



WHOA.
YOU'RE TINY.



YEA, I KNOW.



I AM A KRILL. BUT,
DESPITE MY SIZE, I
PLAY A HUGE ROLE
IN THE FOOD WEB
HERE IN THE
ANTARCTIC!



HERE, FOLLOW ME!
I'LL SHOW YOU WHAT
I MEAN!

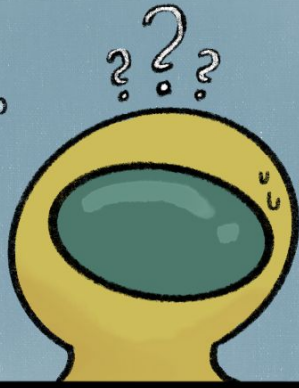


ALRIGHTY THEN.

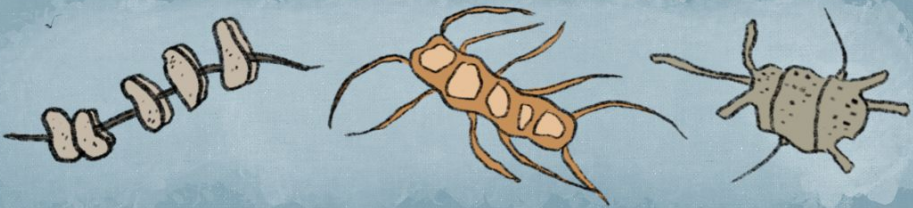
THIS HERE IS A
PHYTOPLANKTON.



UH. I CAN'T SEE
ANYTHING.

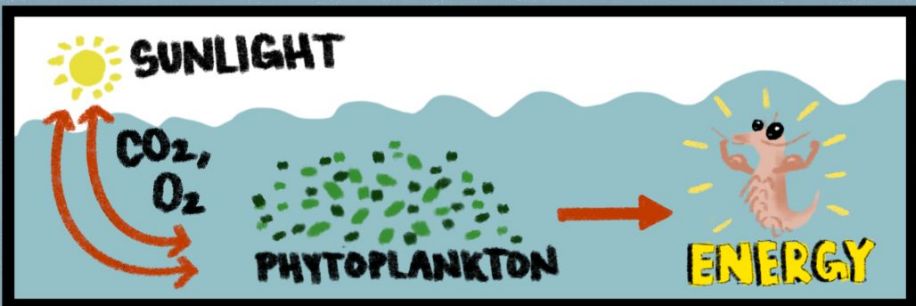


THAT'S BECAUSE THEY'RE MICROSCOPIC.
THEY'RE MY MAIN FOOD RESOURCE.



THEY'RE PRIMARY PRODUCERS, OTHERWISE THE
BOTTOM OF THE AQUATIC FOOD CHAIN. DID YOU
KNOW THAT THEY'RE RESPONSIBLE FOR ROUGHLY
HALF OF THE WORLDS PRIMARY PRODUCTION?

THEY ACQUIRE THEIR REQUIRED ENERGY THROUGH THE PROCESS OF
PHOTOSYNTHESIS.



THEY TAKE IN CARBON DIOXIDE AND SUNLIGHT DURING THIS
PROCESS AND RELEASE OXYGEN AS A BYPRODUCT. THEIR "WASTE"
IS WHAT GIVES ALL OTHER AQUATIC CONSUMERS ENERGY.

I'M A **PRIMARY CONSUMER**, WHICH IS THE TROPHIC LEVEL ABOVE PRIMARY PRODUCERS. I'M PRETTY MUCH ONE OF THE ONLY ORGANISMS WHO EATS THESE GUYS DIRECTLY.



BUT THERE'S A VARIETY OF MARINE ANIMALS THAT RELY ON ME AS A FOOD SOURCE!



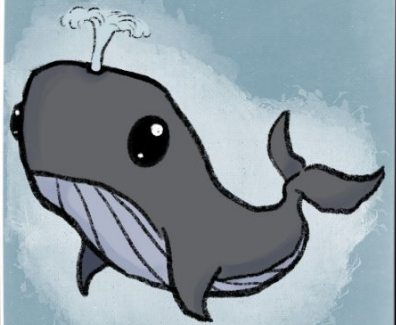
SOME EXAMPLES INCLUDE...

FISH,



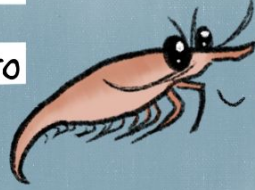
SEALS,

EVEN WHALES!



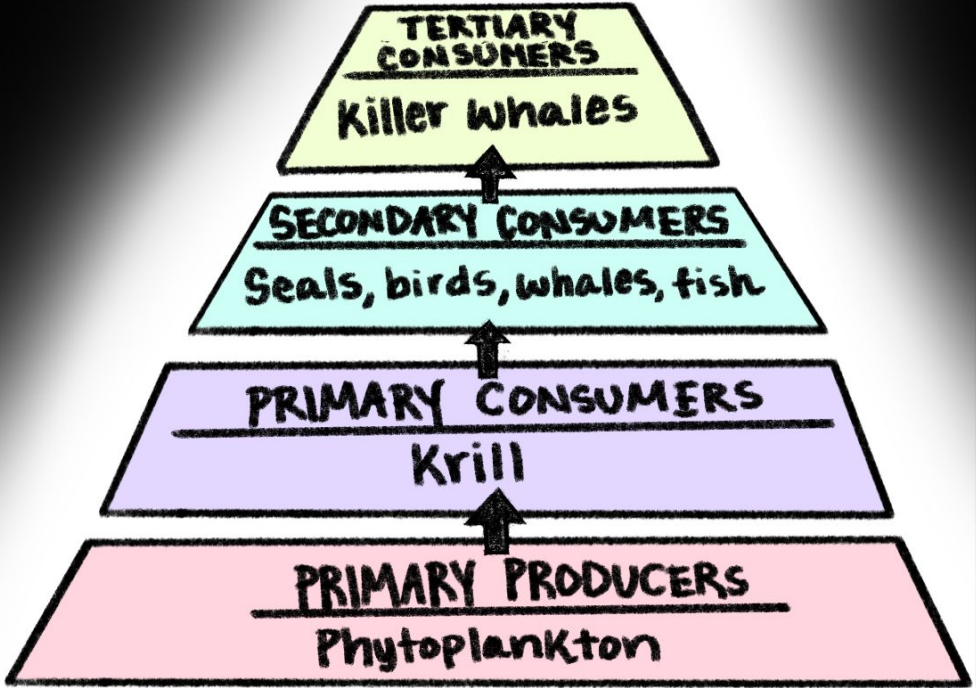
LET ME EXPLAIN A LITTLE BIT MORE...

A **TROPHIC STRUCTURE** DISPLAYS THE FEEDING RELATIONSHIPS BETWEEN ORGANISMS. IT CATEGORIZES THEM INTO DIFFERENT LEVELS BASED ON THE AMOUNT OF ENERGY IT CONSUMES.



LET ME SHOW YOU WHAT I MEAN...

ANTARCTIC TROPHIC STRUCTURE



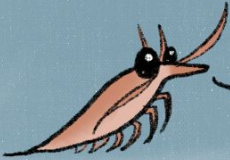
AS YOU CAN SEE, THIS MAKES ME THE DIRECT LINK BETWEEN PRIMARY PRODUCERS AND HIGHER TROPHIC LEVELS HERE IN THE ANTARCTIC FOOD WEB!

EVERYONE IS INTERCONNECTED, AND I ACT AS THE FUEL.



CAN YOU IMAGINE WHAT THEY'D DO WITHOUT ME!?

WOW! I HAD NO IDEA
SOMEONE SO TINY COULD
BE SO IMPORTANT TO THE
SURVIVAL OF SO MANY
SPECIES! WHAT A WELL
STRUCTURED SYSTEM!



HEHE, THANKS.



ALL OF A SUDDEN...



WHAT
WAS
THAT!?



LET'S GO
CHECK IT OUT...



WHO ARE YOU?!



I AM CLIMATE CHANGE!

I WAS CREATED BY HUMANS, AND I AM THE RESULT OF THEIR ANTHROPOGENIC IMPACTS. HUMANS HAVE RAPIDLY INCREASED THE AMOUNT OF CARBON DIOXIDE IN THE ATMOSPHERE, PRIMARILY THROUGH BURNING Fossil FUELS.



FOSSIL FUELS INCLUDE OIL, COAL, AND GAS (GREENHOUSE GASSES), AND WHEN THEY ARE REMOVED FROM THE GROUND AND BURNED, THEY RELEASE STORED CARBON DIOXIDE. BUT THESE HUMAN-CAUSED EMISSIONS ARE INCREASING SO RAPIDLY THAT LIFE ON EARTH CANNOT ADAPT TO THESE CHANGES IN TIME.



IN FACT, THE INDUSTRIAL LIFESTYLE HUMANS TODAY RELY ON HAS RAISED ATMOSPHERIC CARBON DIOXIDE LEVELS BY **50%** SINCE 1970.

I HAVE COME TO DESTROY YOUR WORLD,



AND THERE'S NOTHING YOU CAN DO TO
STOP ME!



**RESULT OF
DESTRUCTION...**

- NO MORE ICE...
- SPECIES LOSS...
- OCEAN ACIDIFICATION..



MUAHAHA!!



OH NO...



DUE TO THE CHANGE IN
TEMPERATURE, MY
FELLOW KRILL AND I CAN
NO LONGER SURVIVE HERE.
WE MUST MIGRATE...

WAIT,
KRILL-

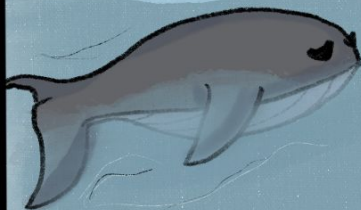
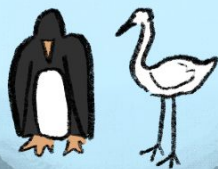


HUH?



FAREWELL...

Chatter...



Chatter...



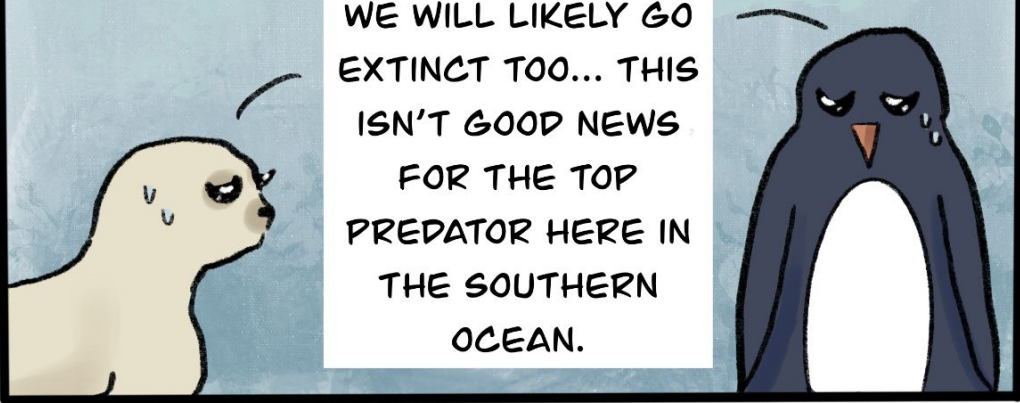
WHAT WILL WE DO WITHOUT THE KRILL?




KRILL ARE MY PRIMARY SOURCE OF FOOD. I'M GONNA STARVE!!



WE RELY ON KRILL TOO. IF WE GO EXTINCT, WHAT WILL THE ANIMALS WHO EAT US DO?!



WE WILL LIKELY GO EXTINCT TOO... THIS ISN'T GOOD NEWS FOR THE TOP PREDATOR HERE IN THE SOUTHERN OCEAN.



I EAT ALL OF THESE GUYS IN ORDER TO SURVIVE - WHAT AM I SUPPOSED TO DO IF NOTHING IS LEFT?

WE'RE ALL GONNA DIE!!

DEVASTATED, THE ANIMALS BEGIN
TO CRY...

WHAT HAVE WE HUMANS DONE...



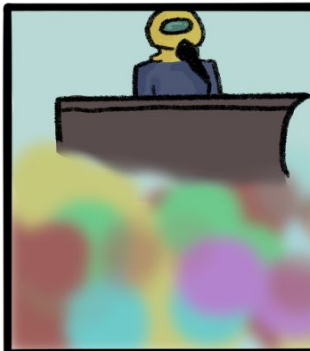
I MUST TELL THE
OTHERS AND SEE
IF WE CAN DO
SOMETHING TO
STOP THIS.



BACK ON THE MAINLAND...



PEOPLE, WE HAVE
CREATED A MONSTER
CALLED CLIMATE
CHANGE, AND IT'S
DESTROYING OUR
WORLD'S ECOSYSTEMS!
WE MUST DO EVERYTHING
WE CAN DO STOP THIS!!



BUT HOW?!



MANY HUMAN ACTIVITIES AND INVENTIONS ARE POWERED BY FOSSIL FUELS: OUR MODES OF TRANSPORTATION, ELECTRICITY AND HEAT, MANUFACTURING INDUSTRIES, ETC.. WE PARTICIPATE IN THESE LARGE-SCALE OPERATIONS EVERYDAY WITHOUT THINKING.

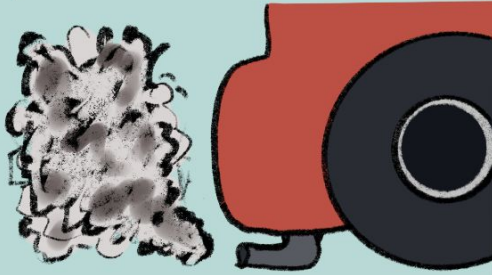
BUT ONE SOLUTION WE CAN START WITH IS REDUCING OUR

CARBON FOOTPRINT, OR

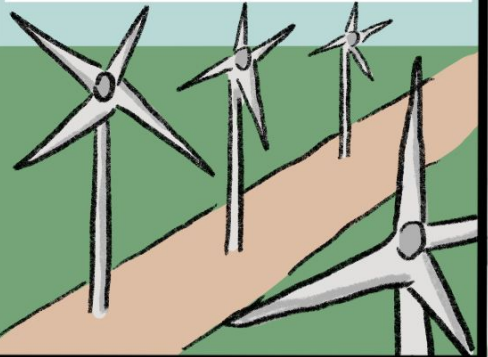
THE AMOUNT OF CARBON WE HUMANS EMIT.



WE CAN DRIVE OUR CARS LESS TO REDUCE THE EMISSIONS PRODUCED BY BURNING GASOLINE,



CONSERVE ENERGY USAGE BY USING ENERGY-EFFICIENT APPLIANCES,



AND MAKE AN EFFORT TO CORRECTLY RECYCLE PLASTICS AND AVOID PURCHASING MANUFACTURED GOODS.

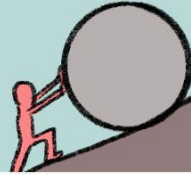


BY TAKING ACTION TO REDUCE OUR CARBON FOOTPRINT, WE CAN LOWER THE AMOUNT OF CARBON DIOXIDE WE RELEASE INTO THE ATMOSPHERE, AND HELP SAVE OUR AT-RISK ECOSYSTEMS.

I KNOW THAT THEY SEEM SMALL
IN THE GRAND SCHEME OF
THINGS... I MEAN, HOW COULD
ONE PERSON MAKE A
DIFFERENCE?

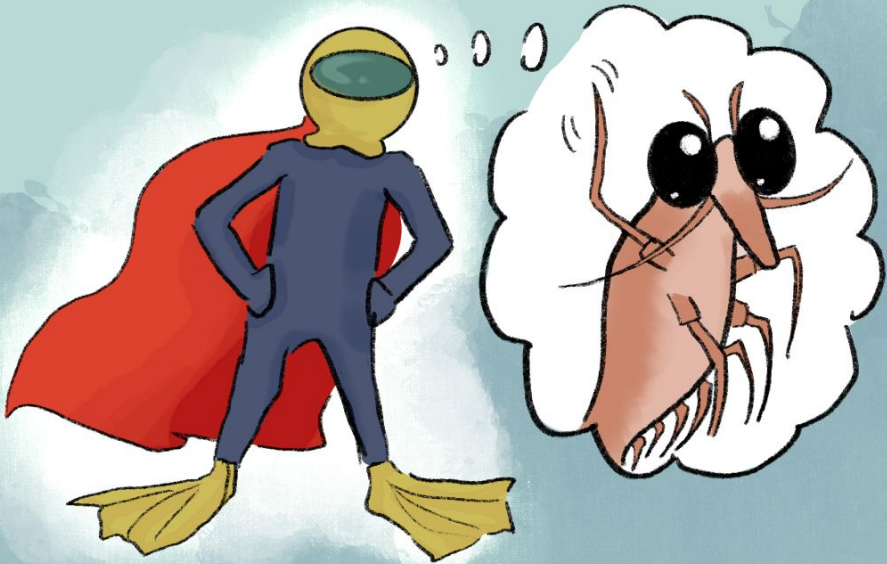
BUT!

IF WE ALL WORK
TOGETHER,



AND MAKE THE
EFFORT,

WE CAN HELP IN THE FIGHT TO
SAVE OUR ANIMAL FRIENDS,



AND OUR **PLANET!**

Sources:

1. Saenz, B.T., Ainley, D.G., Daly, K.L. *et al.* Drivers of concentrated predation in an Antarctic marginal-ice-zone food web. *Sci Rep* 10, 7282 (2020). <https://doi.org/10.1038/s41598-020-63875-y>
2. Ducklow, H.W., W.R. Fraser, M.P. Meredith, S.E. Stammerjohn, S.C. Doney, D.G. Martinson, S.F. Sailley, O.M. Schofield, D.K. Steinberg, H.J. Venables, and C.D. Amsler. 2013. West Antarctic Peninsula: An ice-dependent coastal marine ecosystem in transition. *Oceanography* 26(3):190–203, <https://doi.org/10.5670/oceanog.2013.62>.
3. Melbourne-Thomas, Jessica & Trebilco, Rowan & Constable, Andrew & McCormack, Stacey & Raymond, Ben. (2020). Decades of dietary data demonstrate regional food web structures in the Southern Ocean. *Ecology and Evolution*. 1-15. 10.1002/ece3.7017. <https://onlinelibrary.wiley.com/doi/10.1002/ece3.7017>
4. Norkko, A., Thrush, S.F., Cummings, V.J., Gibbs, M.M., Andrew, N.L., Norkko, J. and Schwarz, A.-. (2007), TROPHIC STRUCTURE OF COASTAL ANTARCTIC FOOD WEBS ASSOCIATED WITH CHANGES IN SEA ICE AND FOOD SUPPLY. *Ecology*, 88: 2810-2820. <https://doi.org/10.1890/06-1396.1>
5. Krumhardt KM, Long MC, Sylvester ZT and Petrik CM (2022) Climate drivers of Southern Ocean phytoplankton community composition and potential impacts on higher trophic levels. *Front. Mar. Sci.* 9:916140. doi: 10.3389/fmars.2022.916140. <https://www.frontiersin.org/articles/10.3389/fmars.2022.916140/full>
6. NEWSHAM, K.K. and GARSTECKI, T. (2007), Interactive effects of warming and species loss on model Antarctic microbial food webs. *Functional Ecology*, 21: 577-584. <https://doi.org/10.1111/j.1365-2435.2007.01250.x>. <https://besjournals.onlinelibrary.wiley.com/doi/full/10.1111/j.1365-2435.2007.01250.x>