

CANBIKE II Course Material Index	2
The Usual CANBIKE II Itinerary.....	3
CANBIKE II Reading List.....	4
Traffic & Cycling Principles this course is based on.....	5
Effective Cycling Notebook-Reasons For Riding On The Right	6
E.C. Notebook-A Beginner's Guide To Efficiency On The Bike.....	7
EFFICIENT GEARING Adapted From TCCC CB Instructors Manual	8
Six points to consider about your body, cadence and efficient cycling.	9
Tips on Cadence.....	9
GEARS INCH FORMULA & CHART	9
E.C. Notebook-Lane Positioning 1 or Attitude Adjustment by Susie Jones	11
E.C. Notebook-Lane Positioning 2 by Susie Jones.....	12
Effective Cycling Notebook-Rock Dodge by Susie Jones	13
E.C. Notebook-Instant Turns by Susie Jones.....	14
Effective Cycling Notebook-Panic Stop by Susie Jones	15
E.C. Notebook-Good Cyclists-Bad Choices By Susie Jones.....	16
E. C. Notebook-Do You See What I See by Susie Jones	19
Tips for Riding in Traffic by Bruce Mol	21
Bicycling Accidents, Incidents, Collisions and Statistics	23
BIKE INJURY FACTS From the Canadian Bike Helmet Coalition.....	24
Canadian Bike Helmet Coalition (613) 224-4144	24

Contents of CANBIKE II Course Material Index

Please print out the index and following pages, read them, do the homework and bring them to classes with you.

CANBIKE II Itinerary	What we do and when we do it over the course of 18 to 20 hours. Usually beginning on a weeknight, meeting again on the weekend, another weeknight and the final weekend.
Reading List	Relevant chapters in 'Effective Cycling.'
Principles	The five traffic & cycling principles this course is based on.
Reasons For Riding On The Right	Ammunition for those times you need to convince a friend, neighbour, child or co-worker why this is such an important aspect of safe bicycling.
A Beginner's Guide To Efficiency On The Bike	An incomprehensive-nutrition, stretching, weather and other factors influencing efficiency
Gear Use and Gear Inches	How to exert nearly the same amount of pedalling effort whether you are riding up a hill, down a hill or on the flats, taking into consideration wind and road surface.
Lane Positioning 1 by Susie Jones	Intersections are where most bicycle crashes occur, but many of them can be avoided.
Lane Positioning 2 by Susie Jones	Executing a left turn on a bicycle in a busy intersection evokes fear in the minds of many cyclists.
Lane Positioning Homework	Prepare for class.
Rock Dodge by Susie Jones	The ability to execute an evasive manoeuvre could mean the difference between a close call and a serious, or fatal accident.
Instant Turns by Susie Jones	You have three choices: hit the car; execute a panic stop; or turn onto the cross street.
Panic Stop by Susie Jones	There is an art to effectively stopping a bicycle in an emergency.
Good Cyclist, Bad Choices by Susie Jones	It is not uncommon to see experienced cyclists make the following well-intentioned mistakes.
Group Riding by Franklin Prosser	There is a certain cycling etiquette, or rules of the road, which you should be aware whenever you cycle in a group.
Do You See What I See by Susie Jones	The Great Mirror Debate.
Tips for Riding in Traffic by Bruce Mol	Understanding traffic movement, where and why accidents occur, is the key to handling traffic on a bicycle
Statistics	Collision and Injury facts, from various sources, we'll be discussing.

The Usual CANBIKE II Itinerary

Night 1:- Your helmet is required-but your bicycle is not!

Introductions

Liability & Insurance Forms

Course description & expectations.

Lesson: 5 principles of traffic, intersection positioning, bike fit, helmet fit.

Homework: Read 'Group riding' in handouts,

Required reading from 'Effective Cycling'

Complete: Intersection Positioning in handouts.

Day 1:

Lesson: Accident statistics,

Rock dodge & emergency turns

Review: Intersection positioning & traffic principles

Communication & group riding

Intersection homework

Group Ride: Pre-trip inspection

1st ride

Rock dodge & Emergency turns.

Road side repairs: The flat tire

Review: 1st Ride & Emergency manoeuvres

Homework: Gear chart from your handouts.

Notes about riding days.

Meals: Lunch will be on the road. We usually stop at a restaurant. Bring your own lunch if you wish. We try to pick an open air restaurant where the bikes can have an eye kept on them. Get those lunch suggestions in early!

Competency: The Canbike instructors assume you have some competency in preparing yourself and your bike for trouble-free riding in any weather. Please ensure your bicycle is in good mechanical shape, fenders mounted, and suitable clothing for wet weather riding. (The lower mainland's normal weather!)

Night 2:

Your bicycle is not required!

Lesson: Efficient cycling

Nutrition

Gear inches from your homework sheet

Riding in the night, rain, heat & cold.

Lesson: Merges & diverges

Video: Effective Cycling-45 minutes.

Day 2:

Review: Merges & diverges.

Group Ride: Bridges, courier test route, road test, handling test.

Review: Rock dodge, Emergency turns. Anything!

Tests: Your final mark is the average of three tests

40 Question multiple choice written test based on the practice & principles of Effective Cycling.

Handling Test: How well you cycle.

Road Test: How well you did on the test route.

Marking exams, course evaluation, review of test.

A Certificate will be mailed to you within the month. 70% minimum to pass; 80% minimum to become a Canbike 2 Instructor.

These links are excellent addition sources of information

The Vancouver Cyclist - An Excellent Canadian CANBIKE site.

www2.portal.ca/vanbike/index.html

Riding with Ray Hall - An Excellent Canadian CANBIKE site.

www.gvcc.bc.ca/ridingwithray.htm

In Saskatchewan - An Excellent Canadian CANBIKE site.

www3.sk.sympatico.ca/borealis/enhanced/can-bike/index.htm

In Manitoba - An OK site. www.cycling.mb.ca/mca8can.htm

John Forester - Author of Effective Cycling. www.johnforester.com

League of American Bicyclists Home of Effective Cycling. www.bikeleague.org

CANBIKE II Reading List

CANBIKE 2 Reading List from John Foresters' "Effective Cycling" 5th or 6th edition. "Effective Cycling" is published by MIT press and is available at bookstores, libraries, MEC and Cycling BC. The order of the chapters compliments the CANBIKE 2 course agenda.

Before	Please Read Chapter
Night 1	26 Basic Principles of Traffic 27 The Why & Wherefore of Traffic Law 28 Accidents 29 Where to ride on the road 30 Avoiding straight road hazards 31 Changing Lanes 32 Riding at Intersections 36 Commuting & Utility Cycling (optional)
Day 1	1 Mechanical Safety & Operational Inspection 2 Bicycles, tools, equipment & clothing 3 Steering & Handling 4 Brakes 5 Gears (optional) 8 Tires & Pumps
Night 2	5 Gears, especially p.41-43 (5th ed.), p.68-70 (6th ed.) 10 Cleaning & Lubricating 13 Matching hubs to for ends 14 Adjusting derailleurs 16 Cranks & Chain wheels 17 Chains 18 Freewheels & Clusters 22 Basic Skills: Posture, pedalling & manoeuvring 23 Emergency Manoeuvres 24 Keeping your body going 33 Riding at night 34 Riding in the rain 35 Riding in cold weather 37 Mountain riding, especially p.243-246 (5th), 398-401 (6th) Optional: Ch.6 (5th) or Ch.42-49 (6th)
Day 2	All the above.

Traffic & Cycling Principles this course is based on

All drivers, regardless of the type of vehicle they drive, follow the same basic traffic principles. The size and speed of your vehicle may influence how you apply these principles, but the reason is the same.

To Reduce conflicts between road users.

1. Ride on the Right
2. Yield to Cross Traffic
3. Yield to New Lane Traffic
4. Destination Positioning
5. Speed Positioning

In greater detail:

1. Ride on the right side of the roadway, not the left, and not on the sidewalk. Cyclists who ride facing traffic are more vulnerable because other drivers do not expect wrong way traffic. Sidewalk riding is also very hazardous because each driveway or lane way becomes, in effect, an intersection.
2. How and when you yield to crossing traffic. When yielding , look both ways and proceed only when it is safe to do so. Drivers on minor roadways yield to those on main streets. At uncontrolled intersections, the driver who arrives last must yield. When drivers arrive simultaneously, the one on the left yields.
3. How and when you yield to same direction traffic. Every driver who wants to move into a new line of travel must yield to traffic already in that line.
4. Destination positioning at intersections depends on your intended direction beyond the intersection. At a simple intersection, start a left turn from or near the centre line and a right hand turn from near the curb. At a multiple lane intersection, choose the 'right most lane that serves your destination.'
5. Positioning between intersections depends on your speed relative to traffic and the usable width of the road. In a lane that is too narrow to share, ride far enough to your left to discourage motorists from overtaking un-safely. In wide lanes, if you are slower than traffic, ride on the right. If you are just as fast as traffic, take the lane.

Please read Chapter 26 of "Effective Cycling" by John Forester

Effective Cycling Notebook-Reasons For Riding On The Right

As a serious cyclist, you know to ride on the right hand side of the road, in the same direction as other traffic. If someone asked you why, though, would you know how to explain your reasons? This edition of the League's "Effective Cycling Notebook" offers ammunition for those times you need to convince a friend, neighbour, child or co-worker why this is such an important aspect of safe bicycling.

Fact: Wrong-way cyclists make up only five percent of bicycle traffic, but make up twenty-one percent of total car-bike collisions. Many people believe that they are safer riding against the traffic because they can "see what's coming"-but only four to six percent of all car/bike collisions involve a cyclist being struck from behind. Real safety comes instead from travelling on the road in the same predictable manner as other road users.

Reasons to Ride on the Right:

- ❑ Motorists expect to find other traffic on the right. Wrong-way cyclists are on the outside of normal searching patterns. This is especially important at intersections, where auto drivers may only be scanning where they expect to see other traffic.
- ❑ Turning manoeuvres for wrong-way cyclists are more dangerous and complicated because a cyclist must cross paths with so many other vehicles on the road.
- ❑ Wrong-way cyclists are in head-on conflict with cyclists who are riding correctly, which can result in a net speed of impact of over 40 miles per hour.
- ❑ The speed difference between a car and wrong-way cyclist in the same lane is much greater than for cyclist riding correctly. Any impact, therefore, will be much more damaging. In addition, approaching motorists have less time to respond to the presence of a wrong-way cyclist. A motorist has more time to react to a cyclist riding with traffic, and more time to plan to give the cyclist adequate room to share the road.
- ❑ Traffic control devices (such as stop lights, stop signs, and yield signs) and other important regulatory signs that apply to all road users can't be seen as easily by cyclists riding on the wrong side of the road.
- ❑ If you need additional motivation, the Vehicle Codes of all 50 states require bicyclists to ride on the right with the flow of traffic. There are exceptions to the strict rule of riding on the right, such as on one-way streets and when a cyclist is changing position to prepare for an upcoming manoeuvre.

For more information on these issues see "E.C. Notebook" #5 (July/August '93) and #6 (Sept. '93) on Lane Positioning; also see "E.C. Notebook" #10 (May/June 94), "How Far Right Is Right?" Note that even in these cases, however, the cyclist is still riding with traffic and not against traffic.

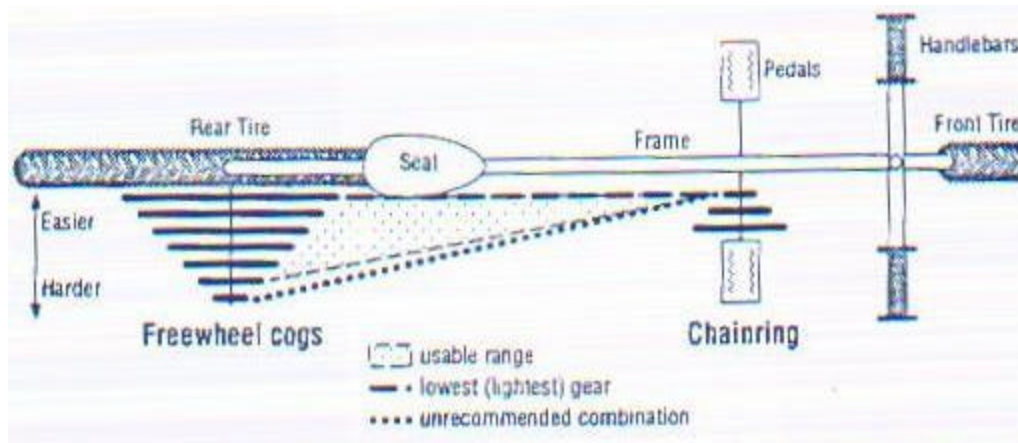
E.C. Notebook-A Beginner's Guide To Efficiency On The Bike

To most League members a "Beginner's Guide" may seem pretty basic, but the advice can sure come in handy for newcomers-so pass this page along to friends, relatives, co-workers and new bike club members. This list is not a comprehensive-nutrition, stretching, weather and other factors influencing efficiency-so consider an Effective Cycling class for more information.

- ❑ Gear Down- Spin, spin, spin! If you're a casual cyclist or new to the sport, there's a good chance you're pedalling in too high a gear, probably at 40-70 revolutions per minute (rpm). This stresses the knees and will cause you to fatigue faster than if you maintain a cadence a 70-100 rpms. It may feel unnatural to spin this fast, so increase your pedal cadence gradually. In time you'll notice how much more energy you have and you'll be saving yourself from future knee problems.
- ❑ No Bull- You know how a bull paws at the ground before it charges? That's what many cyclists look like when a light turns green. They push off the ground to get enough speed to balance and begin pedalling. Instead of doing the "bull dance," while stopped at the light put your weight on one foot and position the other pedal at the two o'clock position. When the light changes, push down on this pedal, and you'll have enough momentum to balance and begin pedalling. (If you use toe clips or cleats, wait until you are safely through the intersection before you clip in.)
- ❑ Lighten Up- Efficiency on the bike is influenced by how relaxed and comfortable you are riding. Assuming you are riding a properly sized and adjusted bike, maintain your comfort by changing hand positions often, keeping your elbows relaxed, and doing neck and shoulder stretches throughout your ride.
- ❑ Don't Rock and Roll- Many new cyclists ride with their saddle either too high (which causes a rocking motion) or too low (which causes knee problems). To get the most output from your pedalling, position your saddle so that when the ball of the foot is on the pedal at the bottom of the pedal stroke, there is a slight flex in the knee.
- ❑ Skip The Ol' Soft Shoe- Shoes designed for tennis, running and aerobics have cushioning built for shock absorption. When you wear these shoes for bicycling, much of your energy output is absorbed by that cushioning before it ever gets to the pedal. A bike shoe's firm sole, on the other hand, allows more of your pedalling to actually propel the bike. Toe clips go a step further with a cage attached to the pedal that you slip your foot into and tighten. A clipless pedal system offers the most technological advantage by "attaching" your foot to the pedal with special pedals and a cleated shoe.
- ❑ Red Light, Green Light- Accelerating up to a red light, just to have to stop and then start out again from a standstill uses a lot of energy. Rather than stopping and starting, time your arrival at an intersection (speeding up or slowing down accordingly) so that you can pedal right on through. If you do have to stop, though, then downshift first so you don't aren't trying to start out from a high gear. Over the course of a long ride, these small behaviour changes will reap significant energy savings.
- ❑ Safety note: Predictability is the key to safety when you're sharing a. Lane with motor traffic. Be aware of how your changes in speed impact other drivers.
- ❑ Avoid the wall- There is a well-known adage among cyclists to "eat before you're hungry and drink before you're thirsty." If you fail to follow this advice, you may reach a state of exhaustion known as "the wall," where fatigue and pain set in. Because of the severity of this condition, most cyclists only hit the wall once before learning their lesson.

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EFFICIENT GEARING Adapted From TCCC CB Instructors Manual



(image from TCCC CB Instructors Manual)

- ❑ Gearing allows you to maintain a constant degree of leg effort under such varying conditions as winds, hills and fatigue. Using gears in this manner may not make you go faster but you will use your bodies resources more efficiently.
- ❑ Developing a high cadence, how often you spin the crank arms per minute, is the key to efficiency. Most new comers to cycling spin at about 60 rpm. Experienced riders generally spin in the 80 to 90 rpm range.
- ❑ To spin a high cadence and not exhaust yourself in the effort, you must choose the correct gear that corresponds with your strength and endurance. You must train your body to accept a higher cadence by increasing your aerobic ability.
- ❑ Your strength affects what gear you choose to pedal at your chosen cadence. Closely linked is your aerobic ability to maintain that cadence over long periods. When riding with friends you may note some have the ability to climb hills in harder gears or maintain a constant high cadence without sign of exhaustion. Luckily our bodies respond well to training and repetition. To become better at maintaining a high cadence, ride at a high cadence until you are no longer comfortable at that level. Keep trying and your body will get better.
- ❑ When confronted with a long set of stairs, do you choose to run up the stairs two or three steps at a time, risking exhaustion before you get to the top, or do you pace yourself and climb the stairway one at a time? It depends what you want to achieve. Cycling is the same. Using your gears you can ease up a hill in small steps or proceed with monumental efforts. Potential exhaustion is not the only drawback to low cadence.
- ❑ Low cadence/big effort cycling is very hard on the knees. Certainly, when you use an easier gear, as in climbing steps one at a time, you will not be going as fast, but you last longer.

Six points to consider about your body, cadence and efficient cycling.

1. **Aerobic Fitness** - Spinning in an easy gear allows the body to use the aerobic metabolism for energy production. Energy stored in the body for this metabolic process are long lasting.
2. **Endurance** - Pushing a harder gear will force the body to use the anaerobic metabolism sooner. This metabolic system is not as efficient with your bodies resources. There is only about 10 minutes fuel supply for this type of metabolism and results in the introduction of lactic acid in the blood stream. A build up of lactic acid in the muscles creates a burning sensation and impedes fatty acids from entering the blood for use during the aerobic metabolic process. Your liver will eventually make use of the lactic acid but it takes a while.
3. **Logic** - You determine the effort to propel you from A to B. For a given distance, the more pedal strokes you make, the less effort required per pedal stroke and the less likely you are to fatigue.
4. **Comfort** - Riding with a smooth, fast cadence will make your legs supple and relaxed instead of stiff and tired.
5. **Reserves** - A fast spin keeps a reserve of power in your legs for when you need to sprint, out run a dog or climb a hill.
6. **Preparation** - Developing a good spin is an excellent base for improved fitness. Smarter riding will lead to increased aerobic ability. Muscle strength will follow if you continue to challenge the threshold of your abilities

Tips on Cadence

- ❑ To develop a smooth fast spin, think 'circles' as you spin the crank arms.
- ❑ Pull through the bottom of the stroke, like you were scraping mud off your shoes.
- ❑ Keep the pedal force light and your cadence high. Occasionally count your cadence or monitor it with a bicycle computer.
- ❑ Gear Selection - for people challenged by gear numbers and terminology
- ❑ Effort becomes 'easier' as the chain gets closer to the frame.
- ❑ 'Easier' is synonymous with 'low' or 'lighter' gearing.
- ❑ Use easier gears for uphill, headwinds or fatigue.
- ❑ AND effort becomes 'harder' as the chain moves further from the frame.
- ❑ 'Harder' is synonymous with 'high' or 'heavier' gearing.
- ❑ Use harder gears for tailwinds, down hills and speed.

GEARS INCH FORMULA & CHART

Adapted from TCCC CB Instructors Manual

What good are gear calculations ?

Once you know how to use your gear selector, you know how to find easier or harder gears. If your 'easiest easy' and or 'hardest hard' does not suit your cycling style, calculating the 'gear inches' will allow you quantify your needs. Calculating 'gear inches' of your entire set-up can help you identify unsuitable gears, gaps, repetitions and the shift pattern of your gearing.

- ❑ **Unsuitable Gears** - as described above, decrease your enjoyment of cycling. Gears are not low enough to allow you to get up

hills easily, or not high enough to allow you to pedal downhill with force.

- ❑ **Unsuitable Gaps** - are found, between your high and low gears. If a selected gear is too hard, but the next one is too easy, there is either a gap in gearing or you are not following the shift pattern of your set-up.
- ❑ **Repetitions** - your set-up may have duplicate gears, or a gear inch so similar to another gear they are essentially the same. Look for gear inches that vary at least three percent.

- Shift Pattern - Your set-up contains one linear shifting pattern to go from the highest to the lowest gear. Use the following formula to illustrate what your linear

shifting pattern is. Maybe the gear you thought was missing is close by on the another chain ring.

To determine gear inches you must know:

1. the diameter of the bicycle wheel in inches,
2. the number of teeth on the chain ring at the front,
3. the number of teeth on the rear cog.

$$\text{gear inches} = (\text{wheel diameter in inches}) \times (\text{\# chain ring teeth}) / (\text{\#rear cog teeth})$$

Touring Bike Example: 27 inch wheel (~700C) with a 52T chain ring and 13T rear cog.

$$27 \times 52 / 13 = 108 \text{ gear inches}$$

Mountain Bike Example: 26 inch wheel with a 46T chain ring and 13T rear cog. $26 \times 46 / 13 = 92$ gear inches

Typical Gear Inches Chart to determine Shift Sequence from Easiest (1) to Hardest (12) gears to spin.

Gear Inches and Shift Sequence				
42T Front Chain Ring			52T Front Chain Ring	
Rear Cog	Gear Inches	Shift Sequence	Gear Inches	Shift Sequence
13T	87.2		108.0	
14T	81.0		100.0	
15T	75.6		93.6	
17T	66.7		82.6	
19T	59.7		73.9	
21T	54.0		66.9	
23T	49.3		61.0	

Avoid Using Extreme Combinations

Extreme combinations wear the chain, chain ring and cog prematurely. As well, these combinations are hard for the derailleurs to manage. You may hear rubbing at the front and at the rear. Also, the chain may skip due to excess chain slackness.

Most people cannot feel a difference of less than 3 gear inches.

E.C. Notebook-Lane Positioning 1 or Attitude Adjustment by Susie Jones

The Effective Cycling (E.C.) Program is rooted in the theory that "cyclists fare best when they act, and are treated in return, as drivers of vehicles, with the same rights and responsibilities that the other drivers have." The group riding skills and emergency maneuver covered in the last four E.C. columns are important skills to master, but it is this vehicular cycling theory which governs all decisions made by effective cyclists. The theory is really an attitude, a strong belief in the rights cyclists have as legitimate users of this country's roadways.

If you have grown up believing that as a cyclist it is your responsibility to ride as far to the right as possible or that a two-ton car always has the right-of-way, it will take some time to change your attitude. Overcoming these feelings, which Effective Cycling author John Forester labels as the Cyclist Inferiority Complex will not happen overnight. It takes time to reverse the well-intended but misguided bicycling education most of us have received over the years.

In each issue of Bicycle USA this column offers practical suggestions to improve your safety and effectiveness on the bike. To feel comfortable executing some of the maneuvers, however you have to first believe in the vehicle cycling theory. An Effective Cycling Instructor (ECI) can help by broadening your cycling knowledge and offering numerous opportunities to practice on-bike skills. You can also learn more about the vehicular cycling and cyclist inferiority theories by reading Effective Cycling. To order a copy call L.A.W.'s toll-free merchandise line- (800) 288-BIKE.

Intersections are where most bicycle crashes occur, but many of them can be avoided. When you approach a multi-laned intersection, think about where you would position yourself if you were driving a car. You wouldn't be in the right-turn-only lane if you were continuing straight. And you wouldn't attempt a left turn from the right lane of a four-lane road.

Generally speaking, as a bicyclist, you should be in the right-most lane that goes in the direction you are travelling. As a bicyclist, though, you also have three positions within the lane

to choose from: the right third, the centre, and the left third. The specific portion of the lane depends on the distinct characteristics of the intersection.

The diagrams below* show correct lane positioning for a variety of different scenarios. Compare them to roads you travel in your regular rides. Are you where you're supposed to be?

E.C. Notebook #6 will delve into the factors involved in choosing the correct position for making left turns.

*Diagrams are in the CAN-BIKE Workbook

E.C. Notebook-Lane Positioning 2 by Susie Jones

Executing a left turn on a bicycle in a busy intersection evokes fear in the minds of many cyclists. They are concerned about delaying motorist traffic and suffering the wrath of angry drivers. Overcoming this perceived fear is possible with an understanding of traffic patterns and ample opportunity to practice. By riding predictably, in a vehicular manner, cyclists will typically proceed through an intersection in the same amount of time as a motorist.

The diagrams shown here* illustrate the "cyclist's lane rule" and are general guidelines for proper positioning for left turns. They assume daytime riding and a lane wide enough to be safely shared by motorists and cyclists. Traffic volume, traffic speed, lane width, road conditions, and visibility are factors that may at times, require slight modification to these rules.

Rather than attempting to cover all the variables in this column, cyclists are encouraged to enrol in an L.A.W. Effective Cycling Class. Understanding the cyclists' lane rule and the factors involved, is what the E.C. Program is all about. Students are given the knowledge and training needed to make informed decisions about the safest place to ride given specific circumstances.

*Diagrams are in the CAN-BIKE Workbook

Effective Cycling Notebook-Rock Dodge by Susie Jones

Riding safely on the road requires a knowledge and understanding of traffic laws and the principles that determine and govern these laws. However, even when you ride predictably and occupy your proper place on the roadway, situations may arise that necessitate an emergency manoeuvre on your part. The ability to execute an evasive manoeuvre could mean the difference between a close call and a serious, or fatal accident.

In this first column, I will discuss a manoeuvre called Rock Dodging, an essential skill for any cyclist to master. Picture yourself riding along when suddenly you see a rock in your path. There is a ditch to your right, and a car or another cyclist on your left. You don't have to hit the rock-there is a way to go around it.

Before the technique will make sense though, it is important to understand how you stay upright on your bike and what happens during a turn. To keep from falling over on the bike, you steer the wheels so they are exactly under you. Using John Forester's example in Effective Cycling, imagine that you are balancing a stick upright with one end resting in the palm of your hand. You balance it by moving your hands so that it stays under the stick, no matter which way it starts to fall. This what also happens on a bike. It is not possible to balance exactly; you are always wobbling to one side or the other, steering to correct the unwanted lean. If you fall, it is because you have steered the wheels out from under you.

To execute a Rock Dodge, keep riding straight until you are very close to the rock. Just before the rock, turn the handlebars suddenly with out leaning so the front wheel goes around the rock. For example, if you steer to the right of the rock you will automatically start to fall (lean) left. However, you will catch yourself as soon as your wheels have passed the rock by steering more to the left than is natural. Your wheel snakes around the rock (see illustration), but your body and handlebars have barely moved.

The entire action happens in a split second.

This technique will feel unnatural at first and will take quite a bit of practice before you can do it smoothly. Once you master the Rock Dodge, practice it regularly to maintain proficiency. While out riding, dodge rocks that you would otherwise be able to avoid, or make constructive use of the time spent waiting for an organised ride to begin by practising in the parking lot. For an emergency manoeuvre to actually work in an emergency, it has got to come naturally, with out your having to think it through first.

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E.C. Notebook-Instant Turns by Susie Jones

In the last Effective Cycling column I described Rock Dodging as an evasive action to take when you need to suddenly avoid an object (such as a rock) that appears in your path. This month's column will address a different scenario and the appropriate countermeasure, called an instant turn.

Picture yourself riding along the right hand side of the roadway approaching an intersection. You plan to continue straight through and are occupying the correct position for this action. Just as you enter the intersection a car passes you and makes a right turn in front of you. You have three choices: hit the car; execute a panic stop (described in the next column); or turn to the right onto the cross street.

Preparing for and executing a normal right turn takes too long and would cause a collision in this situation, so an Instant Turn is necessary. For the technique to make sense, however you have to first understand what happens in a turn. Many people still think that a turn is produced simply by turning the front wheel, but you actually lean first and turn second. Because they happen so fast, the two moves appear simultaneous. For a planned turn, you start by leaning in the direction of the turn. Instead of immediately steering to get the bike back under you, you wait until you are leaning more and more.

The bike then steers itself around the corner while you adjust the handlebars so it feels as if they are directly under you. By steering sharper into the turn you start to fall out of it, which lets you straighten up.

In the situation described above, this type of turn would take too long, because you are not already in a lean position, and you would end up hitting the car. To force the lean quickly you have to perform a manoeuvre that feels unnatural (and sounds even more unlikely)!

"Turn your front wheel left-the wrong way, toward the car. By doing this you've forced the a right lean, and you'll start to fall right. The moment you've got a good lean started, after a tenth of a second or so, turn your front wheel right and you'll find yourself in a tight right turn. This is what you've done.. To make a right turn you must lean right, so to hurry up the leaning process you make the bike track to the left a few inches. Then you are leaning over properly and can steer a right turn. This doesn't ever feel natural, and you must train yourself to do it. It is a jerk in the wrong direction at the start of the instant turn when you deliberately unbalance yourself by steering in the whole bike out from under you." (Effective Cycling-page 125) The Instant Turn will take some time to learn and must be practised regularly. Set a sponge down in an abandoned parking lot and start by Rock Dodging it, slowly progressing to the Instant Turn.

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Effective Cycling Notebook-Panic Stop by Susie Jones

There is an art to effectively stopping a bicycle in an emergency. Doing it incorrectly could cause you to:

- 1) hit the object you are trying to avoid;
- 2) somersault over the handlebars;
- 3) lose control of the bike as the rear wheel skids out from under you. If you are like many people, you instinctively grab both brakes in an emergency and apply them equally until the bike begins to skid. This is inefficient because you have no control over a locked wheel (it cannot be steered), and a wheel that is skidding offers you virtually no stopping power.

When you apply either the front or rear brake, the bicycle begins to slow down and your weight transfers forward because of inertia. The more weight a wheel supports, the more effective the applied braking force, and the less tendency to skid. Thus, if you apply only the rear brake hard, your weight is shifted to the front, decreasing weight on the rear wheel. Since the rear wheel is supporting less weight, it will skid as you brake, decreasing the effectiveness of the brake.

Applying only the front brake hard also shifts weight to the front wheel. In this case, however, the weight transfer increases the effectiveness of the brake, and the tendency of the braked front wheel to skid is greatly reduced. However, the danger is that if the front brake is applied too hard, the rear wheel will lift off the road and the rider may be pitched over the handlebars.

The implications for effective braking are as follows:

- Braking with the rear brake alone will avoid pitchover, but it is not very effective.
- The theoretically fastest stop is made with the front brake alone, but this is dangerous-only a slight error will pitch you over.
- The best system for a fast, safe stop is to use both brakes in a 3:1 ratio, front:rear, which produces the optimum deceleration. If the rear wheel starts to skid, this indicates that you are unweighting the rear wheel almost to the pitchover point. Therefore, when the rear wheel skids, ease up slightly on the front brake.
- When braking hard, slide your body back in the saddle as far as possible. Although it is not necessary for an effective panic stop, you can transfer even more weight to the rear wheel by lifting your buttocks off the saddle and thrusting them straight back over the rear axle.
- If you are carrying a heavy load on the rear of your bike, you will be able to brake harder before pitchover occurs.

E.C. Notebook-Good Cyclists-Bad Choices By Susie Jones

It is not uncommon to see experienced cyclists make the following well-intentioned mistakes.

Do you:

Call "clear" to the riding companions behind you as you pass through an intersection?

Wave cars by when they have been delayed behind you and you spot an opening for them to pass?

Pull in front of cars when they are stopped at an intersection?

Ride in a pack with friends?

Pull into openings between parked cars so motorists can pass you?

Why these seemingly innocent actions are a problem:

Even though you may think it is polite to let others know that an intersection is free of traffic, calling "clear" invites them to roll through without stopping to check for themselves. Although this follow-the-leader syndrome is very common on group rides, it is also illegal and extremely dangerous. Each cyclist is required by law to stop at stop signs and check for traffic before proceeding. In effect, calling "clear" just means that "the intersection was clear for me and it may be for you."

When you wave a motorist by, you can be held liable if that motorist is involved in a crash. Although it may be clear when you signal, there is a the possibility that the motorist will wait a few seconds before proceeding. Those few seconds can make the difference between an opening in traffic and an impending collision. If you are occupying the correct lane position, and are riding predictably, the motorist will pass you when the space and traffic permit.

Never make a motorist pass you twice. When you are travelling on roads too narrow for a car and bike to share easily, motorists may have to wait for some time before passing you. Once they do though, and you encounter them stopped at a red light, don't pull to the head of the line to get to the front of the intersection. Take your place in the line of stopped traffic just as you would in a motor vehicle.

When bicyclists take off together on group rides, they often forget that they are sharing the road with other vehicles. It is important to leave a gap for cars between every three or four bicycles so motorists can "leapfrog" around your group, especially on narrow roads and up on hills.

Pulling into an opening between parked cars so motorists can pass you may seem like a good idea, but it creates a dangerous situation when you have to merge back in with moving traffic. Instead, ride predictably three feet to the left of parked cars, and motorists will pass you when space and traffic permit.

This column is provided as part of our benefit package as an affiliated club of the League of American Wheelmen (L.A.W.), and will focus on various aspects of Effective Cycling (E.C.). Effective cycling is the only nationally-recognized bicycling education program. If you would like to learn more about L.A.W. or the E.C. program, contact the League at (410) 539-3399

E.C. Notebook-Group Riding (From "How to Ride in a group" by Franklin Prosser, L.A.W. Effective Cycling Instructor #159)

Riding in a group is one life's most enjoyable activities. Cycling with friends, travelling rapidly and safely with confidence in your companions, is a joy. However there is a certain cycling etiquette, or rules of the road, which you should be aware whenever you cycle in a group.

Be predictable-Group riding requires even more attention to predictability than riding alone. Other riders expect you to continue straight ahead at a constant speed unless you indicate differently.

Use signals-Use hand and verbal signals to communicate with members of the group and with other traffic. Hand signals for turning and stopping are as follows: left arm straight out to signal a left turn; left arm out and down with your palm to the rear to signal slowing or stopping; and for a right turn, put your right arm straight out (in states where this is legal) or put your left arm out and up.

Give Warnings-Warn cyclists behind you of changes in your direction or speed. To notify the group of a change in path, the lead rider should call out "left turn" or "right turn" in addition to giving a hand signal. The lead rider should announce the turn well in advance of the intersection, so that members of the group have time to position themselves properly for the turn.

Change Positions Correctly-Generally, slower traffic stays right, so you should try and pass others on their left. Say "on your left" to warn the cyclist ahead that you are passing. If you need to pass someone on the right, say "on your right" clearly since this is an unusual manoeuvre.

Announce Hazards- When riding in a group, most of the cyclists do not have a good view of the road surface ahead, so it is important to announce holes, glass, gravel, grates, and other hazards. Indicate road hazards by pointing down to the left or right, and by shouting "hole," "bump," etc.; where required for safety. Everyone in a group should be made aware of the hazards, however everyone does not need to announce them.

Watch For Traffic Coming From The Rear-Even when you are occupying the proper lane position, it often helps to know when a car is coming. Since those in the front cannot see traffic approaching from the rear, it is the responsibility of the riders in the back to inform the others by saying "car back." Around curves, on narrow roads, or when riding double, it is also helpful to warn of traffic approaching from the front with "car up."

Watch Out At Intersections-When approaching intersections requiring vehicles to yield or stop, the lead rider will say "slowing" or "stopping" to alert those behind to the change in speed. When passing through an intersection, some cyclists say "clear" if there is no cross traffic. This is a dangerous practice that should be abandoned. It encourages

riders to follow the leader, letting others do the thinking for them. Each cyclist is responsible for verifying that the way is indeed clear.

Leave A Gap For Cars-When riding up hills or on narrow roads where you are impeding faster traffic, leave a gap for cars between every three or four bicycles. This way a motorist can take advantage of shorter passing intervals and eventually move piecemeal around the entire group.

Move Off The Road When You Stop-Whether you are stopping for mechanical problems or to regroup with your companions, move well off the road so you don't interfere with traffic. When you start up again, each cyclist should look for, and yield to traffic.

Ride One Or Two Across- Ride single file or double file as appropriate to the roadway and traffic conditions and where allowed by law. Most state vehicle codes permit narrow vehicles such as bicycles and motorcycles to ride double file within the lane. Even when riding double is legal, courtesy dictates that you single up when cars are trying to pass you if the lane is wide enough for them to do so safely.

This article is from Bicycle USA, magazine of the League of American Bicyclists. Each issue of Bicycle USA (magazine of the League of American Bicyclists) features an Effective Cycling column like the one above. The column is provided as part of our benefit package as an affiliated club of the League of American Bicyclists (L.A.B.), and will focus on various aspects of Effective Cycling (EC). EC is the only nationally recognised bicycling education program. If you would like to learn more about L.A.B. or the EC program, visit their website <http://www.bikeleague.org> or phone them at 202-822-1333.

E. C. Notebook-Do You See What I See by Susie Jones

The Great Mirror Debate-not quite as big as The Helmet Debate, but definitely an issue that divides cyclists. Effective Cycling Instructors (E.C.I.s) can be found on both sides of the argument because there is no "correct answer". -The decision to use or not use a mirror is a personal one that depends on many factors. E.C. classes, and the E.C. program in general, are not designed to tell cyclists right from wrong, but rather to give cyclists the knowledge and skills they need to make informed decisions about all aspects of their riding (equipment, clothing, technique, road position, etc.).

Those who use mirrors can't imagine riding without one. They argue that the mirror less cyclists are blind to the rear most of the time and must sneak a time consuming-and risky over-the-shoulder glance when they need to know what is behind them. A mirror allows them to frequently glance behind while keeping attention to the road ahead. With knowledge of the total traffic situation, they feel better prepared to react if an emergency situation should arise.

In situations where cyclists confront high volume or high speed automobile traffic (such as a daily commute), and the situation changes quickly, a mirror may be the only way to determine when it is safe to look behind before changing lanes. Mirrors are useful on group rides to keep track of riding companions. Some cyclists experience a decrease in neck flexibility as they age and rely on mirrors to relay information about changing traffic conditions.

Those who prefer not to use mirrors feel that many cyclists become over-concerned with the situation behind them. Since statistics tell us that the situation in front is more likely to cause injury than the one behind, there is concern that the mirrored cyclists are concentrating in the wrong direction. Some cyclists become dependent upon mirrors and forget the importance of looking over their shoulder before executing lane changes or other turning/merging manoeuvres. Although mirrors will alert cyclists of approaching vehicles, it is not always possible to discern how close they are or their speed. Handle bar mirrors are typically convex, causing images to appear further away than they really are. Helmet mirrors can distort depth perception because the cyclist is looking only through one eye.

Cyclists who do not scan over their shoulders before changing lanes lose an important communication tool with motorists. E.C. teaches that cyclists with mirrors should still check over their left shoulders when changing lanes or manoeuvring into position for a turn so that following or overtaking motorists will know a change is coming.

When a cyclist is occupying the correct lane position and is riding predictably, information about what is happening behind him/her should not change that position (except in extenuating circumstances). If a cyclist is riding in the travel lane because the shoulder is littered with debris, then that is the correct position whether or not there are

vehicles approaching from behind. By moving back onto an unsafe shoulder to allow a motorist to pass, a cyclist could hit something, lose control of the bike, and end up in the car's path.

As you can see, there are many valid arguments on both sides of the mirror debate. Using one to be aware of the total traffic situation makes sense; ignoring the limitations of mirrors does not. Glancing in your mirror is no substitute for glancing over your shoulder before changing lanes.

Thanks to E.C.I.s Paul Magrath (MA), Dave Spitler (KY), and John Waltz (NJ) for contributing to this column.

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Tips for Riding in Traffic by Bruce Mol

Understanding traffic movement, where and why accidents occur, is the key to handling traffic on a bicycle. If all road users obeyed all traffic laws, and developed better common sense, there would be fewer accidents.

However, we are not born with common sense, it must be developed. There are five principles of traffic movement which will develop your road (common)sense:

- 1) Ride on the right hand side of the road
- 2) Yield to traffic on greater roads.
- 3) Yield to new lane traffic.
- 4) Position yourself on the road, by planning for your destination.
- 5) Position yourself by your speed. (take the lane when you are going as fast as traffic, move to the right when you are slower than traffic.)

To avoid accidents, cyclists must be alert to the ever changing conditions of the roadway. Cyclists must be aware of the effect that their actions may have on other road users. To minimise the risks of cycling in traffic, cyclists should understand where most accidents occur, and what they can do to prevent them.

Most accidents, with cars, occur at intersections. If cyclists follow what is outlined above, they will probably not cause a bike/car accident. The following are the three most common motorist caused accidents. The key to minimising risks is to understand what they are.

- Motorist, travelling in an opposite direction, turns left in front of cyclist.
- Motorist pulls out from a side street.
- Motorist overtakes cyclist and turns right, immediately in front of cyclist.

Why do motorists do this? Most say " I didn't see the cyclist." Maybe that's true!

Tips to prevent the first two types of accidents.

- Cyclists need to be more visible.
- Wear bright colours.
- White is still the best.
- Use illumination. Since most accidents occur in front of the cycle, the brighter the light, the better.
- Ride further out from the curb.
- If you have been riding on the right hand side of the shoulder line, move to the left hand side, when safe well before intersections.
- When traffic is moving do not overtake on the right.
- Wait for intersections to clear before entering.
- Tips to prevent the third accident type, (overtaking right hand turning car), in addition to the above:
 - Shoulder check to determine location and speed of traffic behind you.
 - Use reflective materials and reflectors.

Learn to recognise, and therefore avoid situations which may cause you to swerve into traffic. A parked car driver's door opening, and road debris are two common causes.

Other ways to Ride Better in Traffic and reduce the risk of accidents.

- Keep your head up.
- Inflate your tires to the rated maximum to prevent flats, lessen rolling resistance, and maximise handling.
- In narrow lanes or roads, 'take the lane' and force motorists to pass you in another lane. Hugging the curb encourages motorists to make poor decisions about how much room is available to pass. Shoulder check frequently to let the motorist know you have seen them. If traffic builds up, and the narrow road continues for some length, pull off, and let motorists pass safely.
- Don't do track stands at stop lights. The unsteady weaving makes other road users nervous.
- At controlled intersections, don't jump queue to front of the line, then hold up traffic when it begins moving. Instead, stay back from the intersection, when the lights change, merge safely with traffic as the third or fourth vehicle.

How far you ride to the right should be determined by you. On most Vancouver streets, if you can put your foot on the curb, you're probably riding too far to the right. This encourages right turning motorists to cut you off.

- Don't ride through puddles. They hide debris and pot holes
- Pull over to let emergency vehicles pass and then be on guard for road users who are watching the red flashing lights instead of where they're going.
- Although it has been mentioned that cyclists should ride lawfully, it is important to stress:
 - do not ride on sidewalks, and do not ride on the wrong side of the road.
 - Ride predictably, do not weave in and out of traffic.

Make sure your bike is well maintained, everything properly adjusted, and safe to ride. It should not creak, rattle or groan, and should stop faster than a car. Remember, your bicycle is not a toy, it is a vehicle.

Avoid cyclists who exhibit erratic and bad behaviour (i.e. curb jumpers, block roads, etc.) Remember, if this is your daily commute, the same people are on the roadway with you everyday. Use this to help build mutual respect and tolerance.

How to become a better Cyclist

- Ride with an experienced rider. Canbike graduates have had training in detection, avoidance, and emergency manoeuvres.
- Take a Canbike course. These are adult oriented bicycling skills courses developed by the CCA and available through Cycling BC.
- Read 'Effective Cycling' by John Forester, (MIT Press). Available from libraries, or book stores.
- Join a bike club. Ride lots. The more you ride, the better you will become.

Bicycling Accidents, Incidents, Collisions and Statistics

Types of Accidents/Incidents

"Effective Cycling" by John Forester

- 50% Personal Falls Stopping - blunt collision
- 17% Car/Bike Skidding - poor traction
- 17% Bike/Bike Diverting - front wheel re-directed
- 8% Bike/Dog Insufficient Speed - lost balance
- 5% Bike/Other

Major Causes of Car/Bike Collisions From "Deaths of Cyclists in B.C."

October 1996

- 25% Cyclist fails to yield to cross traffic
- 17% Cyclist riding on wrong side of road
- 15% Cyclists fails to yield changing lanes
- 8% Motorist turns left
- 7% Cyclist on sidewalk
- 5% Motorist turns right
- 4% Motorist restarts from stop

Contributing Factors in Car/Bike Collisions

For Cyclists

- Driving without due care
- Failing to Yield the Right of Way
- Riding on the wrong side
- Ignoring traffic control device
- Rider inexperience

For Motorists

- Failing to Yield the Right of Way
- Driving without due care
- Improper turning
- Visibility impaired
- Weather conditions

Statistics for B.C.

- 1993 1,916 Injured 10 Fatalities
- 1994 1,926 Injured 9 Fatalities

Injuries you can expect if you fall

27% - Head 27% - Lower leg 22% - Arm/shoulder 24% - Other

Of the 9 fatalities in 1994, 6 were not wearing helmets, 7 were male and most of the instances occurred in clear, dry, daylight in spring or summer.

BIKE INJURY FACTS From the Canadian Bike Helmet Coalition

- Cycling is the most popular outdoor activity among young Canadians. Between 86% and 90% of all children aged 10 to 14 are cyclists.
- Over 100 Canadians die each year from cycling injuries. Children aged 5 to 14 account for half of these deaths.
- Every year, over 50,000 children are seriously injured in bike related mishaps.
- Almost 50% of all the children injured are under 10 years old. 25% are < 7.
- 85% of cycling injuries in childhood do not involve a motor vehicle and occur within six blocks of home.
- The human skull can be shattered by an impact of 7 to 10 kph. Children's skulls are more vulnerable than those of adults.
- A fall from 60 cm (2 ft), can cause permanent brain damage.
- A fall at 20 kph can result in death.
- Head injuries account for 75% of all deaths from cycling injuries. Wearing a helmet reduces the risk of head injury by 85% and brain injury by 88%.
- Cycling mishaps are the leading cause of hospital admissions for head injuries in children.
- Survivors with brain injuries may suffer from seizures, intellectual and memory impairment and personality changes.
- The life time cost of a head injured Canadian are estimated at \$1 to \$1.5 million when including: intensive care; long term hospital costs; lifetime care and home support.

Canadian Bike Helmet Coalition (613) 224-4144