



PRINCIPLES OF WATER

Written by Connie Warasila




www.WATERinMOTION.com
water@scwfitness.com




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Sir Isaac Newton's Laws

- Law of Motion
- *An object will remain at rest or continue in a constant rate of motion unless acted on by a force.*



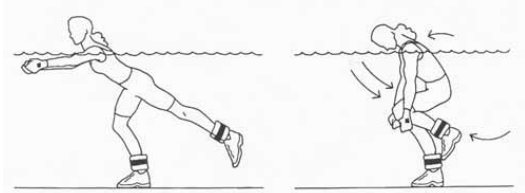

- Movement **WITHIN** the body
- Movement **OF** the body



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Laws of Action & Reaction


- **Every action creates an equal and opposite reaction.**
 - Leg Moves up – body moves back
 - Water pushed forward – water spills around

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Force X Speed = Acceleration

- *The speed at which a participant moves is multiplied by the amount of force used to perform the movement.*



Faster or Stronger Movements

- Momentum / Safety
- Motivation / Cuing



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Water Principles

- Buoyancy
- *Any object, wholly or partly immersed in a fluid, is buoyed up by a force equal to the weight of the fluid displaced by the object.*



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Reduced Impact

- Full range of motion (weight on joints)
- Anchoring / gravity
- Rebounding
- Body fat to lean ratio
- Destabilization and Posture



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Drag

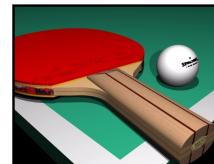
- *Water Resistance - water offers 12 times the resistance of air because water is denser than air.*
 - Size, shape and material of an object
 - Bent leg vs. long lever



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Lever Length

- Size of Object (ping pong paddle)
- Length of Object (hockey stick)
- Angle of the Object (palm)



Resistance that's hard to resist

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Viscosity

• *The property of a fluid that tends to prevent it from flowing when subjected to an applied force*

- Cohesion -water molecules' tendency to stick together
- Adhesion -water molecules' tendency to stick to anything submerged in it



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Turbulence

A chaotic behavior of fluid, characterized by fast variations of the fluid's velocity, both in space and time by moving large volumes of water.



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Surface Tension

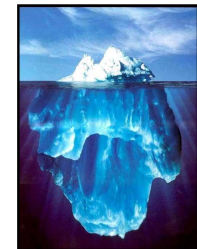
- *The water resistance at the water's surface.*
- The surface water molecules are not surrounded by other water molecules on all sides and consequently are more cohesive than those under the water's surface.



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Heat Dissipation

- *The process of becoming cooler.*
 - *Because water has the ability to absorb heat from submerged bodies very quickly, a participant may increase exercise intensity without necessarily experiencing the usual increase in core temperature.*
 - *Pregnant, hyper-tense, menopause*



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water in motion
The new wave in aqua exercise

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