

# BUOYANCY

*Density of Water Versus Air Resistance Options: By Cathy Ward*

## OBJECTIVES

- To understand the difference between water based and land based exercise regarding buoyancy
- To understand buoyancy
- To feel different buoyancy options
- To learn some appropriate buoyancy options

## WATER VERSUS LAND

There are a number of differences between land based exercise and water based exercises. One of the major differences is 'impact'. On land, participants may opt for either high or low impact fitness disciplines or variations on a move. An example of a high impact option is running. An example of a low impact option is a low-impact land aerobics class. Most injuries in land-based exercise stem in part, from the impact of the exercise on the joints. In water, impact is very low or non-existent, depending on the pool depth. This does not mean that exercise in water is less intense than exercise on land. Water exercise can in fact be more intense, depending on how the resistance factor is utilized. Remember last week's lesson regarding resistance – you felt how the water resisted your movement in a multidirectional way. Today we are dealing with the magical property of water called buoyancy. Some of the most effective water aerobics movements manipulate buoyancy to increase or decrease the workload.

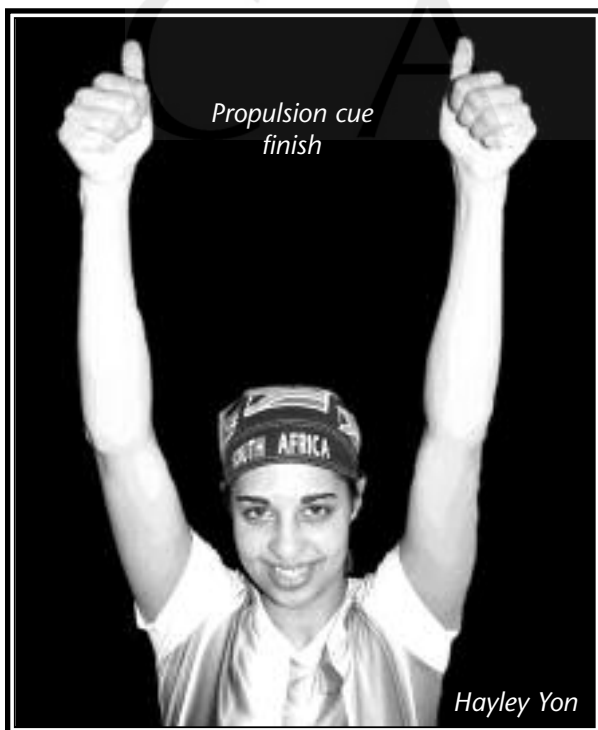


*Anchored cue start*



*Anchored cue finish*

*Cathy Ward*



*Propulsion cue finish*

*Hayley Yon*

## BUOYANCY

Buoyancy = floatability

When a body is immersed in water it will displace an amount of water equal to the weight of the body submerged. The displaced water rises and surrounds the body and pushes up and out towards the surface of the water. Buoyancy is an upward force that counteracts the downward force of gravity. Buoyancy makes the body feel quite weightless. The deeper the body is submerged the less gravity will pull it down and the more buoyancy will lift it up. The reduction of gravity and the increase in buoyancy will support the body frame and reduce the weight the joints are normally required to carry on land.

The degree to which a body will float is determined by the following factors.

- The ratio of body fat to lean tissue
- Where the body fat is carried
- The air in the lungs
- Anxiety level

## HOW TO FEEL BUOYANCY OPTIONS

In water one can work with buoyancy to assist the improvement of mobility and flexibility. One can also work against buoyancy to improve muscular strength and muscular endurance.

### Task One:

Perform a cross-country ski movement using a light bounce option. Do a cross-country ski movement using the anchored option. Do a cross-country ski using the propulsion option. Compare how the body feels during each buoy-

ancy manipulation? Describe how each option feels different? Where do you feel the work of the body when using the light bounce option? Where do you feel the work when you do the anchored option? Where do you feel the work when you do the ski using the propulsion option? Try doing the move in using suspension – zero impact? How does the body feel?

### Task Two:

Do a narrow tuck using light bounce. Do a tuck using propulsion. Answer the same questions as above in Task One.

## VISUAL CUES

### BUOYANCY(LAPS)CUES:

Light bounce	With the hands in front of the chest or at the sides of the head, make two small upward circling actions at the wrist.
Anchored	With both hands starting crossed at the wrists, at chest height, do the "you're safe" signal from baseball.
Propulsion	With both hands in front of the body, thumbs pointing up make a large circle simultaneously with both hands. Thumbs point up at the finish of the circle, to demonstrate the idea of "taking off" from the pool bottom.
Suspended	Place one hand palm up, as though carrying a platter. Point the fingers of the other hand down, toward the palm of the first hand. Perform a cross-country ski action with the fingers of the superior hand, imitating legs with no contact with the pool bottom.

