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PSG PROGRAMME (NCQF LEVEL 5)
MODULE 16

BASIC PHOTOGRAPHY & VEHICLE FUNCTIONS

OBJECTIVES (16.1)

- On completion of this module you will:
  - Know what photography is; photographic skills and awareness.
  - Know how to control exposure through ISO, Aperture & Shutter speed.
  - Understand composition rules.
  - Know how to use lighting effectively to create well-exposed, creative and balanced images.
  - Know electrical components of a vehicle.
  - Understand mechanical components of a vehicle.
  - Know the fuel system of a vehicle.
  - Know the general maintenance checks on a vehicle.
  - Know the driving skills general rules.

WHAT IS PHOTOGRAPHY? (16.1.1)

- Photography is the art, application and practice of creating images by recording light, either electronically with an image sensor or chemically on a light-sensitive material like film. The word "photography" literally means drawing with light, derived from the Greek words 'phos' (meaning light) and 'graphe' (to draw). It is a versatile field used for art, journalism, science, commerce and personal enjoyment.
  - Technical process: At its core, photography involves capturing light. This is done by a camera that either uses a digital sensor to create an electronic image or uses a light-sensitive chemical process to create image on film.
  - Artistic expression: Photography is considered an art form use3d to tell stories, convey emotions and capture moments. A photographer uses elements like line, shape, color and texture to compose an image. It is a popular hobby for many people.
  - What are the four main types of photography? : Portrait, landscape, long exposure and macro photography are the most popular types of photography. Portraits are especially great w3hen the person is enhanced by the talents of the photographer. Long exposure and macro photography are popular because they manipulate the subjects.

PHOTOGRAPHIC SKILLS AND AWARENESS (16.1.2)

- The arrival of digital photography has made it possible for everybody to have cameras and because it is cheap (no film for purchase or processing) and photos can easily be deleted so that they can try again, most visitors now have the ability to document their safari stay in pictures and they want the photos to be good enough to show off to friends on social media etc. It is important therefore, for the following reasons, that guides have at least a basic working knowledge of cameras and photographic principles in order to help guests get the best shots.
  - Most guests buy new cameras for the trip and arrive not knowing how to use them and they often leave the user manual at home because of weight and space restrictions, so they rely on guides being able to assist them with camera functions.
  - Most visitors are used to taking photos of people and city sights so they battle to get the settings right when photographing animals in a natural environment; again they expect help from the guide with respect to camera settings.
  - Guests are in a foreign environment and don`t know what to look for, distances and times to get t places or where good scenic shot`s may be etc.; so they rely on the guide for getting them to the right places at the right time.

❖ **The main camera functions and what do they mean:**

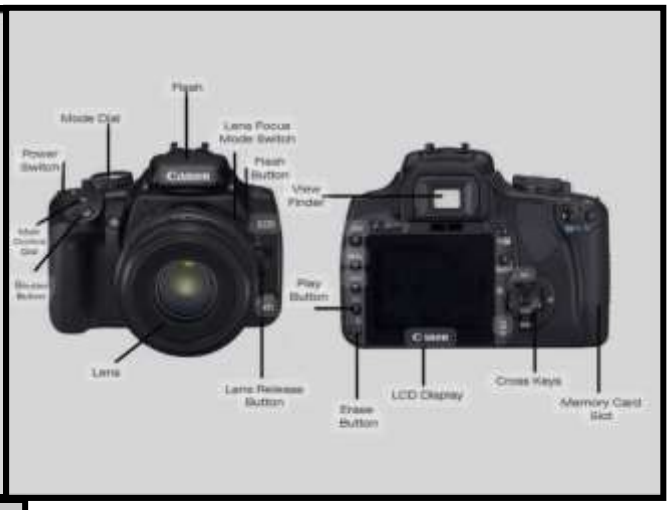
- **Aperture:** Is equivalent to the **pupil** (light opening) of an eye.
  - Its function is to regulate the amount of light striking the sensor.
  - The bigger the aperture (the smaller the number), the more light hits the sensor and the more the background is out of focus (less depth of field). This is good for low light and portrait photography. The shutter speed will be faster if the aperture number is low.
  - The smaller the aperture (the higher the number), the less light hits the sensor and the more the background is **in** focus (greater depth of field). This is good for bright light and group animal or landscape photography. The shutter speed will be **slower** if the aperture number is high.
  - **In general, as the aperture number goes up, shutter speed goes down and vice versa.**
- **Shutter:** Is equivalent to the eye lids of an eye.
  - Its function is to regulate the amount of light passing the aperture.
  - The faster the shutter speed (the lower the number), the less light passes through the aperture to hit the sensor. This is good in bright light and when photographing moving animals. The aperture will be bigger (smaller number) if the shutter speed is high in order to allow enough light to prevent **under-exposure** of the image.
  - The slower the shutter speed (the lower the number), the more light passes through the aperture to hit the sensor. This is good for low light and when photographing stationary animals. The aperture will be **smaller** (larger number) if the shutter speed is low in order to limit light to prevent **over-exposure** of the image.
  - **In general, as shutter speed goes up, aperture number goes down and vice versa.**
- **Sensitivity ISO:** Is equivalent to the sensitivity of the retina of an eye.
  - Its function is to make the sensor more sensitive to available light.
  - The more sensitive the sensor is (the higher the ISO number), the more possible it is to photograph in low light. A negative of increasing ISO is that it makes the image grainier, speckled and less clear when blown-up or enlarged. Though a high ISO is a pre-requisite in low light to prevent under-exposure of the image. Generally, it is not recommended that higher than ISO 1600 be used.
  - The less sensitive the sensor is (the lower the ISO number), the less possible it is to photograph in low light, but low ISO is a pre-requisite in bright light to prevent over-exposure of the image. A positive of decreasing ISO is that it makes the image sharper and very clear when blown-up or enlarged.
  - **In general. As ISO increases, shutter speed goes up and aperture number goes down and vice versa.**

❖ **<u>For best photographic opportunities and results for guests;</u> <u>guides must remember and adhere to the following:</u>**

- If under-exposing (picture too dark), do the following:
  - Increase the aperture (lower the number)
  - Reduce the shutter speed (lower the number)
  - Increase the ISO number.
  - Use flash.
- If over-exposing (picture too light), do the following:
  - Decrease the aperture (increase the number)
  - Increase the shutter speed (increase the number)
  - Decrease the ISO number.

- Camera functional parts (See pictures below):

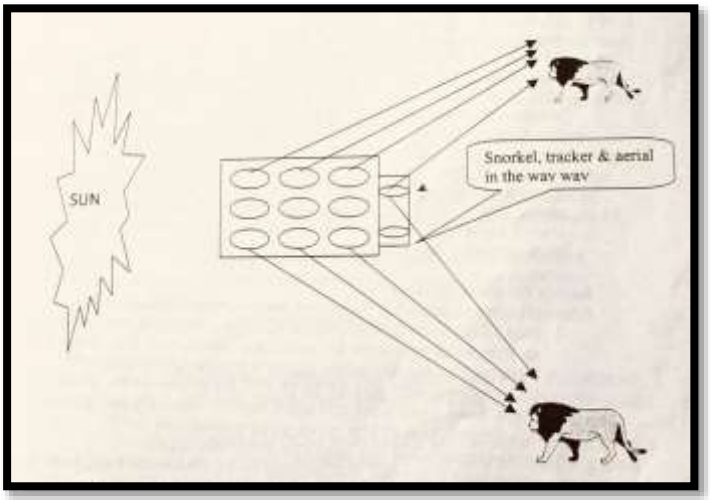






❖ **Things To Remember:**

- The most important aspect of photography is light.
- Always try to position your guests with the sun behind them and with as much light on the **object** as possible, unless otherwise stipulated by your guests.
- Closer is not always the best, especially when the vehicle has a roof.
- Side-lighting often creates better images than direct light.
- Inform your guests what you intend doing, and communicate with them to find out if they are happy with the positioning.
- Try to anticipate the animal`s movements, this works well as you could maneuver your vehicle well in time for great photographs.
- Be aware of where in your vehicle the photographers are seated so that when positioning your vehicle, you can put those guests in the best position for photos`. Try to park with photographers on the side of the animal.
- Try to position the subject against a dark background.
- Be aware of objects protruding into the line of sight of your guests; snorkels/aerials on the vehicle as well as objects in the way of the photographic subject.
- If facing the sun, use hoods or other shading mechanisms.
- Don`t always zoom in, try to get the animal in context.
- When zooming in, try to get an artistic shot.
- Make sure cameras are kept dust free, or they will malfunction. Tell guests to keep checking their lens for dust.
- Do not change lenses, memory cards or batteries on the move.
- Turn camera off when doing the above or short-circuits will result.
- Take polarizing filters off in low light.
- Try not to use the AUTO functions as it activates flash too easily.
- Use Manual focus when there is vegetation in front of subject.
- Try to park the car in a position that requires little follow-up moves; anticipate behavior and tell guests to get ready or what to look for.
- If the animal moves out of sight, move the car immediately. (Vehicle and guest positioning; see picture below):

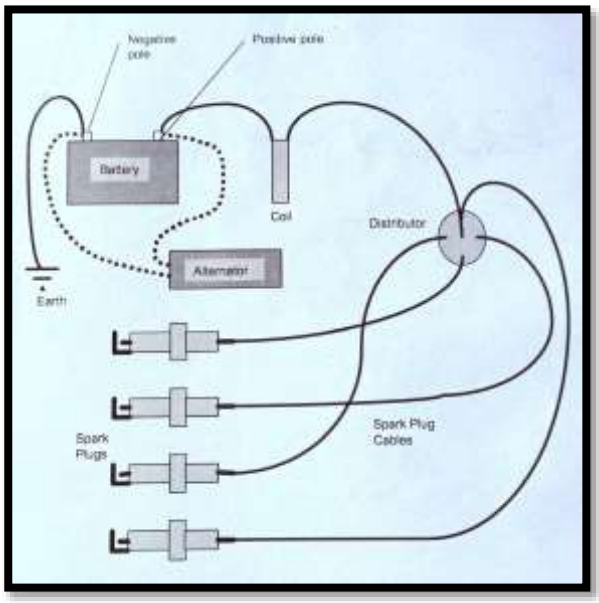


VEHICLES (16.1.3)

- Field Guides often operate by vehicles, and therefore need to know the basics of vehicle functioning as well as understanding how to handle breakdowns, emergencies and difficult situations in the bush.

❖ Electrical Components of a Vehicle.

- All vehicles have certain electrical components in common. These components fulfil specific functions (See diagram below):



- **Battery** – the battery stores electrical energy and provides electrical current when the engine is not running. The battery is charged by an alternator, which is engine-driven via a V-belt and pulley system. When the alternator is faulty is faulty, the battery will not charge and will eventually run down. Disconnect a faulty alternator, as it will continue to draw current from the battery. One of the prime reasons could be a broken or slipping V-belt. The battery has two poles, a negative and a positive pole. Normally the negative pole is earthed to the body of the vehicle, while the positive pole supplies power to the vehicle`s electric systems.
- **Coil** – the coil increases the voltage of the electrical current so that a spark may be formed in the spark plug. The voltage of the battery is too low to generate a spark.
- **Distributor** – the distributor performs true to its name, it distributes current to the different spark plugs on a rotating basis. This provides a precise firing sequence to the different spark plugs.
- **Spark Plugs** – the spark plugs are specialized components designed to provide a spark to ignite the fuel in the combustion chamber. The ignited

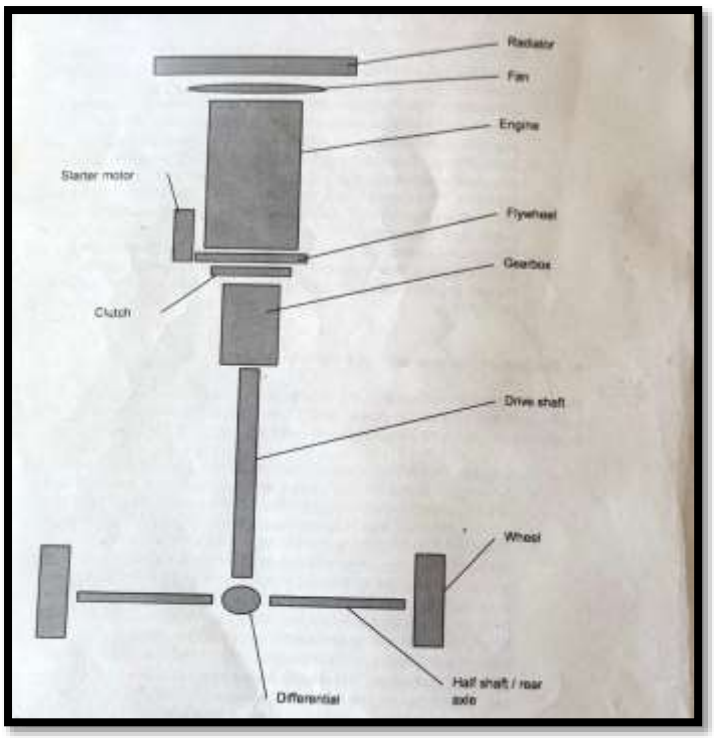
fuel burns quickly, expands and pushes the piston down the cylinder, which provides the primary source of power for the engine.

- **Electrical Cables** – electrical cables convey electric power from the battery to the different components. If a vehicle lacks electric current to provide a spark at the spark plug, it may often be due to a faulty cable.

❖ Mechanical Components of a Vehicle.

- The mechanical components of the vehicle provide the link between the engine, which produces the power, and the wheels which provide propulsion to the vehicle. The following components are typical:
  - **Engine** – this is the power source, created by burning fuel in the cylinder. This results in pistons moving up and down, which in turn are connected to the crankshaft, which eventually transmitted to the wheels.
  - **Radiator** – the burning fuel in the engine causes very high temperatures. The engine is cooled down by circulating water. The water in turn is cooled down in a radiator, where air is drawn between thin pipes containing the hot water, cooling it down in the process. It is very important that the engine temperatures remain within limits, otherwise serious damage may be caused.
  - **Fan** – the fan draws air through the radiator, facilitating air flow and the cooling process. It is usually driven by engine power via V-belt. When the engine overheats, always check that the V-belt is not broken or slipping.
  - **Flywheel** – the flywheel is connected to the crankshaft. This is a heavy metal disc, providing a rotational force that ensures smooth engine running. The starter motor is connected to the flywheel by a gear system, thus turning the engine when the vehicle is started.
  - **Gearbox** – the gearbox provides different gear ratios for propelling the vehicle. It also incorporates a clutch in manual gear systems.
  - **Drive Shaft** – This transmits the rotational power from the gearbox to the axle with the driving wheels.
  - **Differential** – the differential distributes power to the wheels. Normally both wheels do not provide traction at the same time, the differential selects the wheel doing the easier job and transmits power to it by means of gear system. Only when differential locks are employed, do both wheels provide traction.

  - **Half Shaft** – these are the axle transmitting power from the differential to the driving wheels .If a half shaft is broken, there will be no power on the driving wheels. (See diagram below):



❖ **Fuel System.**

- The fuel system consists of the following components:
  - **Fuel Tank** – this could develop leaks, caused by rocks puncturing the tank. Such leaks can be sealed with a paste made of sunlight soap as an emergency measure.
  - **Fuel Pump** – the fuel pump draws fuel from the tank to the carburetor. It is usually electrically driven. If vehicle stoppage is due to fuel starvation; check the electrical connections to the fuel pump.
  - **Carburetor** – its function is to distribute fuel to the engine in a vaporized form. Lever or linkage failures could cause problems. Check all cables and linkages if the engine does not respond to inputs on the accelerator. Generally carburetors are complicated components, and should not be tampered with.
  - **Filter** – the fuel filter prevents foreign particles from entering the carburetor. It could become blocked from dirt, dust or paint peeling from the inside of drums. Check the direction of fuel flow when installing.

❖ **General Maintenance Checks.**

- Vehicle maintenance is extremely important, especially so when you are far from civilization because you are often totally dependent on your vehicle to get you back. Pay attention to the following:
  - **Fuel** – quantity, reserve tanks and the cleanness of the fuel. Water in the fuel can create numerous problems, as well as particles of paint or dirt. Always carry spare fuel filters.
  - **Oil** – check the quantity and cleanness. If water is detected (coloring the oil white), immediate repairs are necessary. Always carry spare oil. Check for leaks.
  - **Water** – Check quantity and condition of radiator and hoses. Check underneath for leaks.
  - **Battery** – check level of fluid and connections. Always top up with distilled water.
  - **Tyres** – correct pressure is important. When using deflated tyres, remember that they tend to heat up. Travel slowly and re-inflate as soon as possible. Check road-worthiness of tyres.

- **Steering** – the steering system should not have excessive play; if this is the case, have it serviced without delay.
- **Lights** – all lights required by law should be functional. Always carry spare fuses and bulbs.

❖ **Driving Skills.**

- Driving skill can only be taught in practice. However, some general rules are useful:
  - Never force a vehicle in sand; drive gently using the minimum power and the highest possible gear.
  - Before crossing streams, inspect the surface and check water depth by walking through (crocodiles permitting). If the water is deed, disconnect the fan belt and drive through slowly and steadily in second gear. On exiting the other side, reconnect the fan belt.
  - Never attempt things that you as a guide/driver or your vehicle are not up to. If in doubt, don't do it!!
  - Engage 4-wheel drive before entering difficult terrain, not after getting stuck. Disconnect when not needed.
  - Never endanger your guests by taking risks while they are on board.
  - Avoid entering sensitive areas by vehicle, rather walk!
  - Push-starting a vehicle is done by turning the ignition key to **on** position, putting the vehicle in second gear and depressing the clutch. When enough speed has been built up through pushing, release the clutch. The engine should start.
  - NB// Always approach animals with caution, respecting their personal space. Always leave room for a get-away, should you experience a charge.

TROUBLE SHOOTING AND EMERGENCIES (16.1.4).

- When encountering problems with a vehicle, the best is to think logically about the problem. What is the problem; and what could have caused it? How can it be rectified? The following general conditions could occur (with countless variations):
  - **Engine fails to start; starter motor does not turn –** this could be due to faulty electrical connections to the starter motor or a flat battery. Check electrical current by switching on lights or wipers. If there is no current, check that the battery terminals are fastened and clean. If the battery is flat, jump-start or push the vehicle. If the current is flowing, look for frayed wires or loose connections around or leading to the starter motor.
  - **Engine fails to start; starter motor turns –** this could have two causes, lack of spark at the spark plug or lack of fuel. If a spark is absent, check all the electrical connections. If there is no fuel flow, check fuel content and lines. Look for blockages and clean the fuel filter. Also ensure that there is fuel in the fuel tank (easily overlooked).
  - **Stalling of the engine –** a cold engine can stall if too much fuel has been injected into the cylinders. Wait for 20 minutes and try to start again; avoid pumping of the accelerator. Alternatively, if the battery is strong, put your foot flat on the accelerator and turn the key; keeping the accelerator on the floor. After cranking the engine for some time, it should start. If it doesn`t, try the first option.
  - **Stuttering, pinking, no power, overheating –** these are general symptoms that could be associated with poor engine turning, engine overheating or interrupted fuel flow. Make sure that the engine is properly tuned, receives an uninterrupted flow of fuel and that the engine is not overheating. Engine overheating could be caused by lack of water in the cooling system. Never add water to an overheated engine`s radiator unless the engine is running to prevent cracking of the overheated metal parts. Start the engine and

slowly add water while it is running. Overheating could also be caused by a broken or loose fan belt, which will prevent the fan from turning. If the fan belt is broken, replace and if it is loose, adjust the tension until it is tight again.

- **Unusual engine noises –** investigate immediately before damage is done. Rattles of doors or bodywork are not serious. Light tapping from the engine is also not serious, as this is most likely caused by loose tappets and only need adjustment. Heavy knocking sounds from the engine when accelerating or under strain could mean worn engine bearings. A clanking when rolling forward could be caused by loose prop shaft. Grinding noises when clutch or brakes are depressed could mean that these parts are worn and should be replaced. In all serious cases immediate help should be sought from qualified mechanic.
- **Faulty brakes –** this could be due to brake fluid levels being too low, or fluid leaking from the system. If you know how to do this, top up the brake fluid and bleed the fluid lines. This should rectify the situation, and make sure no leaks exist.
- **Failing of electrical system –** all electrical systems are protected by fuses. Check the fuses to ensure that they are all intact. If a fuse has blown, replace with correct fuse; do not install a fuse with a higher rating as this could cause other systems to burn out. If the fuse blows continually, have the problem checked by a qualified auto-electrician. If a light is not showing, it could be due to a blown bulb or a blown fuse. Replace the bulb if the fuse is intact. Lastly check electrical contacts for loose or dirty wires, as this may also cause failures.
- **Vehicle fire –** if a fire starts when driving, immediately stop off the road and switch off the ignition. Let the passengers disembark as quickly as possible. If the engine is on fire, wrap one hand in protective cloth and open bonnet **slightly**, spraying the fire extinguisher through the narrow gap onto the flames. In case of an electrical fire, disconnect one of the battery cables. Never smoke or allow smoking at a fuel station, and keep ignition switched off while refueling.
- **Brakes fail while at speed –** immediately apply the handbrake smoothly and gently, while pumping the brake pedal to try and up pressure on the wheel brakes. Reduce speed further by engaging lower gears. If a desperate situation develops, try driving up an embankment or into soft sand if available, without placing the vehicle and its occupants at greater risk.
- **Tyre burst at speed** – a sudden blow-out of a front tyre is dangerous and could cause loss of control of the vehicle. The vehicle will suddenly pull violently to one side. When this happens, take your foot off the accelerator, while keeping the vehicle as straight as possible. Do not apply brakes, as this will worsen the situation. When the vehicle has nearly come to a standstill, steer it off the road.
- **Skidding** – skidding on sand or a wet surface can usually be rectified by lifting your foot off the accelerator/throttle; turning your steering wheel in the direction of the skid (e.g. turn left if the rear wheels are breaking left), and waiting for the wheels to regain grip. Only after regaining traction should you apply gentle acceleration, at the same time steering the vehicle in the desired direction.
- **Towing a vehicle** – towing is a potentially dangerous operation. Fit tow ropes to the appropriate hooks of the vehicle. Never attach a tow rope to the steering linkage or an exposed drive shaft. Never tow an automatic vehicle unless the vehicle`s handbook specifies that this is allowed. When being towed, take up the slack of the tow rope gently, keep it taut (stretched) and drive slowly. Work out signals to communicate with the towing vehicle before-hand.