

## Teaching Tips for Kayaking- A Work in Progress

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The following material provides some insights into paddling and teaching paddling. The document is aimed at instructors and instructor candidates, but portions might be helpful to any paddler. Each time I teach, this document evolves and grows a bit more. Some of the ideas will make sense right away and work for you; others may take time, and still others may not work at all for you. Take these as suggestions to consider and to adapt to your own teaching and paddling personality. If these tips work for you or if you have suggestions or questions, please feel free to comment.

### Characteristics of an Effective Instructor

- Good instructors are brief. They take the time needed to cover the subject without taking more time than needed. They provide the information students need, but very little information students don't need.
- Good instructors are accurate. They have a deep and broad knowledge of the subject matter they're teaching and are able to accurately convey that information with a variety of techniques.
- Good instructors are positive. They use positive directions, have a positive attitude and provide positive reasons for doing things.
- Good instructors recognize that words have power. Students pay attention to what is said and how it is said. Effective instructors use their words with care.
- Good instructors understand learning theory and apply it to their students. They use a wide range of teaching tools and teaching approaches so they can best reach their students.

- Good instructors use their own unique personality and skills to develop unique lessons. They incorporate material from a wide variety of sources but ensure that it is adapted to their own unique personality.
- Good instructors are flexible. Student needs, environmental conditions and a wide range of other variables will impact an instructor's lesson. An effective instructor responds appropriately to these changes.
- Good instructors seek to improve themselves. They seek out feedback on what they've done and seek out new knowledge and skills.
- Good instructors pay attention to their own needs because they recognize they have to be at their best to teach most effectively.
- Good instructors pay attention to the needs of those around them. They demonstrate concern and respect for co-workers, students and everyone else.
- Good instructors are willing to say "I don't know, but I will find out."
- Good instructors teach what the student needs. They recognize that what the student needs isn't always what the student wants, or what the instructor planned to teach. At higher levels, this means good instructors refer students on to other instructors when appropriate.
- Good instructors are open-minded. They are willing to try new ideas and adapt them to their own teaching as appropriate.
- Good instructors are self-aware. They know what they are doing and can modify it in response to new ideas or to demonstrate what a student is (or is not) doing.
- Good instructors use appropriate feedback. They find what a student is doing well and provide specific praise for that success. At the same time, they also provide accurate corrective feedback for what the student is not doing well.
- Good instructors understand "the rules" and why the rules exist. They also understand when to break the rules.

## **Characteristics of an Effective Presentation**

Effective presentations are:

- Clear. They are easily understood and followed by the target audience
- Concise. They contain all the necessary information and very little information that is not needed. (Note the difference between concise and short)
- Connected. Their focus is concentrated on the target audience. They are relevant to the learners, with a clear purpose that meets the learner's needs

- Creative. They contain a variety of teaching approaches so as to engage as many learners as possible. They appropriately balance education and entertainment
- Correct. They contain accurate and up to date information. They distinguish between fact and opinion

## **Suggestions for Effective Teaching**

The list below was attributed to the Israeli Yamam Counter-Terrorism and Hostage Rescue Unit training when it was given to me, but I don't know if that attribution is accurate. Regardless, these are excellent suggestions for any teacher:

- Skill levels are lower when students are stressed
- Do specialized drills that closely mimic the stress of actual encounters
- People in top physical condition are affected less by stress symptoms
- Custom-tailor the training to the individual
- Rarely chastise the student
- Boost the student's confidence through heavy doses of encouragement
- Focus on what the student is doing right
- Gently correct the student for what he does wrong
- When students are constantly focusing on what they can do well they will quickly learn to do other things well
- Have a sound, logical reason for everything that is done
- A student's confidence will increase if he knows that training techniques and methods employed are soundly based in reality
- Everybody is different and may react differently under stress

## **Learning Theory in a Nutshell**

Humans can learn through an amazing variety of techniques. However, many people have a preferred means of learning. Ideally, an instructor would identify each student's preferred learning style and create a unique lesson for each student. In practice, that is almost impossible. There are multiple learning style models and some people don't fit into any specific model. In addition, preferred learning styles can change over time and in response to what is being learned. Finally, a student's preferred learning style may not be the style that is most effective for a specific topic. Therefore, a more common, and generally more appropriate goal is to create lesson plans that incorporate as many different

learning styles as possible and then to provide individual feedback aimed at an individual's preferred learning style at that moment.

One commonly used learning style inventory is the [Learning Style Inventory](#), version 3 (LSI 3) [now version 4. -ed.], developed by David Kolb, one of the early pioneers in learning style research. Kolb theorized that people with no knowledge of a skill move through four stages of learning. First, they experience a new activity. Then, they reflect on that experience and try to conceptualize it. Finally, they actively experiment with the activity, leading to new experiences. Kolb suggested that many individuals prefer two or more of these phases when learning new skills, although he was clear that each phase must be experienced in order to fully learn a new skill. In its most primitive approach, Kolb's four phases of learning are often referred to as *feeling* (concrete experience), *watching* (reflective observation), *thinking* (abstract conceptualization) and *doing* (active experimentation). However, Kolb and others have produced considerable research beyond these basic classifications and have developed fairly complex models. Other approaches to learning theory suggest individuals might prefer to learn by listening, reading and writing, watching, doing or by some combination of these four techniques. These approaches are related to Kolb's theories but there is not always a direct correlation.

Effective instructors will seek to use a combination of teaching techniques that touch upon each learning style. For example, a brief discussion may provide information for those who prefer listening and abstract conceptualization. Handouts may help those who prefer to read. Demonstrations help those who learn visually. Drills and free practice time will benefit kinesthetic learners. Ultimately, full understanding of a skill requires practice, time to consider what works and does not, opportunities to conceptualize the skill and additional opportunities for practice after reflection and conceptualization.

Learning theories also suggest instructors can help students move through stages of knowledge. One approach is that students move from "unconscious incompetence" (i.e., they don't know what they're doing it and don't realize it), through conscious incompetence (now they realize they don't know what they're doing), to conscious competence (they have to think to do the right thing) and finally to unconscious competence. Another approach is that students initially are presented with information. The new information then makes an impression into short term memory and, ultimately, into long term memory. Then, students create bridges with other material they know, and finally develop a full understanding (or unconscious competence) of the material.

Successful instructors use a wide range of approaches and have a wide range of personalities. However, in all cases, successful instructors help students develop a strong understanding of the material being taught, and a strong ability to use that material. Understanding learning theory helps instructors become successful.

## **Giving Direction and Feedback**

"EDRC"

- E – example / explain: Tell the students what you want them to do

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- D – demonstrate: After you tell them, show them
- R – repetition: Then, get them doing what you want
- C – critique: Finally, give feedback on what they’ve done

“PSC” Feedback. Feedback should be positive, specific and congruent.

*Positive:* Give directions about what the participant should be doing and reinforce what they are doing well. Avoid focus on what they’re doing wrong. Instead, describe how to become more effective.

*Specific:* Feedback should be clear and directive. Avoid saying “you’re doing well.” Instead, say “you’re doing well because your top hand is high, your top elbow is relaxed and you’re rotating well through your entire torso.”

*Congruent:* Feedback should be directly related to what the participant is doing. Give feedback about ferries when you do ferries.

## **Paddling Foundations**

Whether you’re paddling a sit-on-top on flat water, a sea kayak offshore, or a play boat in a hole, effective paddlers all draw upon the same basic skill set. Effective instructors need to understand not only how to perform these foundational skills, but also how to communicate them to students.

Below is one way of looking at these foundational skills with explanations of how they relate to paddling and paddling instruction. There are other ways to think about these skills and other ways to teach them. Find what works best for you.

*Comfort:* Comfort may be the most important thing an instructor can provide. Physical comfort comes from taking the time to ensure students are properly dressed, their boats are properly outfitted and fitted to them. Cold students in poorly fitted boats are unlikely to learn much and unlikely to stay with the sport. Good equipment, properly fitted to the paddler, can make the difference between a great day and a miserable day. Physical comfort also means taking adequate breaks for food, water, rest and stretching. Expect beginning paddlers to become sore and tired quickly. Experienced boaters might choose to sacrifice comfort, but that is a conscious, informed choice. New boaters who sacrifice comfort are unlikely to stick with the sport long enough to make an informed decision.

Emotional comfort is just as important as physical comfort. New boaters need time to get comfortable wearing silly looking paddling gear, getting water splashed in their face and hanging out upside down in their boat. Even experienced boaters get scared when they face a significant challenge. Instructors can improve emotional comfort by continuously assessing their students’ comfort level, taking time to ease into new skills, listening to student feedback and maintaining an encouraging and supportive “challenge by choice” attitude.

*Posture:* Good posture leads to good paddling. Paddlers should sit upright with their spine in a relaxed neutral position, with possibly a slight arch slightly forward. Weight should be slightly in front of the

ischial crests (the “butt bones”). The spine should have an upright “S” shape, not a slumped “C” shape. Some people find it helps to imagine their head is being lifted up by a string, lengthening the spine. Most people have less than optimal posture, so good paddling posture is sometimes difficult and hard to maintain.

Proper posture has a number of benefits. First, it allows better visibility because it lifts the eyes higher. Second, it allows better breathing by opening the chest. Third, it places the shoulder and back muscles into optimal position for paddling. Fourth, it allows better balance. Finally, good posture generally makes people feel more confident and thus gives a psychological boost.

*Balance:* Balance helps keeps paddlers in an oxygen rich environment. It’s hard to paddle when you’re upside down! Good balance comes from good posture. Keep the pelvis and low back loose so that the head stays over the centerline of the boat. Once paddlers master maintaining good balance, they can start playing with deliberately putting themselves off balance to drive play moves (e.g., cartwheels). A great extension of the loose pelvis and low back, required for good balance, is that it allows greater range of motion in the low back. This allows improved visibility, turning strokes and boat control.

*Strong shoulder position:* Often referred to as “staying in the box” or “staying in the cube”, this means that paddlers want to keep their shoulders in the strongest position possible. Shoulders are the most mobile joint in the body, and are the most mobile point between the paddle and the boat. As such, they are easily injured while paddling. To reduce the risk of injury and to maximize paddling efficiency, paddlers generally should keep their elbows low (at or below shoulder height), bent and in front of the plane of the body. Elbows can be sharply bent, or almost fully extended, but maintaining some degree of bend allows them to act as a shock absorber, protecting both the elbow and the shoulder. Some people find it easiest to think of a box created by their hands moving with the above restrictions. Others find it easier to just keep the elbows in front of the shoulders. In either case, the shoulders stay protected and the arms are in an effective paddling position.

*Anchor:* To paddle efficiently, all the energy applied to the paddle should make the boat go where the paddler wants. For this to happen, a few things have to be anchored into place. First, the paddler needs to be well anchored in their boat. Good outfitting helps with this, as does consciously pushing with the feet, legs and buttocks during the power phase of a stroke. Second, the paddle needs to be well anchored to the paddler. A solid grip and a strong arm position help transmit the paddle’s power to the boat. Finally, the paddle needs to be anchored into the water, so it doesn’t slip when power is applied to it.

Paddles can be anchored to water in two ways. First, they can directly push against the water, just like your feet push against the ground when you walk. Second, the paddle can be used to generate lift like an airplane wing. In both cases, the goal is to ensure the paddle (the anchor) doesn’t slip. If the paddle moves too fast, water can’t “push” against it effectively. In many cases, bubbles will be generated around the paddle – a phenomenon known as cavitation. Cavitation is a clear sign the paddle isn’t anchoring effectively. It can be corrected by slowing the paddle and ensuring it is fully submerged.

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*Focus:* At its simplest level, focus simply means look where you're going. However, this simple act has some powerful consequences. First, you can see where you're going, which is generally a good thing. Second, keeping the head up and looking toward your destination helps to improve posture. Finally, it tends to set up appropriate torso rotation and boat edging when turning, which makes it easier to get where you're going.

At the next level, focus means paddling proactively. Good paddlers look ahead, plan their route and use as few strokes as possible. They also appropriately plan their day (which might mean a detailed rapid-by-rapid plan or might just mean "I'm doing an Ocoee play day."). This approach lets them avoid bad spots, while hitting fun spots with as much energy as possible and makes the day a lot more fun.

At its highest level, focus means determination. Focused paddlers are determined to get where they need to go. If they hit a rock, miss a stroke, or catch an edge they still maintain that mental and visual focus and accomplish their plan. Determination also means putting in the necessary practice time and finally, means being able to maintain focus when things don't go as planned.

*Timing:* When paddlers first learn, they practice even timing of their strokes so they develop a good paddling rhythm. As paddlers become more experienced they learn to change that rhythm to take advantage of water features. For example, a stroke might be sped up to gain momentum or delayed so it is placed inside an eddy. Appropriately timed stroke placement makes strokes much more effective.

*Symmetry:* Most paddlers find it easier to do things on one side of the body. However, good paddlers work to develop their skills on both sides so there is no "on-side" or "off-side". Being able to paddle equally well on both sides means a paddler can handle whatever comes their way.

## **Stroke Keys**

Paddlers use strokes to control their boat and make their boat do what they want. Strokes can be confusing to new paddlers. It may help to remember that a boat can only do a finite number of things:

- sit still
- sink at an edge, the bow or stern
- move forward and backward
- move right or left
- spin clockwise or counterclockwise

Every paddle stroke, every play move and every river maneuver results from one or more of these basic building blocks. Key elements common to all strokes are presented below. Key elements and diagnostics for commonly used strokes then follow.

## **General Key Elements**

- upright posture with chin lifted and vision forward
- paddle blade oriented for maximum efficiency. Clearly differentiate blade position for different strokes
- quiet arms
- power generated through torso rotation or position achieved through torso rotation
- gaze toward the direction of travel for proactive turning strokes
- gaze toward the direction of optimum efficiency (looking toward the blade may maximize rotation, looking away allows you to see where you're going, moving the head in a head dink allows you to stay upright – do what works best)
- quiet boat (minimize pitch, roll and yaw)
- working hand control
- mold the stroke to the boater and the boat. Recognize the difference between an ideal paddle position (which a paddler probably can't achieve) and the comfortable paddle position a paddler can reliably achieve.
- heavy elbows, light wrists to help stay in the strong shoulder position
- hold on to the paddle. Sounds simple, but many teachers demonstrate “fingertipping” when they teach. Holding the paddle by the finger tips can help provide greater reach but it isn't how we paddle.

## **Paddle Orientation for Efficiency -Basic Naval Architecture**

Kayaks inherently turn to one side or the other when paddled. The question is not “Will my boat turn?” but “How do I control my boat's turns?” To answer that question, it is important to understand how the boat and paddle interact with the water.

At the most basic level, a paddle blade applies force to the water in a direction perpendicular to the wide part of the blade. Therefore, beginners might start with just the information that a paddle oriented for a forward stroke tends to move the boat forward whereas strokes oriented like a sweep tend to turn the boat. More advanced students, however, may need more information which leads to some discussion of naval architecture.

Every boat has a point around which it will spin. Lateral forces applied directly against this spot will move the boat directly sideways, but if the force is applied even an inch ahead or astern of this point (the center of lateral resistance, or CLR), the boat will spin as it moves. The farther a force is applied from the CLR, the more the boat spins and the less it moves sideways. For example, an effective draw

acts directly against the CLR and causes minimal spin. An effective rudder works as far as feasible from the CLR and causes little lateral motion, but lots of turning.

The forward stroke works along the same principles. Paddle orientation for forward strokes is such that the paddle's center of effort (CE – the effective mid point of the working blade face) runs parallel to the midline of the boat. When the boat is stopped, the forward stroke travels from in front of the CLR to roughly even with the CLR. Thus, the boat tends to spin a lot when it first accelerates. As the boat speeds up, the CLR moves forward because the bow becomes “trapped” by the boat's wake. Once underway, the paddle stays relatively close to the CLR during the forward stroke. However, even the best forward stroke induces some degree of turn because the force from the paddle must be applied off center.

Beginners often have trouble placing the paddle so as to distinguish between true turning and forward strokes. More advanced paddlers may have similar trouble but compensate for it through their experience. Skilled paddlers understand how to differentiate their strokes and place their strokes so as to most effectively control both their forward momentum and their turns.

Referring to Figure 1, force applied perpendicular to line 1-2 at “X” (the center of the line, and the midpoint of the boat; thus this would be a perfect draw stroke) makes the boat move directly sideways. Force applied perpendicular to the midline at point “A”, just a little away from the center, makes the boat spin a little and move sideways a lot. A perpendicular force applied at “B” makes the boat spin a lot and move sideways a little.

Force applied parallel to the midline at “Z” causes more turn than that at “M”, but both cause significant forward motion.

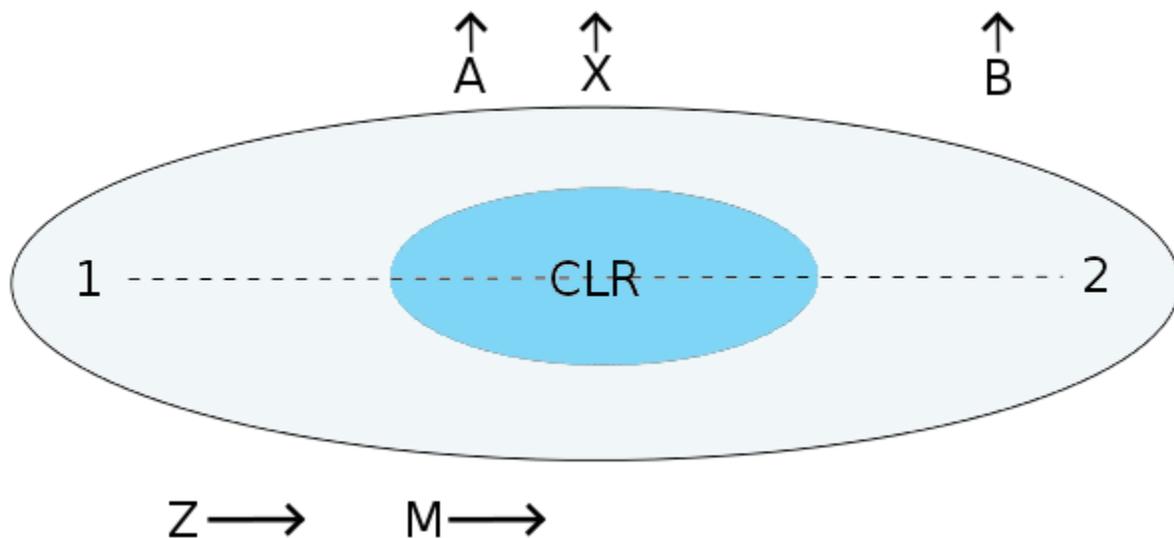


Figure 1. Stroke Forces

If the paddle blade is turned and planted (e.g., for a static draw) while the boat is moving, lift is generated across the paddle, directed perpendicular to the paddle face.

Even though the stroke is performed differently, the force generated is oriented the same as any other stroke. However, the combination of lift and forward motion can cause the boat to do neat things like sideslips or controlled carves. These neat things are much easier to show than write and are easier to cover during an on-water session.

## **Specific Strokes**

Beyond the fundamentals common to all strokes, strokes can be broken down into three phases: catch, power and release. During the catch phase the body is wound up to obtain power and the paddle is placed in the water. Power is then applied to the paddle and boat during the power phase. Finally, in the release phase, power is released from the blade and the blade returns to its setup position for the next catch phase. Release phases include the recovery from the water and any associated glide. Some frequently used strokes are described below along with their purpose and common diagnostic tips.

A second way to look at strokes is to consider 2 constants and 3 variables. All strokes depend, to some degree, on effective torso rotation and strong shoulder position. The variables for each stroke then become the blade orientation, the shaft orientation and the path of the blade and shaft.

## **Forward Power Stroke**

Purpose – Provide forward power. Forward strokes can be used to move straight ahead or to move on an arc.

### *Catch*

- torso winds forward and shoulder blade extends
- paddle is inserted with little splash, approaching the ankles, oriented for forward power
- catch occurs before power is applied
- top hand is high (around shoulder to ear level for touring strokes, above the eyes for power strokes, with the elbow roughly at shoulder height and the shoulder itself as relaxed as possible), allowing for vertical paddle shaft
- top hand may approach midline

### *Power*

- torso unwinds and shoulder blade retracts
- top hand stays high and moves toward and across midline, allowing torso rotation and maintaining relatively vertical paddle shaft
- motion is derived from shoulder and torso, not the arms and hands

- motion pivots around the spine instead of rocking from the pelvis
- paddle blade is buried
- working hand control utilized
- stroke ends about knee to mid-thigh

## *Release*

- paddle lifted out by the shoulder with little or no wrist motion
- blade slices out like a knife without lifting or splashing water
- blade lifted out mid thigh to hip
- glide phase occurs and natural shoulder motion leads to the next stroke
- top hand drops after the paddle is lifted out of the water

## *Diagnostics/key points*

- dropping top hand indicates overly long stroke, inadequate body cross or inadequate rotation
- wrist motion on working hand indicates shoulder is not lifting blade, long stroke or dropping top hand to lift blade
- punching top hand indicates low and less efficient fulcrum point
- splash on entry indicates rapid stroke turnover, inadequate rotation, power applied too soon or inadequate plant
- splash on exit indicates long stroke or low top hand
- boat wobble indicates inappropriate body anchoring to boat, excessive weight shifts, attempts to overpower or sweep component to stroke
- boat pitch indicates leaning forward and back while paddling

## **Reverse Power Stroke**

Purpose – Move the boat backward. Travel can be straight back or on an arc.

## *Catch*

- torso winds back and shoulder blade retracts
- top hand is comfortably high and may cross midline, allowing a relatively vertical paddle shaft.
- paddle blade is oriented for power on the back face

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- paddle is submerged before power is applied

## *Power*

- torso unwinds to move paddle blade
- top hand stays high and moves toward midline
- motion pivots around spine
- paddle blade stays fully submerged
- paddle blade travels close to the boat and parallel to the boat
- stroke ends near the knee

## *Release*

- paddle lifted out by the shoulder, with little or no wrist motion
- blade slices out like a spear, without lifting or splashing water. The boat's direction of travel allows the blade to exit the water while the shaft stays roughly parallel to the midline of the boat
- blade lifted out near the knee or ankle
- glide phase occurs and natural shoulder motion leads to the next stroke

## *Diagnostics/key points*

- encourage vertical paddle shaft for power, rather than a series of mid-range reverse sweeps
- encourage paddlers to look over their shoulder every 3rd or 4th stroke to see where they are going
- inefficient paddle orientation, long strokes and strokes away from midline cause poor tracking
- encourage short strokes
- steering is challenging because it is done predominantly from the stern. Rudder strokes may be more efficient
- compared to the forward power stroke, it is easier to maintain a vertical paddle and harder to lift water or roll the blade at the end of the stroke. Therefore, beginners may find it easier to travel in a straight line while moving backward

## **Forward Sweep**

Purpose-Turn the boat while also moving it forward.

## *Catch*

- torso rotates fully forward with shoulder blade extension
- paddle is placed to provide turning power
- blade inserted near the feet
- top hand is as low as feasible, typically shoulder to ear height
- top hand essentially hangs from the paddle shaft, and is not curled over it
- paddle is fully buried before power is applied

## *Power*

- torso unwinds
- elbows and hands stay fixed relative to the body
- blade separates from boat and travels in a wide curve away from the boat

## *Release*

- stroke ends no later than full rotation, around 4:30
- blade slices upward, lifted by the shoulder
- blade maintains turning orientation at end of stroke

## *Diagnostics/key points*

- rearward oriented blade at beginning of stroke indicates placement by arms instead of torso or, top hand is too low
- blade not in water may indicate top hand is too low (or that blade just isn't placed deep enough prior to power phase)
- elbow motion causes poor separation and suggests inefficient torso rotation
- top hand motion causes poor separation and is often associated with inefficient torso rotation
- top hand curled over indicates top hand rather than working hand control

## **Reverse Sweep**

Purpose – Turn the boat while also moving backward or to radically turn and slow down while moving forward

## *Catch*

- torso is fully wound to the stern
- top hand is about eye level (below power stroke level but above forward sweep level)
- working arm's elbow is tucked into the back and close to the deck
- blade is oriented for turning and is fully buried
- paddle shaft is parallel to long axis of the boat and outboard or above the rail

## *Power*

- torso unwinds toward the bow
- arms stay fixed relative to the body, emphasizing torso rotation
- blade separates from boat and travels in a wide curve away from the boat

## *Release*

- stroke ends no later than full rotation, around 3 o'clock
- blade slices upward, lifted by the shoulder
- blade maintains turning orientation at end of stroke
- in practice, top hand may move toward top shoulder, lengthening the stroke, although focus should always be on torso rotation. In practice, the reverse sweep also may come from a stern rudder and thus torso rotation can drive the stroke to the bow

## *Diagnostics/key points (see forward sweep diagnostics)*

- extended working elbow initially may indicate inadequate early rotation and inefficient form
- movement of the top hand relative to the shoulder decreases efficiency by shortening [moment arm](#)
- early movement of the working hand relative to the body suggests the stroke is effectively more of a rudder and less of a power stroke. It is important to consider the desired purpose of the stroke: a rudder may be what is intended and needed
- blade continuing beyond about 2:30 or 3:00 requires use of the arms at some point. Consider whether the stroke needs to be longer and if the stroke starts at the end of a stern rudder/push away or directly at the stern

## **Stern Draw**

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Purpose – Corrective stroke that draws the stern sideways, toward the paddle, causing a turn away from the paddle side of the boat but causing little slowing of the boat.

Stern draws are often used to correct angle during ferries. Subtle stern draws are commonly used as part of a rudder stroke.

## *Catch*

- torso is fully rotated to stern
- paddle inserted at about 4:30, in a turning orientation
- stroke initiation is at the ending position for a forward sweep
- top hand may be somewhat higher than for the sweep if needed to allow the paddle to stay in the water

## *Power*

- working elbow pistons in to the body
- top hand may climb and cross body, ending at the opposite rail or even over the water
- paddle blade stays completely submerged

## *Release*

- working elbow ends tucked into the small of the back, on, or close to the deck, in strong shoulder position
- paddle is lifted out of the water by the shoulder, maintaining a knifelike blade, without lifting water
- paddle ends parallel or beyond parallel to the long axis of the boat. At the end of the stroke, the paddle can be dropped into water
- bottom arm pistons into small of back, maintaining strong shoulder position
- elbow stays in strong position and does not fully extend

## *Diagnostics/key points*

- blade turning over into a low brace-like orientation suggests top hand, rather than working hand, control
- watch for working elbow to lift or extend rearward, opening the shoulder and increasing the risk for injury as well as causing a weaker stroke
- shaft not ending up parallel suggests inadequate rotation or failure to extend top hand

- paddle not completely immersed suggests working hand is extended too far astern, inadequate rotation or top hand is too low
- true stern draw is primarily an arm based motion, done after the body is fully rotated. However, in practice it may incorporate torso rotation, especially if done as a stand-alone corrective stroke. In this case, the stern draw becomes more of a forward sweep, shifted rearward

## **Stern push-away**

Purpose – Corrective stroke that pushes the stern sideways, away from the paddle, causing a turn toward the paddle side of the boat but causing little slowing of the boat. Stern push-aways are commonly used as part of a rudder stroke and can easily be combined with a bow slice to create a powerful turning stroke.

### *Catch*

- torso is fully rotated to stern
- paddle is inserted parallel or beyond parallel to centerline of boat
- top hand is relatively high (at the ending point for a stern draw) to keep paddle in water and can be outboard
- working elbow is tucked into back at the deck

### *Power*

- working arm pistons outward from hull
- working elbow stays low
- top hand stays high, at or outboard of the working side rail

### *Release*

- stroke ends at end of arm travel
- paddle is lifted out of water in a knifelike fashion by the shoulder
- top hand stays at outboard rail

### *Diagnostics/key points (see also reverse sweep)*

- poor separation suggests motion in the top hand
- paddle rolling over and lifting water suggests elbow motion and lifting from the elbow instead of the shoulder
- extended elbow at start places shoulder in risky position

- true stern push-away is primarily an arm motion. In practice, the stern push-away and reverse sweep can blend together. It is important to keep the top hand near the outboard rail to create separation between the paddle and boat
- For our purposes, the reverse sweep is defined as a torso-powered, power turning and stopping stroke, whereas the stern push-away is defined as an arm-powered, subtle steering stroke. In practice, the two can blend together

## **Rudder**

Purpose – Turn the boat without slowing it. Often used while surfing. Rudders are a combination of pure stern draws and stern push-aways. Paddle motion is primarily arm based, allowing minimal boat motion. Working hand control helps maintain proper paddle orientation. Rudders also can be done if the paddle is parallel to midline and the blade rotated to create lift. On the right side, turning the knuckles of the right (working) hand down moves the stern left and the nose right.

### *Diagnostics/key points*

- unintentional blade rotation may result from top or dual hand control
- paddle not parallel to the boat will cause both a turn and a brake. Paddle should stay within a few degrees of parallel. Rolling the paddle instead of drawing and pushing away helps maintain speed and provides an effective turn but may not feel as powerful
- quiet top hand, with working hand control
- top hand changes position to keep working blade fully submerged
- ideally, top hand extends beyond edge of boat to permit bidirectional rudder
- paddle stays roughly parallel to boat to avoid braking effect
- body is well rotated to attain paddle placement
- functions as a stern draw and push away that is allowed to move back and forth.
- diagnostics are similar to the stern draw

## **Bow Draw**

Purpose – Turn the bow toward the paddle. Used as a corrective stroke. Bow draws can be done with an open or closed paddle face. Closed face, or slicing draws, accelerate the boat through the turn, but may not generate as much turning force. Open face draws slow the boat, but may generate more turning force.

### *Catch*

- blade is placed in water about 60 degrees off the bow

- working power face is oriented roughly toward the boat (although it can be open or closed face)
- paddle otherwise positioned as for a forward sweep
- comfortable rotation for the setup

## *Power*

- knees are driven toward the paddle, closing the angle between boat and blade; power comes from winding up torso
- open-faced draws keep the paddle relatively fixed; closed face draws should move toward the bow

## *Release*

- blade should slice out of the water, driven by the shoulder
- much more common for blade to rotate over and move into a forward power stroke

## *Diagnostics/key points*

- almost never used as a single stroke, so it should smoothly flow into the next stroke
- not a reverse sweep; the working power face generates power whether open or closed face
- otherwise, see diagnostics for sweeps

## **Discussion – Stern draws, push-aways, rudders and reverse sweeps**

These strokes all work at the stern of the boat, have similar diagnostics and key points and in practice often blend together. They all work in the same range of motion. The body is rotated toward the stroke, the top hand is high enough to keep the paddle in the water and the working hand is low with the elbow tucked into the back. However, as instructors, it is important to evaluate them based on what they are intended to do. When used as a subtle steering stroke (e.g., while surfing or controlling a ferry), emphasis should be on the top hand extending to the working rail, with the working arm doing most of the work. In this case, the torso should be fully rotated. On the other hand, when used as a power stroke (e.g., for aggressive angle recovery when ferrying or for dramatic angle changes while paddling), the focus moves from arms to torso. The arms should be placed in a position allowing strong torso rotation and then the torso should provide the power by rotating or unwinding.

The forward sweep/bow draw can follow a similar thought pattern. True forward sweeps are torso driven because doing so allows better paddle placement and more power. Power is necessary to overcome the boat's tendency to stay in its bow wake. Bow draw and push-aways might, however, tend to be more arm- or torso-based, depending on application. For example, a small nudge to create a subtle direction change might be more arm-based, whereas spins in a hole might be more torso-based.

## **Draw – done amidship, causing lateral travel**

Draws can use a “push-pull” (Newtonian) approach, or can generate lift off the blade (Bernoullian, sculling or wing-like).

### *Catch*

- body is rotated toward direction of travel
- paddle is vertically oriented with blade parallel to boat’s long axis
- top hand may choke down and sit farther from paddle throat than normal
- top hand serves as a quiet fulcrum (for arm driven strokes) or stays fixed relative to shoulder (for torso driven strokes)
- blade is inserted a comfortable distance from the hull

### *Power*

- working hand causes paddle to travel toward boat (Newton) or parallel to midline with a slight open face (Bernoulli)
- top hand stays relatively still, serving as a fulcrum
- blade is always fully immersed (although for teaching purposes, it might only be half immersed to demonstrate the blade motion)
- Bernoullian draws can use torso or arm; arm is generally taught and may keep the boat quieter whereas torso provides more power but may induce more boat rocking
- Bernoulli – blade travels back and forth, maintaining a slight open face regardless of direction of travel, and blade stays equidistant from hull (typically 6 to 18 inches)

### *Release*

- Bernoulli – no true release. Instead, transition to another stroke
- Newton – when blade is close to boat, rotate blade 90 degrees (so it is oriented perpendicular to boat’s midline) and slice back out to starting point. Wrist flexes to bring the palm toward the forearm, so the paddle can slice out away from the boat

### *Diagnostics/key points*

- boat circling in one direction means the blade needs to be placed closer to midline
- poor lateral progress caused by overly fast strokes, inadequate climbing angle for lift type draws, or inadequate blade rotation for push-pull draws

- boat rocking indicates overly aggressive arm or torso motion. Look for a quiet top hand, serving as a fulcrum
- splash indicates the paddle is moving too fast or the stroke is too short (especially with lift-type draws)
- sub-vertical paddle indicates inadequate torso rotation, overly extended bottom arm, an attempt to brace on the paddle, or under-extended top hand
- try reversing the blade face angle for a slicing draw, to creating a slicing push away. Simply doing the draw on the other side is more powerful, but this is a great way to practice blade finesse

## **Static Draw**

Purpose – Static draws serve as a rudder or as an anchor point around which the boat turns. Static draws can be placed at the bow, amidship or at the stern. Because they have a wide range of applications, it is challenging to list a specific set of rules. However, all static draws have some commonalities.

### *Catch*

- vertical shaft (when seen from the bow; orientation may be nearly parallel to the water when seen from the side)
- blade is open, neutral or closed, depending on desired effect
- blade is placed aft, forward or neutral to center of lateral resistance, depending on desired effect
- the closer the blade is to the CLR, the greater the tendency of the entire boat to travel sideways
- the farther the blade from the CLR the greater the tendency of the boat to turn

### *Power*

- blade remains in fixed position relative to the boat

### *Release*

- shoulder slices the blade out of the water, without lifting water. The release should naturally flow into the next stroke

## **Combination strokes**

Definition – Two or more fundamental strokes combined to create a desired effect. Catch, power, release and diagnostics are based on the individual strokes used, with the added concern of a smooth flow from one stroke to the next.

### *Common combinations*

- Forward power stroke + opposite side forward power stroke – moves boat forward, either straight ahead or on an arc
- Forward sweep + stern draw – creates a powerful forward turning stroke or brake
- Stern push away + reverse sweep – creates a powerful reverse turning stroke or brake
- Forward power stroke + stern draw – corrective stroke added to a forward stroke, for angle correction
- Forward power stroke + stern push away – change direction with little loss of speed
- Forward power stroke + stern push away + slice to bow draw – change direction with little loss of speed, with bow slice “locking in” new direction of travel and potentially accelerating turning and forward speed. Forward power stroke is often added after the bow draw to further “lock in” the turn and subsequent acceleration
- Forward stroke + opposite side middle static draw + slice to bow draw – change direction toward opposite side, with little or no loss of speed (may add forward stroke after slice to bow to help lock in stroke and drive forward)
- Forward power stroke + middle static draw (on either side) – sideslip the boat on the side the draw is placed
- Reverse power stroke + middle static draw (on either side) – sideslip the boat on the side the draw is placed

## **Fundamental River Moves**

Eddy turns, peel outs and ferries are the fundamental moves required to get down a river with some degree of safety and style. If you can't do these 3 moves, not only will you have trouble hopping on a wave or in a hole to play, you won't easily be able to get in an eddy to watch someone else play. Even more importantly, being able to move across current and enter or leave eddies allows paddlers to rest, avoid hazards, look for hazards and stop in a stable position. Most whitewater boating is about getting into and out of eddies, and moving laterally across current; it's just a matter of how hard it is to do those 3 fundamental maneuvers and what kind of “frosting” you put on top of them.

All three moves have a common foundation. Each has a starting and ending position, an angle relative to the current of interest, an edge to the boat and strokes to steer and generate power. There are a number of mnemonics that can be used to help paddlers remember these key points. Common mnemonics include:

- **PEAS** – position, edge, angle, speed
- **PASTA** – position, angle, speed, tilt, adjustment strokes

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- **EAS** – edge, angle, speed
- **PEPP** – position, edge, power, point
- **AME** – angle, momentum, edge
- **SAVE**- speed, angle, vision, edge

All of these mnemonics work for students; others also work and none of them have to be used. One important point frequently not considered by many of these mnemonics is vision: where to look when performing the maneuver. Vision, however, is crucial. First, paddling is easier if you look where you're going! Second, proper vision helps set the appropriate edge to the boat, making the move easier to execute and often making the boat more stable (i.e., comfortable) for the beginner. Finally, proper vision improves balance, again making the boat more stable and the move more successful.

A mnemonic that may work for instructors evaluating strokes and maneuvers is **VSSSEATTT**.

- **V**- vision (where is your gaze and intent focused?)
- **S**- sphere of awareness (what is going on around you? Should you do what you're planning to do and do you have the skills to do it?)
- **S**- start (where is your starting point?)
- **S**- speed (how fast are you moving throughout the technique?)
- **S**- strokes (what strokes are you using? Consider what's more important – the strokes or the results from the strokes)
- **E**- edge (how much is the boat edged and to which direction?)
- **A**- angle (what is the angle between the boat and features over time?)
- **T**- target (where is the boat aimed?)
- **T**- timing (how do strokes, edges, angle and weighting change over time?)
- **T**- tuning (what strokes and techniques are used to correct the maneuver?)

This mnemonic provides more detail than most paddlers need, but it provides a comprehensive checklist for the instructor evaluating performance. If beginners try to use this, they'll just get a headache. It's intended for experienced paddlers and instructors.

River maneuvers are harder to describe than flatwater strokes. On the river, paddlers have to handle the situation they're given, so the "ideal" situation may not be present and tuning techniques can become crucial. Rocks may guard a feature, obstructions may make access challenging or the paddler might change their mind at the last minute. However, the ability to perform a skill well under ideal circumstances improves the likelihood of executing the same skill effectively under less than ideal

circumstances. All of the factors described below can (and often are) changed as the paddler's skill level increases, but these guidelines serve as a good starting point.

## **Eddy Turns**— getting the boat into an eddy

- *Start position*— upstream of an eddy feature, in a position to provide good angle to the eddy line and with enough distance to develop momentum
- *Vision*— look at the desired end point (generally, deep inside the eddy, and close to the top of the eddy). As the boat moves through its track, gaze should be maintained toward the end point
- *End position*— inside an eddy feature; generally deep inside the eddy line and high in the eddy itself
- *Angle*— generally measure in relation to the eddy line, not the main river current. Eddy turn entry angles depend on current speed, depth of the eddy, hull speed and hull shape. However, somewhere between 60 and 90 degrees probably works for most situations. Think about piercing the eddy line
- *Edge*— slight edge into the turn. Edge can be started any time prior to the eddy line and should be held until the boat is no longer sideslipping in the eddy. For beginners, this means hold edge until the boat stops and is stable in the eddy
- *Speed*— generally, slightly greater than the current speed immediately adjacent to the eddy line
- *Strokes*— power strokes initially to obtain speed and cross the eddy line, then can use a static bow draw (“bow plant”) to lock in the turn, or a midships plant to create a keel and reduce the spin on the eddy line, or simply allow the boat to drift to a stop in the eddy, without using any stroke other than a forward power stroke. Let the water do the work whenever possible

**Peel Outs**— getting the boat out of an eddy. Once the boat is out of the eddy, it can go upstream (attain), across current (ferry) or turn downstream.

- *Start position*— Inside the eddy, ideally 4 or more paddle strokes from the top of the eddy and far enough away from the eddy line to create a good angle
- *Vision*— Initially, vision should be upstream of the eddy, creating a sharp (15 to 45 degree) angle across the eddy line. After leaving the eddy, vision should be shifted to the final destination
- *End position*— somewhere in current. Peel outs can lead to surfs, attainments, ferries, heading downstream, or some combination or other act
- *Angle*— depends on the final goal. Attainments have the lowest (least) angle (just enough to pierce the eddy line). Ferries can have a somewhat higher (greater) angle and downstream moves the highest angle

- Speed– generally slightly greater than the current speed adjacent to the eddy line. More speed allows greater penetration into current
- Strokes– a few power strokes to obtain momentum. After developing momentum, strokes depend on the desired final destination

## **Ferries–** move the boat across current

- Start position– in current, either after a peel out or while paddling
- Vision– to the final destination
- End position– at the final destination, across the river from the start point; this may be perpendicular to current, upstream or downstream and may require some component of drifting downstream or attaining
- Angle and speed are balanced so that the boat travels perpendicular to current. More angle requires greater forward speed. At some point, the boat will flush downstream, so angle should start conservatively low
- Edge– classically, paddlers are told to sink the downstream edge. This may make the ferry feel more comfortable, but in reality the boat will ferry regardless of edge. However, setting an appropriate vision will tend to sink the downstream edge, and this does reduce the risk of water submerging the upstream rail
- Strokes– power strokes to hold position. To bring the nose of the boat parallel with current, use downstream-side stern draws. To bring the nose perpendicular to current, use upstream-side forward sweeps

## **Common Problems for all Three**

- *Losing edge across eddy lines.* Cure by holding edge longer and setting it earlier. Edge can be set before forward speed is obtained
- *No power to drive into eddy.* Cure by continuing to paddle into the eddy and obtaining momentum early. Also, make sure vision is appropriate
- *Spinning on eddy line.* Cure by changing vision and ensuring adequate momentum
- *Turning before entering the eddy.* Cure by using power strokes to drive into the eddy, letting the water turn the boat and working on appropriate entry angle
- *Bracing/slowing strokes when they aren't needed.* Cure by aiming high into the eddy, opening up the approach angle, paddling through the eddy line and (rarely) ensuring the boat isn't overpowered (too little speed is far more common than too much)

- *Not holding position for ferries.* Cure by establishing a visual destination and controlling angle. Work on correcting the “free” end of the boat. Generally, boaters can point more upstream with downstream stern draws and point more downstream with upstream bow push aways. Once the angle is appropriate, power is obtained from forward power strokes

## **Skills Progressions**

Kolb’s learning theory suggests that when learning a new skill, we first experience the activity. We then reflect on the experience and develop an intellectual model about how to do the activity. Finally, we use the model to experiment with new techniques, leading to new experiences. The process then is repeated, creating an upward spiral of knowledge and ability. Although everyone has a preferred learning style, everyone also must move through each of these stages to fully understand and execute any new skill.

Paddling instructors can use Kolb’s model to create a series of teaching progressions for strokes and river moves. Kolb’s model can allow instructors to use a minimum number of words while giving students the greatest amount of hands-on experience. Ultimately, paddling instruction requires students to paddle, so approaches that allow early hands on activity may be more successful than more traditional approaches involving lecture prior to experience.

A series of progressions based on Kolb’s model are presented below. These progressions should be modified to meet the needs of the instructor and learner and to address environmental and logistic constraints. Instructors using these progressions need to provide detailed feedback after students initially experience the activity to help students develop and refine their skills.

### *Flatwater balance and paddling*

a) Students are given an appropriate orientation to their equipment and then are allowed to hand-paddle in a restricted area without skirts. Not using skirts removes anxiety about wet exits (for both the student and the instructor). Hand-paddling removes the distraction of a paddle. This step’s goal is to teach students that the boat is relatively stable and to introduce how to move the boat. Students will feel a little instability, which leads to step b.

b) Students are asked to sit quietly in their boats. Instructors review or introduce the concept of good posture and good balance. Then, instructors introduce gentle edging, with some type of definition so that students can later return to a specified edge. For example, a number 2 edge might be the edge obtained by weight a buttocks cheek and feeling the opposite thigh against the thigh hook. Students move from flat to edged several times, and then are asked to add the arms to display what happens to stability when the arms are centered vs. out away from the boat. After several tries, the students likely will develop the rudiments of a head dink and will understand the importance of staying well centered.

c) Once students understand the basics of edging they can work on edging so much the boat turns over. Therefore, at this point, they can run through a wet exit drill with the goal of developing comfort while underwater and consistently tucking and going for their grab loop.

d) After wet exits there are a number of paths that might be followed. Students might play a paddle-free game like sponge polo to further emphasize boat control by the body and likely to work on wet exits. On the other hand, students might move straight to use of the paddle.

## *Use of the paddle*

a) Initially review how to hold the paddle and practice hand control. Then, let the students paddle around for a few minutes to see what happens. This could be a good time to review or discuss the strong shoulder position

b) Bring the students back together and discuss paddle orientation vs. effect. Basically, the boat is inclined to travel perpendicular to the long axis of the blade. This is a good point to introduce high top hands and vertical paddle shaft for forward power strokes vs. relatively low top hands for turning strokes. It also may be a place to discuss anchoring and traction. Let the students return to the water and experiment now that they have some limited understanding of how to use the paddle.

c) Bring the students back and begin tuning their turning strokes, emphasizing staying within the strong shoulder position and staying relatively centered (particularly with turning strokes). Allow them to play with pinwheels and obstacle courses or play games like stern tag or follow the leader. Give single, specific corrections and recognize the student won't be perfect.

d) Bring the students back and begin tuning their forward stroke, emphasizing short strokes, vertical paddle and rotation. Again, give single, specific corrections and recognize this is challenging. Remember to normalize expectations and to discuss that the forward stroke doesn't mean the paddler is paddling forward. Encourage students to use turning strokes to ensure they are going where they want.

e) Consider teaching braces at this point to bridge back to edge control. Be careful to emphasize the need to center the paddle instead of leaning on it.

## *Paddling technique: bridging to moving water*

This progression bridges to eddy turns, peel outs, power moves, boat control and side surfing.

a) Once paddlers have a rough understanding of how to use the paddle, begin giving them destinations or paths to paddle. This is a good time to discuss vision or focus when paddling.

b) Initially focus on paddling forward 4 or 5 strokes. Instructors can place a buoy in the water, a pole in the mud or place some other fixed point for learners to aim.

c) Ask students to paddle a path around a series of obstacles, incorporating forward strokes and forward sweeps to move the boat.

d) Next, ask the students to play games such as follow the leader. Instructors also can ask learners to complete timed obstacle courses, or see how few strokes they can use an obstacle course.

e) Once learners are comfortable moving a flat boat, ask them to use an edge while paddling. First, ask them to sit on an edge and introduce forward/reverse sweeps with a sculled return, to simulate side surfing. Emphasize staying centered, with the paddle in front of the body, and using edge control rather than the paddle to stay upright.

f) Once learners are comfortable moving the paddle and boat while on edge, they can begin paddling forward on edge. Paddlers use edged paddling to carve turns, so the easiest way to practice this is to paddle in a circle around the instructor. Paddlers watch the instructor while following the boat in front of them, helping to emphasize gaze direction. Instructors can ask students to count the number of fingers held up. Instructors also can ask learners to give several sequential outside strokes to decrease the radius of the circle.

g) Once learners can paddle in a circle around an instructor, they can practice edged figure 8s. After practicing steps f and g, learners can discuss the impact of vision on turns and stability, boat stability on edge, and how to change direction while turning. This discussion can bridge back to use of corrective strokes while trying to move forward.

Boat control while paddling in an arc on edge will directly lead to eddy turns and peel outs, whereas paddling forward on edge will lead to ferries and attainments.

## *Moving water progressions*

a) Eddy turns and peel outs can be practiced by moving the circle drill from step f above to moving water. Start in a river pool with a mild eddy line along side. Begin the drill with the circle moving so they will eventually do a high peel out and a low eddy turn. The instructors can time the extra strokes so they match crossing the eddy line, as needed. When the students are comfortable with the circle in a pool, the circle can be moved so learners cross the eddy line. This drill requires a good spot. Too strong an eddy line will cause discomfort to the learners.

The drill can be accentuated by using a downstream safety positioned as a target, or the target can create a stand alone drill. The target should move up and down the eddy so the learner crosses with an appropriate angle, regardless of where they cross the eddy line.

If an appropriate spot is not available, learners can be coached into or out of an eddy by giving very concrete directions. For example, learners could be given a set edge (which can be initiated long before the eddy line is crossed), a set aiming point and directed to paddle forward, changing the gaze as appropriate.

Once learners have some experience crossing eddy lines, instructors can start polishing their technique. Polishing should be started by giving students very concrete things to do. For example, ask them to set their edge first, before starting to paddle. Then, ask them to pick a feature on the opposite shore to set

their angle. Next, ask them to paddle hard forward, and finally tell them to look downstream (or upstream, or wherever appropriate) when they need to change destinations.

b) Ferries are often taught as a combination of a ferry and a peel out, with possibly an eddy turn on the end. An easier way is to have students hold position in mild current. Then, ask them to look to the side, setting an edge and placing them in a ferry angle. As they continue to paddle forward, they will ferry sideways. Beginners may have trouble with this, so it may be easier to start with a spawning drill.

“Spawning” asks learners to hold position, but recognizes they will lose their angle. They are reminded to use stern draws to bring their stern in line with the bow. Generally, beginners will flush downstream, but they will be able to feel how to correct their nose angle. In the unlikely event that beginners can’t lose their angle, instructors can remind them to use forward sweeps or bow push aways to move the bow. Once this drill is mastered, ferrying may be easier.

Ferries also can be practiced by holding position while an instructor back-ferries in front of the learners. As the instructor moves, the students follow, but maintain separation.

Once learners can ferry without the confusion of an eddy line, ferries can be combined with peel outs and eddy turns, creating S-turn drills. S-turn drills can be tweaked to work on a number of principles, such as holding speed through, and out of an eddy, making sharp turns across an eddy line or using corrective strokes.

c) The ultimate in self-discovery might be asking students to pick a point upstream, while sitting in an eddy, and then tell them to paddle forward, toward that point. Whatever the students do (e.g. peel out and head downstream, flip, ferry, attain, bounce off the eddy line) is then used as the basis for the next block of instruction. Focus on improving whatever the students did well. Instructors lose some control over the flow of the course with this approach, but students can gain a lot of confidence by doing something “right” the first time they try.

d) The “do what I tell you to” approach. I used this to teach my son how to do river moves, and it seemed to work well for him. Simply tell a paddler where to point their boat, then have them paddle forward on edge and finally, tell them to change their vision when appropriate. For an eddy turn, I ask the paddler to paddle straight at me and when they cross the eddy line, I tell them to look straight upstream. This approach provides very concrete instructions, but little explanation. Once the paddler can perform with this level of instruction, start adding details and stop giving them targets. Under Kolb’s learning theory, this provides concrete experience in order to then give something to reflect upon, abstractly conceptualize and then create experiments.

## **Rolling**

What makes a good roll? Good rolls are easy to learn, easy to teach and highly reliable. Good rolls also bridge to other skills, work in a wide range of boats, have clear diagnostics, and have a clear teaching progression. Finally, good rolls keep the paddler in a strong shoulder position and minimize risk of injury.

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There are several rolls that meet these criteria. The two most commonly taught are the C to C roll and the modified sweep roll. Both rolls have similar general principles:

- The setup is the key to success (fortunately, it is almost identical for both rolls)
- Both rolls are physically demanding when being learned because they use new muscle pathways. Most instructors have better success (defined as low frustration levels for student and instructor and eventually successful rolls for the student) when they teach in 15 to 30 minute blocks. Two students sharing a one hour instruction block seems to work well
- Both rolls require practice
- Beginners can safely paddle without knowing either one! Rolling is rarely taught in weekend-long beginner classes
- Rolling can be an anxiety-producing skill. Do everything possible to reduce stress levels as much as possible. Ensuring a solid wet exit is mandatory. Consider demonstrating that you can do a Hand of God rescue to assist the student. Consider teaching with goggles and nose plugs in a heated pool. Cold water, snakes, biting fish and nasty bottom conditions are not conducive to learning.

If sweep and C to C rolls are broken down step by step, it appears there is only one major difference between them. The C to C roll is a “Newtonian” roll, depending on a push-pull relationship between the boat, paddle and water. As such, it depends on a single burst of energy to roll the boat. On the other hand, the sweep roll is a “Bernoullian” roll, which obtains power by generating lift off the paddle blade. All the other differences between the rolls are a function of this single difference in power generation.

## *C to C roll*

The C to C roll can be broken down into five distinct steps— setup, transition to C, C, transition to recovery and recovery. Key points for each step are presented below, followed by a sample teaching progression and some diagnostic keys. The description below assumes the roll is being set up on the left side, with the right hand closer to the bow.

### Key Components and Reference Points

#### 1. Setup— POOR SETUP IS THE MOST COMMON CAUSE OF AN INEFFECTIVE ROLL!

- Wrap the upper body around the boat, so that the right shoulder moves toward the left thigh.
- Forearms are placed on the side of the boat so that the arms are centered around the body.
- When the paddler is upside down, the hands should be in the air.
- Leading hand acts as the control hand and sets a slightly climbing blade angle.
- Gaze is directed upwards

- Pressure is applied to the left thigh and abdomen to bring the head close to the surface.

## 2. Transition to the first C

- While staying tightly wrapped, rotate upper body out to 90 degrees with the boat
- Motion should be initiated by the head and shoulders
- Gaze should be directed straight ahead, parallel to the long axis of the boat, and just under water, with the head just under water
- Allow the rear hand to slide slightly forward, so that it rests on the hull of the boat, wrapped tightly around the boat, and just in front of the spine. Think about pulling the elastic down on the leg of your briefs, or scratching your buttocks
- Drive the leading hand up and out to keep paddle as close to the surface as possible. Use the climbing blade angle to keep the paddle near the surface

## 3. First C

- Head is as close to the surface as possible, with gaze directed straight ahead, parallel to the long axis of the boat
- Spine is curved into a tight C to the left
- Paddle is perpendicular to the boat, over, or just in front of the hips
- Rear hand is sitting over the thigh, just in front of the belly
- Left ear should be close to the left shoulder

## 4. Transition to recovery

- Release the on-side abdomen, knee and hip
- Drive head down, as if you were pushing off the bottom of the river
- Gaze continues to be directed forward
- Drive the right ear toward the right shoulder
- The paddle stays centered and close to the boat, with no rotational component
- Paddle blade is parallel to the surface and as close to the surface as possible
- Engage the right (deep) knee and thigh for hip snap while pressing with the left buttocks against the saddle

## 5. Recovery (second C)

- End on a J-lean, on the same side you started the roll (i.e., a right hand control roll ends with weight on the left butt cheek)
- Once rolling motion ceases, recover to flat
- After recovery to flat boat position, recover the head
- Quiet paddle throughout, ends centered and low in front of body

### *Keys to a successful C to C roll*

Problems with the following four keys explain almost all poor C to C rolls. Of the four, set up is the most common problem.

- excellent set up
- drive the leading hand up to the surface at the first C
- paddle needs to be at 90 degrees to the boat, flat relative to the water, just in front of the body, and held by a body tightly wrapped around the boat at the cockpit
- inside must relax, followed by head drive, followed by outside knee and hip driving the boat upright.

### *Teaching progression*

1. Demonstrate the roll
2. Practice hip snaps. Support the student while in about waist deep water. Place them in an inverted, head out position, in a C position. Then, work on bringing the boat flat using appropriate muscles. Guide the hand so that both hands end low, on either side of the boat. Students can practice off the nose or side of a boat (an Eskimo rescue), off the side of a pool or off a pier
3. Practice setup. Help students get into a perfect setup position
4. Transition to C. While upright and counterbalanced by the instructor, work on transitioning to C. Emphasize appropriate gaze, body position and paddle orientation. Work on driving the leading arm to the surface. Ideally, in this counterbalanced position, the student should be able to put their outside hand under water
5. C. Ensure appropriate body and paddle position while counterbalanced
6. Transition to recovery. Bring student to inverted, heads up C by counterbalancing them over. Then, allow them to use a hip snap to right the boat

7. Recovery. Ensure ending properly weighted
8. Upside down. Set to perfect setup, flip and counterbalance up so that the student moves to their C position with their head out of the water and then recovers
9. Rolling. Gradually decrease the counterbalancing so the student does the roll themselves

Steps one to seven follow a part-whole approach. Once all the parts are developed, steps 8 and 9 are more part-progressive.

## *Diagnostics- C to C Roll*

- Head lifts up before the roll is complete. Look for set up too far forward (which causes the body to “outrigger” and impedes rolling), inadequate release of the inside abdomen (prevents boat rotation) and inadequate head C to C motion (which also impedes boat rotation). Also look for overly tight leg outfitting, which impedes switching from right to left thigh control
- Boat spins during the roll. Caused by excessive climbing blade angle during transition to C, or by paddle not perpendicular to the boat during transition to recovery
- Incomplete boat rotation. See early head lifting. Also caused by failure to disengage the inside thigh, and engage the outside thigh
- Difficulty initiating the roll. Caused by excessive pulling with the leading hand during transition to recovery, or failure to start roll by relaxing the inside thigh and abdomen
- Incomplete initiation of roll. If the boat only rolls up a little, it may be caused by setting up too far forward, or by reaching out too far and creating an outrigger which overbalances the paddler. Correct by working on tight elbows and motion from the torso rather than arms
- Diving paddle. Caused by diving blade angle, inadequate arm extension, punching top hand or inadequate on-side “crunch” during transition to C
- Punching top hand. Makes the paddle become vertical, losing bracing power
- Correct by keeping inside thumb on the boat and keeping the inside elbow close to the chest

## *Sweep Roll*

The sweep roll generates lift off the paddle blade to help bring the body upright, just like a wing generates lift to bring a plane off the ground. Although the body and paddle move through essentially the same motions, the sweep roll can be broken down into fewer steps than the C to C roll: setup, transition and recovery. Because the sweep roll requires lift off the blade, the blade must stay in the water all the time. This may make it an easier roll for less flexible people.

## Key components and reference points

## 1. Setup – POOR SETUP IS THE MOST COMMON CAUSE OF AN INEFFECTIVE ROLL!

- Wrap the upper body around the boat, so that the right shoulder moves toward the left thigh
- Forearms or hands are placed on the side of the boat, so that the arms are centered around the body
- When the paddler is upside down, the hands and front blade should be in the water
- Either hand can act as the control hand, although generally the trailing hand is the control hand. Note that this is different from working hand control
- Leading blade has a slight diving angle
- Gaze is directed upwards
- Pressure is applied to the left thigh and abdomen to bring the head close to the surface

## 2. Transition

- Initiate motion with the head with gaze directed under the water and beyond the paddle blade
- Maintain a slight diving blade angle to generate lift off the paddle blade in the direction of blade motion. Blade motion is directly out from the boat along a circular path
- Relax the left side
- Left hand moves directly to left shoulder
- Right hand moves directly to right shoulder
- Blade moves in an arc out to about 4 o'clock, relative to the bow
- Hip snap is not emphasized. Instead, the lower body follows along because the head and torso are rotating

## 3. Recovery

- Keep chin lifted and look in the direction the paddle points
- Paddle blade rolls back at the end of the stroke so the blade can lift out of the water
- Hands are close to the shoulders, with palms upward. Paddle shaft is centered on the midline of the body, but can be slightly extended to the starting side (so a left sided set up can end with the shaft slightly left of centerline)
- Back is upright and extended

*Teaching progression*

1. Demonstrate the roll
2. Boat rotations: Work on hands shifting from one side of the boat to the other. Work on centering the hands at the recovery phase. Work on changing the gaze, from upward initially to the down and out at the end.
3. Set up: Help students find the perfect starting position.
4. Finish position: Help students find the perfect finish position with good posture, hand position and gaze.
5. Transition and Recovery 1: While completely upright, practice moving on the finish side, from finish to the nose. Avoid crossing over the bow as this seems to create inappropriate muscle memory. Focus on moving only the torso, and keeping the elbows fixed relative to the torso. The forearms and wrists can roll back so they end palm up.
6. Transition and Recovery 2: Once step 5 is working well, begin bringing the boat on edge and repeating it. Slowly lower the student into the water, but continue to emphasize excellent technique with each motion. Make sure the student goes to a perfect finish position each time.
7. Transition 3: Allow the student to be completely submerged, but continue to give them light support and guidance as needed. Gradually stop assisting them. Students often are amazed that they can roll at this point and generally believe the instructor is still helping.
8. Roll: Roll over away from the instructor and roll independently with the instructor nearby for support as needed.

## *Diagnostics- Sweep Roll*

- bow elevates during roll- caused by early pull down by leading hand
  - *cures*- paddle needs to start in the water, work on “away” motion early in the roll, make sure boater is well centered and not leaning forward, make sure paddle is not started too far forward
- top hand punches early in the roll- caused by delayed rotation or uncontrolled hand motion
  - *cure*- initiate roll with head and torso, look where you want the paddle to go, make sure hands chase the shoulder, place hat in crook of top arm’s elbow, start roll with top arm already in finish position
- top hand punches late in the roll- caused by paddler being off balance or uncontrolled hand motion

- *cure*– make sure the leading arm is bent at sent up, work on centering at the end of the roll, loosen up the chin and look at/beyond leading paddle blade to loosen up knees, shed resistance at the end of the roll
- delayed rotation- boat begins roll after arm motion begins, caused by leading with hands instead of torso and results in arms going aft of the torso (leads to poor rolls and shoulder strain)
  - *cures*- see top hand early punch (this is a big symptom of delayed rotation), also work on loose grip allowing slight diving blade angle with resistance shed at end
- incomplete uprighting- caused by locked lower body, resistance or failure to engage rolling knee, or leaning back instead of rotating, or tucking the chin, or locked forearms
  - *cures*- work on delayed rotation cures, centering, lifting chin off chest to loosen knees and improve rotation, end with lumbar extension and rotation, shed resistance, rolling knee drives to top elbow, relax grip and slow down
- failure to shed resistance- caused by not rolling hands back
  - *cure*- work on rolling hands back like a motorcycle accelerator; palms to sky, knee to elbow, elbow forward, chest forward with attitude *-or-* work on Sweep to C roll; keep paddle closer to surface and be sure to engage a firm hip snap at the end of the roll
- head raises early- caused by delayed rotation, resistance at the end of the roll, ending with arms out of the cube, or ending off center. Fundamentally, the head goes up either because the roll has already failed, or because the hips are so tight the head is popped up first
  - *cure*- see above sections
- boat turns during roll – caused by sweeping action on water
  - *cure*- shed resistance; sweep motion is caused by a climbing blade angle at end of roll

## *Tricks for sweep roll success*

- Blow bubbles when hip snapping
- Look beyond where the paddle is moving
- Place a hat under the flying extremity
- Show off your pecs to extend the back

## **Paddling philosophy**

Learning how to perform a single paddle stroke or a single isolated river maneuver is relatively easy. The true challenge comes when a paddler combines strokes and maneuvers into a trip down the river. Ideally, the path downriver is well planned, with no unexpected bumps. However, rivers are “real world”

and it is common for bumps to occur. The planned path can be considered “proactive” boating whereas dealing with the bumps is “reactive” boating. Good boaters can manage both.

The first step to proactive boating is to read the water and come up with a plan. After reading the water, the paddler should first try to find a piece of water that is doing what they want, and use that water. If that isn’t adequate, then the paddler can shift their weight in the boat to achieve their desired movement. Finally, the paddler can use their strength, through their paddle strokes, to achieve their desired motion. The hierarchy for proactive boating is thus:

- I. Read and use the water
- II. Shift paddler weight to edge the boat or sink the nose or stern
- III. Use paddle strokes

Reactive paddling is different than proactive paddling. By definition, a paddler can’t predict what will happen. For some boaters this is a common occurrence. They’re the ones constantly using corrective strokes and flailing to get to their destination. If this happens to you, it’s time to work on your proactive boating. However, even the best paddler hits unexpected current every once in a while.

Two things can improve reactive boating. First, relax the back and hips so the boat can move without moving the upper body. To practice this, try drifting sideways through wavetrains letting the boat twist and turn, but keeping the upper body loose and upright. Second, paddlers can force themselves to boat reactively if they paddle with their eyes closed. Try picking an area with some waves, eddy lines and rocks. Pick a line, try to paddle the line and deal with whatever happens. At first, it may be more comfortable to have a buddy to warn of upcoming problems and to paddle blindly for only a few strokes. However, after some practice paddlers develop a strong feel for the water and blind paddling becomes much more comfortable.

Ultimately, proactive paddling requires route planning and water reading skills whereas reactive paddling requires comfort in the boat, looseness in the torso and effective strokes. Both are essential for good paddlers.

## **Drills**

Drills provide focused practice aimed at improving or developing one or more skills. Some drills come naturally out of stroke and maneuver keys and learning progressions. Below, some less obvious drills are discussed:

- **Helmet hand**– alternately place back of the top hand against front of helmet for forward stroke, forcing torso rotation
- **Stroke evolution**– start with awful posture and strokes, and evolve one step at a time
- **Call your line**– paddle the line you describe in advance

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- Call your strokes– same as above, but call the specific strokes you’ll use
- Count down ferries and S-turns– work on using the paddle most efficiently for river moves
- Blind ferries and S-turns– run the river with your eyes closed, to force sensitivity and pre-planning
- Backward paddling
- Roll demand– participants roll on command, regardless of where they are or what they’re doing

## **Games**

- Sponge polo, sponge hot potato, sponge tag, sponge catch
- Stern tag
- Bow tag
- Follow the leader
- Assassin
- Dancing
- Mirroring
- Challenges– how many strokes for a move? Hit a specific target, backward runs, single side paddling, eyes closed

## **Fundamental playing**

- *Bow surf*– establish a balance point. Carve with rudders and stern push aways. Keep moving. Differentiate between brakes and rudders. Use weight to drive forward or fall off. Pick your entry point.
- *Side surf*– stay centered, control the boat with the lower body, use sweeps, high braces and low braces to move back and forth.
- *Submerging ends*– requires commitment and solid edging. Edges need to be at the point that the boat is falling over. Use body motion and weight to initiate and control. Practice!

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