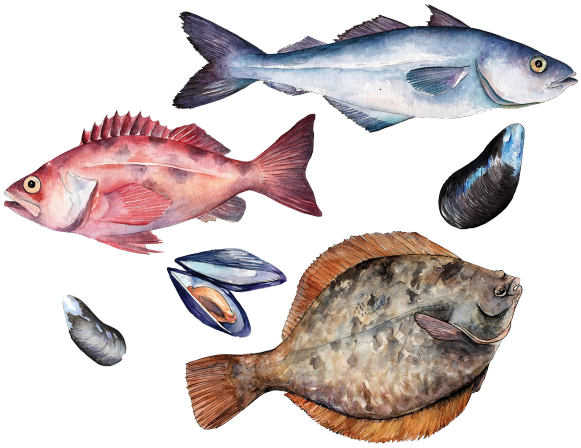
MASSACHUSETTS FARM TO SCHOOL

HARVEST of the MONTH in the CLASSROOM



SEAFOOD

HISTORY

It is difficult to write up a comprehensive history of seafood because fish has been a part of the human diet since Paleolithic times. Archaeologists have excavated ancient sites full of shells and fish bones, indicating our ancestors ate fish. Cave paintings depicting seafood have also been discovered. The Nile river was a crucial source of seafood for the ancient Egyptians, who left tools, paintings, and documentation on papyrus about the importance of fish to their diet and civilization. The ancient Israelites, also left a written record of eating seafood. In fact, for every ancient civilization from Greece, Rome, China, Japan to the indigenous people of the Americas, fishing was a central part of their diets.

FUN FACTS

- The Atlantic Sailfish is the fastest fish - it travels as fast as a car on the highway.
- The Massachusetts State Fish is the Atlantic Cod.
- There are over 25,000 species of fish. 3,000 different species live in the Gulf of Maine (including the MA coastline).
- Fish have been on the Earth for more than 450 million years (even before dinosaurs!).

FISHERMAN BIO

Doug Feeney fishes 15 miles off the coast of Chatham, Massachusetts in a place referred to as “Crab Ledge” aboard his fishing vessel Noah. In his 26 years of fishing, he has seen the decline of our state’s fisheries, and is an advocate for more sustainable fishing practices, including eating locally caught fish. Doug mostly fishes for dogfish and skate, some of which he sells dockside off of his boat and to a wholesaler called Red’s Best. To encourage more people to eat dogfish, he’s developed products such as a Noah Burger and fish sticks, which are available in some school cafeterias. *Photo Credit: Greta Rybus*

MASSACHUSETTS FARM TO SCHOOL

HARVEST of the MONTH in the CLASSROOM

FISH LIFE CYCLE

Grades 3-5 • 30 minutes

SEAFOOD

OBJECTIVES

Students will understand how the life cycle of fish differ from that of other farmed animals, how they grow and develop, and think critically about how their life cycles affect how we harvest them.

ESSENTIAL QUESTIONS

What is the life cycle of a fish?

MA STATE FRAMEWORK(s)

3-5 Life Science

MATERIALS NEEDED

Life Cycle Cards
Fish Fortune Cards (optional)

PROCEDURE

This lesson features a game that students will play to simulate the life cycle of fish, and represent the ratio of adult fish that result from eggs being laid. This is a good lesson to introduce fish as "farmed" animals different from most other livestock, and as a building block to introduce concepts of overfishing.

Intro (5-10 minutes)

Begin the lesson by asking your students to name farm animals they know, and what products we get from those animals. If students do not come up with "fish" immediately, encourage them to think of other types of animals that we may eat (or animals that live in the water, breathe through gills, etc).

What does the class know about fish? Where do they live, how do they grow, how do we harvest them? Show the class your local fish seasonality chart (provide chart), and ask if any of the fish look or sound familiar to your class. How are fish different from the other animals we use for meat?

Life Cycle Intro Activity (15 minutes)

Fish tend to be very different from the birds and mammals that we consider to be "farmed." One of the main differences is how they reproduce and grow, which affects the way we can harvest them.

Divide your class into a few small groups (3-5 students), and distribute the fish life cycle cards to each group. Give them 5 minutes to work as a group to put their cards in order to accurately depict the life cycle of a type of fish (these can all be the same, or different varieties of fish if you'd like). If you would like it to be more challenging, ask your students to complete the task silently. (You may also consider skipping this part of the lesson to save time, and put together the life cycle as a class on the board as an introduction to the second part of the activity).

Lesson developed in partnership with:
Island Grown Initative

FISH LIFE CYCLE

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Come back to a large group, and survey the class. On the board, draw the life cycle with student help. How is this life cycle different from other farm animals (or mammals in general)? Judging by this life cycle, what are some benefits that you could see from using fish as a food? What do you think would be challenging about farming fish?

Life/Reproduction Activity (15-20 minutes)

The next activity is centered around a game, but works as a simulation for reproduction rates/life cycles of fish. Explain that the class is going to simulate a community of fish through a large game of rock paper scissors (RPS).

Like all fish, each student will start the game as an egg. Demonstrate a motion that represents an egg (squatting down into a ball, or holding their hands over their heads in a round shape). Eggs can meet up, and play a game of RPS. If win, you hatch and turn into a larva! The egg that lost the game will remain an egg, and must find a different egg to challenge. Give the larvae another hand/body motion to identify themselves by, and continue the game in that fashion (players can only play RPS with another player at the same stage in the life cycle!). When a larva wins the round of RPS, they become a fry, and the fries will then become an adult (have the adult fish challenge you or their classroom teacher to a best out of 3 RPS. If they win, they can stay as adults). If a student loses a round of RPS at any point in their life cycle, they must start the whole game over as an egg.

Play the game for 5-7 minutes, or until you notice several students have achieved adult fish status. Ask the students to remember the stage of the life cycle at which they've ended the game, then ask them to sit. Take a tally of the number of students that have ended the game as an egg, a larva, a fry, and an adult. More often than not, you will end up with a pyramid pattern to your numbers, with the most number of eggs, then some larva, a handful of fries, and a couple of adults. Ask your students if they think the simulation is similar to what happens in natural fish habitats, or what is realistic or unrealistic about the simulation. Does every egg turn into a fish? What could prevent an egg, larva, or fry from reaching adulthood? Fish eggs are like the seeds of a plant. A lot can happen to prevent most of them from growing to maturity! Questions for students:

What does this mean for fishing?
Do you think it's possible to overfish a species? Why or why not?

FISH LIFE CYCLE

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In case there is not enough time or space to play the life cycle/reproduction game, you may choose to do a card based simulation instead. Use the Fish Fortune Cards (provided) and distribute them to the class.

Create a bunch of Fish Fortune Cards, a set of 20-25 small cards that can be distributed to the class (example cards provided). On each card, write a hypothetical 'fortune' of what happens to a fish egg after it is born. Only one card in the set should end with an egg hatching and surviving into adulthood. Here are some examples of other fortunes:

You are an egg that settles into a sandy spot, and hatches into a larva. You enjoy a few days of floating around the ocean until a large fish eats you.

You are an egg that gets caught in a strong current. You never break free of the current, so you never find a place to settle. You don't hatch.

You are an egg that floats along peacefully until you come to rest on a soft bed. Two days later, a lobster shows up and eats you.

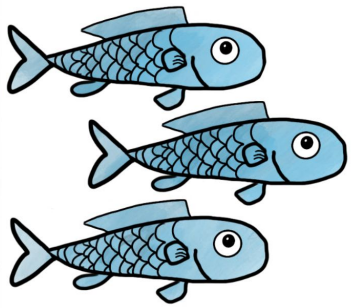
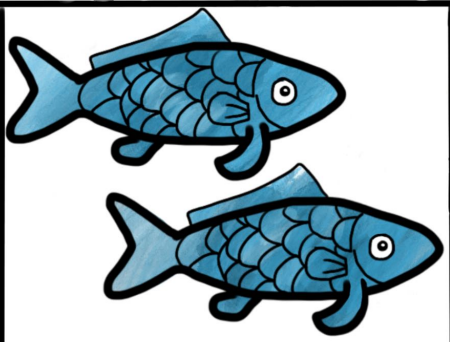
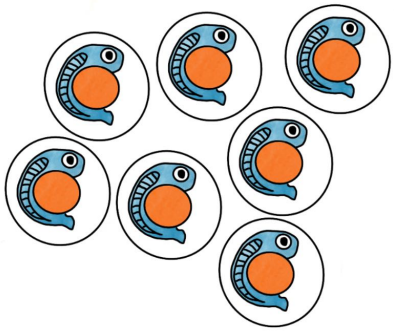
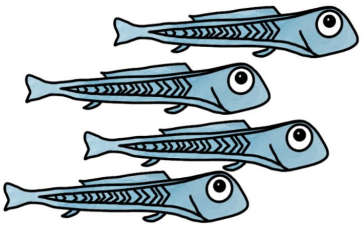
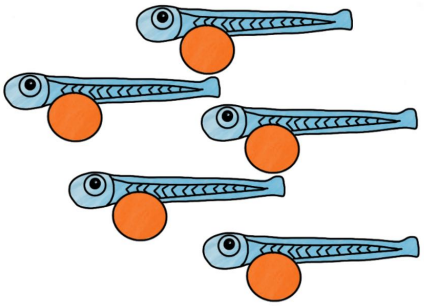
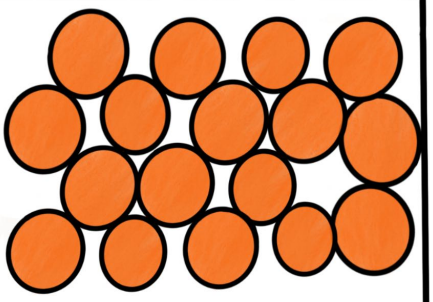
You are an egg that settles into a soft spot, hatches into a larva, and eventually grows to become a fry. You become skilled at swimming quickly and eating small plankton, but unfortunately a larger fish comes along, catches you, and eats you.

Distribute one card to each student, and give them time to read their card silently. Then, pick a few students to read their cards aloud. If the student with the card describing an egg successfully growing into an adult fish isn't called, ask your class to raise their hands if their egg became an adult fish. Students will notice that only one student is raising their hand.

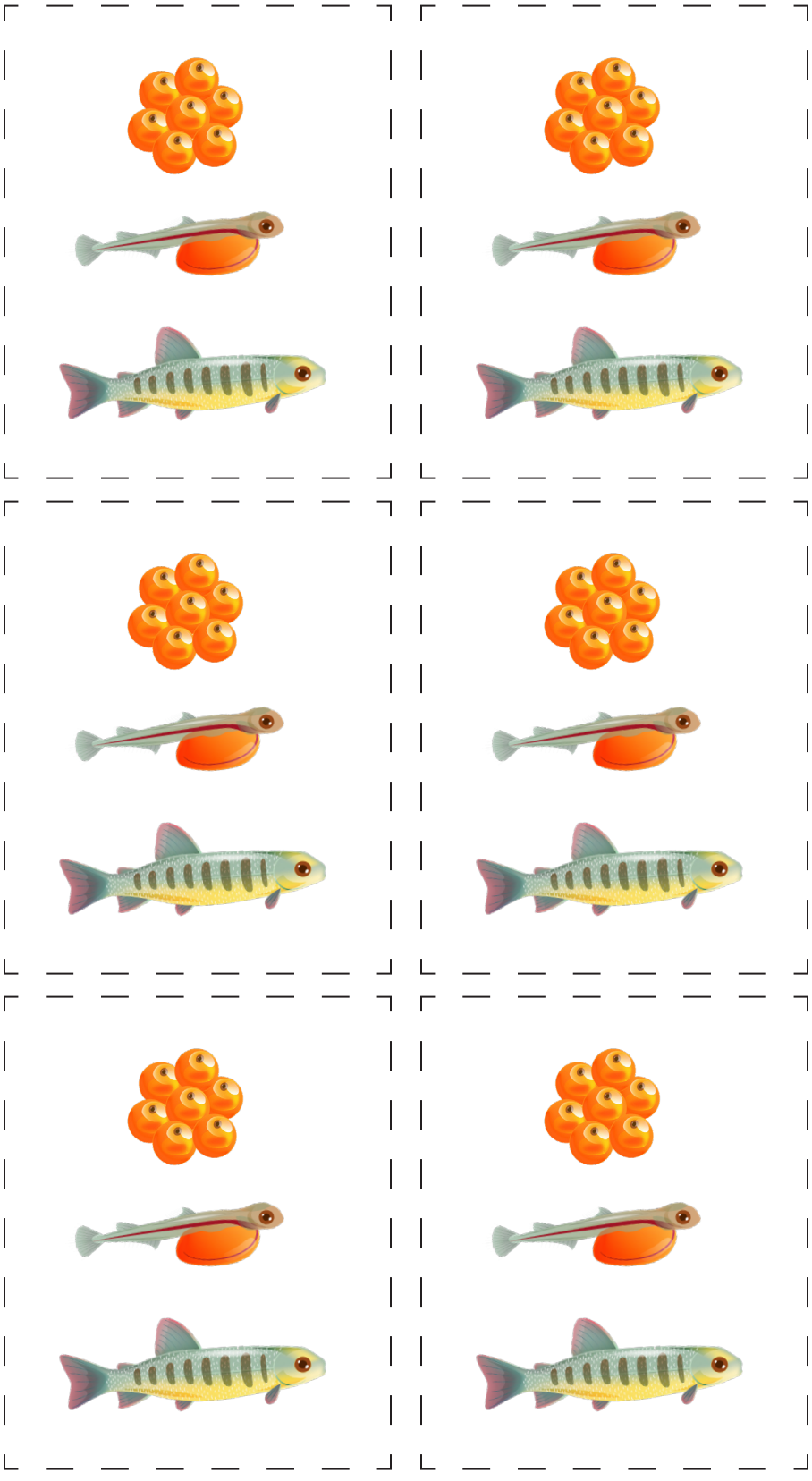
From here, you can use the same wrap up discussion as with the game. It should also be pointed out that even though the odds of becoming an adult fish in this simulation (1 in 20-25) are pretty slim, in real life the odds are more like 1 in a thousand or more. Again, be sure to end the lesson with a discussion of what this means for fish varieties that we harvest for food.

FISH LIFE CYCLE
CARDS

Number the steps in the fish's lifecycle

 ◯ Juvenile	 ◯ Adult fish	 ◯ Developing egg
 ◯ Fry	 ◯ Larva	 ◯ Eggs

FISH FORTUNE CARDS



FISH FORTUNE CARDS

You are an egg that lands in a soft sandy spot and hatches into a larva. You enjoy a few days of floating around, but eventually another fish swims along and eats you.

You are an egg that settles into a soft sandy spot of the ocean, protected from most predators. You hatch into a fry, stay away from larger fish and fishing nets, and eventually grow into an adult. You spend your days swimming around, catching food, and hanging with other fish. Congratulations, you made it!

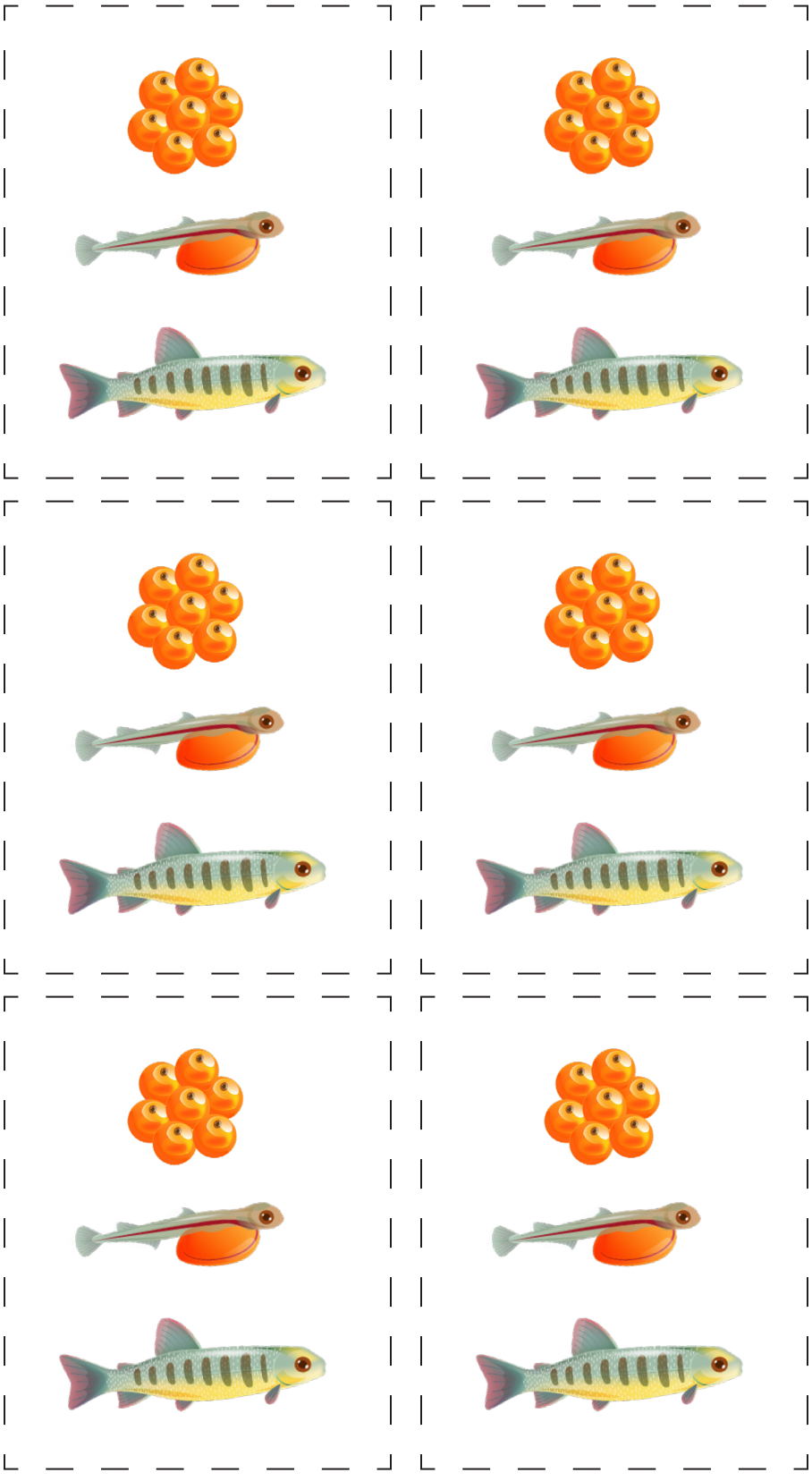
You are an egg that settles into a soft spot, hatches into a larva, and eventually grows to become a fry. You become skilled at swimming quickly and eating small plankton, but unfortunately a larger fish comes along, catches you, and eats you.

You are an egg that floats around peacefully before landing on a soft bed of sand. A day later a lobster shows up and eats you.

You are an egg that drifts down into the deep ocean,where it becomes too cold to hatch.

You are an egg that gets caught in a strong current. You never break free of the current, so you never find a place to settle. You don't hatch.

FISH FORTUNE CARDS



FISH FORTUNE CARDS

You are an egg that gets harvested with thousands of your other brood mates. You end up on a cracker in a fancy restaurant.

You are an egg that hatches and grows into a fry. You try out your young fins and swim right into a large incoming fish. You taste delicious.

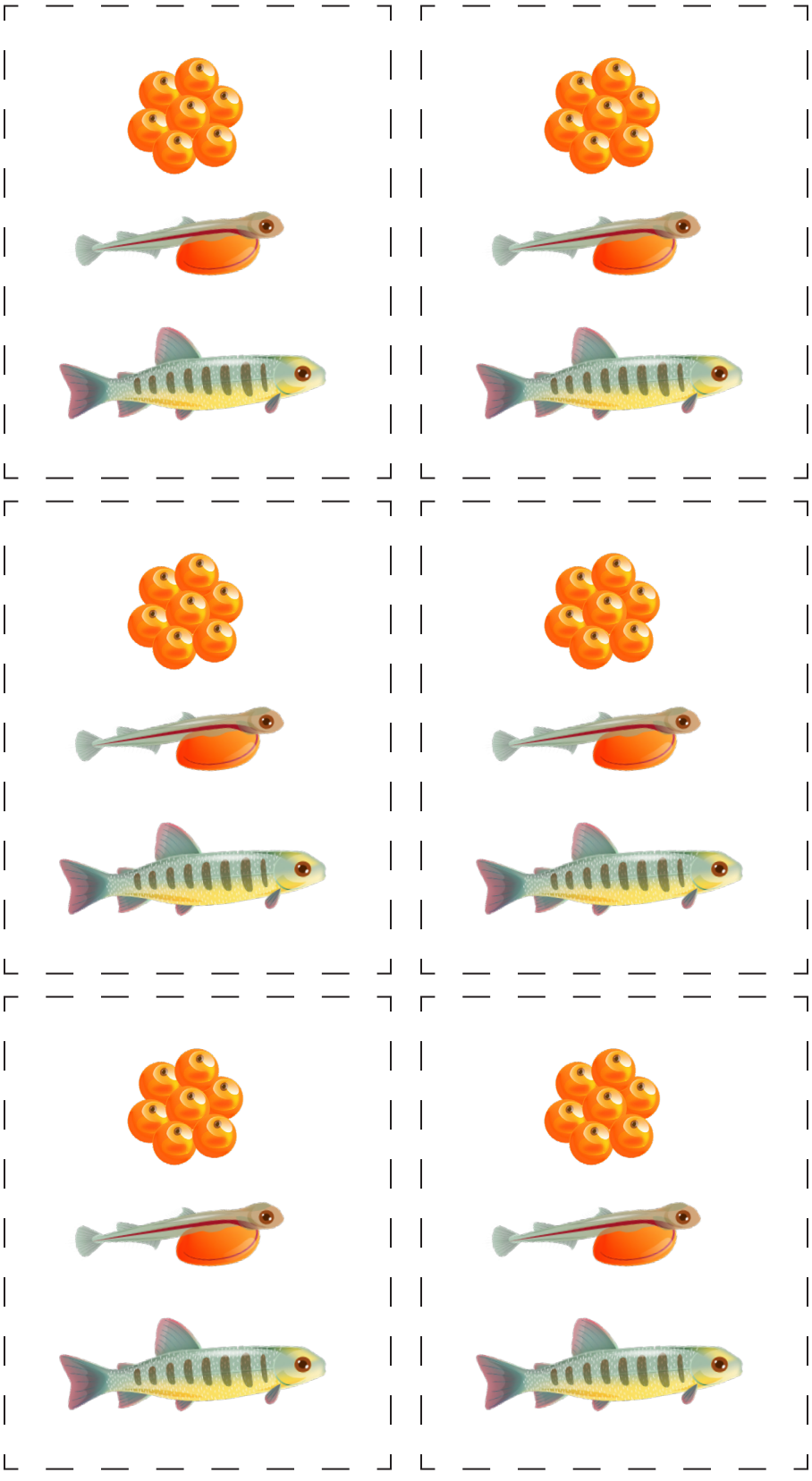
You are an egg that drifts down into the mouth of a waiting fish. Yum!

You are an egg that hatches and turns into a larva. You drift into a shallow part of the shore, where a crab grabs and eats you.

You are an egg that hatches and grows into a fry. One day you are swimming along the bottom of the ocean, when a crab pops up from under some sand and eats you.

You are one egg in a clutch of thousands that somehow didn't get fertilized. You never hatch.

FISH FORTUNE CARDS



FISH FORTUNE CARDS

You are an egg that hatches and grows into a fry. One day you get caught in a tide pool too close to shore. A gull spots you from above, and swoops down to eat you.

You are an egg that for some reason never hatches.

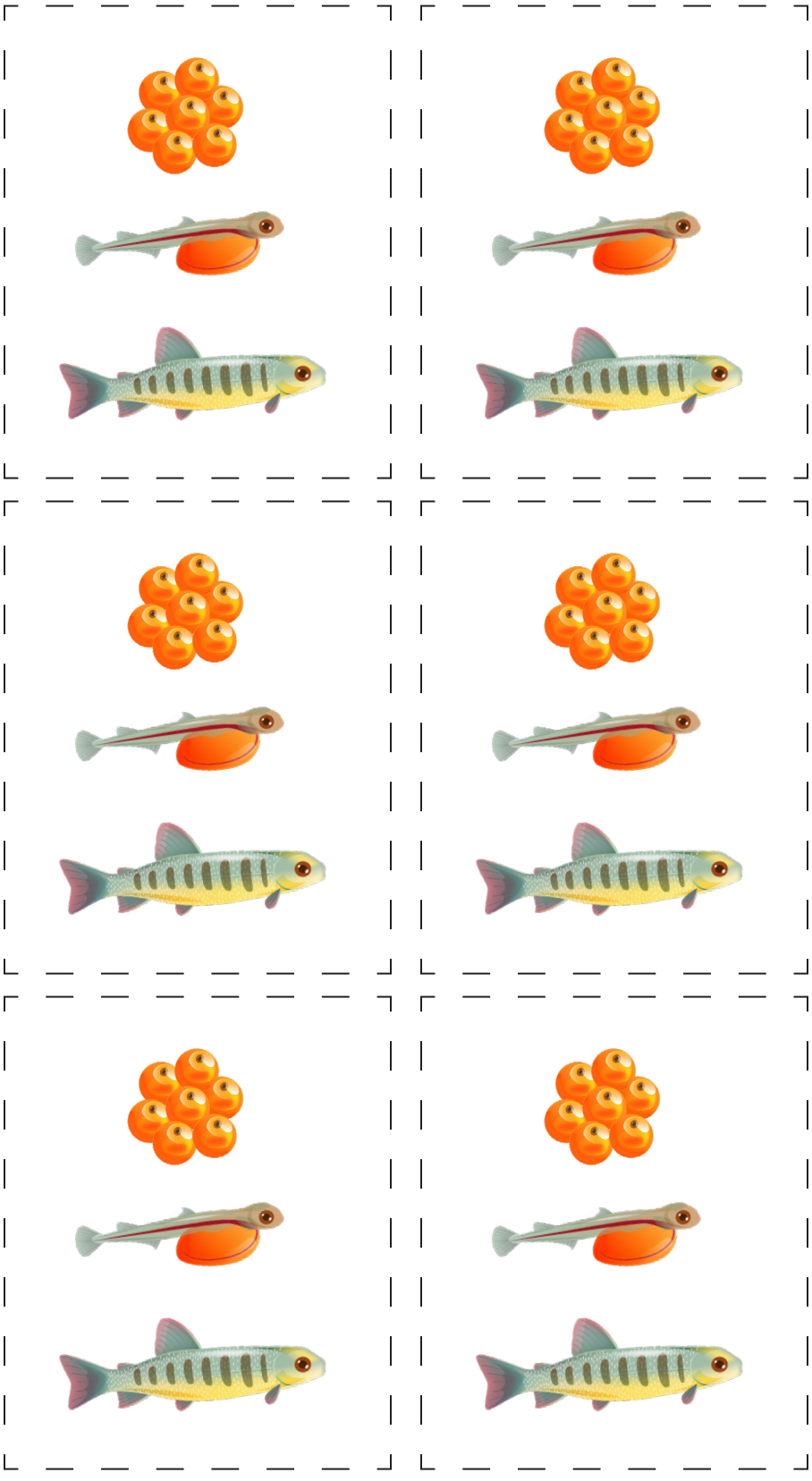
You are one of hundreds of eggs laid in a coral reef. One day a barracuda arrives, and even though your parents try to defend you, the barracuda eats almost all of the eggs, including you.

You are an egg that hatches into a larva. One day as you float around the ocean, you are sucked into the baleen of a large whale and eaten.

You are an egg that hatches into a larva. A large shrimp finds you and eats you.

You are an egg that for some reason never hatches.

FISH FORTUNE CARDS



FISH FORTUNE CARDS

You are an egg that never hatches.

Bummer!

You are an egg that grows into a small fry, but then are eaten by a larger fish of your species. Rude!

You are an egg that hatches and grows into a large fry. One day you get tangled in a fishing net and are dragged on board a ship.

You are an egg that hatches and grows into a larva, but you are eaten by a whale.

You are an egg that hatches, but are quickly eaten by a sardine..

You are an egg that never hatches.