

# The Education Program at the New Jersey Sea Grant Consortium

22 Magruder Road Fort Hancock, NJ 07732 732-872-1300 njseagrants.org



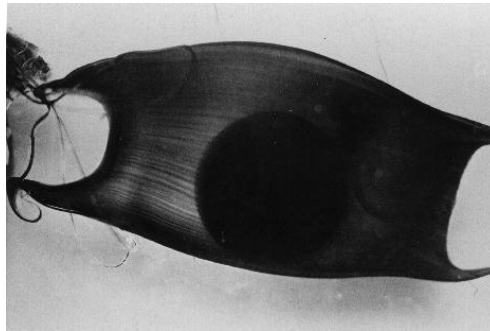
## SKATES

<b>OVERVIEW</b>	A large part of science deals with understanding the structure, characteristics, and basic needs of living things and their role in the world. This understanding also makes students aware of how important all living organisms are to the world.
<b>OBJECTIVES</b>	Following completion of this lesson, the students will be able to: <ul style="list-style-type: none"><li>• Identify the parts of a skate;</li><li>• Observe the details of a skates body and skate egg case;</li><li>• Understand the unique characteristics of a skate.</li></ul>
<b>GRADE LEVELS</b>	K-3 <sup>rd</sup> grades
<b>NJCC STANDARDS</b>	<b>Science Indicators:</b> <b>5.5:</b> End of Grade 2: A1, B1; End of Grade 4: A1, A3, B2; End of Grade 6: C1; End of Grade 8: B3 <b>Language Arts Indicators:</b> <b>3.1:</b> End of Grade 3: E3, G1; End of Grade 4: G13, H3, G13,C2; <b>3.4:</b> End of Grade 2: B1; End of Grade 4: A1, B2; End of Grade 8: B2
<b>MATERIALS</b>	<ul style="list-style-type: none"><li>• Rubber <b>Gyotaku</b> skates (available in craft catalogs or stores),</li><li>• skate egg cases, skate facts (provided),</li><li>• 11 x 14"skate egg case craft paper (egg case picture provided),</li><li>• paint, paintbrushes and glue.</li></ul>
<b>PROCEDURES</b>	Pass around the rubber skate models to the students and ask them what animal they think the model is. After identifying the skate, ask students what facts they know about them. After students explain what they know about skates, begin to tell students some other interesting facts about skates. Introduce a skate egg case again ask students if they know what the object is before telling them. Then have a discussion about the egg cases. After finishing the discussion, pass out the craft sheet of egg cases, paint and paint brushes. Explain to students to paint a thin layer of paint on the skate model. They may then take the egg case craft paper and carefully lay it over the painted skate model. They will try to print a skate into the egg case. Students must press down all over to print and pick up details from the skate. Then they may gently peel back the paper off the skate. Students will cut and glue the skate facts onto their picture of the skate inside the egg case. Have each student present their skate and tell one fact about a skate, or discuss a certain feature of the skate that appears in their picture.

## BACKGROUND

Skates are closely related to sharks and rays. Skates can be found in shallow bays to deep-sea habitats and live on the bottom of the sea floor. Skates have a huge pair of **pectoral fins** that connect the head to their body. The rounded shapes of the fins help form their flattened disk-like body, with eyes on top and mouth underneath. The flat body and large fins give skates the appearance of flying when swimming through the water. They have small thin tail with 1-2 fins on the tip that helps the skate steer, plus they can locate prey with electric organs found in their tail. The skate eats a variety of crustaceans, mussels, clams, snails, and worms. One of the best-known species is the *little skate*, which can be found along the New Jersey coast in the Atlantic Ocean. This skate is 1 to 2 feet (30 to 61 centimeters) long. A larger skate that lives along the New Jersey coast is the *barn-door skate*.

Skate are **oviparous**, meaning egg layers. After a breeding season, female skates can store sperm to fertilize and secrete eggs continually throughout a 3-4 month period. Females may lay a pair of eggs every three to five days and may produce between thirty to forty pairs of fertilized eggs. The eggs are encased in a tough, leathery protective egg case that is black, with four points.



(yolk inside the skate egg case)

Long thin **tendrils** extend from each point to anchor the egg cases to seaweed, rocks, or sand. Inside the egg case is yolk, much like the yolk in a hen's egg. A skate **embryo** utilizes the yolk as nourishment and develops inside the egg case.

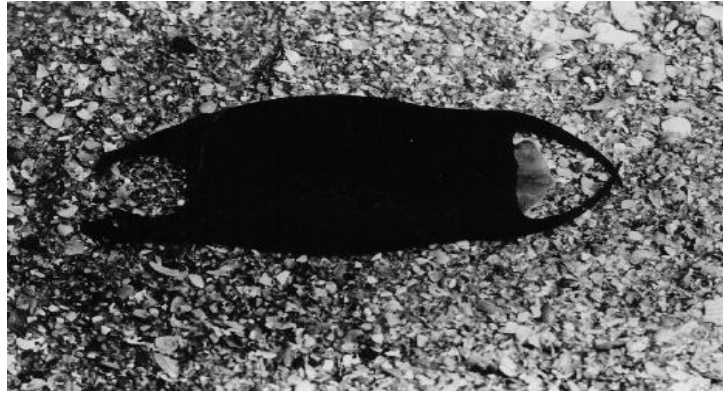


(clearnose skate embryo)

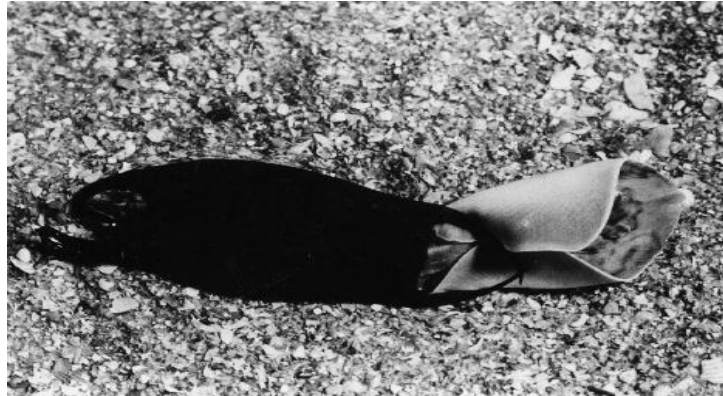
Development is complete in about 12 weeks when the skate hatch out, looking like a miniature adult. Often after the eggs hatch the empty egg cases wash ashore and are known as "mermaids purses" to beachcombers.

## The Birth of a Skate

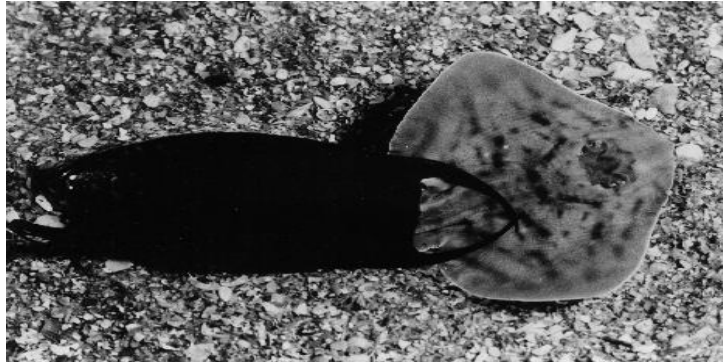
1.)



2.)



3.)



4.)



## VOCABULARY

**Embryo-** an animal in the early stages of growth prior to birth or hatching.

**Oviparous-** animals that lay eggs outside the body.

**Pectoral Fin-** a pair of fins located on the sides of a fishes body, they give propulsion and aid in steering through the water

**Tendrils-** a stem modified into a slender spiralling organ serving to attach an object to its support.

## REFERENCES

Johnson, J. 1998. Children's Guide to Sea Creatures. Simon and Schuster Books for Young Readers, New York. pp.44.

Paxton, J.R. and W.N. Eschmeyer. 1998. Encyclopedia of Fishes. Academic Press, San Diego, CA. pp. 64-66.

Zimmer, C. Biomechanics. "The Mystery of the Mermaid Purse." (7/99-8/99). p. 24.

### Internet Resources:

<http://www.mote.org/index.php?src=gendocs&ref=Skates&category=Shark%20Research>

REV. 11/11/10



The New Jersey Sea Grant Consortium (NJS GC) is an affiliation of colleges, universities and other groups dedicated to advancing knowledge and stewardship of New Jersey's marine and coastal environment. NJS GC meets its mission through its innovative research, education and outreach programs. For more information about NJS GC, visit [njseagrant.org](http://njseagrant.org).

## Skate Fact Cards

**SKATE FACT:**

Along with sharks and stingrays, skates belong to the class called Chondrichthyes, which means cartilaginous fish. A skate's skeleton is entirely cartilage.

Visit The New Jersey Sea Grant Consortium at  
<http://www.njseagrants.org/>

**SKATE FACT:**

Skates can grow up to two meters in length (16 ½ feet) but most are smaller than one meter (3 ¼ feet).

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**SKATE FACT:**

The hatched baby skate measures six inches long and about four and one half inches across (from pectoral fin to pectoral fin).

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**SKATE FACT:**

Skates have a flattened body covered with tiny spines. A line of larger spines runs down the middle of the tail, which the skate uses to defend itself against attackers.

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**SKATE FACT:**

Skates live near the bottom of the ocean because, like sharks, they have no swim bladder. A swim bladder is what helps a fish stay up in the water and not sink to the bottom of the ocean.

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## Skate Fact Cards

**SKATE FACT:**

Skates are carnivorous and feed on crabs, shrimp, lobster, and other small crustaceans, as well as polychaete worms, bivalve mollusks, and small fish.

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**SKATE FACT:**

The skate egg case is known as a “mermaid purse.” It takes approximately twelve weeks for a skate to develop inside the egg case.

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**SKATE FACT:**

Skates can be found in shallow estuaries to deep-sea habitats in the ocean.

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**SKATE FACT:**

The tough leathery skate egg cases act like little water pumps with slits on the four tendrils that allow oxygen to enter and the baby skate breathe.

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