

## **Classification of Fish Scales by Developmental Stage**

Many different kinds of fish inhabit the earth. Some of these kinds of fish have not changed much for millions of years. Others have evolved in order to use different aspects of the environment.

A good way to classify fish is by their scale type. There are four main types of fish scales. These types include placoid, ganoid, cycloid, and ctenoid. Scales differ among fish types.

### **PRIMITIVE**

Primitive scales are not worse than advanced scales. This term only relates to the time frame of its evolution. Primitive fish existed long before advanced. Some of these primitive fish have become extinct, but several still exist.

#### **Placoid Scales**

Placoid scales, the most primitive form of scales, are found in sharks. These scales do not grow in size as the fish size increases. Instead, more scales are added. Placoid scales have 3 layers. The first is the pulpy vascular core. Secondly, a layer of dentine comprises the middle layer. Finally, the outside layer is made of hard vitrodentine.

#### **Ganoid Scales**

Ganoid scales, found in gar, are slightly less primitive than placoid scales. These scales grow in size as the fish ages. Ganoid scales are diamond shaped. These scales are hard and thick. The scale is formed from ganoine.

### **ADVANCED**

#### **Cycloid Scales**

Cycloid scales are the less advanced of the advanced scale types. An example of a fish with cycloid scales is minnows. Cycloid scales increase in size as the fish ages. The growth can be seen in rings on the scale. These rings can be related to the age of the fish. Cycloid scales are thin, circular scales covered by a thin layer of epidermis and mucus. This gives the fish a slimy feel.

#### **Ctenoid Scales**

Ctenoid scales are the most advanced of all the scale forms. Sunfish and drum are fish with ctenoid scales. These scales also increase in size as the fish grows, producing rings. Ctenoid scale structure is similar to cycloid scales with the exception of tiny comb-

like protrusions on the posterior of the scale. These projections allow the fish to swim faster.

While different kinds of fish have developed different types of scales, each type allows the fish to function well in its environment. The more primitive scales allow for more protection than the advanced scale forms. Advanced fish use the increased speed allowed by their thinner scales to avoid harm, possibly avoiding capture by the tougher but slower primitive fish.