The Laws Of Swimming Essay, Research Paper

Presently scientist are conducting research to help people gain new techniques in swimming. While scientists continue research for new swimming techniques, scientist must start with early techniques of swimming as a sport and part of life.

Learning how to swim is not easy. However, swimming is physics. There are laws, buoyancy, drags and motions. To become a good swimmer one should take initiative to learn how certain techniques evolved. This report will state a brief summary of the physics of swimming and its mechanics

A beginner swimmer must learn how to float in water. This is known as buoyancy, water that exerts an upward force against an object to the weight of the water that would be pushed aside by the object. For example, take three glass bottles the same size, each bottle weighs one pound and can hold five pounds of water. Leave one bottle empty and seal it and place it in water. Now the bottle floats high in the water with the majority of the bottle above the surface. Then take the second bottle and fill it with three pounds of water and place the bottle in the water. Second bottle will float vertical in the water. Finally, put five pounds of water in the third bottle and insert it into the water. The third bottle will sink to the bottom but will sink vertical. Therefore, first bottle floats because it weighs one pound but pushes aside ten pounds of water. Thus it would take some effort to push the empty bottle underwater. This is called buoyancy. The second bottle also floats but floats vertical because three pounds displaces the five pounds of water. Although the third bottle sinks, buoyancy is still a factor. Thus the bottle is sinking but it is sinking upward. This is known as specific gravity.

Form Drag

? Form drag is resistance to the object?s shape and profile to the water.? For example, narrow water skis would pass through water more efficiently than a wider water ski. The narrow water ski pushes less water aside than the wider skis. Second example to reduce drag is the streamlined position. ? To feel the difference, push off from the wall of the pool and try gliding in various positions: streamlined, with your arms out to the sides, and with your knees flexed. As you increase the surface area the water must pass around, you increase from drag and cannot glide as far.?

Wave Drag

? Wave drag is resistance caused by water turbulence.? Wave drag also occurs during speed of the swimmer. The faster the swimmer swims the faster the wave drag occurs in the pool. A swimmer can reduce wave drag by smooth process of strokes but, one must not use splashing arm entries to reduce wave drag. On the other hand, swimmers can create wave drag; thus lane lines have been created to reduce drag.

Frictional Drag

Frictional drags ? is the resistance caused by the surface texture of the body as it moves through the water. For example, to reduce frictional drag Olympic swimmers would shave the body hairs to reduce frictional drag. This method is thought to increase the speed of swimmers and reduce frictional drag.

Law of Inertia

The law of inertia states ? that a force is needed to move a body at rest, to stop a body that is moving or to change the direction of a moving body. Law inertia effects on Aquatics in two aspects, first the law of inertia can be divided into two segments. First static inertia ? is the tendency of a body at rest to stay at rest.? Swimmer must overcome every time he or she enters a pool because the static inertia of the water will resist any effort change position. Secondly, Dynamic inertia ? is the tendency of s moving body to keep moving.? To overcome the law of inertia, swimmer must poses energy to complete a stroke than to keep moving. Furthermore, dynamic inertia lets swimmers rest because your body is moving. However, if one rest to long during dynamic inertia, one might have to over come static inertia.

The Law of Acceleration

The Law of Acceleration ? states that the speed of a body depends on how much force is applied to it and the direction of that force.? The law acceleration is relevant in swimming in two ways. First the more force you apply to a stroke, the faster a swimmer will swim. Second swimming is more efficient when a swimmer chooses to stay in a chosen direction when all your propulsive force is in the same direction.

The Law of Action and Reaction

The law of action and reaction states ?that for every action there is an equal and opposite reaction.? Reaction and Action can occur in water and land. For instance, if a ball drops into a bucket of water the ball stops in the water and the water will project from the bucket. Thus it is creating an action and reaction from the ball. A second example, when one dives from a diving board, the ?board reacts to the force of your feet acting against it so you can take off for the dive.?

The Law of levers

?The law of levers is the product of force and force arm is equal to the product of the resistance and resistance.? The law of levers for swimming can be demonstrated in the arm stroke and the front crawl. Arm muscles provide the force and the shoulder is the pivot point. Water is the resistance, which comes from the arm during the strokes. The way to improve leverage is to use less force when swimming. For example, the front, crawl a swimmer can perform this by bending the elbow, this reduces the force when needed

330