown from the tractor cab in the event the tractor over turns.

Remind the children about why they wear a seat belt in a car?

What else should the farmer wear A Hi Vis vest of course. Why is this useful?

## S.T.O.P.I.T.

Also known as the 'Safe Stop', these set of important steps reminds farmers about how to correctly stop and park their tractor after a long day's work. AgriKids has created this handy acronym to make it easier to remember the Safe Stop.

**S** Stop the tractor in a **S**afe place. Park the tractor facing forward so it can be driven forward & not reversed.

**T** Take up the hand break and prevent the tractor from rolling.

**O** Take the tractor **O**ut of gear and feet **O**ff the pedals

**P** Put the bucket, loader or fork down. If left up & hydraulics fail, it could fall!

**I** Turn off the **I**gnition

**T** Take out the keys.

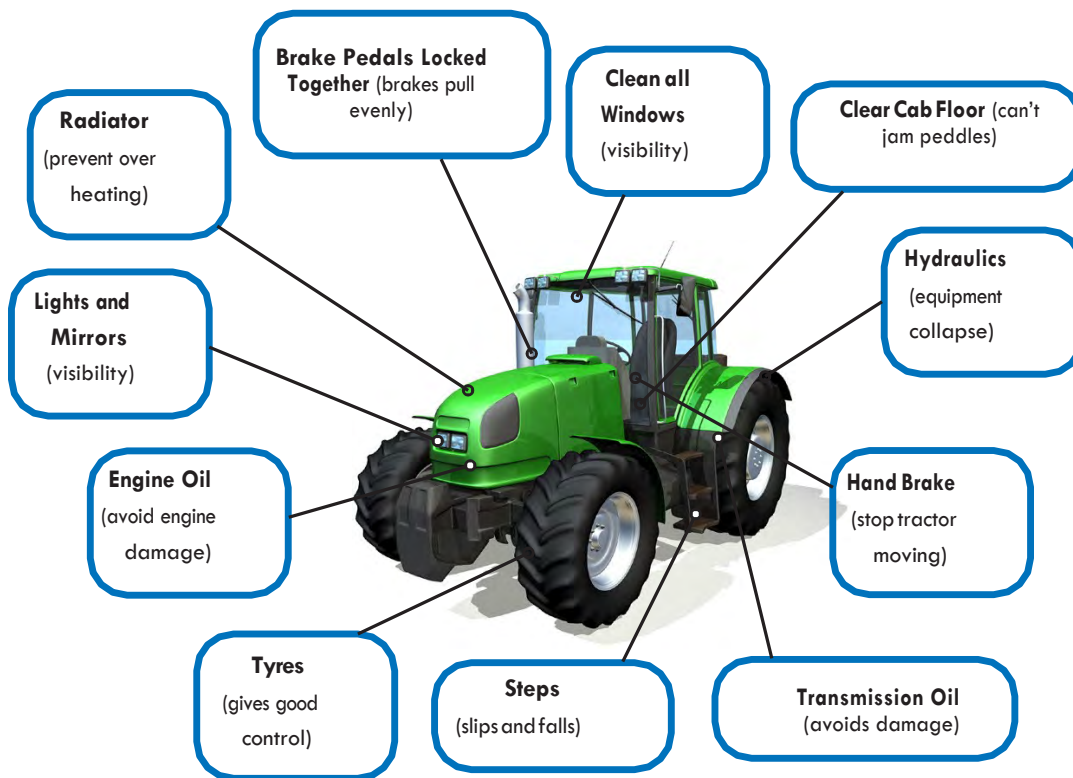
Leaving keys in the tractor means the farmers is at risk of it being stolen or driven by someone with no permission to do so.





## Topic 4: TRACTOR CHECKLIST

Ahead of busy times on the farm, the farmer must ensure their machinery, equipment and vehicles are in proper working order. Carrying out the below checklist on their tractor means they are preventing bigger problems which could pose a danger. Checking their tractor inside & out is a very important job for the farmer.



### Inside

Cab floor - no litter that might roll & jam under pedals  
Brakes /Pedals - held together to prevent swerving  
Windows and Mirrors- clean and in place  
Engine Oil - replaced if needed & topped up  
Fuel - topped up  
Transmission Oil - protects engine & gears  
Radiator - working to prevent over heating

### Outside

Lights - working and clean  
Tyres - pumped & deep thread  
Windows and Mirrors - clean and in place  
Steps - clean to prevent slips  
Hand brake - working and engaged when exiting tractor  
Hydraulics - keep equipment in place, eg. loader

**Discuss what might happend if these checks did not take place!**

## Topic 5: PTO SAFETY I

Power Take Off (PTO), transfers the power from a running tractor engine to power an implement attached to the tractor. Eg. A slurry spreader, a mower or a hay turner.

As the PTO can rotate between 9 & 16 times per second farmers must be careful to keep clear so as not to get entangled in the moving shaft.

Therefore all PTO's should be covered with a guard and safety chains.

Play a video in class of a PTO demonstration to see just how fast and how dangerous these implements can be.



**Danger of entanglement**



## Topic 6: MACHINERY FOCUS

### Combine harvesters

**Harvesting** is a very busy time for the farmer and it is important that you stay a safe distance from machinery when they are being used. The farmer may have sown wheat, oats, barley or corn. When it is time to harvest crops, the farmer uses a machine called a combine harvester. Combine harvesters can be very dangerous machines to be around on the farm. They have large blades and cutting tools which you could get trapped in if you do not stay away from the machine. The front part of the combine, the header, pulls the plants into a bar that cuts them off. The combine then removes the grain from the stem and leaves. The grain is stored in a hopper on the combine. The stems and leaves are thrown back out on the ground. When the hopper on the combine is full, the grain is unloaded into a trailer and the farmer takes it away to a storage area on the farm until the entire field has been harvested and the farmer is ready to sell it or feed it to his or her animals.



### Trailers and loaders

**Trailers** and **loaders** are used for the transportation of goods, animals or other machines on and off the farm. You should never ride on the draw bar of a trailer or on the trailer or loader itself, as this is very dangerous. Stay out of the farmer's way when he/she is loading animals or machinery onto trailers. When on the farm, do not stand where the farmer cannot see you.

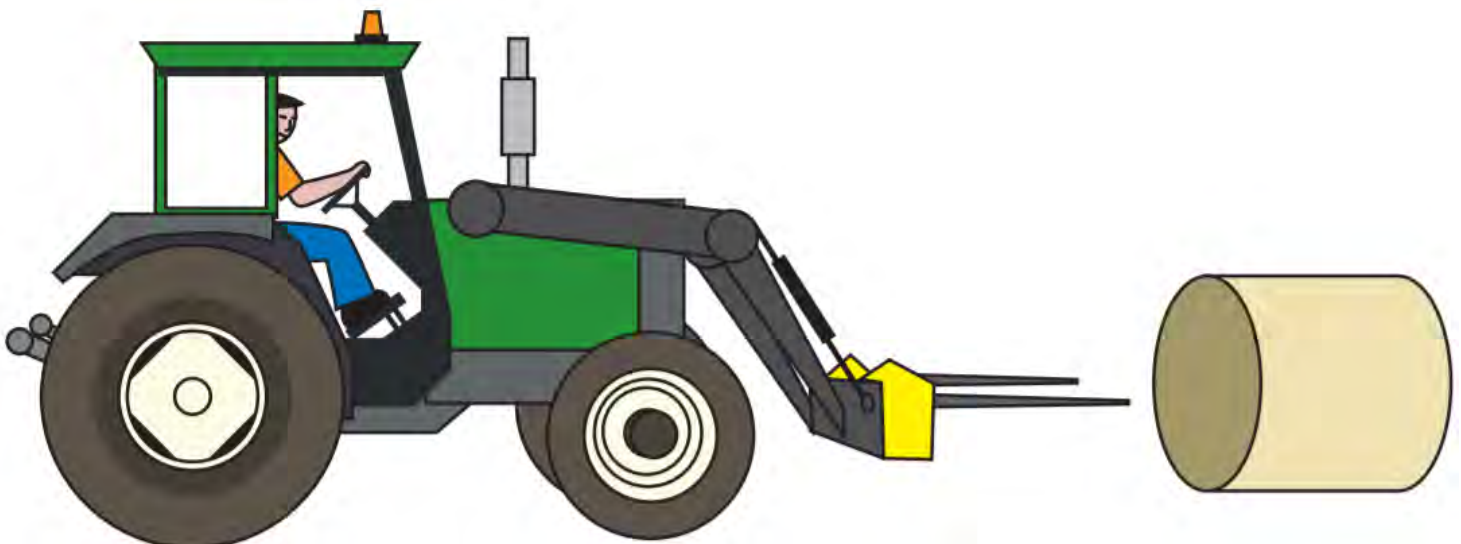
**REMEMBER the Blind spots:** When on the farm, do not stand where the farmer cannot see you.

### Stay away from dangerous machines

Most serious accidents involve tractors and farm machinery.

Machines are dangerous and there are many different types of machines to be found on a farm. These machines are used for many different jobs, with some machines having sharp blades and spikes which can cause injury if not used carefully.

Accidents can happen easily because they are often very noisy and the person using them may not know that there are people close by.



## Topic 7: QUAD BIKES II

A quad bike is also known as an All-Terrain Vehicle (ATV). When it comes to safety, we always say to: Remember your ATV'S!

**A Age:** Are you old enough to use a quad bike? To use quad bikes typical to farms you must be 16+.

**T Training:** New rules coming into operation will make it mandatory for all quad bike users to be trained before using a quad. Courses of a QQI standard.

**V Visual Inspections:** Like their tractor, farmers should check their quad is not damaged, has oil, lights, good tyres and fuel.

**S Safety equipment:** Farmers must make sure they are wearing the correct clothing and PPE (Personal Protective Equipment) when using their quad bike. See below:

- Head protection, eg. proper quad helmet with approved safety standards.
- Clothing which is strong and covers arms and legs.
- Gloves for protection and to keep hands warm in cold weather & for good control.
- Boots or wellingtons which are strong and have offer good grip.
- Goggles / helmet visor to protect eyes from insects and branches.
- Sunglasses to shield eyes from the sun.



*No passengers are permitted on a quad bike!*



*Farmers must wear PPE when using a quad bike*

### Suggested activities

- Try the Lesson Plans for this module.
- Discuss the differences between tractors of today and in olden times.
- Discuss the different types of machinery found on the farm. Why do they differ from job to job and used at different times of the year?
- Divide class into groups of three or four and get them to come up with ways to stay safe on the farm
- During computer time, get pupils to investigate photographs of old farm machinery and discuss how it has changed and evolved through the ages
- Create an acrostic poem about the 'TRACTOR'
- Split the class into groups of four and get them to create a drama on staying safe on the farm. When one group performs their drama piece, ask the other group how these accidents could have been prevented
- Discuss other types of machinery found on the farm and how they too could be dangerous
- Watch Agri Aware's 'Once Upon a Farm' and discuss the potential dangers associated with the farm machinery scene

An initiative by: