<table>
<thead>
<tr>
<th>Lesson Title</th>
<th>Unit</th>
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<tbody>
<tr>
<td>Intro to Fish and Lifecycles</td>
<td>Seafood</td>
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<tr>
<th>Grade Level(s)</th>
<th>Common Core Standard(s)</th>
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<tr>
<td>3</td>
<td>3-LS1-1</td>
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<tr>
<th>Objectives</th>
<th>Essential Questions</th>
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<td>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</td>
<td>What is the life cycle of a fish?</td>
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<th>Duration</th>
<th>Materials Needed</th>
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<td>~.5 hour</td>
<td>Life cycle cards for fish, Fish Fortunes Cards if doing the alternative activity</td>
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<th>Background Information</th>
<th>Setup Required</th>
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<td>Types of farm animals, farm products</td>
<td>If you do the large group game, you will need a space with room to move</td>
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**Overview**

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 than most other livestock, and as a building block to introduce concepts of overfishing.
Procedure

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, and ask if any of the fish look/sound familiar to your class. How are fish different from the other animals we use for meat?

Life Cycle Intro Activity (15 minutes)

As you have just discussed, 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 smallish groups (3-5 students), and distribute your 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).

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 rocks, papers, scissors.

Like all fish, each student is going to start the game as an egg. Give the students some sort of motion that represents an egg (they can have to squat down into a ball, or just hold their hands over the heads in a round shape). Eggs can meet up, and play a game of RPS. If you 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 a couple 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 then 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 adults. Ask your students if you think the simulation is similar to what happens in natural fish habitats, or what could be 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 much like the seeds of a plant. A lot can happen to prevent most of them from growing to maturity!

What does this mean for fishing? The are a LOT of fish in the sea, but do you think it’s possible to overfish a species? Why or why not? (Use this time to either wrap up the lesson, or segue into the next lesson about overfishing or aquaculture).

Extensions and Variations

Fish Fortune Card (Alternative to the game listed above):

In case there is not enough time or space to play the life cycle/reproduction game, you may choose to do this card based simulation instead. 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 a second to read their card but ask them not to share yet. 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, but expedited since each card gives an example of how or why a fish egg might not reach adulthood. 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 should mean for fish varieties that we harvest for food.
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 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 drifts down into the deep ocean, where it becomes too cold to hatch.

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 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 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 drifts down into the mouth of a waiting fish. Yum!

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

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 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 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 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. A large shrimp finds you and eats you.

You are an egg that for some reason never hatches.

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 never hatches. Bummer!
You are an egg that hatches and grows into a large fry. One day you get tangled in some 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.