Training schedules
## Senior Rowers Training Schedule 2016

### July to Dec 2016

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**Notes:**
- Public Holidays/MidTerm Breaks
- School Holidays
# Senior Rowers Training Schedule 2017

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**Public Holidays/MidTerm Breaks**

- Term 1 = 10 weeks
- Term 2 = 10 weeks

**School Holidays**

- Family holiday / MidTerm Breaks
- Staff Prof. Dev. & Meetings (Academic staff)
The basics of training

• Always be on time
• Do not avoid the chores
• Always be in uniform
• Show leadership
• Always bring water and a snack
• Look after yourself and each other
• Study is paramount
• Have fun
• Listen to your parents
• If you are sick, tell someone
• If you are injured, have it treated
• The golden rule of recovery from injury - if it hurts do not do it
• Remember a crew is exactly that. You can not row an VIII with seven people. Make sure all crew members are included in crew activities both at and away from the shed
• Remember you row, not your parents. You are responsible for getting up in the morning
It is our attitude at the beginning of a task, which more than anything else, will affect its successful outcome. It is our attitude toward life, which will determine life's attitude toward us.

We are interdependent. It is impossible to succeed without others and it is our attitude toward others, which will determine their attitude toward us.

Before a person can achieve the kind of life he wants, he must become that kind of individual - he must think, act, talk, walk and conduct himself in all of his affairs, as would the person he wishes to become.

The higher you go in any organisation of value, the better will be the attitudes you will find.

Your mind can hold one thought at a time. Since there is nothing to be gained by holding negative thoughts, hold successful positive thoughts.

The deepest craving of human beings is to be needed, to feel important, to be appreciated. Give it to them and they will return it to you.

Part of a good attitude is to look for the best in new ideas.... and look for good ideas everywhere.

Do not waste your time broadcasting personal problems, it probably won't help you - and it can't help others. Do not talk about your health unless it is good - unless you are talking to your doctor.

Radiate the attitude of wellbeing, of confidence, of a person who knows where he is going. You will find good things will start happening right away.

Lastly, for the next thirty days, treat everyone with whom you come in contact, as the most important person on earth. If you do this for thirty days, you will do it for the rest of you.
Positive athlete interaction

In team sports the way the players interact with each other is important. Positive coaching needs to be backed up by positive athlete interaction.

Teammates need to:

• Look for positives to praise and encourage teammates

• Process praise skill errors

• Use reminders for strategy errors

• At no time should a player criticise a teammate
Managing the rowing/study balance

This booklet has been designed to make the rowing season as stress-free as possible. With careful time management it should be possible for all boys to maintain or improve their academic results while participating in a full rowing program.

Efficient use of your time is the key to success. The following points may help:

• Shower immediately on arriving home after training

• Hydrate. When you are studying, have a water bottle with you

• Have a snack such as a sandwich, muesli bar or protein drink – but not too much

• Hit the books. Always attempt your more difficult subjects first

• Do not eat your main meal until you have completed most of your study or assignments. Nibble on nuts or dried and fresh fruit to keep the hunger pangs at bay. Schedule your main meal for 7.00pm to 7.30pm

• Read after dinner and try to be in bed by 9.00pm

• Be smart. Use School study periods wisely. They are not a social event

• Wednesday, Friday and Sunday are training free, so optimise your study on those days

• Optimise study time. At lunchtime, snatch 30 minutes in the library. Waiting for a lift home? Ten minutes reading is time well spent while you wait

• Support each other. It is in the whole crew’s interest that everyone is managing his or her academic performance. Offer to help if you can

• Finally, listen to your parents. I know this might go against the adolescent grain, however, their support is paramount and invaluable. Your parents care for you and are often very aware of the challenges you may be facing. Listen to them and if any issues need my personal attention, please alert me as soon as possible

I wish you the very best of luck. Have a wonderful season.

Steve Saunders
Director of Rowing
Getting the most out of class

Get to class on time
If you are late, you may miss the ‘pearls of wisdom’ often given by your teachers in the first few minutes of a period. You may also miss the important foundations of a lesson and may be behind the eight ball for the whole lesson or leave without the whole picture. You also distract other students and this is not fair.

Go to all your classes
You may be tired or a little run down and tempted to take a ‘sickie’. If you are not really sick then this is foolish. You never know when the class will cover an absolutely crucial topic. You will just get behind and have to catch up later, therefore adding to your workload and stress.

Where you sit counts
Avoid sitting next to disinterested students who talk or waste time. Sitting closer to the front has the advantage of you getting a clear view and hearing better. You will generally be away from distractions and be able to get the teachers attention for questions more readily. It will also make tuning out harder to do.

How you sit
Act alert then you will probably be alert. Sit comfortably upright. If you lounge around you are more likely to fall asleep or goof around.

Be prepared
Bring all texts and equipment needed. It is also a good idea to pre-read. This will give you some hooks for new information to be hung on and it will impress your teachers.

Engage your mind
Actively engage in the lesson. Discuss and question as required. Adopt a curious attitude. Listen carefully.

Review afterwards
Follow up what happens in class. Do not let a lack of understanding hinder future progress.

Ask questions such as:
• What were the main ideas covered in that lesson?
• Where does it fit into what we have been doing?
• Are there any bits that are not clear to me?

Do not leave empty handed
Never trust your memory. Take notes at all lessons. Handouts and other people’s notes are generally not as good.
Study and organisation
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Technique

The following is a brief outline of basic sweep rowing technique. The first thing we must establish is:

**Correct posture**
- Sit tall from the base of the spine
- As you swing the body forward and move the slide forward, you must press the stomach forward to maintain your posture
- The head is very important in that any excessive movement up, down or sideways will influence the body; the aim should be to minimise any head movements
- Good technique can only be achieved if a loose and relaxed state is maintained through the arms, shoulders and neck while maintaining a good posture

**The stroke**
There is no beginning or end to a rowing stroke, it is a continuous circle. However, because we need a starting point, we will start the stroke at the finish with the blades still square prior to tapping down. At this point the following should apply:
- Elbows should be level with the handle
- Hands must be one and a half to two fists apart
- Shoulders should be slightly angled toward your rigger
- When the blade is square the wrist is flat

**Handle position through stroke**
- Inside hand should do the squaring and feathering
- Outside hand taps the finish down and covers the blade at the catch
- The outside hand height at finish should be between the first and second rib

**Stroke technique**
As stated above, we will start at the finish. That is, hands against the body at or around the second rib, wrist flat and elbows level with the handle and blade square and covered.

**Finish**
Tap down the outside hand and roll knuckles back with your inside hand as you push your arms forward. As your hands lead away from your body, a rocking forward of the body must take place. This rocking forward is a key to a pattern of length and control. By rocking forward while the legs are held down it allows you to establish your body position for the catch prior to any movement of the slide. The control of the movement of the slide forward is enhanced by this rocking over. It puts your body weight on your feet thus allowing the oarsman to have complete control of the movement of his seat up or down the slide, in turn minimising the interference to your boat speed and allowing the oarsman to prepare himself for the catch whilst attaining a good length with the body in a strong position.
Rotation of body and shoulders
A rotation of the upper body and shoulders must take place as the rower moves forward on his slide. During the recovery phase this rotation should take place gradually and smoothly to minimise any disturbance to boat speed. The rotation must be done whilst still maintaining a slight angle of the shoulders towards the oarsman’s side of the boat (bow side or stroke side). As the handle of the oar swings around the arc the body and shoulders should rotate, and this allows the oarsman to maximise his length.

Hand speed away from finish
The hand speed away from the finish should be relative to the speed of the hands through the dive phase.

The hands should move away from the body, relaxed and at a similar speed at which they came in, and this should be done in a smooth and controlled manner.

A steadying or slowing of the hand speed takes place as the hands cross the knees. This allows emphasis to be placed on the control of the seat as it leaves the back of the slide. Once the seat leaves the back, the hand speed is dictated by the speed of the body and seat forward. The hands then move forward at an even pace until the hands reach the final approach to the catch, where once the blade is squared, the hands travel in an upward movement with a slight quickening of the hand speed so the blade is covered as quickly as possible.

Handle heights
Hand heights are relevant to handle height. The handle moves through the stroke in two plains connected by an upward movement as you approach the catch, and a tapping down movement at the finish. There should be little or no variation from their plain other than a movement to compensate for balance.

Seat movement once the knees are released and positioning of the body as you approach the catch
Once you have rocked your body over and your wrists are past your knees, a squeezing or slow release of the knees should take place. At this point the arms should be extended but not rigid and the handgrip only firm enough to control the oar. A loose and relaxed state will allow the oarsman to execute an effective catch. Once the knees are released the slide should travel in controlled and even pace staying in ratio to the drive portion of the stroke. The smoother and more controlled, the more opportunity the boat has to maximize its boat speed.

As the seat approaches the front of the slide it is very important that the oarsman tries to time the placement of the blade in the water and the application of the leg drive. This is the single most difficult part of the rowing stroke and can affect boat speed dramatically. Squaring of the blade should commence as the hands cross the foot stretcher. Square the blade by rolling the knuckles forward and fingernails back and under, with the wrist finishing flat and level. When you square the blade there should be a conscious effort to commence the raising of the hands to cover the blade. The blade should be square and ready to cover as the seat approaches its last four centimetres of travel forward, given that you should have commenced your hand and arm movement to cover your blade. You should be able to place the blade at the point of maximum leg drive.

Do not lift the body to cover the blade at the catch.
Drive phase
The drive phase is the simplest part of the rowing stroke if the preparation has been correct throughout the recovery phase. Once the blade is covered, there should be no lifting (or opening) of the body or bending of the arms during the first half of leg drive. It is not until the last third of the leg drive that an opening of the body through its arc commences. Once the legs are down the arms maintain the pressure through to the finish. The arms are the weakest phase and are not capable of increasing the boat speed, however they can maintain the boat speed produced by the legs and body. With that in mind the optimum way of producing boat speed from your finish is to maintain the pressure with arms and an opening of your shoulders and chest at the finish, while maximising the length of your stroke at the same time as producing a clean finish.

Three phases of the drive are:
1. Leg phase
Legs initiate the drive once the blade has been covered (no body lift). Phase One should have the appearance of rowing flat.

2. Body phase
The opening of the body arc should commence as the legs enter the last third of their drive. The opening of the body should not be one of lifting, but of swinging through the arc staying as flat as possible.

3. Arm phase
The arm phase should commence as the legs finish their phase and the body is half way through its phase. As the arms bend, an opening of the shoulders should take place. Opening the shoulders allows the rower or sculler to utilise many muscle groups such as the chest, shoulder blades and the back, instead of relying on the arms only. Another facet of the finish, which will help maintain the acceleration is the position of the elbow. The elbow should be level with the handle, with the point sitting at about 30 degrees relative to the body.

Remember length and control are the keys to boat speed.
How to tape hands

The taping of the hands is very important. Please take a good look at the images below.

Step 1.
Always cover blisters with gauze or fold some tape onto itself, so tape does not stick to blisters.

Step 2.
Wrap tape around the hand one and a half times.

Step 3.
Cut strips of tape and place them between the fingers. Ensure they reach the tape on both sides of the hand. These will prevent tape rolling off that side of the hand.

Step 4.
Wrap tape around the hand again ensuring the tape covers the tape ends between the fingers. Move tape down over the palm, around the back of the thumb, back up to the little finger and onto the palm. This stops the tape rolling up the other direction.
Basic Rowing Physiology

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Author’s note

The author wishes to express his appreciation to Sigmund B Strömme, Professor of Physiology, Norwegian College of Physical Education and Sport for his valuable suggestions and to the illustrator Sturla Kaasa.

1.0 Introduction
Rowing requires a well-conditioned body able to perform at a high level during periods of training and competition. During training and competition the body is the engine that propels the rowing boat across the water and as such requires energy in order to operate. The source of the energy for muscle contraction is the breakdown of chemical bonds in the muscle cells. The fuels of the body; carbohydrates and fats from food must replace these chemical bonds. They are stored in the body in the form of glycogen and fat and used to restore the chemical bonds in the muscle cells as needed.

Many changes take place within the body during exercise in order to improve its efficiency, utilise fuel and produce energy.

2.0 The rowing motion
We need to study the rowing motion in order to understand the physiology of rowing. The rowing motion is created by an athlete seated in a boat moving forward and backward on a sliding seat while pulling on an oar placed in the water. The boat is pried (pulled) forward across the surface of the water. When the athlete is pulling on the oar he creates a positive directional force on the boat. When the oar is out of the water and the athlete is moving in the opposite direction of the boat he creates a negative directional force.

The technique the athlete uses must co-ordinate the proper use of the muscle groups and the movement of the boat to maximise the positive directional forces and minimise the negative directional forces. This will optimise the prying motion of each stroke and cause the greatest possible velocity to be achieved during a 2000 metre race. During each stroke, the athlete applies the equivalent of a 40 to 45 kilogram load to the oar handle in each of the 220 to 250 strokes that occur during the race.

3.0 The rowing race
The 2000 metre rowing race consists of three parts or phases:
1. the start phase
2. the middle or distance phase
3. the finish or sprint phase

During the start phase the rowing boats generally start the race at a stroke rate higher than the stroke rate of the middle or distance phase. The velocity of the boat is higher than the average velocity achieved by the boat during the race.

The energy used to achieve and maintain this increased velocity is obtained from the stored chemical bonds in the muscle cells and the breakdown of stored fuels. During this phase of the race the muscle cells are operating without sufficient oxygen in the breakdown of these fuels, known as anaerobic (or without oxygen) metabolism and results in the production of lactic acid, the waste product. It’s this accumulation of lactic acid that causes muscle pain.
During the middle or distance phase the athlete is using energy obtained by converting the stored fuels into energy using oxygen. The presence of sufficient oxygen in the system results in the more complete breakdown of these fuels and is termed aerobic (or with oxygen) metabolism. This phase lasts about four to six minutes until the finish phase.

The aerobic process is about 18 times more productive than anaerobic metabolism and does not produce the debilitating lactic acid. The advantage of anaerobic metabolism is in its ability to provide energy faster and support high velocity muscle contraction.

Like the start phase, the stroke rate increases during the final or sprint phase in an attempt to increase speed in the final minute or two of the race.

This increase in stroke rate and increased boat speed increases the energy requirements of the body to a level beyond the energy supply capacity of the aerobic metabolic process. At this point the anaerobic metabolic process is called upon to contribute and acid is produced in increasing amounts.

*Figure 1  The phases of the race*

In order to increase the rower's performance his capacity to produce energy and cope with increasing demands must improve. This is known as endurance capacity.
4.0 Endurance capacity
Endurance capacity is the ability to persist; the ability of the athlete to perform at a given load over a period of time and is increased through appropriate training.

As a coach you have a responsibility to understand the effects of training on your athletes. This knowledge will assist you in the preparation of training programmes that suit your goals, give your athlete the chance to increase performance and realise his potential.

5.0 Aerobic metabolism
Endurance capacity optimisation must include training the aerobic metabolic process which contributes 75 to 80 percent of the energy used in a rowing race.

5.1 The oxygen transportation system
There are three systems involved in the journey of oxygen from the air to the muscle cells.
1. the respiratory system
2. the circulatory system
3. the muscular system

The respiratory system takes oxygenated air into the lungs. Approximately 21 percent of the air is composed of oxygen (O2). The oxygen diffuses from the air through the walls of the tiny air sacs or alveoli into the blood.

The circulatory system carries the oxygenated blood from the lungs to the heart where it is pumped through the arteries to the exercising muscles. As the blood travels through the circulatory system, the arteries become smaller and branch off into thousands of capillaries. These surround the individual muscle fibres.

The muscular system is responsible for moving oxygen from the capillary walls to the muscle cells. Here the oxygen is taken to the mitochondria and used in the conversion of fuels to energy.
5.2 The major components of oxygen transportation

The first component, the lungs, can take in 120 to 180 litres of air per minute during exercise in the average person. Top rowing athletes have been observed with an intake of over 200 litres of air per minute.

Considering that the air we breathe is about 21 percent oxygen, up to 42 litres of oxygen per minute can be inhaled by a heavyweight athlete during heavy exercise. This is considered enough for the metabolic demands of the body and does not change significantly with training.

The second component is the ability of the blood to carry the oxygen. This is dependent on the volume of blood and the number of red blood cells in the blood. The red blood cells carry haemoglobin, the oxygen carriers. Trained athletes generally have greater total blood volume and more red blood cells than non-athletes. It has been observed that endurance training can produce up to a 16 percent increase in resting blood volume. This change is due to an increased plasma volume and red blood cell volumes.
The third component is the heart. Cardiac output is the measure of the quantity of blood pumped by the heart through the circulatory system to the body in one minute. It is equal to the blood volume pumped in each beat (stroke volume) multiplied by the heart rate. The volume of blood pumped can be increased by training.

Cardiac output varies from five litres per minute at rest to over 40 litres per minute during strenuous exercise. Reductions in exercise heart rate and resting heart rate, typically occurring with training, are indicators that stroke volume has increased.

Considering that a normal male can pump approximately 110 millilitres of blood per heart beat during exercise and assuming a heart rate of 200 beats per minute, the result is 22 litres per minute of blood being pumped. In athletes, stroke volumes of 160 ml (lightweight men) and up to 200 ml (heavyweight men) can produce between 32 litres and 40 litres per minute of blood pumped at maximum exercise. Blood, having a haemoglobin level of 15 g per 100 ml and carrying 200 ml of oxygen per litre, can deliver up to eight litres per minute of oxygen to the muscular system.

![Cardiac output diagram]

*Figure 5 Cardiac output*

The fourth component is capillary density. Each muscle fibre is surrounded by capillaries, the extensions of the arteries. An increase in the number of capillaries surrounding a particular muscle fibre will deliver more blood to the area and therefore deliver more oxygen to the muscle.

Evidence suggests that training increases the total number of functional capillaries surrounding muscle fibres and consequently allows more oxygen to be available to the muscles.
Another component of oxygen transportation is the flow of blood to the working muscles. During exercise the flow of blood to the increases because arteries carrying blood to inactive areas tend to constrict while arteries carrying blood to areas that are requiring greater amounts of oxygen tend to dilate. Research indicates that training will increase the blood flow to working muscles.

Many adaptations also take place in the muscle cells themselves to increase the consumption of oxygen. Endurance training increases the effectiveness of the machinery within the muscle cells to produce energy.

5.3 Limitations
The respiratory system delivers more oxygen to the circulatory system than can be transported in the blood. The lungs are not considered a limitation to a rowing athlete’s performance.

Nonetheless the circulatory system can be improved with training and can have a strong influence on the physiological capacity of the athlete. To produce a training effect in the circulatory system, any type of exercise that loads the heart can produce improvement in oxygen transportation and oxygen uptake.

In the muscles the oxygen is taken up and utilised in the conversion of fuel to energy. These two processes have also been shown to improve significantly with training and they contribute to improved physiological capacity. The muscular system is considered to have the greatest potential for improving aerobic metabolism.

To produce a training outcome that will influence the utilisation of oxygen by the muscle cells, training should remain specific to the sport by loading the muscles which are principally used at a medium training load for a long duration.
6.0 Anaerobic metabolism
Anaerobic metabolism is utilised primarily in the start and finish phases of the race. During the initial seconds of the race energy is provided by the chemical bonds stored in the muscle cells, after which the body must rely on the anaerobic breakdown of glycogen to provide the remaining energy requirement of the start phase. The intensity experienced during the start and finish phases necessitate the use of anaerobic energy to support the high velocity muscle contraction and provide sufficient energy to meet the high energy demands on the body.

![Figure 7 Energy production](image)

The use of the anaerobic metabolic system for the breakdown of the fuels produces lactic acid, the accumulation of which causes fatigue and reduces the ability of the muscles to contract.

Training improves the athlete's ability to tolerate the accumulation of lactic acid and improves the mechanism for its removal. This course will emphasise aerobic metabolism because the aerobic metabolic system is more efficient and contributes a greater proportion of the energy requirements of the rowing race.
7.0 Measurement
An athlete’s maximal oxygen uptake or VO2 Max which represents the body’s maximal total aerobic metabolic rate is measurable. It is significant because of the relative importance of the aerobic metabolism to rowing. The difference between the oxygen content of the inhaled air and the oxygen content of the exhaled air is measured (we know that the air inhaled from the atmosphere is 20.9 percent oxygen). This difference is multiplied by the amount of air exhaled (ventilation) to arrive at the absolute maximal oxygen consumption of the athlete. This value is expressed as litres per minute of oxygen.

![Diagram](image)

**Figure 8 Maximal oxygen uptake**

The following average VO2 Max values have been observed for international athletes in rowing:

- Heavyweight men: 6.2 litres per minute
- Lightweight and junior men: 5.3 litres per minute
- Heavyweight women: 4.4 litres per minute
- Lightweight and junior women: 3.9 litres per minute

VO2 Max can also be expressed as the relative oxygen consumption of the athlete by dividing VO2 Max by the athlete’s body weight in kilograms. For example, using the relative VO2 we have observed average consumptions of 68 ml/kg-min for heavyweights and 71 ml/kg-min for lightweights.

Although the measurement of oxygen uptake requires the use of expensive equipment and the assistance of an experienced exercise physiologist, this information is not necessary to produce world-class rowers.
8.0 Training methods
The focus here is on training methods which affect the principal systems of aerobic metabolism. The three systems are represented by the lungs, the heart and the muscles.

8.1 The lungs
The respiratory system cannot be significantly improved to increase the efficiency of the entire system. Although the lungs adapt to the load imposed by the increased breathing that occurs with training, the respiratory system is not considered to be a limitation to physiological improvement.

8.2 The heart
The circulatory system can be improved with training. The most effective type of training places a demand on the heart that causes it to enlarge and strengthen itself. The best type of training to produce this effect is interval training, a systematic procedure that utilises short periods of work at a high training load alternating with periods of recovery. This type of training will result in a higher cardiac output to the body and an increased capacity for oxygen transport.
8.3 The muscles
The muscular system can also be improved with training. The most effective training places a demand on the muscle fibres to utilise oxygen. The best type of training is long distance training, a systematic procedure that utilises long periods of work at a medium training load which may or may not alternate with periods of rest. This type of training increases the number of functional capillaries around the muscle fibres and increases the activity and mechanisms in the muscle cells to utilise oxygen.

This is a very brief description of the types of training that will increase the performance level of the athlete. Other courses in Levels I and II of the FISA Coaching Development Programme will provide further information.

9.0 Summary
You should now have acquired a basic understanding of the physiological requirements of the sport of rowing. With this information you will be able to assist your athletes in their understanding of the body systems that are important to rowing and how to improve these systems.

The copy you are reading has been altered slightly to accommodate Australian physiology language style.
Fluid replacement tips for athletes

**Fluid replacement**
In general, for every one per cent you are dehydrated, sporting performance drops approximately five per cent. If you lose weight while exercising - what are you actually losing from your body?

In general, athletes/players should aim to keep weight losses to approximately one per cent of total body weight.

**What is dehydration?**
Water comprises 50 to 70 per cent of a person’s body weight.

During intense exercise, four to five kgs can be lost during a two-hour period. This equals around four to five litres of fluid lost from the body.

Dehydration occurs when fluid lost is not replaced. Dehydration reduces the body’s ability to perform. Thirst is a very poor indicator of your body’s fluid levels.

**Signs and symptoms of dehydration**
- Tiredness
- Excessive sweating
- Weakness
- Dizziness
- Headache
- Lack of co-ordination
- Nausea
- Confusion
- Flushed
- Fainting
- Hot
- Muscle cramps

**Warm v cool**
Some research has shown that athletes are inclined to drink more fluid if it is cool, (but not icy cold) in warm weather.

**Fluid replacement – How much should you drink?**
Before training and competition:
300 to 500mls 30minutes before

During training and competition:
250mls every 15 minutes

After training/competition:
Keep drinking until urine is clear
**Water v sports drinks**

Water is the best option for replacing fluids lost during light to moderate activity > 60 minutes.

Sports drinks provide energy (carbohydrates) for the working muscles and replace fluids as well as electrolytes that are lost through sweat.

**Fluid replacement**

Sports drinks:
- Designed for use in exercise
- Specific carbohydrate concentration, five to eight per cent
- Contains electrolytes (sodium)
- No caffeine
- Non carbonated

**When are sports drinks useful?**
- Continuous high intensity activity > 45 minutes
- Intermittent activity > 60 minutes
- Carbohydrate supplement
- After exercise to promote recovery
- For those who do not like water
- For use in hot weather

**Fluid replacement**

Home made sports drink 1L
- 1 litre of water
- 1/3 cup sugar
- 1/4 teaspoon salt
- Small amount of flavour (orange juice or cordial)
High performance nutrition

How does nutrition affect sporting performance?

You can row well despite eating a poor diet, however you can perform five to 20 per cent better if you eat well and stay well hydrated (see table below). Good nutrition will help you in the following ways:

- Better endurance and more energy
- Better skills
- Improved running speed
- Improved muscle tone and strength
- Better recovery between training sessions and races
- Less chance of getting sick
- Better health and wellbeing
A high carbohydrate diet
As you can see from the graph below, your body uses mainly carbohydrates when you exercise at high intensity, so if you want to train and play hard you will have to constantly refuel with carbohydrates. Most athletes know the importance of carbohydrates, yet the majority do not eat enough. You will need six to eight grams of carbohydrate per kilogram of your body weight every day. For most athletes that is between 400 to 700g per day.

Figure 2: Proportion of carbohydrates v fat protein used during exercise

Nutritious carbohydrates
Nutritious carbohydrates are those that also give you other nutrients. These types of carbs should make up the bulk of your diet. Nutritious carbs are:

- Breakfast cereals, particularly wholegrain
- Bread, bread rolls, crackers, muffins and crumpets Pasta and rice
- Fresh fruit, fruit juice and dried fruit Milk and yoghurt
- Legumes such as lentils, chick peas, soy beans, baked beans
- Starchy vegetables such as potato, sweet potato and corn
Less nutritious carbohydrates
You should only eat a minimum of these types of carbs (particularly if you want to lose body fat)

Sugar and sugary foods
Syrups such as molasses, maple syrup and treacle
Sweet spreads such as jam, honey and marmalade
Jelly and ice-cream
Cakes, biscuits, pastries and desserts
Lollies soft drinks and cordials

Eating enough carbs will make the difference to your performance, particularly on the days that you train, the day before a game and the day after a game. To make sure you have enough fuel in the tank, it is recommended you follow the high carbohydrate meal plan (see below).

High carbohydrate meal plan

Breakfast
Large bowl of wholegrain breakfast cereal like Weetbix, oats, Sports Plus or Just Right, and reduced fat milk with or without fruit
AND/OR
Toast with jam/honey/marmalade/baked beans/tinned spaghetti
Fruit Juice

Lunch
Sandwiches/rolls OR pasta/rice/noodles
Fruit eg banana
Reduced fat fruit yoghurt
Milk/reduced fat flavoured milk/fruit juice

Dinner
Meat/Chicken/Fish in moderation
*Potato/pasta/rice/noodles
Vegetables/salad
Fruit with low fat yoghurt/reduced fat ice-cream/custard

Snacks
Fruit/muesli bars/sandwiches/toast or toasted sandwiches/crumpets/muffins/baked beans/tinned spaghetti/
two minute noodles

*Make these carbohydrates the main part of your meal
**Top up before training**

To get the most out of each training session or race, you need to make sure you are well hydrated and you have enough fuel in your tank.

Drink plenty during the day you have training, so you start your training session well hydrated. You will probably need to drink between three to four litres every day to keep well hydrated.

Aim to drink 500 to 600mls in the half hour before training starts, and before a race.

You can eat any time between one and four hours before training or racing. More than four hours without eating is too long. Obviously if you eat too much too close to training or racing, you can feel full and bloated. If you do not eat enough you may feel hungry. You have to eat the right amount for you and this varies from rower to rower. You need to eat food that is low in fat and high in carbohydrate. Some suggestions include:

- Breakfast cereals like Sustain, Porridge, Sports Plus, Weetbix with skim milk or low fat milk
- Rolls or sandwiches with low fat fillings such as chicken or ham and salad
- Toast, crumpets or muffins
- Fruit and yoghurt
- Baked beans or tinned spaghetti on toast
- Leftovers such as pasta, rice or noodles

You should never feel hungry during training.

**Refuelling**

- Have a routine
- Eat and drink within an hour of finishing training or racing, or sooner
- Replace one and a half to two times more fluid than you’ve lost due to sweat ie if you lose a kilo, you will need to drink one and a half to two litres of fluid. Sports drinks help retain fluids after exercise
- Your body needs carbs and protein to assist with recovery
- Examples of foods or drinks that contain carbs are sports drinks, fruit juice, soft drink, lollies, fruit and muesli bars
- Supplements can contain both, such as Sustagen, protein revival, powerbars, pb energy bars and other sports bars
- Rice or pasta meals with a small amount of meat or chicken also contain both carbs and protein. Remember to drink plenty of fluids

**Further information**

*Gold Medal Nutrition*, Glenn Cardwell
*Survival for the Fittest Cookbooks*, Australian Institute of Sport Sports
*Dieticians Australia Website*, www.sportsdieticians.com
Takeaway foods

Best choices if you have to eat fast food!

**Sushi/California rolls**
- Very low in fat and becoming more readily available

**Sandwiches and rolls**
- Ask for them unbuttered and try bagels/grain breads rather than croissants and cheese breads
- Choose low fat fillings such as lean meat, chicken or turkey breast, salmon, tuna with lots of salad
- Ask for chutney, relish or mustard for flavour
- Try toasted Turkish bread for a change with lots of vegetables, but go easy on the cheese

**Noodle soups**
- Available from Asian food bars/Japanese restaurants
- Order with tofu/fish/seafood/prawns to fill you up

**Chicken**
- A lot of chicken outlets now have skin free/not crumbed/lower fat options
- Have skinless chicken in a roll rather than with chips, or have with vegetables/corn cob/coleslaw

**Chinese**
- Select stir fry meats with vegetables
- Corn and chicken soup or a clear soup with vegetables

**Baked potatoes**
- Ask for no butter/sour cream/cheese
- Try for baked beans, vegetable or tomato based toppings

**Hamburgers/steak sandwiches**
- Look for the plain old fashioned type made on a toasted bun with lettuce, tomato and beetroot
- Ask for no butter/margarine, and avoid the optional fried egg, bacon and cheese (try a little fried onion for flavour)

**Lebanese/Turkish**
- The meat on the spit is a pretty good choice when served with plenty of salad, along with tabouleh, bread and hummus
- Some of the fat will drip away during cooking

**Mexican**
- A lot of foods on the menu are laden with fat, especially the nachos
- Try burritos with meat, beans, avocado and salad

**Thai**
- Thai beef salad
- Dry curries with jasmine rice
- Beef/chicken satays/curry vegetables
Vietnamese
- Clear hot soup with chicken or beef
- Chicken vermicelli soup
- Seafood and vegetable combination with rice/noodles
- Cold rice paper spring rolls (steamed)

Japanese
- Noodles with fish/chicken/pork
- Soups with noodles and vegetables
- Sashimi/bento boxes
- Sushi

Snacks

Key points:
- Listen to your appetite
- Eat every two to three hours
- Make sure the snacks offer you some nutritional benefits
- Plan ahead

Snack ideas:
- Serve of fresh fruit eg one apple, two kiwi, one cup strawberries, half a rockmelon
- Handful of dried fruit, eg box of sultanas, six dried apricots, three fresh dates
- Tinned fruit in natural juice eg snack pack
- Small bowl of fresh fruit salad
- A baked apple with cinnamon
- Low fat yoghurt or fruche
- Small fruit bun or scone*
- Glass of low fat milk and flavouring/fruit smoothie/milo or aktavite
- Glass of soy or butter milk
- Small serve low fat cake or muffin
- A serve creamed rice
- Piece of heavy fruit bread/raisin bread*
- A piece of toast, English muffin or crumpet*
- A small bowl of cereal and low fat milk
- A pancake or pikelet*
- A small bowl of popcorn
- Handful of low fat pretzels
- Three low fat dry biscuits with tomato, peanut butter or avocado
- Mug of thick vegetable soup
- A handful (30g) of peanuts, almonds, walnuts or macadamias
- Raw carrot sticks with hummus
- A bagel eg blueberry, cinnamon*

*with fruit spread/jam/mashed banana/creamed corn/tomato/stewed apple
Handy foods for the cupboard

It is a good idea to store healthy foods for times when you can not shop, such as:

**Bread and cereals:**
Breakfast cereals and muesli bars
Rice, spaghetti, pasta, two-minute noodles, flour and rolled oats
Dry biscuits, rice cakes and rice crackers

**Meat and meat alternatives:**
Tinned fish (ie tuna, salmon and sardines)
Canned meat, peanut butter and nuts
Legumes (ie kidney beans, baked beans, split peas, lentils, chickpeas and dried beans)

**Fruits and vegetables:**
Legumes (see examples mentioned above)
Canned or dried fruit and canned fruit juice
Canned or dried vegetables (such as dried peas and dehydrated mashed potato)
Canned soup and soup mixes

**Dairy products:**
Milk powder, UHT long life milk, custard powder and tinned rice pudding
Cheese and eggs (refrigerated)

**And in the freezer:**
Frozen vegetables and oven fry chips
Halved chicken breasts or fish fillets
Leftover meals or small serves of mince
Ice cream and frozen yoghurt
Bread, bread rolls, crumpets and muffins
Recipes for the rowing team
Recipes for rowing Team

Dr Louise Burke, PhD

Gnocchi with bolognese and vegetable sauce

**Ingredients:**
- 600g lean mince
- 500g jar of commercial pasta sauce
- Other veggies as desired (e.g., chopped celery, tomatoes etc)
- Pepper
- 750g packet of fresh gnocchi

**Method:**
- Chop celery and tomatoes into tiny cubes.
- Brown mince in a lightly greased wok. Add pasta sauce and the veggies. Season with pepper and simmer gently until pasta is ready.

In the meantime, boil a large pot of water and add gnocchi to boiling water. When they float to the surface, remove from heat and strain.

Serve gnocchi with sauce and a little grated reduced-fat cheese.

Tuna potatoes

**Potatoes:**
- Allow 1 or 2 medium-large potato per person.
- Wash potatoes and prick skins.
- Cook in moderate oven (approx 1.5 hours) or Microwave (10-20 minutes per potato)

**Tuna Sauce**

**Ingredients:**
- 1 large can tuna in brine (drained well)
- 1 jar pasta sauce (e.g., Raguletto Light Style)
- ½ celery – cut into small pieces
- 1 green capsicum – chopped into small pieces
- Juice of a small lemon
- Black pepper to taste
- 1 avocado – peeled and cut into cubes

**Method:**
- Place tuna, pasta sauce, and chopped celery and capsicum in a large wok or saucepan. Season with lemon juice and pepper. Simmer for 20-30mins.
- Before serving, cut avocado into cubes and gently stir through.

Cut cross into baked potatoes and serve tuna sauce over potato.
Mexican potatoes

**Potatoes:** Allow 1 or 2 medium-large potato per person. Wash potatoes and prick skins. Cook in moderate oven (approx 1.5 hours) or Microwave (10-20 minutes per potato)

Chili con carne sauce

**Ingredients:**
- 500g lean mince
- 500g can kidney beans
- 2-3 large tomatoes
- or large can peeled tomatoes (drain juice)
- 4 stalks of celery
- 1 capsicum
- 1/2 – 1 jar El Paso Taco sauce (depending on your taste)
- Black pepper

**Method:**
- Chop vegetables into smallish pieces.
- Dry fry mince in wok. Add kidney beans and celery and stir.
- Add tomatoes, capsicum, sauce and pepper and let simmer.

When potatoes are cooked, cut cross in top and pull open. Spoon in chili con carne and top with grated low fat cheese.

Chicken and cashews with noodles

**Ingredients:**
- 500g chicken fillets (remove skins)
- 100g cashews
- Onion
- 150g snow peas
- 150g green beans
- ½ celery
- 1 can baby corn
- 2-3 tsp soy sauce
- Fresh grated ginger – 1-2 tsp
- Black pepper
- 250g (small packet) of soyaroni/wholemeal noodles

**Method:**
- Heat a large saucepan of water and add noodles to boiling water. Stir to prevent them sticking together. When cooked (al dente), strain and run under hot tap. Put back into saucepan and close lid keep warm.

**Meanwhile:**
- Skin chicken and cut into smallish pieces. Heat a little oil in wok and stir-fry until all pieces have been sealed on the surface.
- Add cashews and finely chopped onion and stir for a couple of minutes until cooked. Add soy sauce, ginger and pepper to taste.
- Cut celery, snow peas and beans into long thin strips. Add these and corn to wok and cook with lid on until cooked but crisp.

When cooked, add soyaroni noodles and stir through.
Chicken, broccoli and almond stir-fry

**Ingredients:**
- 500g chicken breasts
- 300g of broccoli
- Can of baby corn
- Small onion
- 1 capsicum
- 150ml orange juice
- 100g almonds
- Fresh grated ginger – 1-2 tsp
- Black pepper
- 250g (small packet) noodles

**Method:**
Boil a saucepan of water and add noodles. Cook until al dente and drain.

Meanwhile, skin chicken and cut into cubes. Cut onion into small pieces. Heat a tsp of oil in wok and brown chicken and onion together. Add ginger and pepper (to taste). Add almonds also. Cut broccoli and capsicum into small-medium pieces, and add these along with the orange juice and corn to the wok. Stir until just cooked. Stir in noodles. Check seasoning and serve.

Pizza

**Base:** McCain’s Frozen pizza bases – use straight from freezer fresh pizza bases from supermarket deli – with tomato topping.

**Tomato Topping:** Mix tomato paste and bottled pasta sauce (eg Edgell or Raguletto light style) in equal amounts. Spread generously over base. (If needed)

**Topping 1:** Ham, pineapple, corn and red capsicum

**Suggestions:** Use low-fat ham (eg Tegels 95% fat-free)

2. Vegetarian supreme
Microwave mixed Chinese vegetables until just crunchy. (eg Birds Eye Chow Mein frozen Chinese style vegetables). Drain well in sieve and mix in kidney beans, corn and diced capsicum. Spread on pizza and top with slices of avocado. Season with black pepper.

3. Mexican
Kidney beans (or left-over chili con carne sauce), corn, green capsicum, taco taco sauce, tomato and avocado.

4. Chicken, corn, pineapple, capsicum, avocado
Cut chicken breasts into small pieces and brown in wok. Spread on pizza base, and add corn, pineapple, diced capsicums and diced avocado.

5. Seafood
Can of Anchor seafood mix, tomato slices, mushrooms and green capsicums.

**Cheese:** Sprinkle reduced-fat tasty cheese or reduced-fat tasty mozzarella blend.

**Cook:** Cook in hot oven (200 degrees) until ready.
Beef and vegetable satay with rice

Satay Sauce – reduced fat version

Ingredients:
- 150g packet unsalted peanuts
- 2 cups water
- Small onion
- 2 tsp soy sauce
- 1 tsp curry powder
- Black pepper

Method:
- Chop onion finely and “dry fry” in saucepan with a tsp of oil and curry powder.
- Add soy sauce, pepper and water and bring to boil.
- Add peanuts and soften for 1-2 minutes.
- Remove from heat and blend into sauce with Bamix.
- Return to low heat.
- Simmer gently for 20 minutes and allow to reduce (thicken up).
- Thicken further if necessary with corn flour, and check seasonings.

While sauce is simmering, put rice on to boil and make kebabs.

Beef and vegetable kebabs

Ingredients:
- 500g lean steak
- Green capsicum
- Red capsicum
- 2 large tomatoes
- 2 potatoes
- Large lemon

Method:
- Cut steak, potatoes, capsicums and tomatoes into cubes. Soften potatoes in Microwave for 6-8 minutes. Thread onto skewers – 2 vegetables to a cube of meat. Place on alfoil in griller and sprinkle with lemon juice. Grill – turning each side as it is cooked. Continue to sprinkle lemon juice over vegetables to keep moist.

Note:
- Can also be cooked on barbeque.

Serve on bed of rice and spoon satay sauce on top.

Chicken and vegetable satay with rice

Satay Sauce – reduced fat version

Ingredients:
- 150g packet unsalted peanuts
- 2 cups water
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- 1 tsp curry powder
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- Return to low heat.
- Simmer gently for 20 minutes and allow to reduce (thicken up).
- Thicken further if necessary with corn flour, and check seasonings.

While sauce is simmering, put rice on to boil and make kebabs.
Chicken and vegetable kebabs

**Ingredients:** 600g lean chicken
- Green capsicum
- Red capsicum
- 2 large tomatoes
- 2 potatoes
- Large lemon

**Method:** Cut chicken, potatoes, capsicums and tomatoes into cubes. Soften potatoes in Microwave for 6-8 minutes. Thread onto skewers – 2 vegetables to a cube of meat. Place on alfoil in griller and sprinkle with lemon juice. Grill – turning each side as it is cooked. Continue to sprinkle lemon juice over vegetables to keep moist.

**Note:** Can also be cooked on barbeque.

Serve on bed of rice and spoon satay sauce on top.

Quick spaghetti bolognese

**Ingredients:** 600g lean mince
- 500g jar of commercial pasta sauce
- 500g packet of pasta
- Other vegetables as desired (eg chopped celery, beans etc)
- Pepper

**Method:** Brown mince in a lightly greased wok. Add pasta sauce and any vegetables. Season with pepper and simmer gently until pasta is ready.

In the meantime, boil a large pot of water and add pasta to boiling water. Cook until al dente.

Serve pasta with sauce and a little grated reduced-fat cheese.

Chicken souvlaki

**Ingredients:** 3 Chicken breasts (600g-800g)
- Pita bread – pocket or large
- Tomato
- Lettuce
- Lemon juice

**Sauce:** Tomato/salsa/barbeque/natural yoghurt

**Method:** Cut chicken into cubes and thread onto skewers. Cook in griller or barbeque, sprinkling with lemon juice and black pepper. Warm pita bread in microwave or barbeque. Remove cooked chicken from 1-2 kebabs and place in pita bread. Cut tomato into slices and shred lettuce and place on top of chicken. Add sauce of choice. Roll up pita bread.
**Beef and cashews with noodles**

**Ingredients:**
- 600g lean beef
- 100g cashews
- Onion
- 150g snow peas
- 150g green beans
- ½ celery
- 1 can baby corn
- 5 tsp soy sauce
- Fresh grated ginger – 1-2 tsp
- Black pepper
- 250g (small packet) of soyaroni/wholemeal noodles

**Method:**
Heat a large saucepan of water and add noodles to boiling water. Stir to prevent them sticking together. When cooked (al dente), strain and run under hot tap. Put back into saucepan and close lid keep warm.

**Meanwhile:**
Prepare all ingredients before you start to cook:
- Trim fat from steak and cut into thin strips. Prepare veggies including those which need to be cut into strips.

Heat a little oil in wok and stir-fry steak until all pieces have been sealed on the surface.
Add cashews and finely chopped onion and stir for a couple of minutes until cooked.
Add soy sauce, ginger and pepper to taste.
Add veggies and stir until just cooked.

When ready, stir cooked noodles through and add extra seasonings as required.

**Secrets:**
1. Have everything prepared before you start cooking.
2. Cook quickly and lightly – the veggies will stay crisp.
3. Overcooking will cause the meat to toughen up.

**Mangoes and icecream**

**Mangoes:**
Cut mangoes into cubes by:
1. Cut the mango into “halves” (leaving the stony strip in the middle)
2. Turn the mango half over so that the flesh faces you.
3. Using a sharp knife, cut a criss-cross pattern in the flesh, cutting deep but just missing the skin.
4. Turn the skin “inside out” and the mango “cubes” will pop out.
5. Using the knife, slice the cubes from the skin.

Serve with low-fat ice-cream.
Exotic Summer fruit salad

**Ingredients:**
- 1 punnet of strawberries
- 1 punnet of blueberries
- 1 can boysenberries
- 1 punnet raspberries or 250g of cherries (pips removed)
- 200g natural almonds

**Method:**
Cut large berries into smaller pieces and place in bowl. Let sit in cool fridge for 1-2 hours. Stir in almonds just before serving.

Serve with low fat ice cream, low fat yoghurt or berry Fruche.

Icecream with boysenberry sauce

**Ingredients:**
- Can John West Boysenberries (or mixed berries)
- Low fat ice cream – vanilla or chocolate swirl
- Mint leaves
- (Optional addition – 1 flake)

**Method:**
Place scoop of low fat ice cream into good bowls. Spoon boysenberries over ice cream and drizzle sauce over top. Crumble a little flake chocolate on top, and finish by garnishing with mint leaf.

Golden syrup dumplings with banana sauce

**Ingredients:**
- 2 Cups of water
- 60g sugar
- 3 Tablespoons Golden Syrup

**Method:**
Place ingredients in saucepan and heat.

**Dumplings**

**Ingredients:**
- 2 Cups whole meal flour
- 2 eggs lightly beaten
- Skim milk

**Method:**
Beat eggs gently in a bowl, stir in flour and enough milk to make a stiff dough. Break off pieces the size of a walnut and drop into boiling sauce. Cook for a couple of minutes until they swell and float.

Serve with chopped banana and a spoon of low fat ice cream. Halve the dough mix for a small group.
Rowing Technical Model

**Sweep catch**

- Length in front of the pin
- Heads still and looking forward
- Shins vertical
- Inside arm slightly bent
- Outside leg close to outside shoulder
- Wrists flat
- Hands relaxed

**Sweep recovery**

- Eyes forward
- Head still
- Handle grip two fists wide
- Inside arm slightly bent
- Body weight on your side of boat
- Whole body rotation majority from hips
- Outside hand as a hook
- Legs slightly apart
- Inside leg aligning with middle of body
- Outside leg aligning with outside of body
- Body weight in front of hips
- Extension of outside shoulder early in recovery

**Body Position at catch**

- Inside knee in middle of chest
- Outside knee just outside shoulder
- Outside arm straight at catch
- Inside arm slightly bent
- Body rotated from hips
- Body weight on his side of boat
- Eyes looking forward
- Head still
- Outside wrist flat
- Shins vertical
- Shoulder fully extended
Early drive

- Eyes looking forward
- Head still
- Outside arm straight
- Inside arm slightly bent
- Fingers hooked over oar not tight grip
- Body weight hanging off arms allowing maximum leg drive
- Back in strong position
- Wrists flat
- Blades fully buried

Body position during leg drive

- Body weight on your side of boat
- Angle of shoulders the same as angle of oar
- Legs slightly apart
- Fingers of outside hand just a hook
- Body weight hanging off handle
- Eyes looking ahead
- Head still
- Shoulders fully extended
- Outside arm still relaxed and straight half way through leg drive
Late leg drive mid stroke

- Outside arm starting to bend
- Starting to engage back and shoulders
- Head still
- Eyes looking forward
- Body weight still slightly on your side
- Fingers hooked outside hand
- Shoulder angle still slightly there
- Hand grip two fists apart

Maximum pressure prior to square on to pin

- Shoulder angle still good
- Fingers hooked and relaxed
- Still on your rigger side of the boat

Maximum pressure prior to square on to pin

- Eyes to front
- Head still
- Lats engaging
- Arms just starting to take pressure
- Body swinging through the arc
- Legs still driving
- Wrist flat
- Shoulder angle into rigger still there
- Body weight still maintained to rigger
Rowing Technical Model

**Sweep finish**

- Body weight still being maintained by pressure being applied off toes
- Wrists flat
- Body weight still on their side of the boat
- Shoulders still relative to angle of oar
- Head still
- Eyes looking straight ahead
- Handle still being drawn up to second rib
- Fingers on outside hand still just a hook
- Knees flat

All rowers will have a technical problem that is very hard to change. In this case it is Hamish.

Bond position of his elbow is his. His elbow points down and in most case this would lead to weak finish.

Bond has overcome this by not collapsing the body and having it follow the elbow, he also continues the body drive slightly longer than normal which helps maintain the pressure on the handle despite losing this through the dipping of the elbow.

Sometimes as a coach you have to make compromises and accept that not everything is perfect. But that must be your initial aim.
**Rowing Technical Model**

**Sculling catch**
- Sculling technique is very similar to sweep
- Head still
- Eyes looking to front
- Wrists flat
- Arms straight
- Shins vertical
- Placement of blade in water at maximum length forward of gate
- Strong body position
- Shoulders off body not collapsed down
- Length achieved thru extension of shoulder and thoracic region
- Hands similar height
- Pressure immediately applied to foot stretcher as blades buried
- Knees close together
- Grip at very end of handle
- Thumbs and fingers close together
- Shoulders at maximum extension no closing of shoulder once blade in water

**Sculling early drive**
- Head still
- Eyes looking front
- Arms straight
- Knees together
- Wrists flat
- Shoulders still fully extended
- Body tall and strong
- Body weight still hanging off handle
- Hands at similar height
- Blades buried and locked (no wash)
- Grip at very end of handle
- Core strong, body moving with seat
Rowing Technical Model

**Early recovery**

- Hands approaching knees
- Body movement forward has started
- Right hand leading left hand away
- Shoulders relaxed
- Arms starting to extend
- Knees still flat
- Head still
- Eyes looking forward
- Blade height all the same
- Wrists slightly down
- Hands close together

**Mid-recovery**

- Approaching half slide, body in catch position
- Body weight on feet to control slide movement
- Shoulders extended 90 per cent
- Arms straight
- Wrists bent for squaring of blade
- Head still
- Eyes looking forward
- Hands at similar height
Rowing Technical Model

Late leg-drive
- Arms starting to be applied
- Handles being drawn up
- Body moving through arc
- Back and shoulders being engaged
- Grip thumb and fingers close together
- Hands close together
- Work still in front of pin
- Maximum pressure being applied approaching square to pin
- Arms being engaged
- Back engaged
- Body swing still happening
- Shoulders still extended

Leg drive complete
- Legs fully extended
- Arms fully engaged
- Back muscles fully engaged
- Body swing still happening
- Leg muscles engaged to allow the core to be activated
- Head still
- Eyes to front
- Wrists flat
- Shoulders closed up and starting to rotate

Finish
- Wrists still flat
- Head still
- Eyes looking forward
- Body completed swing
- Hands still high at second rib
- Shoulders and body still high
- Legs still pushing off pointed toes
- Elbows still high