



KAYAK TECHNICAL TEMPLATE

Glossary of Terms

Bottom / lead hand

This is the “pulling” hand; hand of the blade in the water; hand of the blade about to go into the water during the drive phase; the front hand in the set up – the “lead hand”

Top / follow hand

This is the hand in the air during the pull phase; “follow or guide” hand in the set up.

Set up

This is the break between strokes, although it might be subtle at high rates. The paddling motion is a continuous smooth rhythmical powerful stroke, yet there is a slight break/pause in the set up phase.

Head up

Eyes are looking ahead – approximately six feet in front of the boat – awareness in the lane.

Individual differences

The coach allows some variance in the athlete’s technique for individual body differences, although the principles of biomechanics will still apply. The coach has identified an acceptable bandwidth of deviance from the ideal and communicates this with the athlete.

Equipment

Full foot board, as much as possible and straps are part of the connection to the boat. The pressure is applied by the heel versus the toe of the foot while utilizing a full foot board. Pushing on the footrest (60%) and pulling (40%) – emphasis the pushing – squeezing the footrest vs sudden all in push!

The use of swivel seat is a choice for an athlete during the Learning to Compete stage who demonstrates a good grasp of the technical elements of the kayak stroke specifically in hip rotation through a strong core and its associated muscle groups.

MF - Mental Focus

Athlete is mentally focusing on a particular technical element within a given phase of the stroke.



This is an explanation or definition appearing at the start of a new phase in the stroke. It is also inserted to highlight a drill or drills to be used by the coach to assist the athlete with specific skill acquisition / consolidation or refinement.

Set Up



The set up phase is the break/pause between strokes – the end of a stroke occurs when both hands are at approximately the same level. The end of one stroke is the prep for the next – beginning of the next.

Key Elements

- ⇒ “Lead” hand position – eye level — site the horizon.
- ⇒ “Follow” hand position – approximately eye level — individual differences – body length (length of torso, shoulder to the water distance).
- ⇒ “Follow” hand and elbow form an angle that is 90 degrees or slightly less.
- ⇒ The forearm and “follow” hand is in an approximate 45 degree angle forward to the water.
- ⇒ The elbow to armpit is parallel to the water - avoid a low elbow position.
- ⇒ “Follow” hand is set with knuckles face forward versus the palm facing forward – MF – “throwing a punch” position.
- ⇒ Athlete is relaxed as much as possible in shoulders and arms – relax / drop shoulders.
- ⇒ All rotations are at a maximum – hips, lower back, torso and shoulders – near knee in strong flex position / “near hip” is fully rotated forward.
- ⇒ Once the set up is in place, avoid over reaching with the bottom shoulder or hyper extending the elbow – “relaxed straight” position in the arm.
- ⇒ Boat is level.



1. Use an erg or balance board with mirrors to assist the athlete in identifying the “feel” for correct positions.
2. “Tap drill” – to assist athlete with correct “follow” hand elbow position – athlete holds the set up position and moves hand in and touches side of head by ear and moves hand back out to correct position. This teaches the athlete to be flexing the top elbow to acquire the “90 degree or slightly less” at the upper arm and elbow.

Drive Phase:



The drive phase is from the set up to the tip of the blade touching the water when the “catch” phase begins. The aim is to generate as much “free power” as possible in this phase by being aggressive and dynamic. Biomechanics are at play in this phase - the “stretch – shortening cycle”. Athlete is preloading with an isometric contraction – firming the core, applying pressure on foot rest, tensing in the near leg, and anticipating the “all in” principle of neuromuscular activation.

MF – analogy to hitting a nail with a hammer – you lift the hammer and hit the nail versus placing the hammer on the nail and tap / tap / tap it!

Speed of the blade hitting the water is needed to overcome the resistance of the water and combined weight of paddler and boat.

Key Elements

- ⇒ Both hands are directing paddle into the water. There is a “lead” and “follow/guide” relationship that develops between the bottom hand (lead) and the top hand (follow/guide) during each stroke.
- ⇒ Athlete maintains all the rotations while driving/directing the paddle into the water close to the boat.
- ⇒ MF – “lead” hand stays forward as it drops towards the water with the “follow” hand directing/driving the motion – avoid rotating to the catch as in beginning your de-rotation prior to the catch phase.
- ⇒ Press the “lead” hand downward and feel your weight going onto the blade – the paddle actually is stopping you from tipping – if the blade snapped, you would fall in.
- ⇒ Boat is level.



DRILLS

ZIPPER

To assist the athlete in maintaining all rotations while in the “drive phase” attach a plastic zip lock tie to deck of the boat (duct tape) so that it projects out from the side of the boats. This is a visual cue as well as a kinesthetic one for the athlete to target. It is used to help the athlete from prematurely initiating any early movements that result in catching the water short (CWS) or losing rotation before the “catch”.

DRIVE/DROP

Starting in a set up position drive the paddle into the water without any other action – maintain all rotations. 3 to 5 per side then switch sides – each one is progressively more forceful.

Catch Phase:



The catch phase starts when the blade tip touches the water and is completed when the blade is fully immersed or buried.

Key Elements

- ⇒ MOST IMPORTANT - Blade is buried in the water, before any counter rotation is initiated – MF – before leg drive (extension) and hip rotation is to occur, blade must be completely buried in the water..
- ⇒ If rotation occurs before placement of blade in the water, catch ends up being short (CWS) and maximum force application is past ideal critical angle resulting in loss of maximum propulsion.
- ⇒ Paddle is placed into the water as close to the boat as possible – “guide” hand is directing the blade into the water.
- ⇒ “Lead” hand is pressing down; near side of torso is strong and long - MF - engage the oblique muscle group.
- ⇒ Big angle under near armpit - hold shoulder down through catch and pull phase.
- ⇒ Strong, dynamic forceful catch with minimal splash – there will be some splash depending on point in the race – more at the start.
- ⇒ NOTE: MF – there is some excitement at the catch – BALLISTIC!
- ⇒ This is the beginning of a sequence of rhythmical movements.
- ⇒ Boat is level.



1. “Drive drill” - 10 strokes – drive blade into the water to buried position with no other movements – “drive and direct”.
2. “Catch drill” - Drive the blade into the water and exit immediately afterwards – feel weight onto the blade.
3. “Alternating catch drill” - 10 strokes on one side with an aggressive catch with accompanying 10 easy strokes on the opposite side.
4. “Hand drill” – coach is standing in shallow water and has hand in water under the catch area to feel downward pressure of blade on hand.

Pull Phase:



The pull phase starts when the blade is fully immersed and finishes when the blade leaves the water.

Key Elements

- ⇒ MF - sequence of rotation begins with the brain, followed by foot pressure, leg drive, and rotation through the hips, lower back, torso and shoulders.

- ⇒ “Lead” hand and “guide” or “follow” hand lock the paddle in the water at the catch; the athlete is loading the paddle by applying forces in both a horizontal (reach ahead, grab the water and move the boat past the blade) and a vertical direction (force down the length of the shaft, critical to power generation and engage the core).
- ⇒ The athlete is trying to create as much power as possible through a summation of these forces – both vertical and horizontal.
- ⇒ The critical component in this phase is to maintain the vertical paddle angle as close to 90 degrees for as long as possible by:
 - ✓ Push/pressure is directed down the shaft by the “guide/follow” hand - avoid the “guide/follow” hand / shoulder creating a forward push.
 - ✓ Athlete is trying to create a torque motion/rotation about/around the paddle.
 - ✓ “Follow” hand height maintains its position – it is stable.
 - ✓ “Guide/follow” hand guides the paddle in following the path of motion of the “lead” hand.
 - ✓ “Guide” hand moves laterally in fixed angle (maintain same angle in elbow) in support of hip, lower back, torso rotations.
 - ✓ Pressure with the “guide/follow” hand throughout the pull phase — “guide/follow” hand is stabilizing the paddle in the water and attempting to maintain a vertical angle as long as possible – **NO FORWARD PUSH – the “guide” hand follows across the face, the path set by the lead hand as it moves in the water away from the boat.**
 - ✓ Between the “guide” and “lead” hand there is a maximum load on the shaft – “bend the shaft”.
 - ✓ Paddle in water follows its own “path of motion” – along the bow wave – lead hand and elbow go with paddle.
 - ✓ Paddler is trying to pull him/herself forward.



1. “Guide Hand” drill – 1 stroke @ 100% power – begin in the water; press down very hard with maximum tension between two points of contact with paddle (guide and lead hand) is constant; lose either one and the result will be that the connection to the water is lost. MF – the “guide” hand is pressing down; yet it is maintaining the same level – it is not moving down. It has a supportive strong role versus a dominant role.

- ⇒ The speed of these movements (why they are done as well as how they are done) is the most critical of all components in the biomechanical application towards power generation – summation of power = mass x acceleration x velocity.
- ⇒ STRONG CONNECTION - from hip to the boat is through the leg to the foot board. Rotation occurs on the seat with hips; as hips rotate – moves the boat past your catch. Torso rotation follows hip rotation - hip movements through a “strong connection” to the overall body movements are powering the boat.
- ⇒ MF - all movements must be a forward motion about a vertical axis – rotating around the paddle versus leaning laterally.
- ⇒ All movements must direct the boat forward - “the athlete is one with the boat”.



Arm movements are to allow for hip to move efficiently – the path of movement of the “guide” hand is eye level versus for it to loop. It is important for the “guide” hand to follow the “lead” hand - MF – in stabilizing the paddle, guiding the paddle. There is a definite connection between the roles of the hands – there is a “pull” and “follow” in a supportive manner.

- ⇒ “Lead” hand stays in same height relative to distance from water throughout the stroke from catch – same level.
- ⇒ “Lead” hand is following the blade movements in the water yet the **elbow comes in “slightly” towards the hip** at end of this phase.
- ⇒ Boat is level.



GRIP - “*lead hand*” - fingers hooked solid; palm slightly open; avoid clenched fist or death grip; no pressure in crux area between thumb and first finger; “*follow hand*” - fingers are around paddle shaft in a strong grip but avoid squeezing “white knuckles”; very strong in thumb, index and middle finger, less so with ring and baby finger.



1. “Hand drill” – sitting in the boat – paddle parallel to the water – check grip on the paddle – first row of knuckles leading – wrist is flat vs flexed – gap in the palm – fingers hooked on shaft of the paddle.

Exit Phase:



The exit is a moment in the stroke between the pull phase and the set up phase when the paddle clears the water. MF - once past the critical acceleration point, the athlete is not moving boat forward. Get the paddle out of the water!

Key Elements

- ⇒ Allow elbow to bend in latter part of the pull phase.
- ⇒ This movement of the elbow slightly “in” sets the paddle and arm movements up perfectly for the set up position described earlier – it is a more dynamic and fluid motion.
- ⇒ Elbow stays in front of the hip – MF – finish off the pull phase aggressively; sharp on the exit.
- ⇒ The force is accelerating throughout the pull phase; avoid slowing down. MF - ***Opposite hip drives forward*** on exit – ends in fully rotated set up position for next stroke with knee completely flexed.
- ⇒ On exit as elbow drops in and down the fist goes above the elbow; versus straight arm exit; MF – athlete thinks of flicking baby finger to the side and up.



1. “Bump drill” – hit elbow to the body versus allowing it to drag past the hip or out to the side

Credits

Scott Oldershaw, Head Coach, Canoe Kayak Canada – personal coach Adam Van Koeverden & Mark Oldershaw.
Nathan Luce, Head Coach USA Canoe / Kayak, 2005 – 2009; Australia National Team Coach – 2011 – present.
Dean Oldershaw, former Head Kayak Coach, Mississauga Canoe Club / 3x Olympian Canada
Jeff Howser, Nova Scotia Provincial Team Coach.
Shaun Caven, Head Coach, Oklahoma City; USA National & Olympic Team Coach /former BCU Men’s Kayak coach.
Dr. Jurgen Sperlich, Germany, Sport Scientist and Bio-mechanic – OTC Chula Vista, Feb. 2010.
David Gubser, former Swiss Senior National Team member 2001-2012.
Dan Henderson, Head Coach Cascade C/K Club; Kayaking and Power Presentation Coaching & Leadership Conference-OKC, Feb. 2010.