Lionfish Dissection:
Gut Content Analysis

This lionfish dissection activity demonstrates how invasive species can impact the dynamics of a habitat through predation. Lionfish are voracious piscivores and their predation of native reef species is a top concern regarding their invasion.

Students perform a gut-content analysis of a lionfish "puppet" and discover which native species are being consumed. Students record data and identify stomach contents of the lionfish. This hands-on experience mimics procedures that researches at the Dauphin Island Sea Lab perform to understand predation of lionfish in the northern Gulf of Mexico.

Leave the gloves and goggles behind and see what species your lionfish has consumed!

Created by Jennifer Latour ~ Dauphin Island Sea Lab ~ Discovery Hall Programs ~ 2015

Teacher Guide

Lionfish puppets should be prepared ahead of time by teachers or students.

Students:

- Scatter fish around a "reef" in a classroom and have students act as lionfish, eating the species around them. Students then stuff the stomachs with what they collected and seal them in the lionfish puppets. Students should not dissect the same puppet they have prepared.

Teachers:

- Stuff pieces randomly. Maybe one is empty?
- Throw some partially digested critters into the mix for a more realistic approach and a challenge when identifying.

Each lionfish has been tagged for data collection.
Numbers need to be written on each tag.

Students will open the lionfish to reveal the stomach and then open the stomach to identify contents. The stomach content key can be used to identify which species of fish were consumed. Sometimes prey will be in stages of advanced digestion. Students should try to identify each item and record it as unidentifiable if necessary.

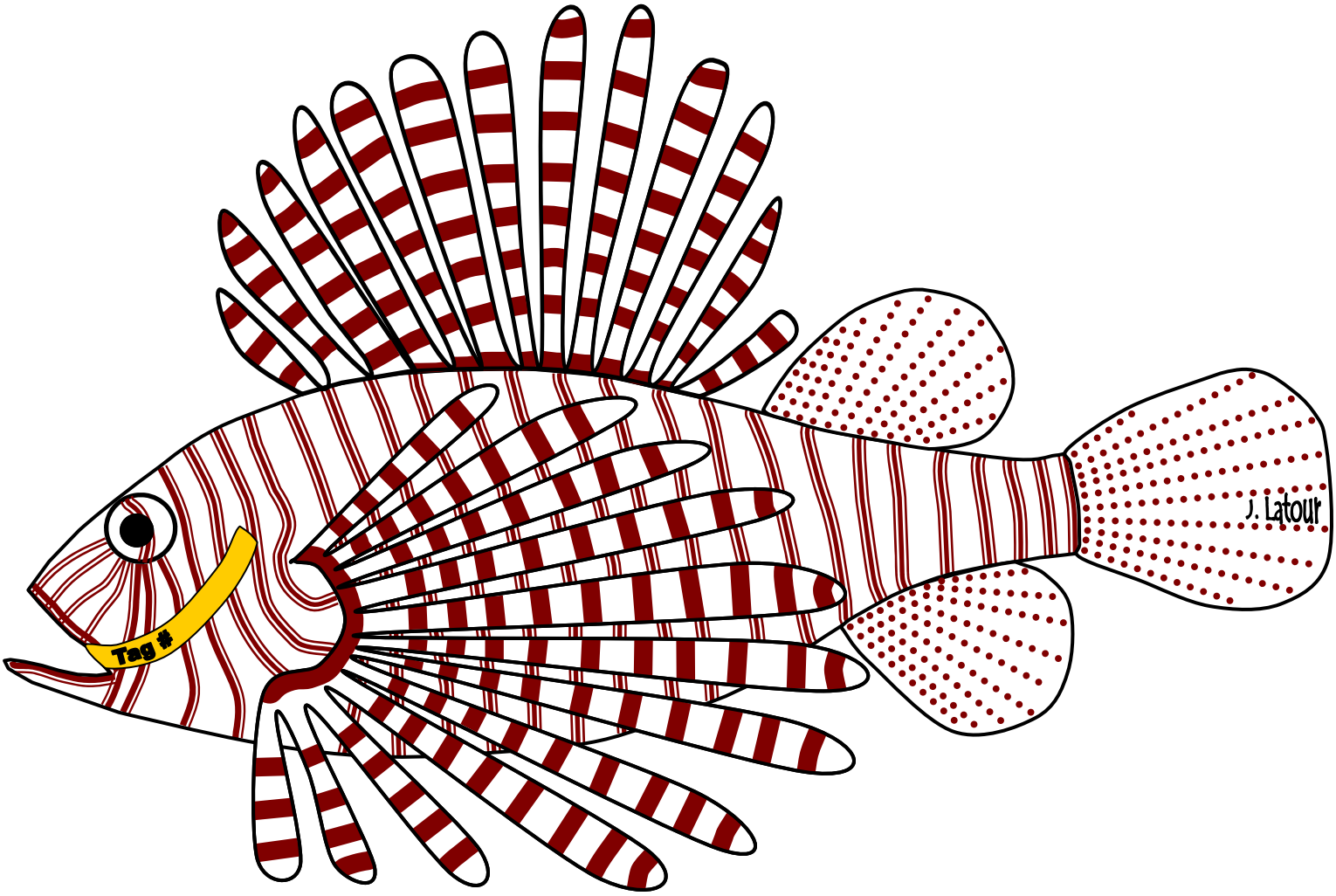
Tag #	# of prey	Snapper	Grouper	Damselfish	Goby	Blenny	Crab	Shrimp
1	5	2		2			1	

After data has been collected, have the students find out the percentage of crustaceans that were consumed by the sample collection of lionfish. Discuss which species were identified in the stomachs and discuss what effects their consumption may have on the native species, food web and biodiversity of the habitat.

- Were there more demersal reef fish than other species? How could this effect the dynamics of a reef habitat?
- Were any commercial gamefish species consumed?

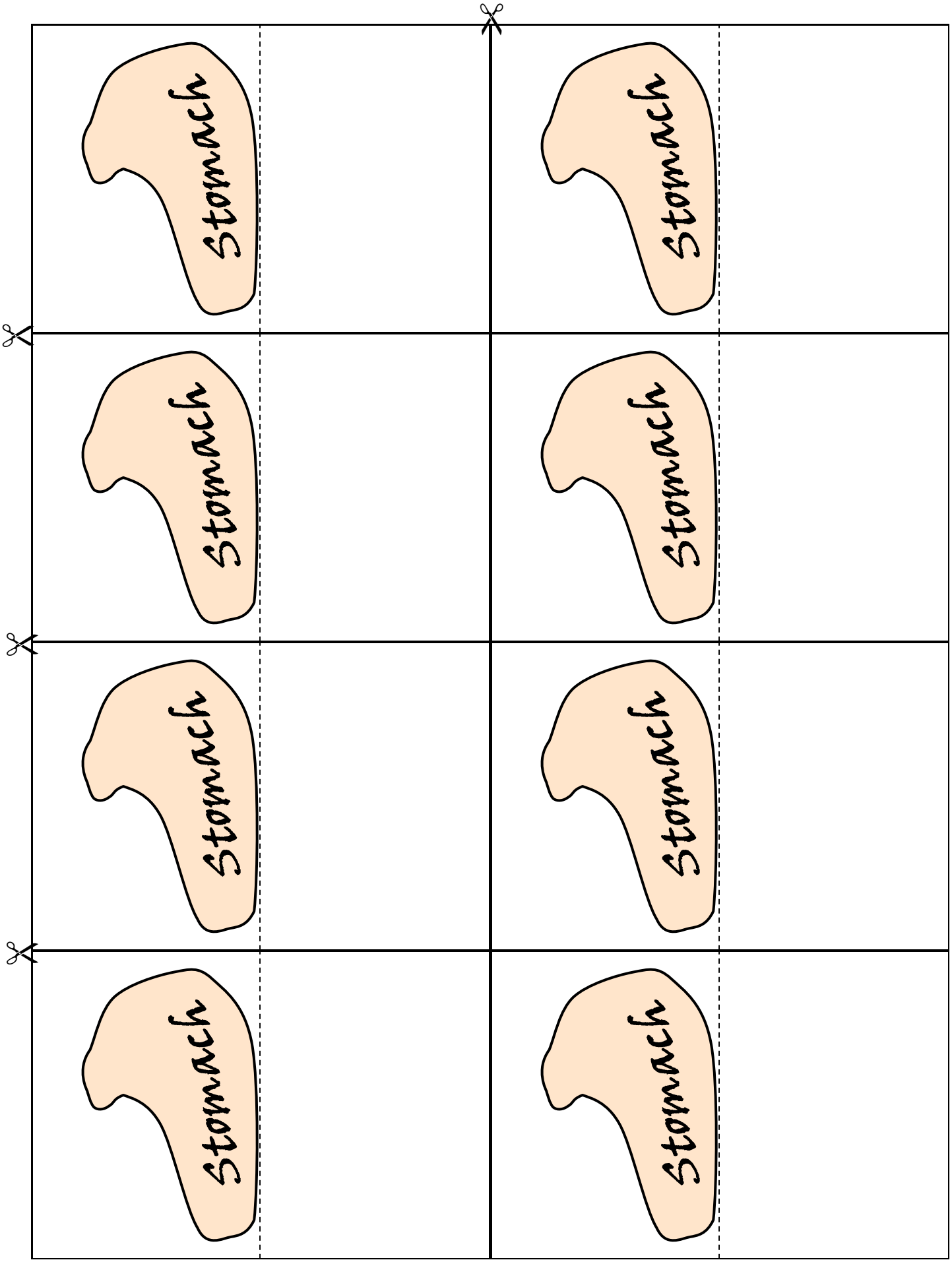
In a real lab setting, many other parameters are measured and recorded.

- Oeteliths are removed and age is determined
- Lionfish are weighed and measured
- Gape width and height is measured
- Stomach contents are weighed individually
- Unidentified stomach contents are tested for genetic identification

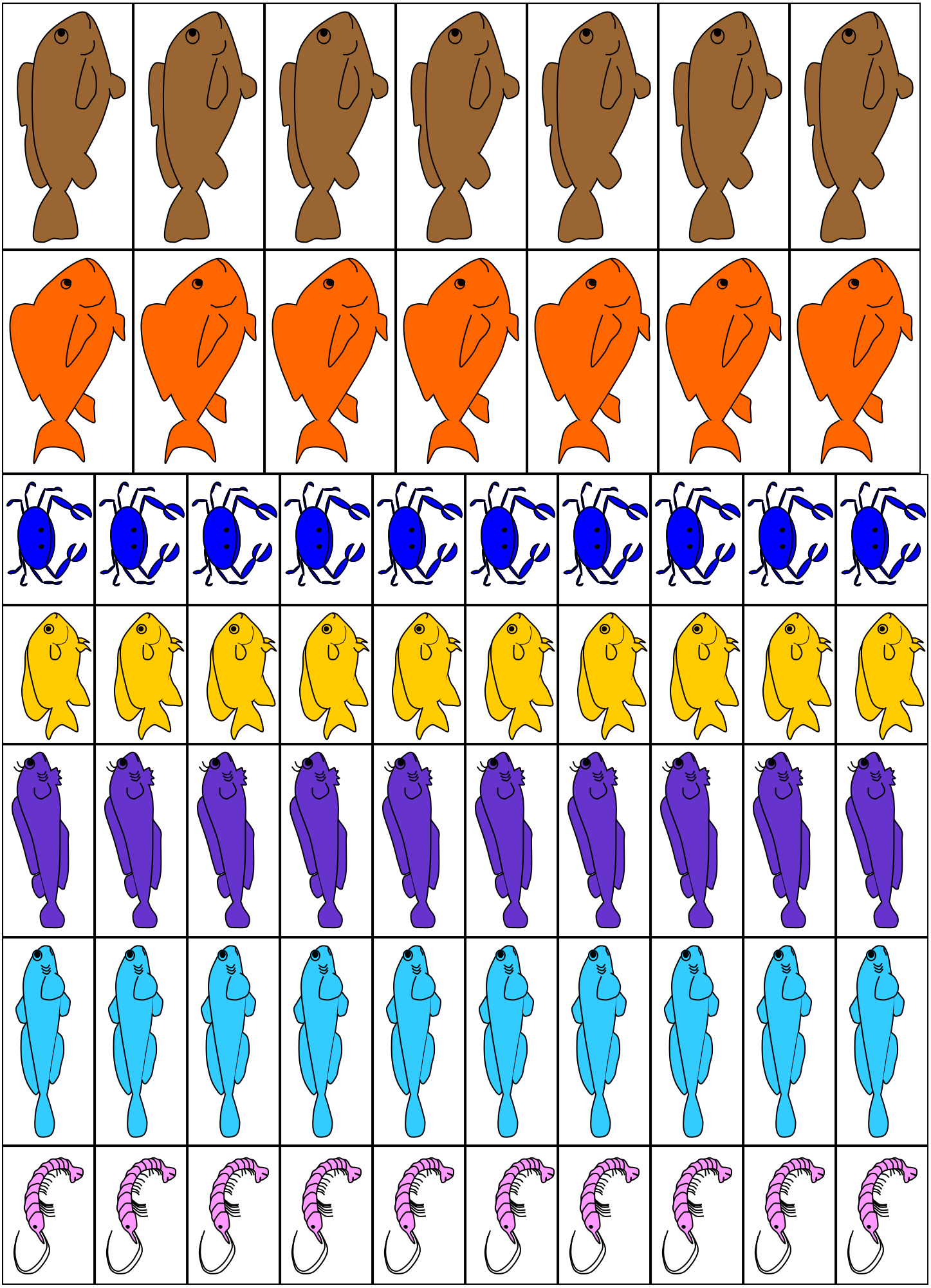


Lionfish Dissection Puppet:
Fold on the dotted line. Cut around lionfish shape but do not cut along folded edge. Insert filled stomach and tape closed.

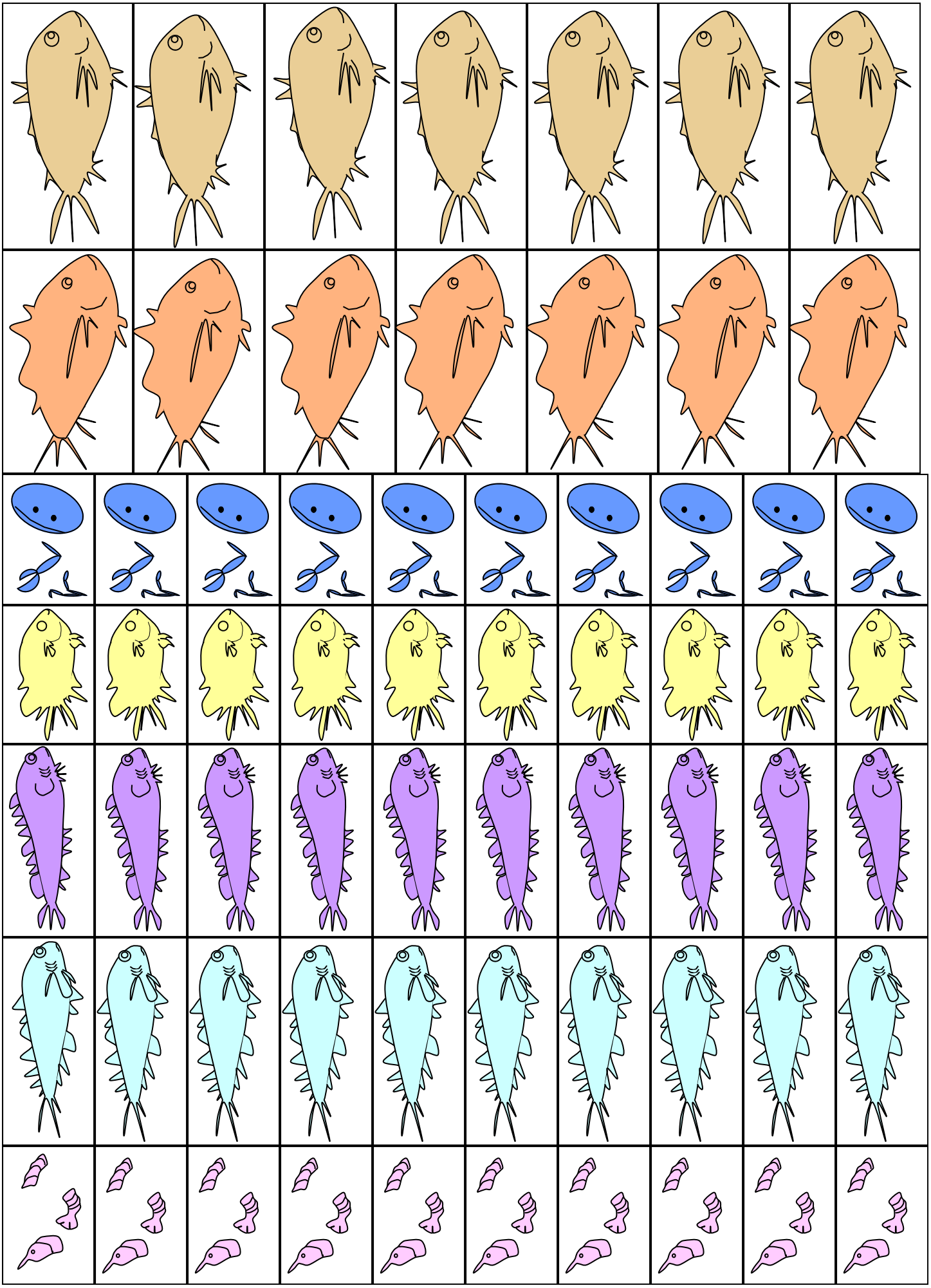
Created by Jennifer Latour ~ Dauphin Island Sea Lab ~ Discovery Hall Programs ~ 2015



Lionfish stomachs:
Fold on the dotted line. Cut around stomach shape but not folded edge.
Fill with stomach contents and tape closed.

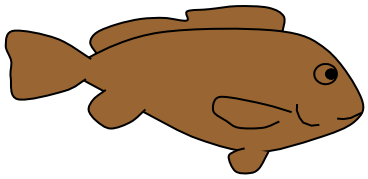


Stomach contents:
Cut shapes out on the solid lines



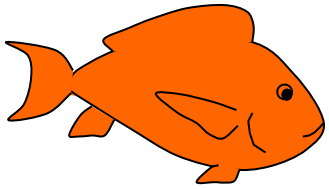
Partially digested stomach contents:
Cut shapes out on the solid lines

Stomach Content Key



Juvenile grouper

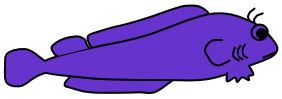
Adult grouper are one of the few known predators of lionfish in their native range. In the Caribbean they would be considered a lionfish predator but they are too heavily fished. They have not been proven to be a predator yet in the gulf of Mexico.



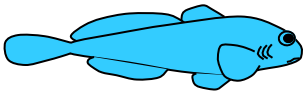
Juvenile snapper

Snapper are an economically important fish to commercial and recreational fisheries. They are on the same trophic level as lionfish and could possibly become out-competed for food.

Damselfish

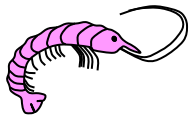


Blennies

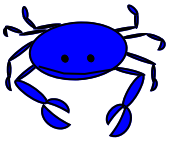


Gobies

Damselfish, blennies and gobies are demersal reef fish and secondary consumers feeding on plankton and small invertebrates. They are heavily preyed upon by lionfish.



Shrimp



Crabs

Crabs and shrimp are secondary consumers and a main prey source to many other fish species.

Tag #	# of prey	Snapper	Grouper	Damselfish	Goby	Blenny	Crab	Shrimp

Tag #	# of prey	Snapper	Grouper	Damselfish	Goby	Blenny	Crab	Shrimp

Tag #	# of prey	Snapper	Grouper	Damselfish	Goby	Blenny	Crab	Shrimp

Tag #	# of prey	Snapper	Grouper	Damselfish	Goby	Blenny	Crab	Shrimp

Tag #	# of prey	Snapper	Grouper	Damselfish	Goby	Blenny	Crab	Shrimp

Tag #	# of prey	Snapper	Grouper	Damselfish	Goby	Blenny	Crab	Shrimp

Tag #	# of prey	Snapper	Grouper	Damselfish	Goby	Blenny	Crab	Shrimp

Tag #	# of prey	Snapper	Grouper	Damselfish	Goby	Blenny	Crab	Shrimp

Tag #	# of prey	Snapper	Grouper	Damselfish	Goby	Blenny	Crab	Shrimp

Tag #	# of prey	Snapper	Grouper	Damselfish	Goby	Blenny	Crab	Shrimp

Tag #	# of prey	Snapper	Grouper	Damselfish	Goby	Blenny	Crab	Shrimp

Tag #	# of prey	Snapper	Grouper	Damselfish	Goby	Blenny	Crab	Shrimp

Tag #	# of prey	Snapper	Grouper	Damselfish	Goby	Blenny	Crab	Shrimp

Tag #	# of prey	Snapper	Grouper	Damselfish	Goby	Blenny	Crab	Shrimp

Tag #	# of prey	Snapper	Grouper	Damselfish	Goby	Blenny	Crab	Shrimp

Tag #	# of prey	Snapper	Grouper	Damselfish	Goby	Blenny	Crab	Shrimp