

AgriKids Farm Safety Ambassador

Theme 2: Tractor & Machinery Safety

Level: 5th – 6th Class

Objective

Learn about the various types of farm machinery and equipment that are commonly used on a farm and how and why a farmer must be responsible and safe when using tractors, quad bikes and Power Take Off, (P.T.O.), equipment. We also learn how we can help remind farmers by learning key safety tips which can be shared.

Learning outcome topics

1. What kind of machines do farmers use.
2. How tractors changed over time.
3. Where are the tractor blind spots?
4. Learn the tractor safety checklist.
5. What is S.T.O.P.I.T?
6. Quad bike rules
7. What are PTO's and how are they used?

Topics

1. What machines the farmers use.

Ask the class how many different types of farm machinery they can list. Do they know what each piece of machinery does? You can use the below table as a prompt guide.

Write their answers on the board. If the following are mentioned underline them:

Tractors, Quad Bikes, Power Take Off (P.T.O.).

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



Where do they use them?

Do they know the difference between a farm vehicle and machine (equipment used by the farmer).

1. Vehicles – ie. driven by the farmer
2. Machinery – ie. powered or pulled by a tractor
3. Where on a farm these vehicles or machines will be mostly used. Some might be used in more than one location.
4. Do they know at what times of the year these machines are needed?

If there are pupils in your class with access to a farm this is a great opportunity for them to tell their classmates about life on their farm and the machines used.

Farm Machinery

Tractors – Vehicles

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



Combine Harvester – Vehicles

Plough

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



Slurry / Muck spreader

Trailers

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



Cultivator / Tillers

Cuts and harvests grain and cereal crops.



Spreads slurry across the farmer's fields



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.



Mowers

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 fertilisers or 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- Vehicles

4 wheel motorised bike used to drive across fields. They are only 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.



2. Tractors – how they changed over time.

How many brands of tractors can the class name? Here is a list to help the discussion.

Have we missed any?

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

Why do we measure tractor speed in horsepower?

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 farms shared their horses, this practice was known as 'Comhar', the Irish for partnership.

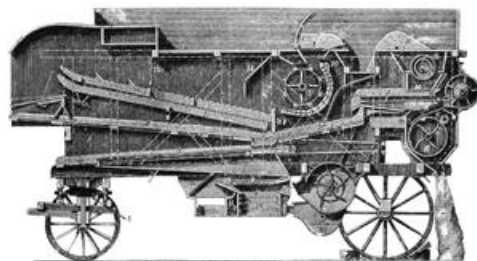


Over time as mechanisation came about and the safety of tractors improved, the use of horses began to decline from the mid 1940's and throughout the end of the 20th century.

What came after the horse?

From the 1700's, steam was quickly evolving as a major player in power and transportation. Steam powered engines were pumping water from mines, travelling across railways and waterways.

In agriculture it's presence was felt with the arrival of the steam thresher. Threshing is the process of removing the grain from the stalk. With horses to feed, grain was always 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 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.

Pictured: Early steam thresher and trailers of grain bundles awaiting threshing.



The evolution of tractors

1940's - At the end of WWII, tractor technology was emerging as safer and the more efficient way to farm. Largely with thanks to Harry Ferguson (picture), who previously working for Ford honed his skills to bring about the Massey Ferguson. It was about 20HP



1950's - Some of the earliest mechanised combine harvesters were in use in Ireland. (*Harvester dating back to the 1950's pictured on a farm in Co. Kildare*)

1980's - Tractors such as the 'International' were common on Irish farms and at 50HP were seen as very fast machines.



2000s - Nowadays our tractors are bigger, on average 5 times faster and more efficient in getting the job done. However at this scale the potential for accident is also high.

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. Also early tractors provided no cab and therefore no roll over protective system (ROPS), see pictures. Having roll over bars created a 'survivable space' in the event of a tractor roll over.



Ask the class to talk about what kind of dangers may have been on farms in these olden times



3. Tractor Safety

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 his/her animals.

Tractors are big, powerful machines and the farmer's job is to make sure that children do not go near them. Farmers drive at a safe speed around the farm and are always on the lookout for children and adults.

It is important to always know the key rules to tractor safety. The age you are permitted to be a passenger and drive, wearing seat belts as well as knowing the correct sequence farmers should follow when parking their tractors will ensure that tractor and machinery safety rates will improve.

Blind spots – You cannot be seen

Visibility can be limited for farmers when sitting high up in tractors, combine harvesters, etc. Never play near a moving 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.



Above is how you will see a tractor from the ground. In the pictures below is what the farmer can see from their tractor! Ask the class about the differences.



Tractor Checklist

Ahead of busy times when they will be relying on their tractors to get the job done, farmers must take extra care of their tractor. As a class discuss what the fallout would be in the event some of the below checks did not happen. Discuss how prevention and forward planning can assist in doing a better job, a safer job and a more efficient job.

All farmers should check the following before using their tractor.

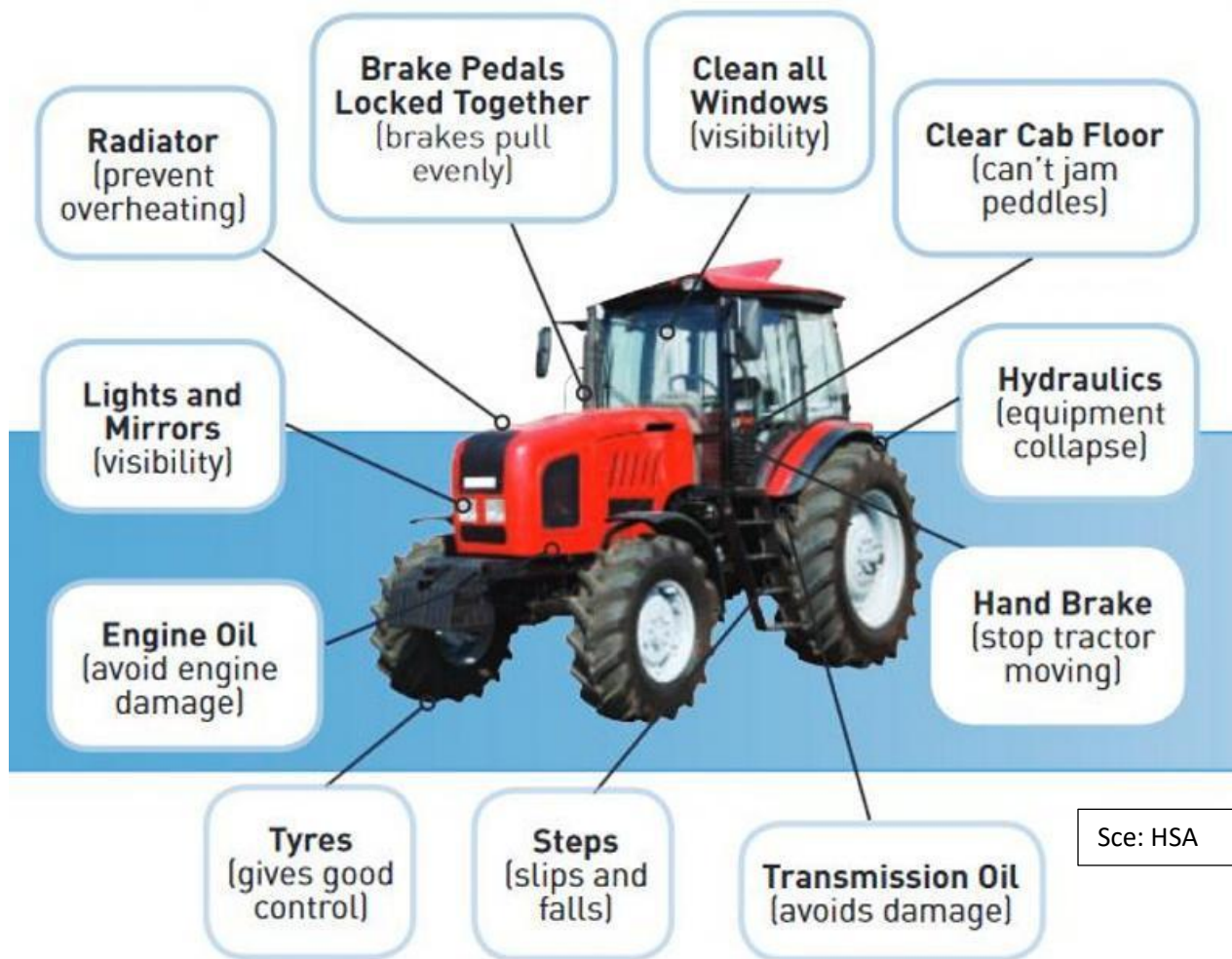
Create a list on the board labelled: Inside and Outside the tractor. These refer to those areas of a tractor and their location which a farmer will need to check. See how many areas the class the name and if they know what kind of 'checks' the farmer should be looking for and why. The graphics on the next page will assist the discussion.

Inside

Cab floor
Brakes /Pedals
Windows and Mirrors
Engine Oil
Fuel
Transmission Oil
Radiator

Outside

Lights
Tyres
Windows and Mirrors
Steps
Hand brake
Hydraulics



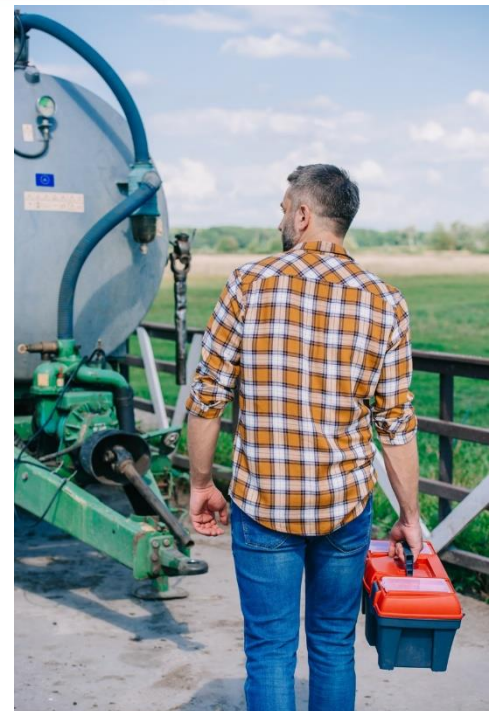
- Engine oil – avoid engine damage;
- Tyres – good tyres give good control;
- Clear steps into the cab of mud to prevent slips and falls;
- Handbrake – prevent tractor rolling when on an incline;
- Hydraulics – to eliminate the risk of equipment collapse;
- Clear cab floor – to avoid the risk of pedals jamming;
- Clean all windows for good visibility;
- Brake pedals locked together to ensure that the brakes pull evenly;
- Check lights and mirrors for visibility;
- PTO protected – the PTO must have a guard and the shaft must be covered.

What age are you?

Do you know the rules about being a passenger or driving a tractor?

- 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 one day's safety training
- 16 years: You may drive a tractor on the road but only after completing one day's safety training.

**In the UK, no child under the age of 13 is permitted to ride in a tractor as a passenger*

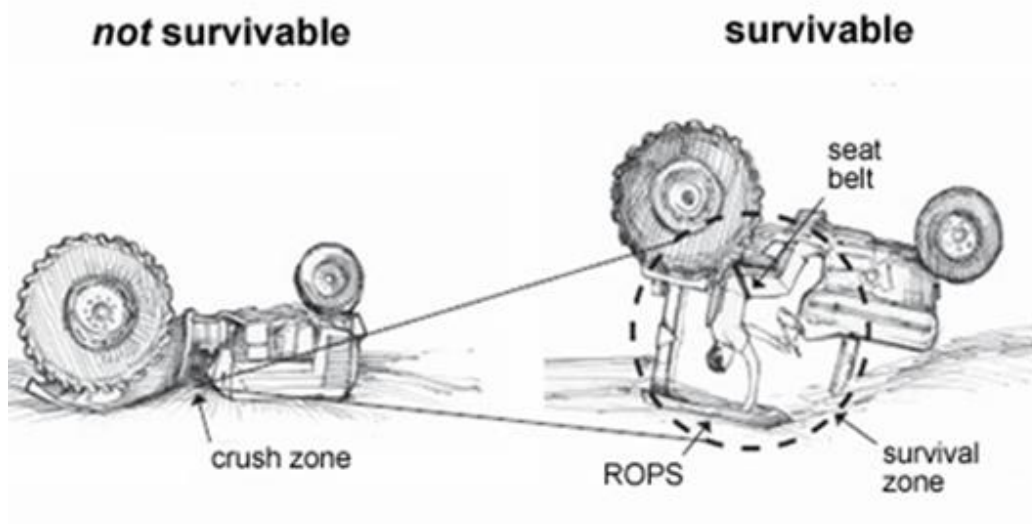


What to wear:

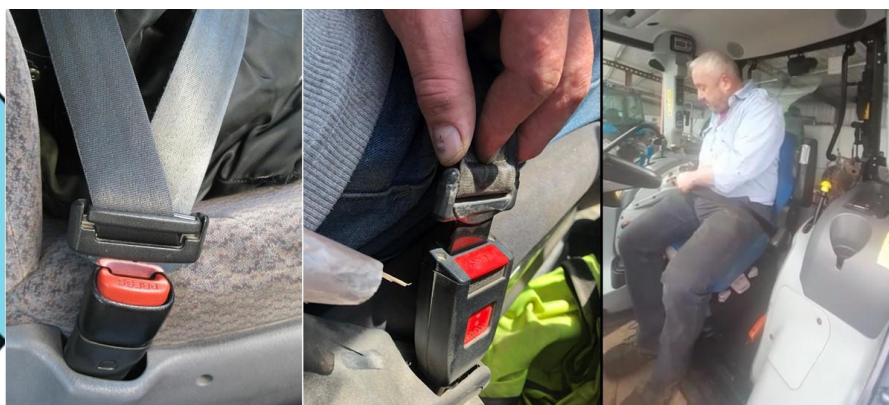
Seat belts – The Safety Zone

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.

All passengers should wear a seat belt to prevent them from falling from the tractor.



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



4. Do you know how to S.T.O.P.I.T?

Also known as the 'Safe Stop', S.T.O.P.I.T, is handy acronym which makes it easy to remember how farmers correctly stop and park a tractor after a long day's work:



S – Stop the tractor in a Safe place. Farmers should park the tractor facing forward. This means they don't have to reverse it out when using it again.



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



O – Take the tractor Out of gear and feet Off the pedals



P – Put the bucket or fork down.



I – Turn off the Ignition



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.



5. Quad Bikes

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: Before using a quad, all farmers should be trained in how to operate the vehicle.

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

S – Safety equipment. Farmers must make sure they are wearing the correct clothing and PPE (Personal Protective Equipment). **See pic below**

PPE (Personal Protective Equipment)

What PPE should be worn on a quad bike?

- Head protection, eg. a motorcycle or a horse riding helmet.
- Clothing which is strong and covers arms and legs
- Gloves for protection and to keep hands warm in cold weather & for good control of the ATV.
- Boots or wellingtons which are strong and have good grips
- Goggles to protect eyes from insects and branches
- High visibility clothing



Remember: No passengers should ever be on a quad bike. You can unbalance the quad and cause it to turnover

6. Power Take Off (PTO)

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.

The PTO can rotate between 9 & 16 times per second.

To prevent injury by entanglement, farmers ensure all PTO's are covered with a guard and safety chains.

You can be in danger of entanglement with an uncovered PTO entanglement



Ask the class to mention machines that require a PTO - the below list will help.

Slurry spreader | Combine harvester | Tedder | Diet feeder | Agitator
Mower | Sprayer | Hedge cutter



Peter lost his leg in a PTO accident

Follow up activities & projects

- Review the project ideas for this theme.
- Check out our white board and PC games: Farm Yard Safety, Off to Work and Follow the Signs on agrikids.ie
- Download and fill in our 'Spot the Dangers' worksheets.
- Sign up for an AgriKids webinar
- Ask the class to pick their favourite farm machinery to do as an individual or group project.
- Invite a farmer or farm representative such as IFA or Teagasc to show the class more about tractor safety.
- Why not learn more about farming back in the olden days. Compile a project, invite a local historian to class or visit a museum or vintage park.
- As a class carry out research into the machinery and equipment that use a PTO
- Invite a machinery expert to class to talk about PTO, quad bike and farm machinery safety.
- Watch Peter Gohery tell his PTO survivor story on www.embracefarm.com