ROYAL CANADIAN ARMY CADETS

SILVER STAR

INSTRUCTIONAL GUIDE

SECTION 3

EO M326.02B – RIDE A MOUNTAIN BIKE

Total Time: 180 min

PREPARATION

PRE-LESSON INSTRUCTIONS

Resources needed for the delivery of this lesson are listed in the lesson specification located in A-CR-CCP-703/PG-001, Chapter 4. Specific uses for said resources are identified throughout the instructional guide within the TP for which they are required.

Review the lesson content and become familiar with the material prior to delivering the lesson.

Every cadet must have a water carrier prior to the start of this lesson.

All mountain bikes and helmets being used should be organized by size prior to the start of this lesson.

For TP 3 select a mountain bike to use as a model when identifying the parts of the bike. These parts should be labelled on the bike using gear or masking tape.

Choose a location that is large enough to allow the cadets to ride and practice mountain bike techniques as they are presented, but not too large that control is compromised. The area should have some hills and varied terrain.

Have cleaning materials available to complete the pre-ride and post-ride check.

Timings for this EO will vary. While there is a requirement for initial training, the focus should be on having the cadets complete each technique through the practical activity in TP 7.

PRE-LESSON ASSIGNMENT

N/A.

APPROACH

An interactive lecture was chosen for TPs 1 and 2 to introduce the principles of safe riding and provide an overview of the parts of a mountain bike.

Demonstration and performance was chosen for TPs 3, 4, 6 and 8 as it allows the instructor to explain and demonstrate selecting and adjusting a mountain bike, the procedure for a pre-ride and post-ride bike check, and proper mountain bike techniques while providing an opportunity for the cadet to practice each skill under supervision.

Demonstration was chosen for TP 5 as it allows the instructor to explain and demonstrate safety precautions when mountain biking.

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A practical activity was chosen for TP 7 as it is an interactive way to introduce the cadet to mountain bike techniques and procedures in a controlled environment during an expedition. The expedition contributes to the development of these skills and procedures in a fun and exciting manner.

INTRODUCTION

REVIEW

N/A.

OBJECTIVES

By the end of this lesson the cadet shall have selected and fitted a mountain bike, followed trail etiquette, obeyed safety regulations and ridden a mountain bike.

IMPORTANCE

It is important for cadets to be able to safely ride a mountain bike for the safety of them and those around them. Safe riding practices are built on knowing the parts of a mountain bike, an ability to properly fit a mountain bike, the development of mountain bike techniques and an awareness of trail etiquette. Having a properly fitted mountain bike will make the riding experience more positive for the cadets, allowing for a more comfortable ride, limiting the possibility and occurrence of injuries and increasing the overall performance of the mountain biker. Demonstrating mountain bike techniques without difficulty will assist the cadets in keeping up with members of their team and completing the practical expedition activity. Following trail etiquette will ensure that all trail users (mountain bikers, hikers, joggers and motorists) are able to use the trails and roads in a safe, enjoyable manner.

Teaching point 1 **Introduce Principles of Safe Riding**

Time: 5 min Method: Interactive Lecture



The following information will be explained to the cadets as a lead-in to the technical skills associated with mountain biking.

Mountain biking is a growing sport in North America. By the 1980s, the popularity of mountain bikes exceeded all other styles of bicycles combined, culminating with its entry into the 1996 Olympic games in Atlanta as a genuine racing event.

The popularity of the sport in the past two decades has led to the development of a trail classification system which informs mountain bikers of the type and technical difficulty of hundreds of trails throughout North America and the rest of the world.

TRAIL RATING SYSTEM

Mountain bike trails are classified by mountain biking organizations. Interest in establishing consistent criteria for the rating of trails has been increasing.

The International Mountain Bicycling Association (IMBA) developed a basic method to categorize the technical difficulty of recreation trails. The system was adapted from the International Trail Marking System used at ski areas throughout the world.

The IMBA Trail Difficulty Rating System has been created to:

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- help trail users make informed decisions;
- encourage visitors to use trails that match their skill level;
- manage risk and minimize injuries;
- improve the outdoor experience for a wide variety of visitors; and
- aid in the planning of trails and trail systems.

Mountain bike trails, in accordance with the IMBA Trail Difficulty Rating System have been divided into three categories based on trail width, trail surface, trail grade, obstacles and technical features.

Novice Trails. A novice trail should take two hours or less to complete. Characteristics of a novice trail include:

- hard-packed surfaces,
- some hills which require limited skill to ascend and descend, that are short in duration with few obstacles to navigate around – not too many included in the route,
- no high-speed downhills, and
- mostly flat ground with the inclusion of interesting terrain features such as small roots, logs and rocks to negotiate around.

Intermediate Trails. An intermediate trail can be completed in three to four hours. Characteristics of an intermediate trail include:

- a variety of moderate hills, that require technical skill to ascend and descend with ease,
- some high-speed downhills,
- some difficult obstacles such as roots, logs and rocks are included, but should not be a common feature of the trail, and
- some loose surface.

Experienced Trails. An experienced trail can vary from one to several days in length. Characteristics of an experienced trail include:

- a mix of flat and technical terrain (hills, obstacles and cornering),
- a variety of ascents and descents on steep and uneven terrain,
- a combination of loose and hard-packed surfaces, and
- obstacles such as rocks, roots and logs throughout the route.



It is critical that trail ratings are observed and that the mountain biker pays due diligence by riding on trails that meet their skill and experience level.

SIX CODES OF CONDUCT

With the popularity of mountain biking on the rise, problems between mountain bikers and other trail users is increasing. Conflicts between trail users and mountain bikers have resulted in frequent trail closures in parks and wilderness areas, leaving enthusiasts of the sport seeking alternative locations to ride.

One of the best ways to prevent trail closures and to improve the image of the sport held by non-mountain bikers, is to improve relations with other trail users. To do this, mountain bikers are required to understand and practice trail etiquette whenever they are out on the trail. The IMBA has developed six codes of conduct to

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minimize the impact of mountain bikers on the environment and on other users, which all mountain bikers are encouraged to adhere to when riding.

Riding on Open Trails Only

Mountain bikers should always respect trail and road closures. Check the status of roads/trails before riding on them. Ensure that permits and authorization are obtained as required. Respect private and public property.

Practicing the Principles of Leave No Trace

Be sensitive to the earth. Even on open trails, care should be taken to ensure that no evidence is left once the trail has been ridden. After a rain or thaw, the ground may be soft and should not be ridden to avoid causing damage. When the trail bed is soft, consider other riding options. Practice low-impact mountain biking by not sliding when riding, staying on the existing trails and not creating new trails. Do not ride through streams and pack out what was brought in.

Controlling Your Bicycle

Inattention may cause an accident. Pay attention to the trail and be aware of approaching mountain bikers and hikers. Excessive speed can hurt the mountain biker and other people on the trail. Obey all speed regulations.

Giving Way to Other Users

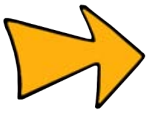
Approach other trail users with caution. Let them know well in advance of the approach of a biker. A friendly greeting (or bell) is considerate and works very well. Try not to startle others on the trail by speeding up to or behind them. Show respect when passing others by slowing down or even stopping, depending on the trail width. Anticipate that other trail users may be around corners or in blind spots.

Avoiding Animals

Animals may be startled by an unannounced approach, a sudden movement or a loud noise. This can be dangerous for the mountain biker, other trail users and the animals. Give animals extra room and time to adjust. When passing horses, it is advised that the helmet and sunglasses are removed. Then use care and follow the directions of horseback riders. It is a serious offence to run cattle and disturb wild animals.

Planning Ahead

Know the equipment being used and the ability of the mountain biker and the trail, and prepare accordingly. Be self-sufficient at all times. Wear a helmet, ensure the bike is maintained and carry the necessary supplies for changes in weather and other conditions. A well executed trip will result in a satisfactory experience for the mountain biker.



Respect for other trail enthusiasts and the natural environment is an attitude that all mountain bikers should adopt.

CONFIRMATION OF TEACHING POINT 1

QUESTIONS

Q1. What level of trail are you riding on when it is a mix of flat and technical terrain, made up of both loose and hard-packed surfaces, consists of a variety of ascents and descents on steep and uneven terrain and has obstacles such as rocks, roots and logs throughout the trail to navigate?

Q2. What measures should you take to practice low-impact mountain biking?

Q3. What actions should be taken when approaching a horse on the trail?

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ANTICIPATED ANSWERS

A1. An experienced trail.

A2. Practice low-impact mountain biking by not sliding when riding, staying on the existing trails, not creating new trails, not riding through stream and packing out what was brought in.

A3. When approaching a horse on the trail it is advised that the helmet and sunglasses should be removed. Use care and follow the directions of horseback riders.

Teaching point 2 **Identify the Parts of a Mountain Bike**

Time: 10 min Method: Interactive Lecture



This TP is intended to give cadets an overview of the different parts of a mountain bike.

Use a mountain bike as a training aid to point out each as they are discussed. Allow the cadets to have a closer look.



Cadets will have some previous knowledge of the material presented in this TP. Use this knowledge through questions to identify the parts.



To make it easier for the cadets to remember the different parts, present them in a clockwise direction, as illustrated in Figure 1.

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"Fullerton Bicycle Co. & Buena Park Bicycle Co.", Dirt–Mountain Bikes. Retrieved October 25, 2007, from http://www.fullertonbicycle.com/images/Yukon.lg.jpg

Figure 1 Parts of a Mountain Bike

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Handlebar. The handlebar is a horizontal bar attached to the bike with handgrips at each end, where brake levers and gear shifters are attached.

Gear Shifter. There are two gear shifters, high and low, located on either side of the handlebars. The front shifter, which works the front derailleur, is normally located on the left side. The rear shifter, which works the rear derailleur, is normally located on the right side.

Brake Lever. There are brake levers on both sides of the handlebar to activate the brakes. The left brake lever is for the front brake, the right is for the rear brake.

Top Tube. The top tube is the horizontal tube running across the top of the bike providing strength and stability to the bike frame.

Tire. The tire is rubber tubing attached to the rim to form a wheel.

Quick Release. There are quick release levers located on both the front and rear wheels. These levers allow for the wheels to be dropped out without the need of a screwdriver or other tool.

Derailleur (Front and Rear). The derailleur is a lever-activated mechanism that pushes the chain off one chainring or sprocket and onto another, altering the gear ratio.



Sprocket is the general term that applies to both chainrings and to cassette cogs. A sprocket is defined as a disc with teeth which drives the chain when the bike is pedalled to propel it forward.

Chainring. A chainring is a toothed ring attached to the crank that drives the chain.

Chainset. The chainset is made up of two or three chainrings that pull the chain around when the pedals are turned.

Chainstay. The chainstay is the lower bar on the bike frame that attaches the rear wheel.

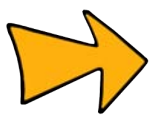
Pedal. The pedal is the platform for the foot to press on, attached to the crank.

Chain. A chain is the circular set of links to transfer power from the chainrings at the front of the bike, to the sprockets in the rear of the bike.

Cogs. A cog is a disc with teeth which drives the chain when the bike is pedalled to propel it forward. Cogs are blocked together to form cassettes which work in conjunction with the rear derailleur.

Cassette. A cassette is comprised of a number of cogs mounted together and attached to the rear hub. The smaller cogs provide a higher (harder) gear for maximum speed, while the larger cogs provide a lower (easier) gear for climbing hills.

Brakes. A bike has two sets of brakes: one set located in the front and the other in the rear. The brakes are activated by the brake levers attached to the handlebars.



There are two different types of braking systems which are used on mountain bikes. The traditional direct-pull (V-Brake) system and the more advanced disc brake system. Some bikes might have a combination of both types, with a disc brake on the front and a direct-pull on the rear.

Seat Tube. The seat tube is a hollow tube which runs from just below the saddle down to the bottom bracket of the bike in which the seat post is inserted into.

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Seat Post Release. The seat post release is a quick release lever that holds the seat post in the desired position when it is inside the seat tube.

Seat Post. The seat post is an adjustable support for the saddle which fits into the seat tube.

Saddle. A saddle is the term used to describe the seat of a bike.

CONFIRMATION OF TEACHING POINT 2

QUESTIONS

Q1. If the left brake lever is pulled, which brake–front or rear–would be activated?

Q2. When climbing up a hill a biker would want to use the gear shifter on which side to move the chain to a smaller cog on the cassette?

Q3. What are the two different types of brakes found on mountain bikes?

ANTICIPATED ANSWERS

A1. The front brake.

A2. The right gear shifter.

A3. The two types of brakes found on mountain bikes are disc brakes and direct-pull brakes (V-brakes).

Teaching point 3 — **Explain, Demonstrate and Have the Cadet Select and Adjust a Mountain Bike**

Time: 20 min — Method: Demonstration and Performance



For this skill TP it is recommended that the following format be followed:

(1) Introduce cadets to the importance of selecting a proper fitting mountain bike and a proper fitting helmet.

(2) Discuss selection of a helmet and then demonstrate how the helmet can be adjusted.

(3) Discuss the different methods which can be used to select a mountain bike.

(4) Using a bike that has already been properly selected and adjusted, explain the complete procedure for selecting and adjusting a mountain bike.

(5) Explain and demonstrate each step required to complete the skill. Monitor cadets as they imitate each step.

(6) Once each cadet has selected a mountain bike and helmet, they must be labelled with gear or masking tape.

Note: Assistant instructors may be used to monitor cadet performance.

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Since the first introduction of the mountain bike in the mid to late 1970s, the design of bikes has evolved. The quest for improved products has led to continued improvements and advancements in materials being used to construct the bikes, as well as the overall design of the bikes themselves. With the introduction of new bikes each year by front runner manufacturers the use of stronger and lighter new materials and cutting edge designs compete to maximize speed, power and strength.

While it is important to have a well-designed mountain bike, if the bike chosen does not fit the mountain biker then the excellence in design will be lost. Having a properly fitted bike is important for riding efficiency and power as well as safety. When a bike does not fit the mountain biker properly, injuries are more likely.

SELECTING A HELMET

A properly fitted helmet should:

- fit level and square on the head;
- cover the front of the forehead;
- sit snug on the head, without fastening the chin strap;
- not slip when the head moves; and
- have straps adjusted to meet just below the ear and fasten tightly.



"Ministry of Transportation Ontario", Cycling Skills: Cycling Safety for Teen and Adult Cyclists, Copyright 2005 by Government of Ontario. Retrieved October 5, 2007, from http://www.mto.gov.on.ca/English/pubs/cycling/cyclingskills.htm

Figure 2 Proper Fit of a Helmet

Helmet sizes vary from extra small to extra large and it is important to try on a variety of sizes to make sure the fit is correct.

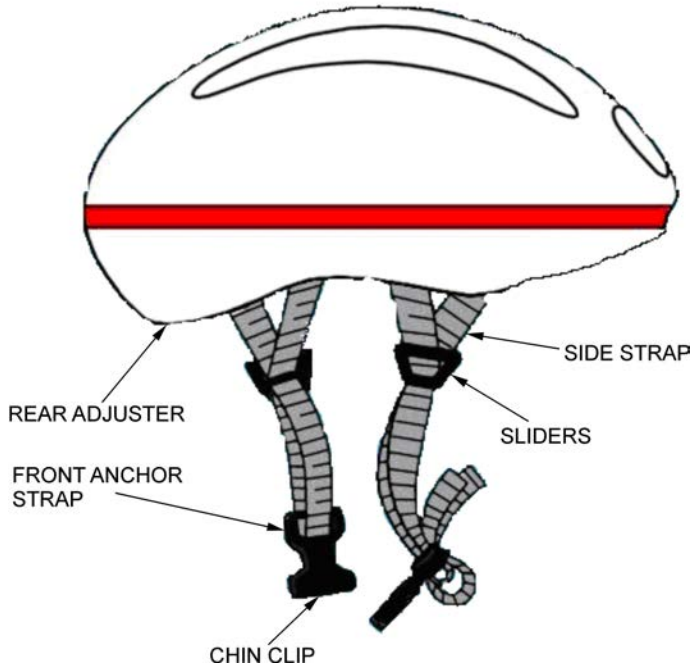
ADJUSTING THE HELMET

A helmet will not necessarily fit properly without making some minor adjustments. The following are some basic adjustments that can be made to ensure the helmet will protect the mountain biker in an accident:

- Adjust removable pads, if required, to make the fit firm and comfortable.
- Centre the chin clip so it is just under the chin and so the strap is even on both sides. This is done by pulling the strap from one side to another through the underside of the helmet.
- Adjust the side straps by pulling or pushing them through the sliders. The slider should sit just below the ears forming a 'V'.

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- Use the rear adjuster (if there is one) by sliding the mechanism to make it bigger or smaller.
- Buckle the chin clip and ensure that no more than two fingers can fit under it.



"U.S. Consumer Product Safety Commission", CPSC Issues New Safety Standard for Bike Helmets. Retrieved October 30, 2007, from http://www.cpsc.gov/cpscpub/prerel/prhtml98/98062.html

Figure 3 Parts of a Helmet

SIZING A MOUNTAIN BIKE

While some manufacturers size their bikes by labelling them as small, medium, large and extra large, in most cases bike size is given in inches and is based on leg length. The size is determined by measuring the distance from where the crank attaches to the bike to the intersection of the seat tube and the top tube.

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"Dynamic Bicycles", Bike Sizing Guide, Copyright 2005 from Dynamic Bicycles, Inc. Retrieved October 31, 2007, from http://www.dynamicbicycles.com/bikes/sizing.php

Figure 4 Sizing Measurements

The following steps should be followed when sizing a mountain bike:

1. **Size by Eye.** The initial step in sizing a bike is to select a bike with a frame size that coincides with the height of the mountain biker.

2. **Stand-Over Test.** The next step is to straddle the bike. There should be minimum five-centimetre (two-inch) clearance between the top tube and the crotch when the mountain biker is straddling the mountain bike.

3. **Saddle Adjustment.** Standing next to the bike, the mountain biker will adjust the saddle height to just above their hip by opening the seat post release, raising or lowering the saddle, then closing the release. The mountain biker will then sit on the saddle, place their left foot on the pedal with the ball of the foot over the centre of the pedal. The left leg should be almost perpendicular, without the knee locking.



It is important for cadets to label their bikes and helmets after they have been selected and adjusted. This can be done by using a different colour of gear or masking tape for each team/group. On the bike it is best to wrap the gear tape around the left side of the handlebar and then using a permanent marker place the cadets' initials on the tape. On the helmet, wrapping the tape around one of the side straps on the inside will work. Ensure that the cadets initials are on that as well.

Note: It is best to have assistant instructors help with the labelling.

CONFIRMATION OF TEACHING POINT 3

Selecting and adjusting a helmet and a mountain bike will serve as the confirmation for this TP.

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Teaching point 4 **Explain, Demonstrate and Have the Cadet Practice the Procedure for Completing a Pre-Ride Bike Check Using the ABC Quick Check Method**

Time: 10 min Method: Demonstration and Performance



For this skill, it is recommended that instruction take the following format:

(1) Explain and demonstrate a pre-ride check while the cadets observe.

(2) Explain and demonstrate each step of the pre-ride check. Monitor the cadets as they practice each step.

(3) Monitor the cadets' performance as they practice a complete pre-ride check.

Note: Assistant instructors may be used to monitor the cadets' performance.



When demonstrating the pre-ride check, have the cadets seated away from the bikes to ensure they are paying attention.



The cadets should don their helmets prior to completing any steps of the pre-ride check. This will ensure that no cadet will ride their bike without a helmet.

Mountain biking is incredibly hard on the bikes and equipment. Before the start of a ride it is important to run through a pre-ride check to ensure the mountain bike is in the best possible condition for riding. It may seem redundant to do this before every ride, especially when a post-ride check was completed; however, it only takes one broken cable or one flat tire to ruin a ride.

The ABC Quick Check is an easy way to remember what parts of the bike should be checked during a pre-ride check. The check is a series of questions that the mountain biker must ask themselves, in relation to five areas of the mountain bike. The ABC Quick Check should be practiced so that it can be done quickly and efficiently. The mountain biker will correct any minor issues at the time of the pre-ride check; any major issues, or those that require a bike tool, will have to be brought to the attention of the ride leader for further attention.

AIR

The first step in the ABC Quick Check begins by focusing the mountain bikers' attention on the wheels and tires of the bike.

Do the Tires Have Enough Air?

This can be checked using a bicycle pump that has a built-in tire pressure gauge. The tire pressure for mountain biking should not be below 35 pounds per square inch (psi) (240 kpa) and not above 65 psi (448 kpa).



When pumping the tires, the cadets should aim to ensure that the tire pressure is between 45–50 psi (310 kpa – 345 kpa). This will allow for a variety of trail conditions.

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Different trail conditions require different tire pressures. Harder surfaces are easier to ride with harder tires; 50–65 psi (345 kpa – 448 kpa), and conversely, softer surfaces are easier with softer tires; 35–40 psi (240 kpa – 275 kpa).

Is There Any Excessive Wear on the Tread or Any Cuts on the Sidewalls of the Tires?

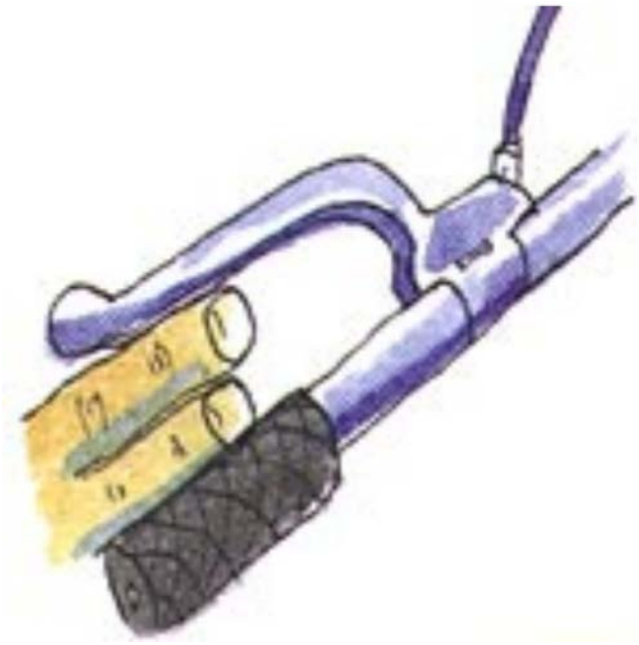
Any loose or engrained mud or debris that is lodged into the tread should be removed. This will help eliminate the possibility of sharp objects working their way through the tire casing into the inner tube, causing a flat.

BRAKES

The mountain biker will now inspect the front and rear brakes of the bike. It is important to spend time on the brake levers, as well as the actual braking mechanism.

Do the Brake Levers Work Effectively?

There should be at least two finger's width of distance between each brake lever and the handlebar when pulled. It should require little effort to engage the brake lever. If it is hard to pull then the brake cables require adjustment.



"Ministry of Transportation Ontario", Young Cyclists Guide, Copyright 2005 by Government of Ontario. Retrieved November 5, 2007, from http://www.mto.gov.on.ca/English/pubs/cycling/youngcyclists.htm

Figure 5 Brake Lever Positioning

Do the Brakes Function as They Are Supposed to?

The front and rear brakes should be checked independently. The mountain biker should stand beside the bike and push it forward by the handlebars. When the front brake lever is pulled, on its own, the rear wheel should lift up as the front wheel locks. When the rear brake lever is pulled, on its own, the rear wheel should lock and slide across the ground.

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CHAIN AND CRANK

The chain and crank are what make the bike move forward. If they are not in good working order then the bike will be difficult to manoeuvre and will most likely not get very far.

Is the Chain On and Lubricated?

The chain should be able to move freely around the front and rear sprockets when the pedals are moved with no visible signs of bends or kinks. There should be no evidence of rust on the chain. If there is, an application of lubricant should work out the rust.



"Ministry of Transportation Ontario", Young Cyclists Guide, Copyright 2005 by Government of Ontario. Retrieved November 5, 2007, from http://www.mto.gov.on.ca/English/pubs/cycling/youngcyclists.htm

Figure 6 Lubricating the Chain

Do the Pedals Spin Freely?

The mountain biker should lift up the rear wheel and move the pedals with one hand to check the functionality.

QUICK RELEASE

Quick release levers are located on the front and rear wheels, as well as the seat post.

Are the Wheel Quick Releases Working?

Open and close both the front and rear tire quick release levers. They should be easy to open and close. If not, lubricant can be applied. Ensure that they are fully tightened following the check and that the lever is flush with the fork of the bike.

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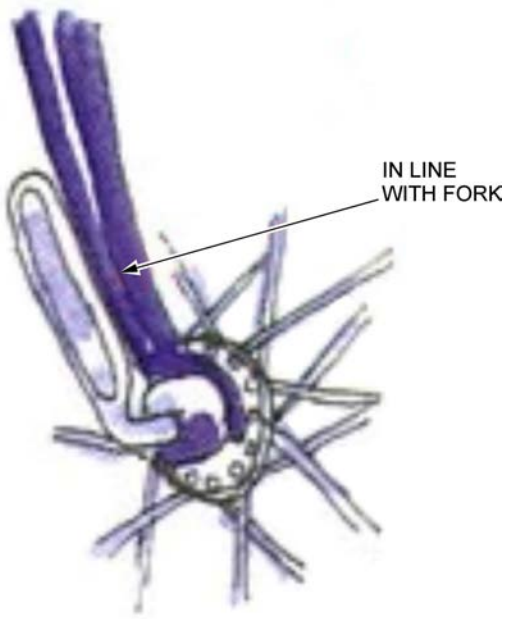
Figure 7 Quick Release Incorrect Position – Example 1



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Figure 8 Quick Release Incorrect Position – Example 2

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Figure 9 Quick Release Correct Position

Is the Saddle Quick Release Working?

Open and close the lever to ensure that it is in good working order. It should be easy to open and close. If not, lubricant can be applied. When closed the lever should be flush with the seat post, pointing towards the back of the bike.

FINAL CHECK

Finally, the mountain biker should complete a final check of their bike. The bike should be lifted five to seven centimetres (two to three inches) off the ground and then dropped in a controlled manner. When it drops the mountain biker should be listening for sounds associated with loose parts (clings/clangs/pings).

CONFIRMATION OF TEACHING POINT 4

The cadets' participation in completing a pre-ride check of a mountain bike will serve as the confirmation of this TP.

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Teaching point 5 **Explain and Demonstrate Safety Precautions Which Must be Adhered to When Mountain Biking**

Time: 10 min Method: Demonstration



For this TP, it is recommended that instruction take the following format:

(1) Discuss the rules of the road.

(2) Demonstrate all three (left, right, stop) hand signals while cadets observe.

(3) Discuss ride discipline.

(4) Demonstrate riding distances and stopping procedures.

Keeping safe on mountain bikes is part common sense and part informed risk-taking, together with a healthy dose of good judgment. Prevention of injury is far easier to deal with than seeking medical attention after the fact. Following basic trail and road safety rules will ensure that the ride is safe, not only for the mountain biker but for all trail users.



Investigate the specific rules and regulations associated with bike safety for your province or territory to pass along to cadets in conjunction with the material presented in this TP.

Each province and territory has specific rules and regulations in relation to bike safety. Bikes are the smallest vehicles on the road which makes it very important for mountain bikers to be as visible as possible to other road users at all times.

RULES OF THE ROAD

Each province has specific rules of the road which form laws within the province. In Ontario, these rules are stated in the *Highway Traffic Act* (HTA).

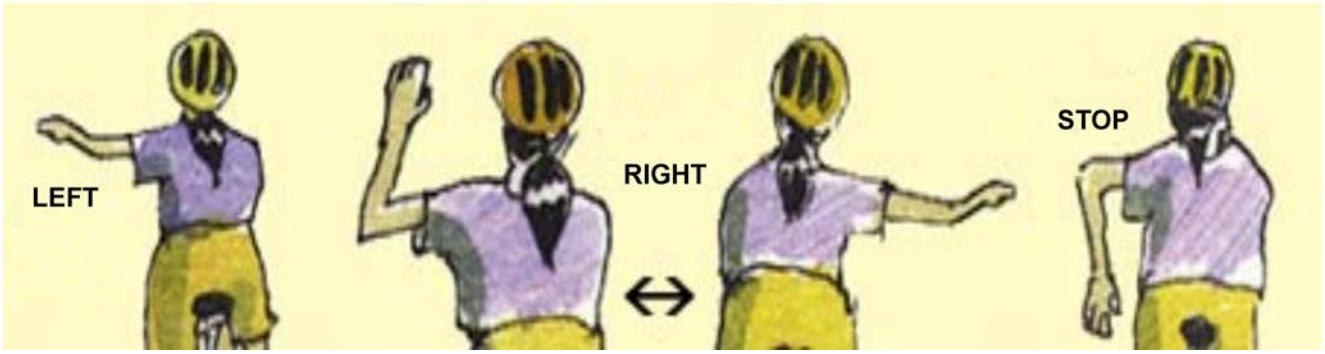
Some important rules that mountain bikers should know are:

- A bike is a vehicle and as a mountain biker, the same rights and responsibilities apply as to other road users.
- Stop at red lights and stop signs, and travel in the designated direction on one-way streets.
- A bike is a slow vehicle and must travel as far to the right as possible, except when preparing for a left turn or passing. Ride out from the curb far enough to maintain a straight-line path.
- Never compromise safety for the convenience of a motorist; use any part of a lane if safety of the mountain biker requires it.
- Stop for pedestrians at crosswalks, and walk the bike across crosswalks.
- Stop for school buses when the upper red lights are flashing and the stop arm is out.
- Stop 2 m (6.5 ft) behind streetcar doors and wait until the passengers have boarded or reached the curb.
- Do not attach a bike to a vehicle to hitch a ride.
- Do not ride on expressways, freeways or on roads where “No Bicycle” signs are posted.
- Mountain bikers must correctly identify themselves when stopped by the police for breaking traffic laws.

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SIGNALLING

When riding a bike on the road it is important to ensure that drivers of motor vehicles are aware of the mountain bikers' direction of travel at all times. Making a surprise turn in front of a car is dangerous to both the mountain biker and the driver. Demonstrating proper hand signals will help to eliminate some of the risk associated with riding a bike on roadways.



"Ministry of Transportation Ontario", Young Cyclists Guide, Copyright 2005 by Government of Ontario. Retrieved October 5, 2007, from http://www.mto.gov.on.ca/English/pubs/cycling/youngcyclists.htm

Figure 10 Hand Signals

RIDE DISCIPLINE

Whether riding a bike on the side streets of town or on a double track in a conservation area, demonstrating awareness for the other mountain bikers will ensure that everyone has a safe ride. Ride discipline is a multi-faceted term that coincides with a variety of aspects of mountain biking, from personal and group organization, to stopping and starting procedures.

Riding in a group is one of the safest ways to ride. It is important to remember that each mountain biker is responsible for the person following them. Always have visual contact with the mountain biker behind. If when looking back the other mountain biker is not visible, stop and wait for a moment. If the mountain biker does not appear in a reasonable amount of time, call a halt to the mountain bikers ahead, and go back and look for the other mountain biker.

There are a few safety tips to keep in mind when travelling in groups:

- Ride in single file on roads and trails as much as possible.
- The lead mountain biker must communicate turns, obstacles and changes in momentum to the remainder of the group through hand signals and voice commands.
- Keep at least 1 m (3.2 ft) between mountain bikers in the group on flat ground.
- When descending hills, keep at least 3 m (9.8 ft) between mountain bikers.
- When ascending hills, stay in single file and keep to the right.
- When stopping, ensure that the entire group is completely off the trail or road.
- When stopped, all group members should get off their bikes, turn bikes so they are facing the road, close in ranks and stand to the left of their bikes.
- If travelling on roads in a large group, break into smaller groups of about 10 with at least 1 km (.62 miles) between each group to allow traffic to pass.
- Road crossings should be completed with the group lining up parallel to the other side of the road and then, in-line, walking their bikes across.

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CONFIRMATION OF TEACHING POINT 5

QUESTIONS

Q1. The rules of the road are found in what document?

Q2. When making a left hand turn what hand signal should be used?

Q3. When riding in a group how should you cross a road?

ANTICIPATED ANSWERS

A1. They are found in provincial regulations.

A2. The left arm should be extended straight out from the body.

A3. Road crossings should be completed with the group lining up parallel to the other side of the road and then, in-line, walk their bikes across.

Teaching point 6 — **Explain, Demonstrate and Have the Cadet Practice Mountain Bike Techniques**

Time: 55 min — Method: Demonstration and Performance



The cadets should be standing beside and to the left of their bikes with their helmets on, in a large semicircle when presented the demonstration portion of each skill.



When the cadets are practicing each individual technique, it is important to set clear and defined boundaries of where they are to ride. It is also important to give specific time limits for each practice phase and a signal for the cadets that tells them to return to the main teaching area and reform the semicircle for further instruction. This could be a whistle blast. Establish signals before the demonstration and ensure cadets know what action is required.



Mountain bike techniques should be presented using the following format:

(1) Explain and demonstrate each technique while the cadets observe.

(2) Explain and demonstrate the steps for each technique in the following order – mounting, braking, dismounting, gearing, ascending hills and descending hills – while the cadets observe. Ascending and descending hills can be demonstrated concurrently.

(3) In a controlled manner, have the cadets practice the steps for all skills. Changes from step to step and technique to technique should be on the command of the instructor.

(4) Monitor the cadets as they practice all techniques.

Note: Assistant instructors may be used to monitor the cadets' performance.

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MOUNTING

The straddle mount is the most common way to mount a bike. It is always advisable that the bike is in a low, easy gear prior to attempting to mount it.



It is recommended that the mountain biker start the mounting procedure with their non-dominant side. If they are right-handed then they should start with the left pedal. If left-handed then they should start with the right pedal.

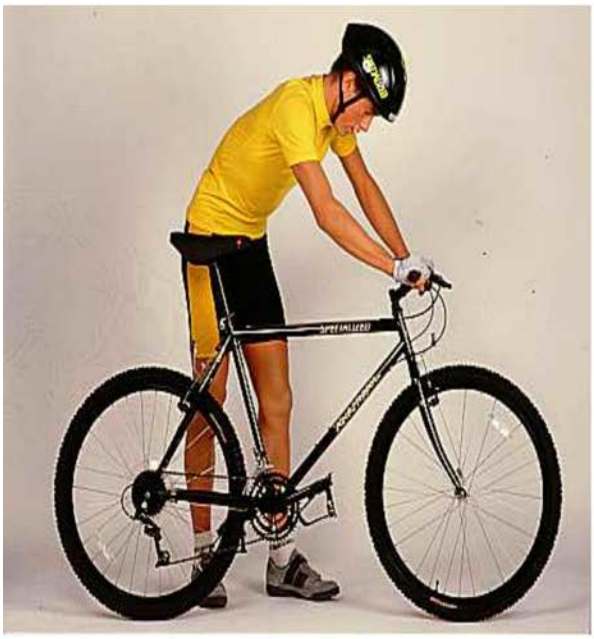


Instructions for the cadets who favour the left leg are in brackets.

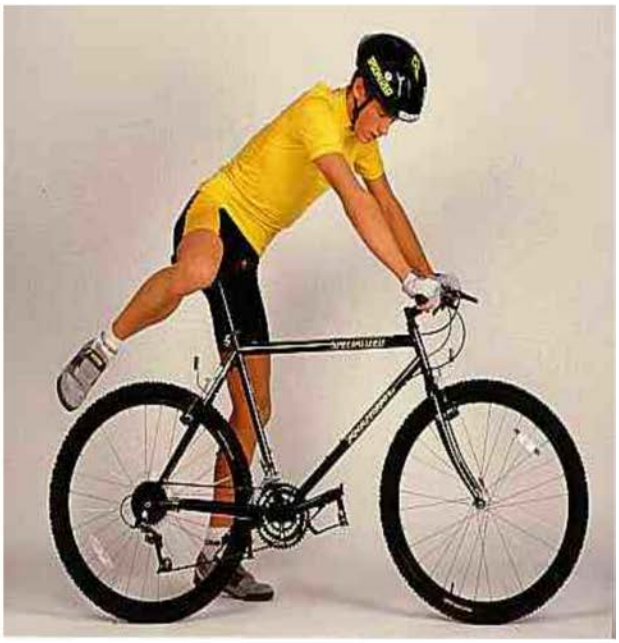
The steps for completing a straddle mount are as follows:

1. Stand to one side of the bike with hands firmly on the handlebars.
2. Lift the right (left) leg over the saddle and straddle the bike.
3. Move the right (left) pedal into the three o'clock position.
4. Place the left (right) foot securely on the left pedal and then hop onto the saddle and push forward.
5. Once moving forward, place the right (left) foot onto the right (left) pedal and keep pedalling.

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STEP 1



STEP 2



STEP 3-5

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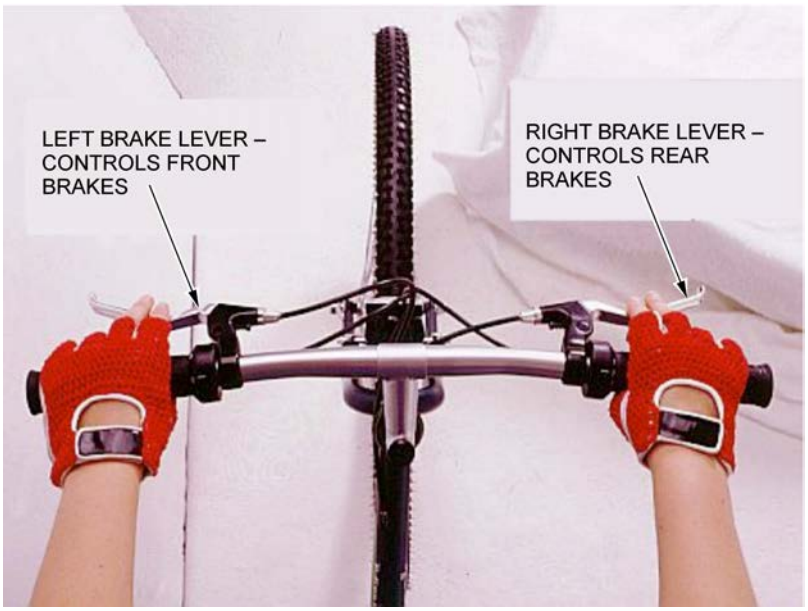
Figure 11 Straddle Mount a Bike

BRAKING

Braking is used not only for stopping, but for slowing down and controlling the bike through technical portions of the trail. It is important for a mountain biker to be able to judge the amount of pressure to use and when to brake for various situations while on the roads and trails. This knowledge will ensure personal safety as well as the safety of other mountain bikers and trail users.

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The left hand brake lever controls the front brake while the right hand lever controls the rear. Most braking is completed by the right hand, rear brakes, with the left adding assistance as required.



"DK Images", Sports, Games, Recreation, Mountain Biking, Copyright 2007 by DK Limited. Retrieved November 5, 2007, from http://www.dkimages.com/discover/Home/Sports-Games-Recreation/Outdoor-Adventure/Mountain-Biking/index.html

Figure 12 Braking Hand Position

DISMOUNTING

The straddle dismount is the most common and safest dismount.

The steps to complete a straddle dismount are as follows:

1. Prepare to stop by applying the brakes to slow down the bike.

2. While coasting, remain seated in the saddle.

3. Place the left (right) pedal into the six o'clock position.

4. Remove the right (left) foot from the right (left) pedal and place it on the ground slightly to the outside of the pedal.

5. Once the bike has come to a complete stop, slide forward off the saddle and place the left (right) foot onto the ground.

6. Swing the right (left) leg over the back of the bike.



Mountain bikers should be cautioned against using the left brake lever by itself. While this will stop the bike, the forward momentum may cause the mountain biker to continue over the front of the handlebars and bike, resulting in a possible injury.

GEARING

Terrain can change quickly when mountain biking. The ability to time a perfect gear shift is a crucial mountain bike technique to master. Smooth shifting makes the difference between a smooth, easy ride and a rough, hard ride. Gear components are equipped with pre-set gears and ramps built into the chainrings and cogs to

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help the chain move smoothly from one to another. The mountain biker has to shift to the correct gear at the appropriate time.

Gearing adjusts the pedalling load so the mountain biker can adapt to changes in terrain. A gear is described by the number of teeth on the sprocket that is being used.

Gear Ratio

The gear ratio is the relationship between the front chainring and the rear cassette being used. If the chainring and the cog have the same number of teeth, than the rear wheel would turn once for every pedal stroke and the ratio would be 1 : 1. If the chainring has more teeth than the cog, for example, 34 versus 17, then the ratio would be 2 : 1 and the rear wheel would revolve twice for every pedal stroke. There can also be negative gear ratios where the rear cog has more teeth than the smallest chainring, which makes the rear wheel turn slower than the pedal stroke.



FRONT CHAINSET REAR CASSETTE

"DK Images", Sports, Games, Recreation, Mountain Biking, Copyright 2007 by DK Limited. Retrieved November 5, 2007, from http://www.dkimages.com/discover/Home/Sports-Games-Recreation/Outdoor-Adventure/Mountain-Biking/index.html

Figure 13 Front Chainset and Rear Cassette

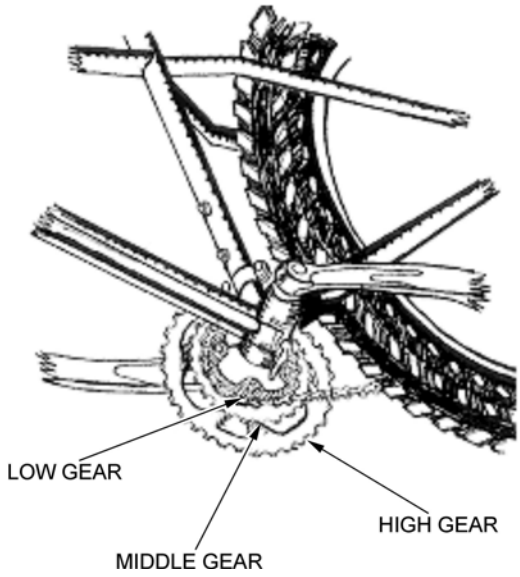
Typically, mountain bikes have two or three chainrings in the front and seven to nine cogs in the back. Each of these sprockets is attached to a numerical value, which corresponds to the numbers on the gear shifting mechanism attached to the handlebars.

Chainset

The chainset is numbered one through three. The biggest chainring in the chainset – three – is located on the outside of the set while the smallest chainring in the chainset, one, is located on the inside of the set.

The bigger chainring in the chainset is used for flat terrain, high speeds, downhills and road pedalling. The middle chainring in the chainset is for most off-road situations including single track, small hills and bumpy downhills. The smallest chainring in the chainset is used for steep uphills and very difficult technical terrain.

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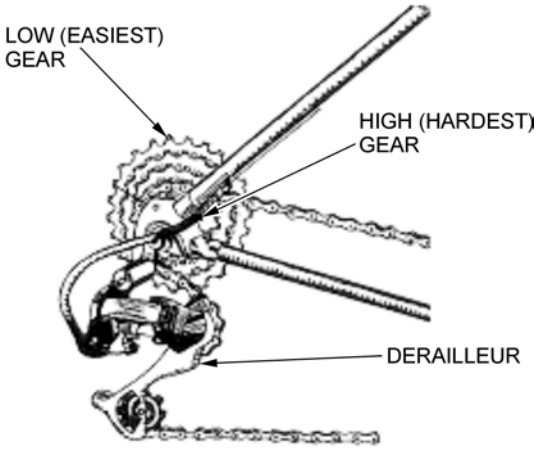


"Gorp", Your First Mountain Bike Moves: Shifting Gears, Copyright 2007 by Orbitz Away LLC. Retrieved November 7, 2007, from http://www.gorp.away.com/gorp/publishers/menasha/how_ride5.htm

Figure 14 Front Chainset

Cassette

The cassette is numbered one through nine from the inside, closest to the frame, to the outside. The inside cogs, the larger sprockets, equal the low and easiest gears which are primarily used to climb hills and when traversing uneven terrain. The outside, smaller sprockets, equal the highest and hardest gears which are used to gain speed on flat terrain.



"Gorp", Your First Mountain Bike Moves: Shifting Gears, Copyright 2007 by Orbitz Away LLC. Retrieved November 7, 2007, from http://www.gorp.away.com/gorp/publishers/menasha/how_ride5.htm

Figure 15 Rear Cassette



The bike chain should never be in the big rings on the front and rear at the same time. It places an enormous amount of tension on the chain as it moves the chain from a straight to a diagonal line.

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Shifting Gears

As with braking, the left gear shifter controls the chainrings on the front chainset, while the right gear shifter controls the cogs on the rear cassette. When the gear shifter is pushed, the derailleur, front or rear, will move the chain from one sprocket to another.



"2 Wheel Bikes", Suspension Mountain Bikes. Retrieved November 7, 2007, from http://www.2wheelbikes.com/suspension-mountainbikes/sm3000-mountain-bike.html

Figure 16 Right Gear Shifter

All mountain bike gears are indexed which means that they are pre-set and will click into place when the gear lever is activated. Most bikes have a visual indicator on both sides, which shows what gear the bike is in.

Pushing the gear shifter moves the chain onto a bigger chainring or cog, because the movement is against the spring tension in the derailleur. The mountain biker will have to push the lever further than the resting point so that the chain can make it up onto the bigger chainring or cog. This is done with the mountain biker's thumb, because it is stronger than the index finger.

Changing to the smaller chainrings or cogs is an easier motion because the lever is releasing the spring tension, letting the derailleur fall naturally into position. These gear changes are completed using the mountain biker's index finger to pull the lever forward.

It is possible to change more than one gear at a time. This is done through either a series of several clicks or one movement depending on the type of gear shifting mechanism the bike uses.

There are several important points to remember when gearing:

- Gears cannot be changed if the pedals are not moving.
- Cogs are used for small changes in speed, like when the mountain biker is climbing a long steady hill.
- Chainrings are for bigger changes in speed, such as descending the summit of a hill.
- The ideal gear to begin biking is somewhere in the middle of the cassette, four or five, and the middle chainring.

ASCENDING HILLS

Climbing hills is a challenge when mountain biking and the mountain bike has been specifically designed to meet this challenge. Its broad, grippy tires, the position of the mountain biker over the back wheel and the increased number of gears give the mountain bike the technical ability to ascend hills.

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A mountain bike can handle inclines close to 45 degrees on badly broken ground.

Being able to ascend a hill is influenced by two factors – power and balance. Balance is gained through awareness and practice, while power is gained through repetition of the skill and muscular and cardiovascular strength.

There are factors that affect the mountain bikers' technique while attempting to ascend a hill.

Position

The centre of gravity of a bike and the mountain biker is located at the mountain biker's abdomen. When climbing a hill, the centre of gravity must move forward on the bike to enable the mountain biker to keep their balance. The mountain biker should pull their body weight forward on the bike as the climb gets steeper, otherwise the front tire will not have enough weight on it and will lift up, resulting in a fall.

Centre of gravity is the point where all the weight of an object is concentrated.



T. Brink, The Complete Mountain Bike Book, Ragged Mountain Press (p. 51)

Figure 17 Proper Ascent Position

While it may seem easier to stand up from the saddle when climbing hills, it in fact requires more power and expends more of the mountain biker's energy. Keeping the body low and forward on the saddle is a much more effective climbing position.

Gearing and Shifting

Depending on the steepness of the hill, it is acceptable to have the front chainset on the middle chainring, index two. The rear cassette is more dependent on the grade of the hill. It is advisable, when approaching

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a hill to begin shifting down into a medium intensity gear, perhaps four or five. Once the mountain biker has begun the ascent they will have to continue to lower the cogs in relation to their ability to maintain pedal power. Remember that in order to change gears, the pedals have to be moving and the more steep the incline the harder it will be to pedal.

DESCENDING HILLS

Descending is about letting gravity do the work, while the mountain biker concentrates on braking and distributing weight. It becomes a combination of balance and applying the brakes at the correct time. Mountain bikers must always think ahead and be aware of rough terrain, corners, obstacles and other mountain bikers that may be on the trail. It is critical to apply the brakes to move around or by disturbances, but not too much will completely lose the momentum from the hill.

Position

When descending a hill it is critical that the centre of gravity of the mountain biker does not fall more than halfway down the top tube of the bike. If it does, the mountain biker may go over the handlebars. The mountain biker should move their body weight towards the back of the bike, be as low as possible and extend their arms so they are almost straight in front of them. Depending on the steepness of the hill, the mountain biker may want to slide their bottom off and behind the saddle for further stability.



"2 Wheel Bikes", Suspension Mountain Bikes. Retrieved November 7, 2007, from http://www.2wheelbikes.com/suspension-mountainbikes/sm3000-mountain-bike.html

Figure 18 Proper Descent Position

Gearing and Shifting

Gearing and shifting are not as critical when descending hills as they are in ascending hills. The key thing to remember is that descending hills provides momentum, and speed must be maintained once the hill has ended. To do this, think ahead and shift into gears that will provide the most momentum. The front chainset should be in the biggest chainring and the rear cassette should be in the highest gear, eight. It may be necessary to shift to lower gears once the momentum from the hill begins to slow and pedalling gets harder.

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Speed must be controlled when descending hills, with the mountain biker applying equal brake pressure, as required, on both the front and rear brakes. The mountain biker's hands must remain on the brake levers for the duration of the descent and should be ready to break at all times.

CONFIRMATION OF TEACHING POINT 6

The cadets' participation in the practice of each mountain bike technique will serve as the confirmation of this TP.

Teaching point 7 — **Have the Cadet Practice Mountain Bike Skills and Techniques During an Expedition**

Time: 45 min — Method: Practical Activity

ACTIVITY

OBJECTIVE

The objective of this activity is for the cadets to participate in a practical expedition activity to practice mountain bike skills and techniques in a controlled environment for an extended period of time.

RESOURCES

- Mountain bike equipment, to include:
  - Mountain bike (one per cadet),
  - Helmet (one per cadet),
  - Bell or horn (one per mountain bike),
  - Lights and reflectors,
  - Water carrier (one per cadet),
  - Day pack (one per cadet); and
- Topographical map of area (one per team/group),
- Compass (one per team/group),
- Whistle (one per cadet),
- Communication device (two per team/group),
- GPS Receiver (one per team/group),
- Batteries (spares for communication device and GPS),
- First aid kit (one per team/group), and
- Bike maintenance tool (one per team/group).

ACTIVITY LAYOUT

Designated novice mountain bike trail route.

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ACTIVITY INSTRUCTIONS

1. Have the cadets retrieve their bikes and helmets.

2. Have the cadets conduct a pre-ride check for no longer than 10 minutes.

3. Conduct a mountain bike phase of the practical expedition activity, following the designated route to practice:

    a. mountain bike techniques, to include:

        (1) mounting;

        (2) braking;

        (3) dismounting;

        (4) gearing;

        (5) ascending hills; and

        (6) descending hills; and

    b. riding formations, and

    c. communication skills.

4. Upon arrival at the end point, instruct TP 8 and then have the cadets store their bikes and helmets.

SAFETY

- Each group will have a cadet wearing a reflective vest in both the front and back.
- Road- and trail-riding rules must be reviewed with the cadets prior to the commencement of the ride.
- The cadets must travel in single file at all times.
- The cadets must use road hand signals.
- All the cadets must have at least 500 mL (16 oz) of water.

CONFIRMATION OF TEACHING POINT 7

The cadets' participation in the activity will serve as the confirmation of this TP.

Teaching point 8 **Explain and Demonstrate the Procedure for Completing a Post-Ride Bike Check**

Time: 5 min Method: Demonstration and Performance



This TP can be instructed following the biking phase of the practical expedition activity. The instructor should first demonstrate the procedure on their bike and then have the cadets complete a post-ride bike check on their own bike.

Proactive maintenance can reduce the chances of trail side breakdowns. It is the mountain biker's responsibility to ensure the bike is road/trail ready. The initial step in this process is through the implementation of the pre-ride bike check. While the pre-ride check is important, it is just as important to complete a post-ride check.

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A post-ride check consists of:

- cleaning; and
- assessing for repairs.

CLEANING

Mountain biking can be a dirty sport. While riding through mud, dirt and water on the trails is part of the experience, if left on the bike long term they can effect the technical components of the mountain bike. Regularly cleaned parts last longer. The following steps should be taken when cleaning the bike:

1. Hose the bike down to get as much mud and dirt off as possible.
2. Turn the bike upside down, wipe down the tires.
3. Using a stuff brush clean all excess dirt and grease off the rear cassette and the front chainset.

ASSESSING FOR REPAIRS

A final quick assessment of the bike should be completed to ensure that nothing requires maintenance before the next time the bike is used. Some key issues to look for include:

- frayed or damaged cables,
- unevenness in the cable and lever system of the brakes; the brake lever should not be able to touch the handlebar,
- cuts in the sidewalls of the tires, and
- wear, cuts and missing knobs on the tires.

CONFIRMATION OF TEACHING POINT 8

The cadets' participation in completing a post-ride check of a mountain bike will serve as the confirmation of this TP.

END OF LESSON CONFIRMATION

The cadets' participation in the practical expedition activity will serve as the confirmation of this lesson.

CONCLUSION

HOMEWORK/READING/PRACTICE

N/A.

METHOD OF EVALUATION

This EO is assessed IAW A-CR-CCP-703/PG-001, Chapter 3, Annex B, Appendix 8 (326 PC).

CLOSING STATEMENT

Mountain biking is one of three dynamic modes of transport that can be used during expedition training. It is critical that the cadets understand the importance of maintaining a mountain bike and riding it safely. Being able to perform mountain bike techniques will allow the cadets to have an enjoyable and safe experience during the biking phase of the practical expedition activity.

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Verify against the official publication.

INSTRUCTOR NOTES/REMARKS

Expedition centres are required to select two dynamic modes of travel from EO M326.02a (Paddle a Canoe, Section 2), EO M326.02b (Ride a Mountain Bike), and EO M326.02c (Hike Along a Route, Section 4) to incorporate into their weekend training.

This EO has been allocated five and a half periods in the overall course period allocation. Each expedition centre may adjust this allocation to reflect the choice of activities, facilities and available resources at the expedition centre.

Upon arrival at the expedition centre cadets will be broken into teams/groups. These teams/groups will remain the same for the duration of the weekend.

IAW A-CR-CCP-930/AG-001, the following equipment is required for the familiarization ride:

1. reflective vest (worn by the person in the rear of the group),
2. topographical map of the area (if unfamiliar),
3. compass,
4. first aid kit,
5. communication device (cellular phone or hand-held radio), and
6. basic bike repair kit.

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