

AGES

**8+**



2 - 4  
PLAYERS

THE

# CRAB LAB

Defeat the evil mutated  
crab and save the crab  
population!

## CONTENTS

4 Player Tokens

1 Boss Token

1 iPad

8 Mini-Boss Tokens

8 Main Room Pieces

1 Boss Room Piece

1 Tutorial Room Piece



Missing  
Alaskan  
Crabs

# Millard West

## UNO IT Innovation Cup

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### SET UP

- 1 Place the main rooms around the tutorial space in a square
- 2 Place the boss room on the outside of this square
- 3 Move the tutorial room to an outside of the square position
- 4 Place the player models in the tutorial room
- 5 Place the boss model in the boss room
- 6 Place the mini-boss tokens and iPad the outside of the rooms on the baseboard
- 7 Press start on the iPad

## PLAY

### How to win

Gather all the genetic keys and defeat the boss!

### How to play

Youngest player starts, then play continues counterclockwise.

**1 Round:** Every player has completed a turn

**1 Turn:** A completed action

### Best Solution:

As of the current day, the best proposed solution, as predicted through various bioinformatics research centers, is genetic modification. Despite there only being 18 species of Alaskan King Crabs these species have been found to still have quite a bit of genetic diversity. This makes genetic rescue thus very ineffective. Genetic modification on the other hand would allow the crabs' eggs to adapt to the changing conditions and be able to survive. This practice is the current front runner, but at this current moment there is no official solution other than the calling off of the Alaskan crab fishing season for 2022.

## Genetic Rescue:

To counteract this crisis with the Alaskan crabs' several possible methods have been suggested including genetic rescue. Genetic resumption, according to Michigan State University, is the process of increasing population growth with new genetic variation by migrating individuals into another small population (ie., gene flow). By introducing new sets of genes, local populations can increase genetic diversity thus enabling further evolution and survival. Bioinformatics is used to determine the lack of diversity within the local crab populations and outsiders and thus make this practice successful.

## Genetic Modification:

Another proposed solution to the crab crisis is genetic modification. According to Wageningen University & Research, genetic modification is a technique to change the characteristics of a plant, animal, or microorganism by transferring a piece of DNA from one organism to a different organism. Most recently this has been made cheaper and easier with a technology called CRISPR. CRISPR is already found in bacteria native to the Alaskan King Crab's ecosystem and is now being further investigated to see if this would be the best solution to this crisis.

## Mini-Bosses:

These minions of the evil boss spawn randomly in non-protected rooms either by a chance action or by a randomized possibility.

When a mini-boss spawns, put a mini-boss token in that room and keep it there until it is defeated.

### How to fight:

1. It must be fought first before any action and counts as that player's turn
2. Answer the trivia question correct and defeat it
3. Fail and lose a turn. The mini-boss will despawn.

## Tasks:

This is how you get the genetic keys to access the boss room.






You must answer the question correctly to get it.

## Firewalls:

This protects a room from a mini-boss spawning inside it.

You must answer three Simon Says iterations to build this.

## Chances:

-  Extra move
-  Lose a move
-  Spawn a mini-boss
-  Prevent a mini-boss
-  Nothing

# BOSS

## How to Get to the Boss:

You must have collected all 8 keys from each room through the completion of all the task actions.

Once 8 keys are collected, all players must immediately be teleported to the boss room.

## Fighting the Boss:

8 possible questions

### HP Worth of Questions

Decryption → 3 HP points

Morals → 2 HP points

Trivia → 1 HP point

Total HP of the Boss is 8 HP.

There is no retry if you lose.

## Migration:

Once crabs become mature, they achieve a regular molting pattern, and they start a very set migration pattern. In late winter, they come into shallow waters to mate. These shallow waters are usually filled with crabs and fishing is prohibited at this time. By the next spring, the eggs hatch and are sent off to fend for themselves. These larvae will thus migrate back to deep-water feeding grounds in the 2-3 months that they are in this phase. It is these deep-water feeding grounds that will initiate their molting process to become mature and restart the migration.

## Crab Crisis:

As of December 9th, 2022 there is no king crab season nor any Alaskan crab fishing season. This is because 11 billion crabs have gone missing. NOAA has published many reports blaming overfishing, but private research shows a much different view. These private researchers show that the crabs don't have the necessary breeding grounds anymore in Alaska and thus have either had to migrate further north or just die off without mating and breeding. This loss of habitat is critical as it is impacted heavily by humans. Human pollution in the water has caused the chemical balance to be off and climate change has raised the temperature of their breeding grounds. With these two metrics being off eggs are not able to hatch and thus crabs are dying off in the Alaskan region.

These creatures are arthropods and are among the largest true crabs. They are descendants of hermit crabs, a type of false crab, and thus have a history dating back over 150 million years. Their crab genus is officially known as *Pagurus* and the complete evolution to the form they hold today took place between 13 to 25 million years ago. Because of this evolution, there are officially 18 species of Alaskan King Crab and 4 of these are native and regularly found in waters surrounding Alaskan islands.

45,000-500,000 eggs are laid by a female Alaskan King Crab which has been keeping her babies safe under her wide tail flap for close to a year. However, for these eggs to develop correctly they must be in a certain area of the seafloor waters to have the correct temperature and nutrient exposure. These babies are born as larvae and due to the nature of their habitat can swim right after hatching. These little larvae must survive 2-3 months of this stage and be constantly threatened with death during this phase of the cycle. After they come to a close with this phase, they start to settle on the soft seafloors. This triggers their molting cycles to form and sets them on the evolution to becoming a king crab. During this time they lose the ability to swim but develop a calcium skeleton for protection. Once they have reached a certain point the crabs will start a more regular molting process. Once this process starts they will be able to mate and breed thus starting the cycle over.

[illegible]

## ALPHANUMERIC

A	B	C	D
1	16	3	22
E	F	G	H
23	15	10	18
I	J	K	L
7	8	17	11
M	N	O	P
14	24	12	25
Q	R	S	T
19	20	5	4
U	V	W	X
6	9	2	26
Y		Z	
13		21	

## RESEARCH

### True vs False Crabs:

Yes, there are true and false crabs. So what are the differences? Excluding claws which are typically counted as legs, true crabs have four pairs of lanky legs while false crabs only have three. However, false crabs do have a much smaller pair towards their back. True crabs will have short abdomens that curl under their bodies while false crabs will have longer ones that are less protective of inner organs. True crabs will also be mostly carcinoid. Yet, science is constantly rewriting these rules as different evolutions, fossils, and species are found so differences between them cause biologists to carry on with the debate.

### Ecosystems:

Crabs are notable for living in water and sometimes even land. Alaskan crabs live in soft sandy or muddy ocean bottoms. These are typically found in waters less than 650 feet deep. By having these softer surfaces, they can burrow if threatened by predators or when hunting. Inside their ecosystem, they are vital food sources for both humans and marine animals. They additionally provide litter decomposition which allows soil nutrient levels to stay at a healthy trend.