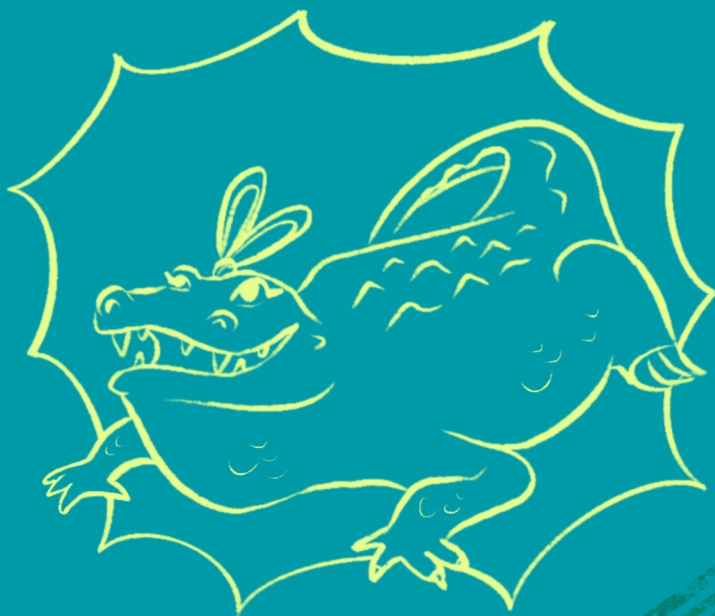


CHAPTER 3

BIODIVERSITY



ONE WEEK EARLIER...

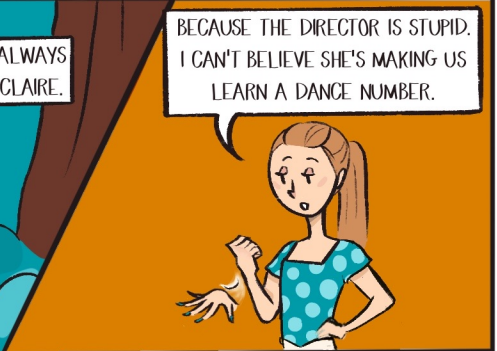


EXCELLENT, WELL DONE EVERYONE! NOW WE JUST NEED TO REHEARSE THOSE FEW STEPS AGAIN, TO REALLY GET THEM DOWN. WATCH ME CAREFULLY.




I'M BORED.

YOU'RE ALWAYS BORED, CLAIRE.



BECAUSE THE DIRECTOR IS STUPID. I CAN'T BELIEVE SHE'S MAKING US LEARN A DANCE NUMBER.



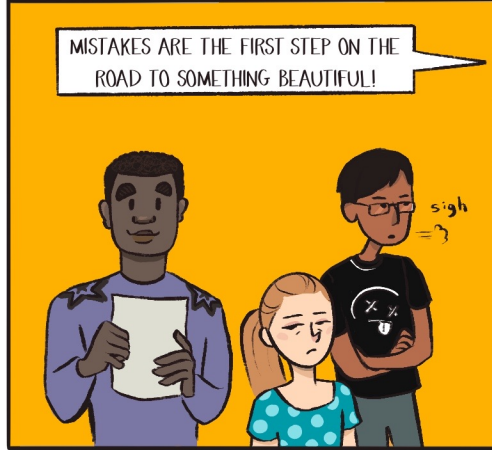
I MEAN... IT'S A MUSICAL. DIDN'T YOU VOLUNTEER TO BE HERE?

WHATEVER.



AND THAT'S HOW IT GOES!

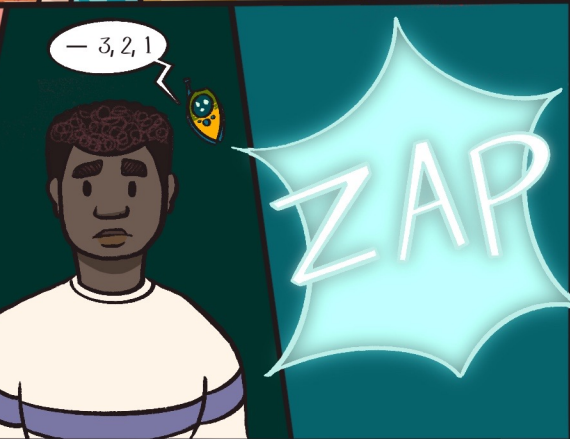
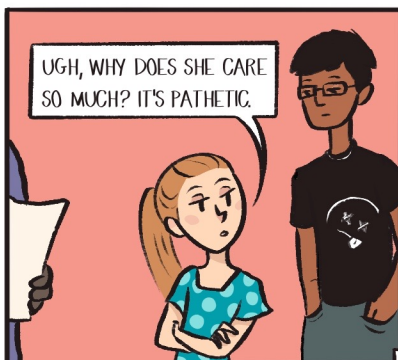
I NOTICED SOME OF YOU STRUGGLING WITH THIS STEP, BUT THAT'S OKAY!



MISTAKES ARE THE FIRST STEP ON THE ROAD TO SOMETHING BEAUTIFUL!



AND I HAVE SOME GOOD NEWS—COSTUMES FOR THE ENSEMBLE ARE FINISHED NOW, SO AFTER REHEARSAL YOU CAN PICK THEM UP TO DOUBLE-CHECK THE FIT.





WHERE ARE WE?



FLORIDA! AN
EXTRAORDINARY
LOCATION—A GLOBAL
HOTSPOT FOR DIVERSITY
AND HOME TO OVER 1500
UNIQUE SPECIES FOUND
ONLY IN THIS REGION.

OKAY, EXCELLENT! WE SHOULD—
WAIT, WHERE DID THE GIRL GO?



whisper

I AM A PRINCESS.



HEY— WHAT'S YOUR NAME?

JIWON?

COME DOWN FROM THERE.



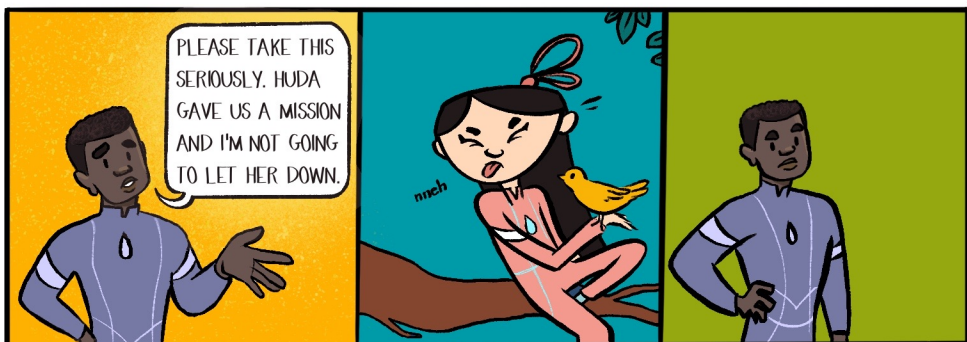
ACTUALLY,
I GO BY JIJI!



OKAY, JIJI. NOW COME ON.

BUT... THE BIRD IS SO PRETTY.
AND I'M MAGICAL,
APPARENTLY.





PLEASE TAKE THIS
SERIOUSLY. HUDA
GAVE US A MISSION
AND I'M NOT GOING
TO LET HER DOWN.

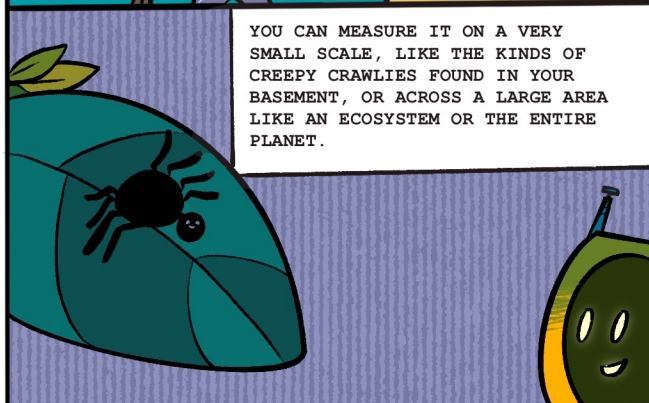
meh



PSHH.
GEN—YOU SAID SOMETHING
ABOUT BIODIVERSITY.
WHAT IS THAT?



BIODIVERSITY IS THE
NUMBER AND VARIETY OF
LIVING THINGS IN YOUR
SURROUNDINGS.



YOU CAN MEASURE IT ON A VERY
SMALL SCALE, LIKE THE KINDS OF
CREEPY CRAWLIES FOUND IN YOUR
BASEMENT, OR ACROSS A LARGE AREA
LIKE AN ECOSYSTEM OR THE ENTIRE
PLANET.



AN ECOSYSTEM?



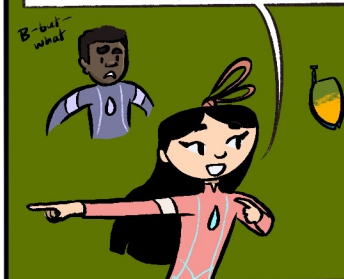
AN ECOSYSTEM IS THE
DYNAMIC WEB OF LIVING AND
NON-LIVING THINGS THAT
SUSTAIN LIFE ON EARTH.
HUMANS, MICROORGANISMS,
THE ATMOSPHERE, THE ROCKS
BENEATH OUR FEET—THESE ARE
ALL PART OF THE ECOSYSTEM.

LIFE DEPENDS ON ITS
ENVIRONMENT TO SURVIVE, AND
THE ENVIRONMENT IS
CONSTANTLY BEING SHAPED BY
LIVING THINGS.



GEN, WHILE I WAS LOOKING INTO THE BIRD'S NEST, I NOTICED AN ALLIGATOR NESTING RIGHT BELOW IT. DOES THAT MEAN THEY'RE FRIENDS?

THERE ARE MANY INTERACTIONS BETWEEN SPECIES. WHAT YOU NOTICED IS CALLED MUTUALISM—WHERE TWO ORGANISMS BENEFIT FROM EACH OTHER.



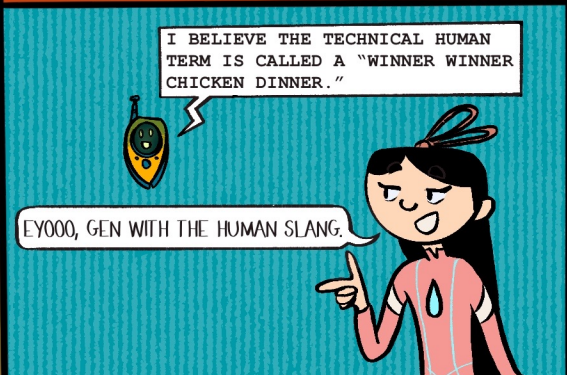
		Species 1		
		+	0	-
Species 2	+	Mutualism	Commensalism	Predation/ Herbivory/ Parasitism
	0	Commensalism	No fitness effects	Amensalism
	-	Predation/ Herbivory/ Parasitism	Amensalism	Competition

THE BIRD'S NEST IS PROTECTED FROM PREDATORS, AND THE ALLIGATOR GETS TO EAT AN OCCASIONAL OPOSSUM OR RACCOON THAT TRIES TO REACH THE EGGS OR CHICKS.

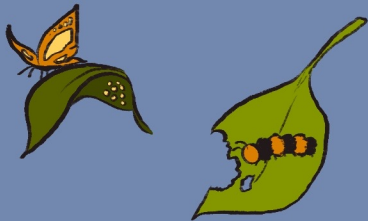


I BELIEVE THE TECHNICAL HUMAN TERM IS CALLED A "WINNER WINNER CHICKEN DINNER."

EY000, GEN WITH THE HUMAN SLANG.



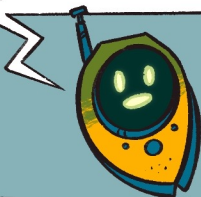
IN OTHER TYPES OF INTERACTIONS, ONE CREATURE MAY BE AFFECTED NEGATIVELY— FOR EXAMPLE, A BUG MAY LAY ITS EGGS ON A PLANT. WHEN THE BABY BUGS HATCH, THEY EAT PART OF THE PLANT FOR NOURISHMENT. THIS IS PARASITISM.



AND THE OTHER RELATIONSHIPS BETWEEN LIVING CREATURES?



OF THE FIVE INTERACTION TYPES, THREE OF THEM END POORLY FOR AT LEAST ONE CREATURE. HOWEVER, COMMENSALISM IS AN EXAMPLE WHERE ONE CREATURE BENEFITS AND THE OTHER REMAINS UNAFFECTED.



I DON'T KNOW IF I'LL REMEMBER THIS LATER.

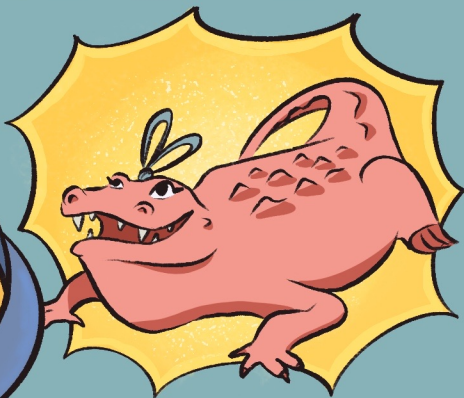


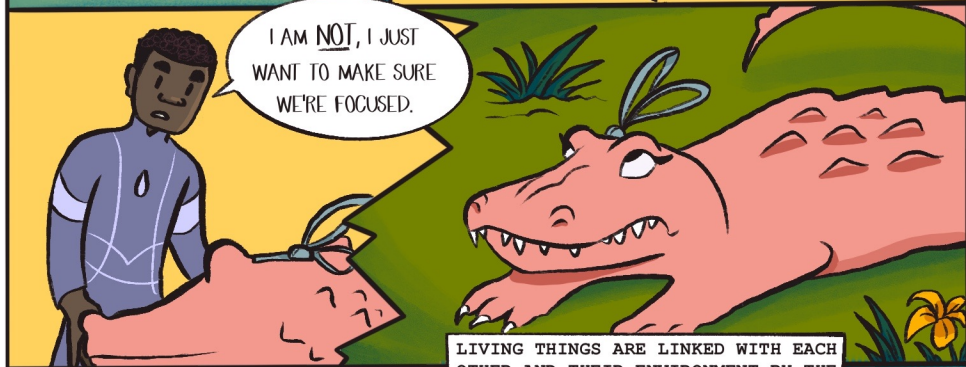
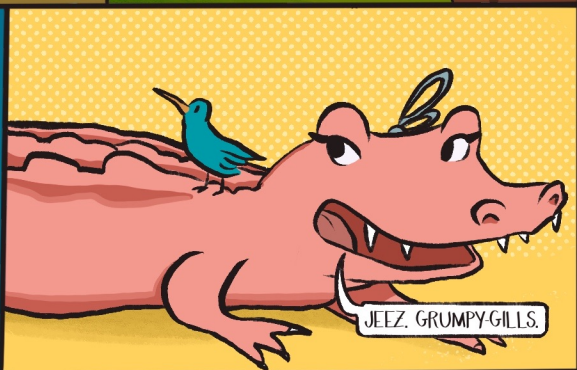
CAN I BE ZWOOPED INTO AN ANIMAL?

THIS WILL BENEFIT YOUR LEARNING PROCESS?

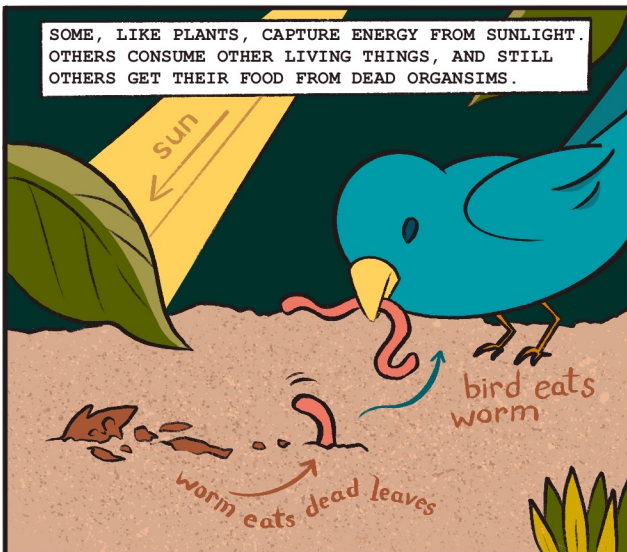


VERY WELL.





SOME, LIKE PLANTS, CAPTURE ENERGY FROM SUNLIGHT. OTHERS CONSUME OTHER LIVING THINGS, AND STILL OTHERS GET THEIR FOOD FROM DEAD ORGANSIMS.



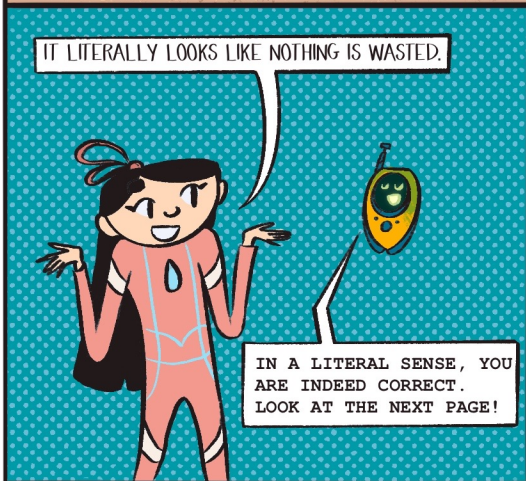
SO, IS THAT WHAT'S CALLED A 'FOOD WEB'?



PRECISELY.



IT LITERALLY LOOKS LIKE NOTHING IS WASTED.

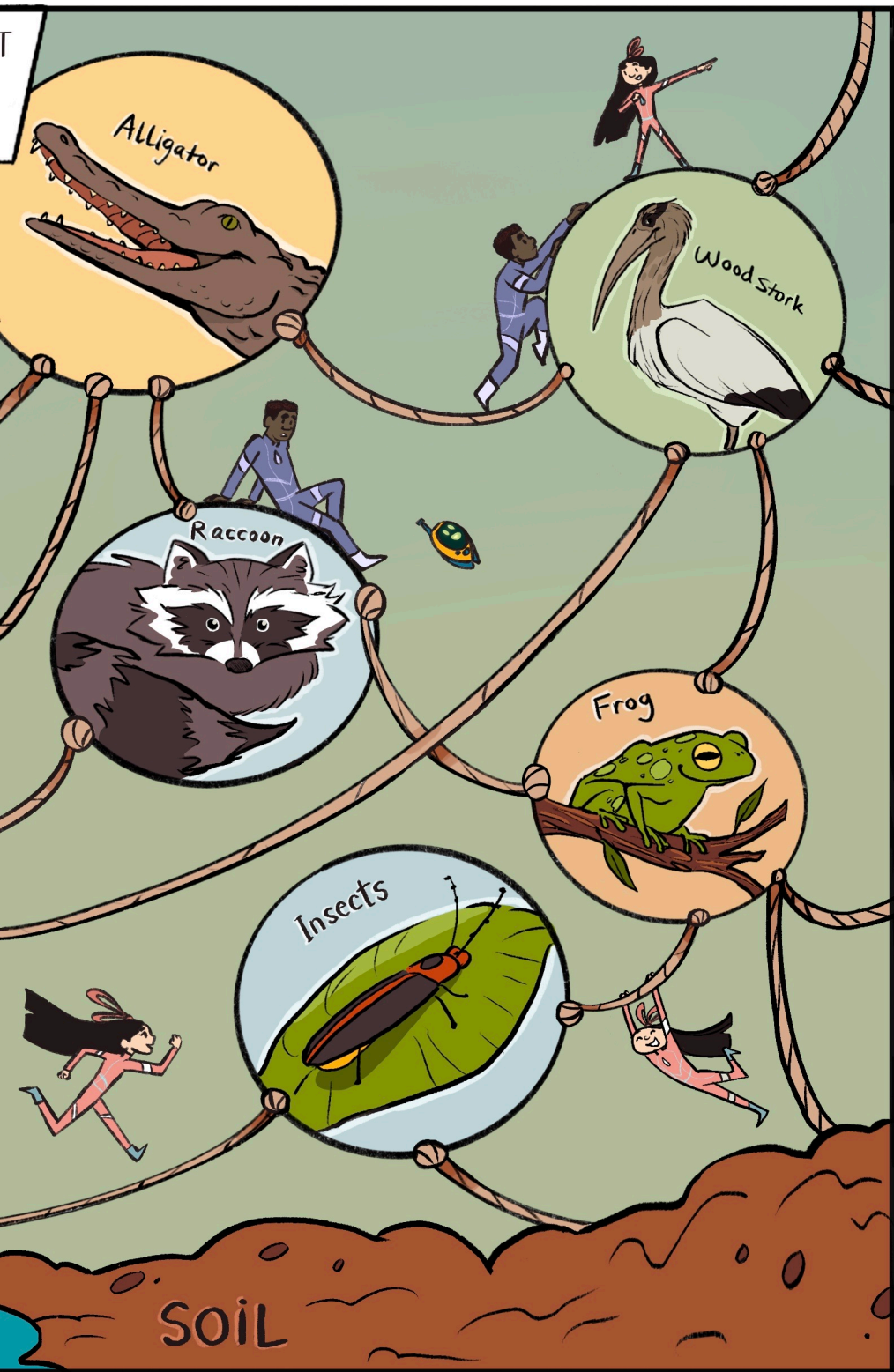


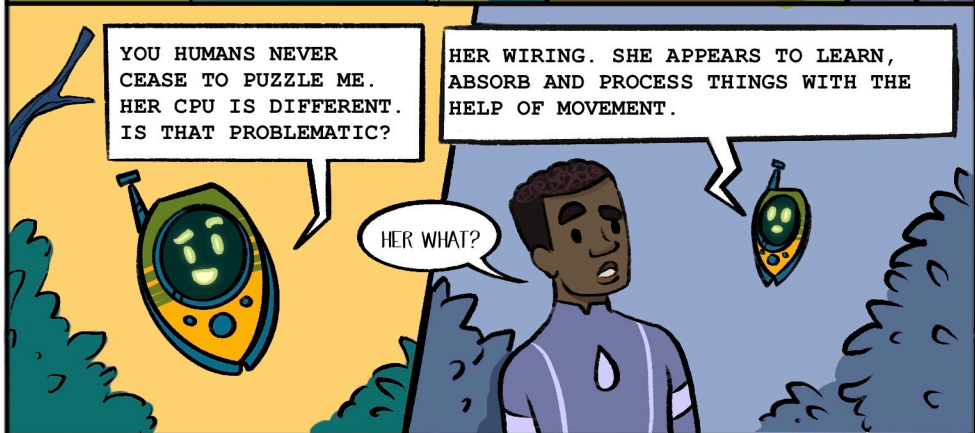
IN A LITERAL SENSE, YOU ARE INDEED CORRECT. LOOK AT THE NEXT PAGE!



I NEVER THOUGHT OF WATER, SOIL, AND SUNLIGHT
BEING ON A FOOD WEB, BUT SOME ORGANISMS
"CONSUME" THEM! C'MON, VINCE! ONWARDS!





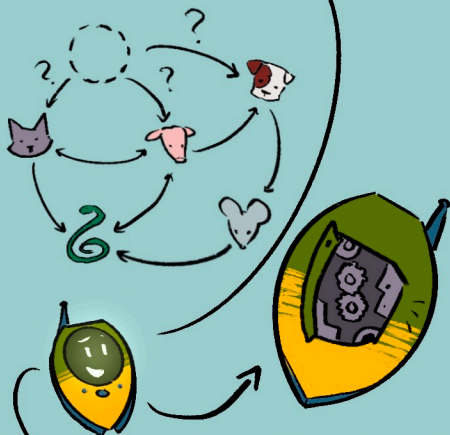


NOW, WHY DO YOU THINK IT'S IMPORTANT TO KNOW ABOUT FOOD WEBS?

IT SEEMS LIKE EVERYTHING'S CONNECTED! EVERY TIME I TOOK A STEP THE WHOLE WEB STARTED HUMMING AND VIBRATING.

YES, YOUR SPECIES CAN AFFECT OTHERS DIRECTLY BY HARVESTING THEM OR MOVING THEM AROUND, OR INDIRECTLY BY CHANGING THE TEMPERATURE, LAND COVER, OR RAIN.

IF ONE SPECIES IS REMOVED OR REDUCED IN NUMBER, IT AFFECTS THE WHOLE NETWORK.



IT'S LIKE PARTS OF MY OWN MACHINERY, YOU MAY NOT KNOW HOW EACH PART MAKES MY SYSTEM WORK, BUT IF ONE GOES MISSING MY WHOLE SYSTEM MAY CRASH!



IN FACT HUMAN ACTIVITY NOW AFFECTS EVERY PART OF THE EARTH SYSTEM. AGRICULTURE, BUILDINGS, MINING, ROADS, FISHING, DREDGING... EVERYTHING HAS AN IMPACT ON THE ECOSYSTEM.

THE COMBINED EFFECTS OF HABITAT LOSS, OVERHARVESTING, INVASIVE SPECIES, AND CLIMATE CHANGE HAVE PUSHED MANY SPECIES TO THE BRINK.

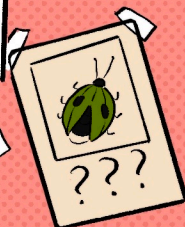
IMAGINE HOW CONSTRUCTION OF A MAJOR FREEWAY CAN INTERRUPT MIGRATION AND BREEDING PATTERNS OF DEER OR OTHER WILDLIFE?

ADD THE CHANGING CLIMATE ON TOP OF THE COMPETITION FROM COWS, AND THINGS CAN GET HARD REALLY FAST. EACH YEAR 2,000-10,000 SPECIES GO EXTINCT.



THAT'S A REALLY BIG RANGE! HOW DO WE NOT HAVE A BETTER IDEA?

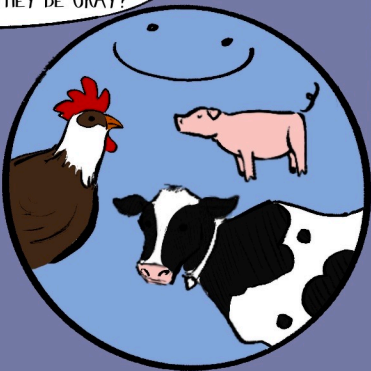
HUMANS DON'T KNOW FOR SURE BECAUSE WE DON'T HAVE A GOOD UNDERSTANDING OF EXISTING BIODIVERSITY AND THE RELATIONSHIPS BETWEEN LESSER KNOWN SPECIES.



IT'S ESTIMATED THAT ALMOST 9 MILLION SPECIES EXIST ON AND IN THE EARTH, BUT ONLY 1.2 MILLION HAVE BEEN DESCRIBED BY SCIENCE. IT'S HARD TO DETECT THE LOSS OF SOMETHING YOU DON'T KNOW YOU HAVE.

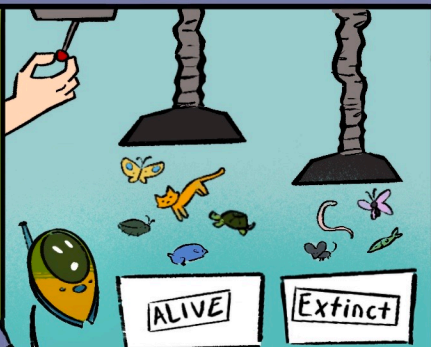
BUT THERE ARE MORE ANIMALS THAN US, RIGHT? WON'T THEY BE OKAY?

HUMANS HAVE DOMESTICATED ANIMALS LIKE PETS, COWS, PIGS, CHICKENS, AND OTHER LIVESTOCK, WHICH ACCOUNT FOR 98% OF ALL THE VERTEBRATE CREATURES ON THE EARTH. 1/9TH OF THE ANIMALS LEFT ARE THREATENED WITH EXTINCTION.



IT'S STRANGE KNOWING IT'S MOSTLY CONTROLLED BY US.

WHOA... ANTELOPE, BEAR, COW, DOG, ELEPHANT... WHEN I THINK OF ANIMALS, I MOSTLY THINK ABOUT ANIMALS WITH BACKBONES...



YES. HUMANS ARE MAKING RAPID DECISIONS ABOUT WHAT SPECIES LIVE AND WHICH GO EXTINCT. OFTENTIMES DRIVEN BY REACTION, AND A SENSE OF CONNECTION OR THE ECONOMIC ADVANTAGE OF AN ORGANISM.

FOR EXAMPLE-SALMON ARE THREATENED WITH EXTINCTION DUE TO DAMS AND OTHER HUMAN IMPACTS AND MANY ARE CONCERNED BECAUSE WE EAT SALMON AND HARVEST IT RECREATIONALLY.

HOWEVER, THE PACIFIC LAMPREY IS EQUALLY ENDANGERED BY DAMS, BUT SOME PEOPLE DON'T CARE BECAUSE IT'S NOT USED COMMERCIALY, AND NOT A VERY AESTHETIC FISH. IT IS RARELY BROUGHT UP IN THE CONVERSATION.



INDEED. THERE IS HOPE: MANY PEOPLE HAVE BEEN WORKING FOR YEARS TO RESTORE CORAL REEFS, REPLANT TREES, AND MAKE CAREFUL PLANS TO BALANCE ECOSYSTEMS, BREED CERTAIN SPECIES, AND PREVENT FURTHER LOSS.

THERE ARE MANY PEOPLE WORLDWIDE WORKING TO PROTECT THE ECOSYSTEMS OF THE EARTH.



HERE IN FLORIDA, THE AMERICAN CROCODILE IS RECOVERING THANKS TO ECOSYSTEM RESTORATION AND PROTECTION EFFORTS.



AND SMALLER SPECIES LIKE THE MIAMI BLUE BUTTERFLY WERE ONCE DANGEROUSLY CLOSE TO EXTINCTION- AT ONE POINT DOWN TO ONLY THIRTY-FIVE BUTTERFLIES.



BUT BECAUSE CONCERNED CITIZENS TOOK ACTION QUICKLY, MANY PEOPLE BRED MORE BUTTERFLIES, WORKED TO RESTORE ITS HABITAT AND FOOD SOURCES, AND RELEASED THEM BACK INTO THE WILD. NOW THEY NUMBER IN THE THOUSANDS.

IT'S HARD WORK.

