

# Swimming

## Brief History

Back in Japan 1603, swimming became a statutory sports event in schools. In 1837, the National Swimming Association in London, Britain also started organizing international swimming competitions. While swimming became one of the events in the first modern Olympic Games in 1896, the Federation Internationale De Natation Amateur (FINA) was founded in 1908, renamed World Aquatics in 2023. It mainly develops swimming, diving, high diving (M: 27m, W: 20m), water polo, Artistic swimming, and open water swimming. It also organizes international competitions.

## What benefits do you get from swimming?

1. Strengthening the cardiorespiratory function
2. Enhancing brain and nervous system
3. Facilitating body's intake of calcium and phosphate while strengthening the bones and muscles and maintaining body shape

## General racing rules

1. When using the one start rule, any swimmer starting before the starting signal has been given, shall be disqualified.
2. In both individual medley events and medley relay events, swimmers cannot use backstroke, breaststroke or butterfly in freestyle.
3. Obstructing other swimmers by swimming across another lane or otherwise interfering shall disqualify the offender.
4. In all events, a swimmer when turning shall make physical contact with the end of the pool.
5. Standing on the bottom shall not disqualify a swimmer, but he shall not walk, move with the aid of the bottom or pull on the lane rope. Offenders shall be disqualified.
6. In individual medley events, swimmer covers the four swimming styles in the following order: Butterfly, Backstroke, Breaststroke and Freestyle.
7. In medley relay events, swimmers cover the four swimming styles in the following order: Backstroke, Breaststroke, Butterfly and Freestyle.
8. Some part of the swimmer must break the surface of the water throughout the race, except it shall be permissible for the swimmer to be completely submerged during the turn and for a distance of not more than 15 metres after the start and each turn. By that point, the head must have broken the surface.

## Events

Events	Olympics		World Championship	
Gender	M	F	M	F
50M Butterfly	N/A		✓	✓
100M Butterfly	✓	✓	✓	✓
200M Butterfly	✓	✓	✓	✓

50M Backstroke	N/A		✓	✓
100M Backstroke	✓	✓	✓	✓
200M Backstroke	✓	✓	✓	✓
50M Breaststroke	N/A		✓	✓
100M Breaststroke	✓	✓	✓	✓
200M Breaststroke	✓	✓	✓	✓
50M Freestyle	✓	✓	✓	✓
100M Freestyle	✓	✓	✓	✓
200M Freestyle	✓	✓	✓	✓
400M Freestyle	✓	✓	✓	✓
800M Freestyle	✓	✓	✓	✓
1500M Freestyle	✓	✓	✓	✓
100M I.M. (Short Course Only)	N/A		✓	✓
200M I.M.	✓	✓	✓	✓
400M I.M.	✓	✓	✓	✓
4 x 100M Free Relay	✓	✓	✓	✓
4 x 200M Free Relay	✓	✓	✓	✓
4 x 100M Medley Relay	✓	✓	✓	✓
4 x 100M Mixed Free Relay	N/A		✓	
4 x 100M Mixed Medley Relay	✓		✓	
Open Water	Olympics		World Championships	
5KM	N/A		✓	✓
10KM	✓	✓	✓	✓
25KM	N/A		✓	✓
4 x 1500M Mixed Relay	N/A		✓	

### **Fluid mechanics**

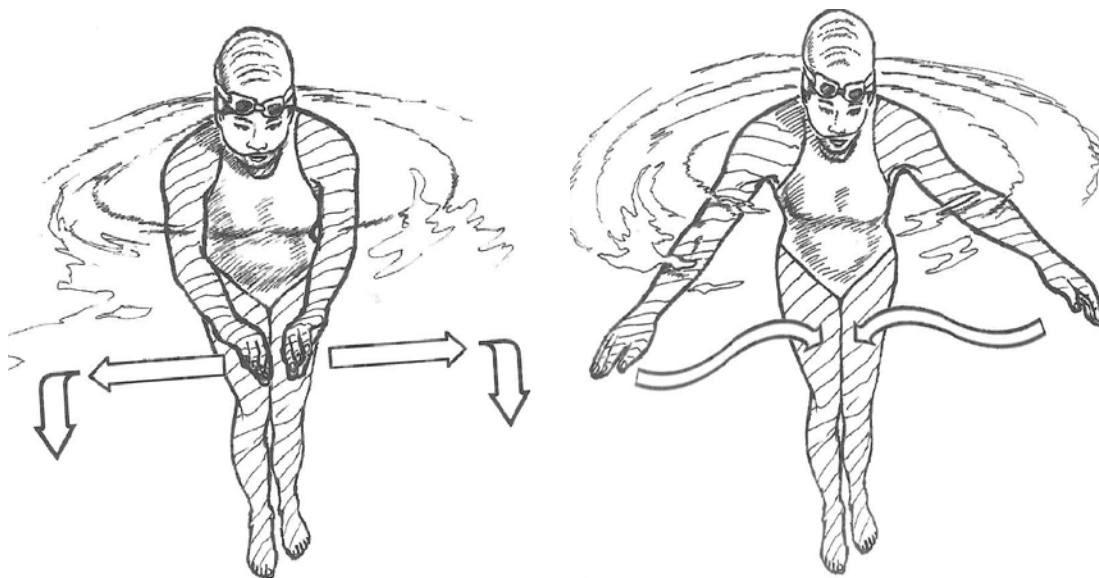
1. When an object submerges in a static state, its floating position is mainly influenced by an object's weight and buoyancy. When the buoyancy is greater than an object's weight, an object will float. When an object's weight is greater than the buoyancy, an object will sink. When an object's weight is equal to the buoyancy, an object will be suspended in the water.
2. Weight is due to gravity. The direction of attractive force created is toward the centre of the earth.
3. Buoyancy is an upward acting force, which is generated by fluid pressure. The magnitude of buoyancy is equal to the weight of fluid which is displaced. This is known as Archimedes' Principle.
4. The density of an object determines whether an object floats or not. If the density of an object is smaller than or equal to the density of the water, an object will float. If the density of an object is greater than the density of the water, an object will sink.
5. Breathing can affect the human body density. When inhaling, the volume of the thoracic cavity

will increase. Thus, the body density will decrease, which causes the human body floats. When exhaling, the volume of the thoracic cavity will decrease. Thus, the body density will increase, which causes the human body sink.

6. When breathing, head should not raise too high. The breath should be short and full. After inhaling, breath holding should be maintained for a short period of time. This helps to reduce the loss of buoyant force and increase the amount of oxygen inhaled.
7. According to Newton's third law, the mutual forces of action and reaction between two bodies are equal, opposite and collinear. When swimming, through the backward movement of stroking, kicking and treading, it imposes forces to the water. Thus, due to the water reaction, the human body moves forward.

### **Water treading**

1. Stand in water about mid-chest depth with both arms extended in front of you about shoulder-width apart
2. Scull with the hands moving in opposite directions at the same time. Sweep out with both hands first, then sweep in with both hands.
3. Change the angle of the hands as you move them through the water
4. Keep your wrists strong
5. Rotate from the elbow
6. Feel the pressure on the hands and forearms



### **Freestyle (Front Crawl)**

#### **A) Key points for flutter kick**

1. Keep legs straight and turn the feet inwards. Toes pointed.
2. Kick from hips to create splash.
3. Up and down movement with legs slightly bent at  $150^\circ$ . Legs relaxed when moving upward.
4. Kick at the water surface. Leave a gap of 0.5 meters between the upper and lower legs.
5. 2, 4 or 6-beat kick

### B) Arm stroke

1. Entry - Bend your elbow and keep it high. Fingertips should be in line with shoulder when the hand enters water.
2. Catch – catch water with palm and forearm after the whole arm entering water.
3. Pulling - Pull from the shoulder, back, breast and arm. Wrist in line with forearm. Pull long and hard to accelerate and finish at thigh.
4. Recovery – Lift the elbow and relax the arm. Recover hand to starting position in line with shoulder.



### C) Breathing

1. Swiftly turn the head to side and inhale with mouth as the arm passes the shoulder or chest.
2. While lifting and extending the arm in front, turn the head to the water and hold breath. Then exhale through the mouth and nose.



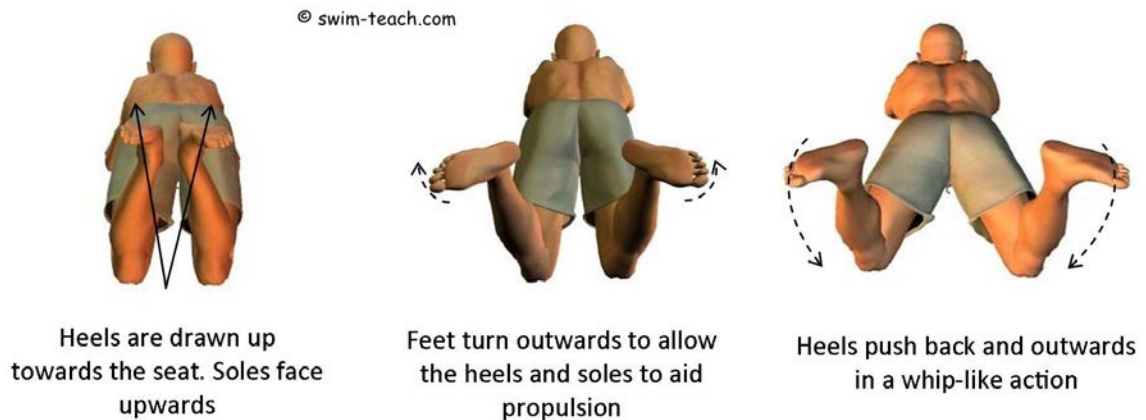
### D) Rules abstract

1. Swimmer may swim any style except in individual medley or medley relay events.
2. Some part of the swimmer must touch the wall upon completion of each lap and at the finish.

## **Breaststroke**

### **A) Leg kick**

1. Legs flex – Knees apart and leg flex. Move thighs towards the body until they become 120° with body.
2. Feet outwards - Turn the toes out. Feet outwards and ankles remain dorsi-flexed.
3. Kick backward – Feet are pushed swiftly backward to extension of the knees. Legs keep close and heels move in curve. Legs and big toes together and glide.



### **B) Arm stroke**

1. Pulling – Keep hands together. Move arms apart, downward and outward. Bend ( 90° to 100° ) and lift the elbow. Hands press downward and backward.
2. Inward sweep – As the arms move backward, which are in line with the shoulders, hands start to squeeze together and pitch diagonally inward.
3. Stretching – Stretch arms and extend forward.

### **C) Breathing**

1. Propel head forward and out to inhale when hands pressing down.
2. Face down and exhale slowly through the mouth and nose when you stretch the arms.

### **D) Coordinating leg kick and arm stroke**

Arms pull is followed by legs flex. When you kick, stretch your arms and glide.



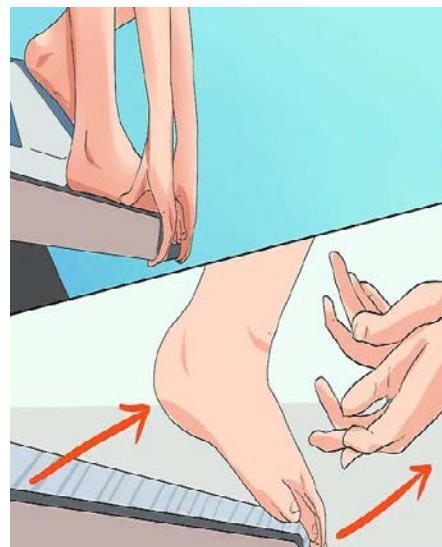
E) Rules abstract

1. All movements of the arms and legs shall be simultaneous and in the same horizontal plane without alternating movement.
2. At each turn and at the finish of the race, the touch shall be made with both hands separated (please see the picture below) and simultaneously at, above, or below the water level.
3. The stroke cycle must be one arm stroke and one leg kick in that order.
4. During each complete cycle, some part of the swimmer's head must break the surface of the water.
5. The hands shall not be brought back beyond the hip line, except during the first stroke after the start and each turn.

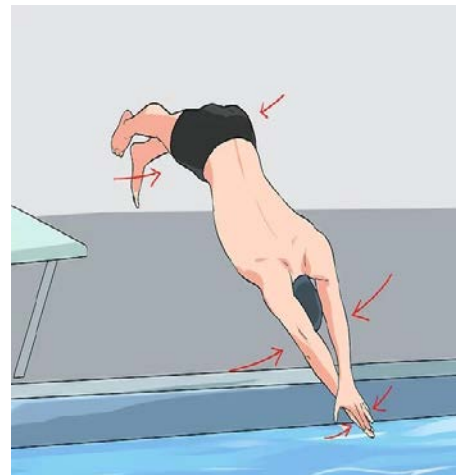




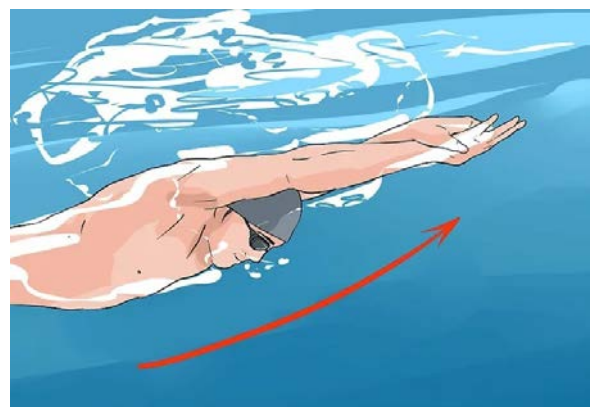
## Diving



Place one foot in front of the other. It is often recommended that you put your strong leg in the back position, with toes facing straight ahead.



Use the momentum you create by pushing off with your hands to throw your arms forward into this position. Look up slightly as you push off. This will force your body to follow the direction of your head. Look up slightly as you push off. Eyes looking downward and your arms locked straight behind your ears. Keep your body streamline.



Lift your hands and head slightly after you hit the water. You will still be holding the "hands on" streamlined position, start kicking until you are just about to resurface and begin swimming.

## **Water safety**

1. Do not swim in reservoirs, streams, catchwaters, ponds, piers, construction sites or rocky shores with oyster shells.
2. Do not swim in rough waters or areas which have reports of sharks in vicinity.
3. Do not jump into shallow waters or unfamiliar water environment.
4. Do not overrate your skills and physical strength to perform an attempt of rescue if you have not learnt any life-saving skills.
5. Go swimming in pools and beaches attended by qualified lifeguards.
6. Observe the rules and regulations of swimming pools and beaches.
7. Know your swimming skills and physical conditions.
8. Learn to swim and master life-saving skills.

## **References**

1. Guzman, R. J. (2017). The Swimming Drill Book 2<sup>nd</sup> Edition. Champaign, Illinois: Human Kinetics.
2. Leung, F. L. (2002). Water Safety Teaching Interactive CD-Rom for the Primary and Secondary Schools in Hong Kong, Hong Kong Life Saving Society.
3. Lucero, B. (2011). The 100 Best Swimming Drills, Meyer & Meyer Fachverlag und Buchhandel GmbH.
4. 小松原 真紀編，林昆樺譯. 2015 提升游泳技巧 200 絕招 完整收錄自由式·蛙式·仰式·蝶式練習項目，台灣：東販股份有限公司.

## **Relevant Websites**

Hong Kong China Swimming Association

<https://www.hkgswimming.org.hk/zh-hant/>

How to Dive off a Starting Block

<https://www.wikihow.com/Dive-off-a-Starting-Block>

Leisure and Cultural Service Department

<https://www.lcsd.gov.hk/tc/beach/atten-general/atten-clean.html>

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<http://www.swimmingworldmagazine.com/>

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<https://www.worldaquatics.com/>