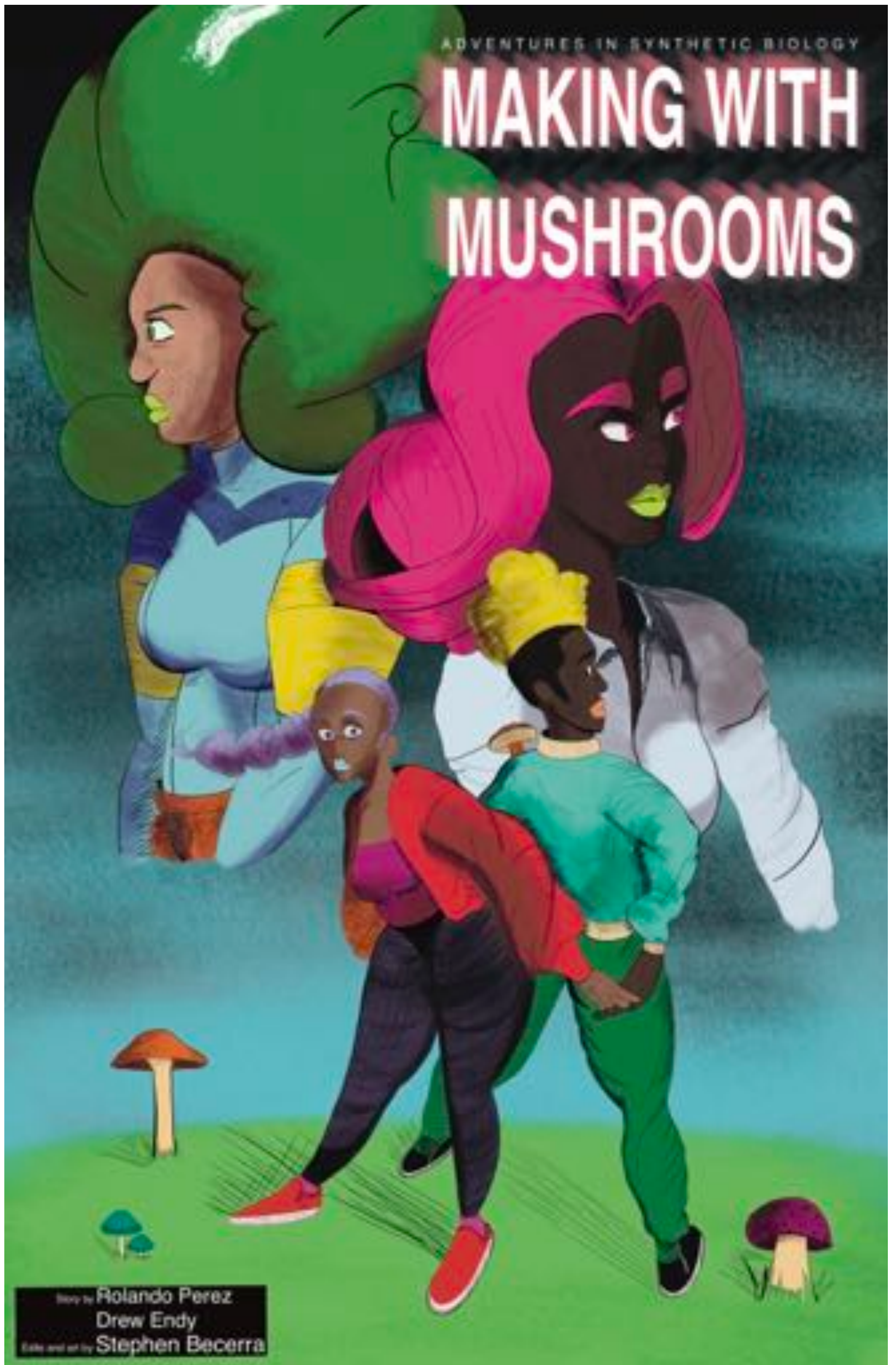


ADVENTURES IN SYNTHETIC BIOLOGY

MAKING WITH MUSHROOMS



Story by Rolando Perez
Drew Endy
Edited and art by Stephen Becerra

Adventures in Synthetic Biology: Making With Mushrooms

Starring: Jack and Xochitl
Also Starring: Shroomy!

Story: Rolando Perez, Drew Endy
Edits and Art: Stephen Becerra

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Rated A: All Ages

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Chapter 1:
Making With
Mushrooms



WOW! JACK! LOOK-- THERE'S COMPANIES THAT MAKE JACKETS AND SHOES OUT OF MUSHROOMS. BUT IT DOESN'T LOOK LIKE THEY'RE FOR SALE JUST YET..



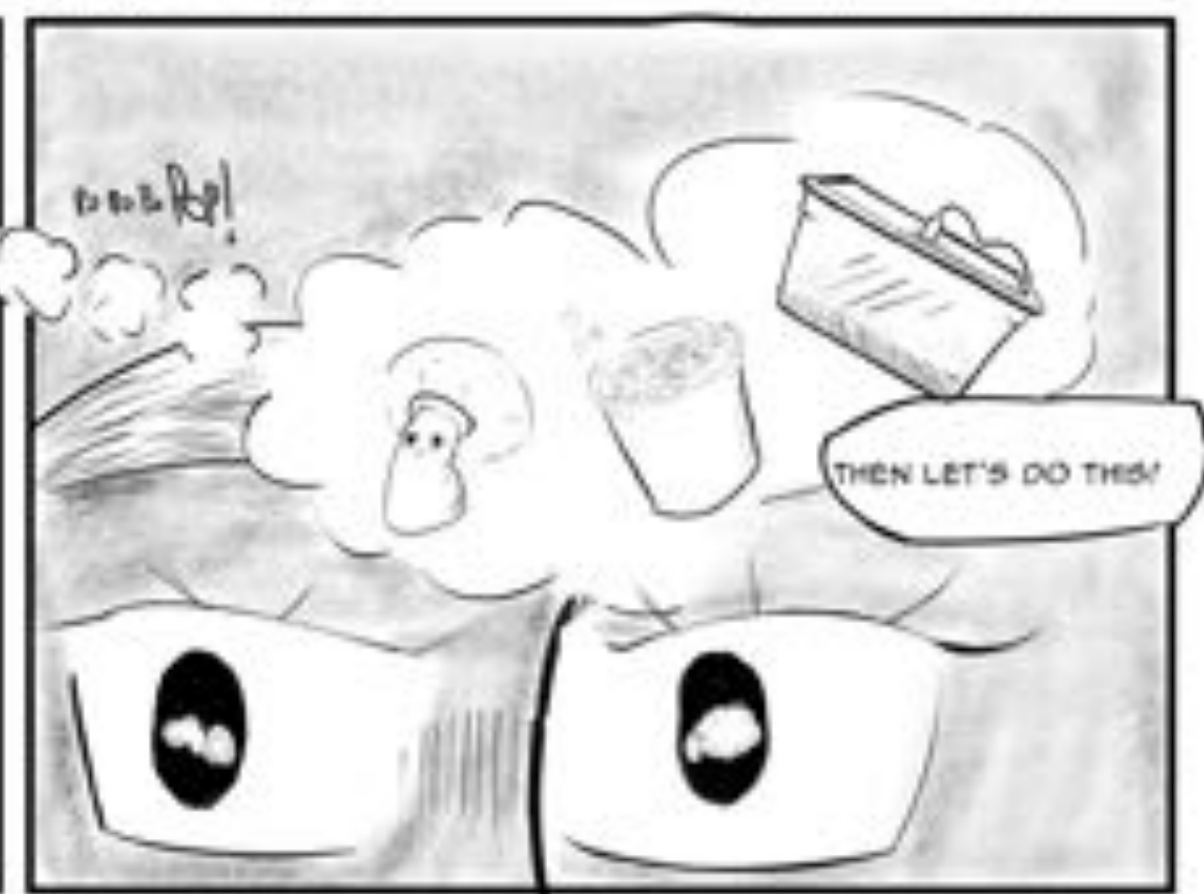
AH, SUMMER...

THEN HOW ARE WE SUPPOSED TO GET ONE, XOCHITL?

WE COULD GROW OUR OWN, TOGETHER.



THIS SITE SAYS WE JUST NEED SOME FUNGI, A FEEDSTOCK, A FORK, AND A WAY TO CONTROL THE GROWTH ENVIRONMENT.



POOP!

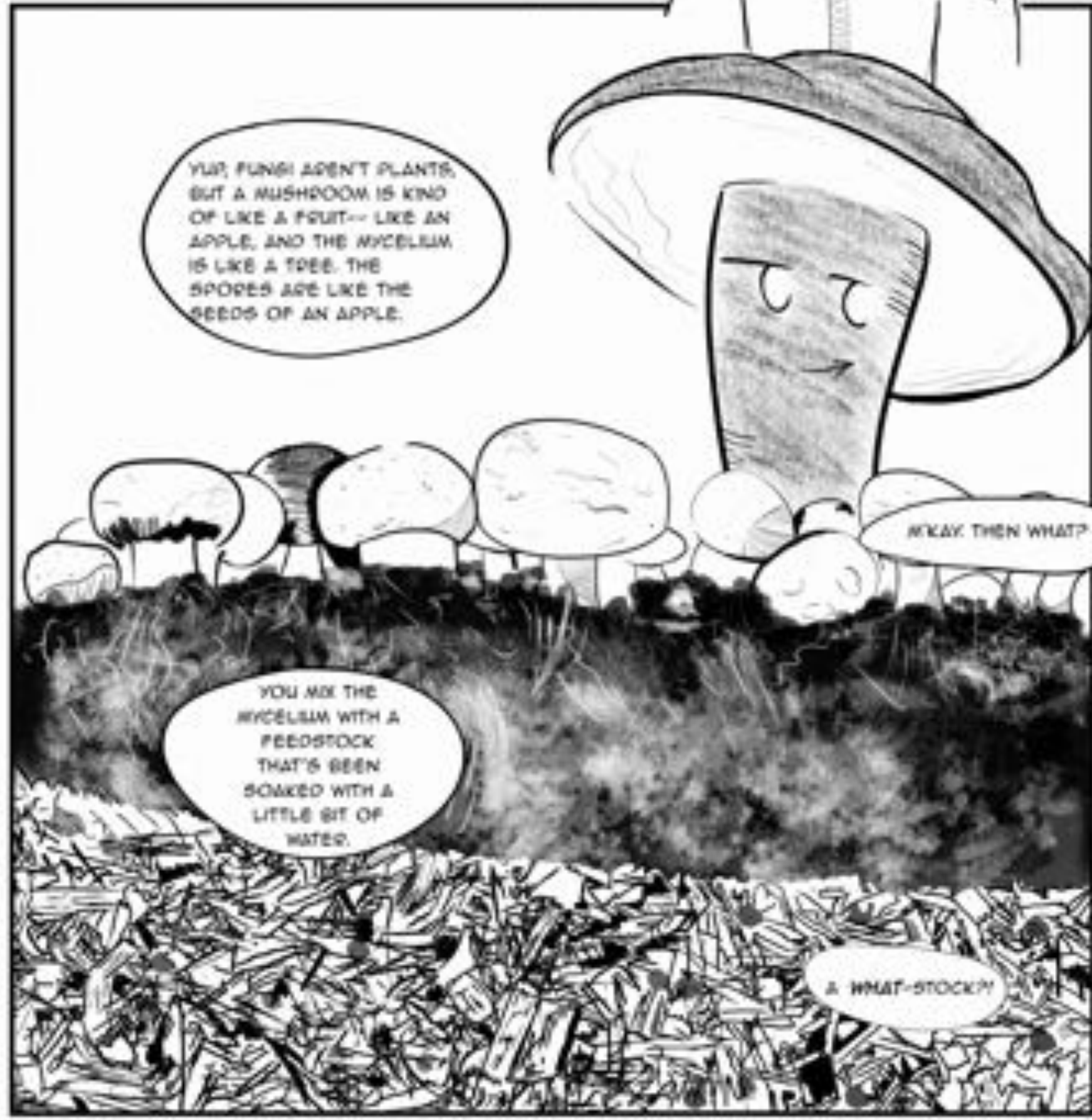
THEN LET'S DO THIS!



SO... BASICALLY YOU TAKE THE...

MYCELIUM

THE VEGETATIVE TISSUE OF A FILAMENTOUS FUNGUS?



YUP! FUNGI AREN'T PLANTS, BUT A MUSHROOM IS KIND OF LIKE A FRUIT-- LIKE AN APPLE, AND THE MYCELIUM IS LIKE A TREE. THE SPORES ARE LIKE THE SEEDS OF AN APPLE.

OKAY THEN WHAT?

YOU MIX THE MYCELIUM WITH A FEEDSTOCK THAT'S BEEN SOAKED WITH A LITTLE BIT OF WATER.

A WHAT-STOCK?!

FEEDSTOCK! IT'S BASICALLY FUNGI FOOD. WE COULD EVEN USE WOOD CHIPS OR SOMETHING. AFTER WE MIX THE MYCELIUM AND FEEDSTOCK WE PACK IT IN A GROWTH TRAY. THE MUSHROOM "MAGIC" HAPPENS UNDER THE RIGHT CONDITIONS.

EXACTLY, BUT NOT JUST TEMPERATURE.. ALSO HUMIDITY AND ATMOSPHERE.

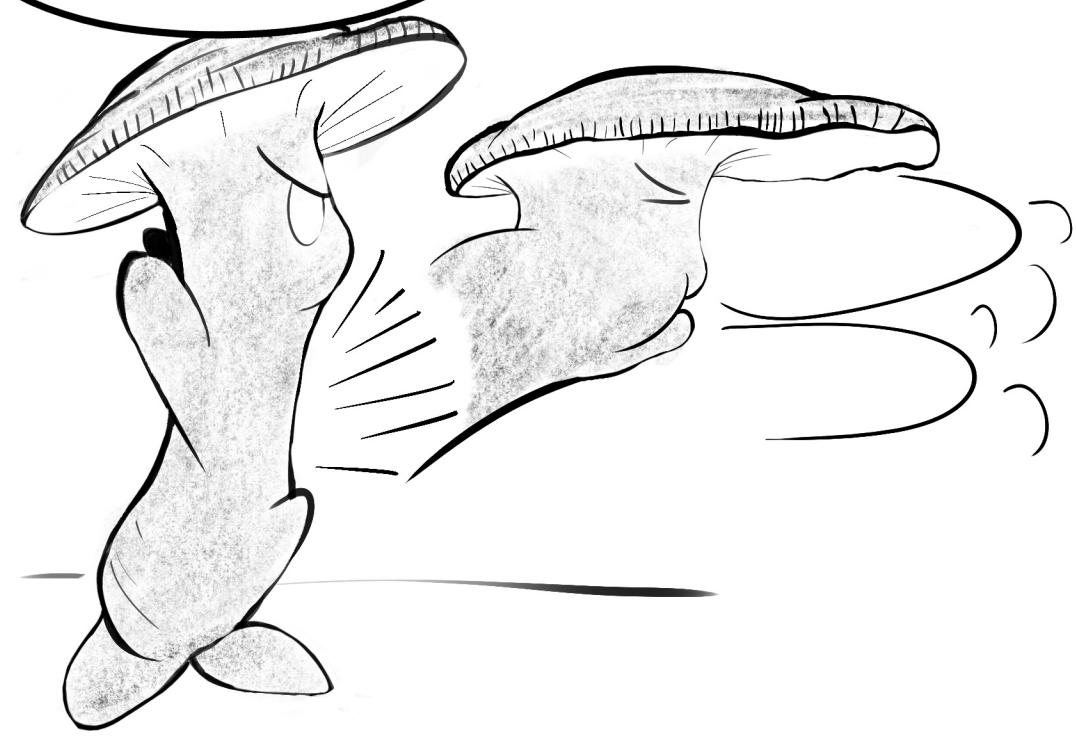


KINDA LIKE COOKING!

BECAUSE FUNGI BREATHE, KINDA LIKE US.

YUP, FUNGI TAKE IN OXYGEN AND RELEASE CARBON DIOXIDE. CARBON DIOXIDE LEVELS HELP REGULATE THEIR GROWTH.

SO THIS IS A KIND OF FERMENTATION?



YEAH, BUT FERMENTATION IS USUALLY WITHOUT OXYGEN, LIKE WHEN PEOPLE BREW BEER.

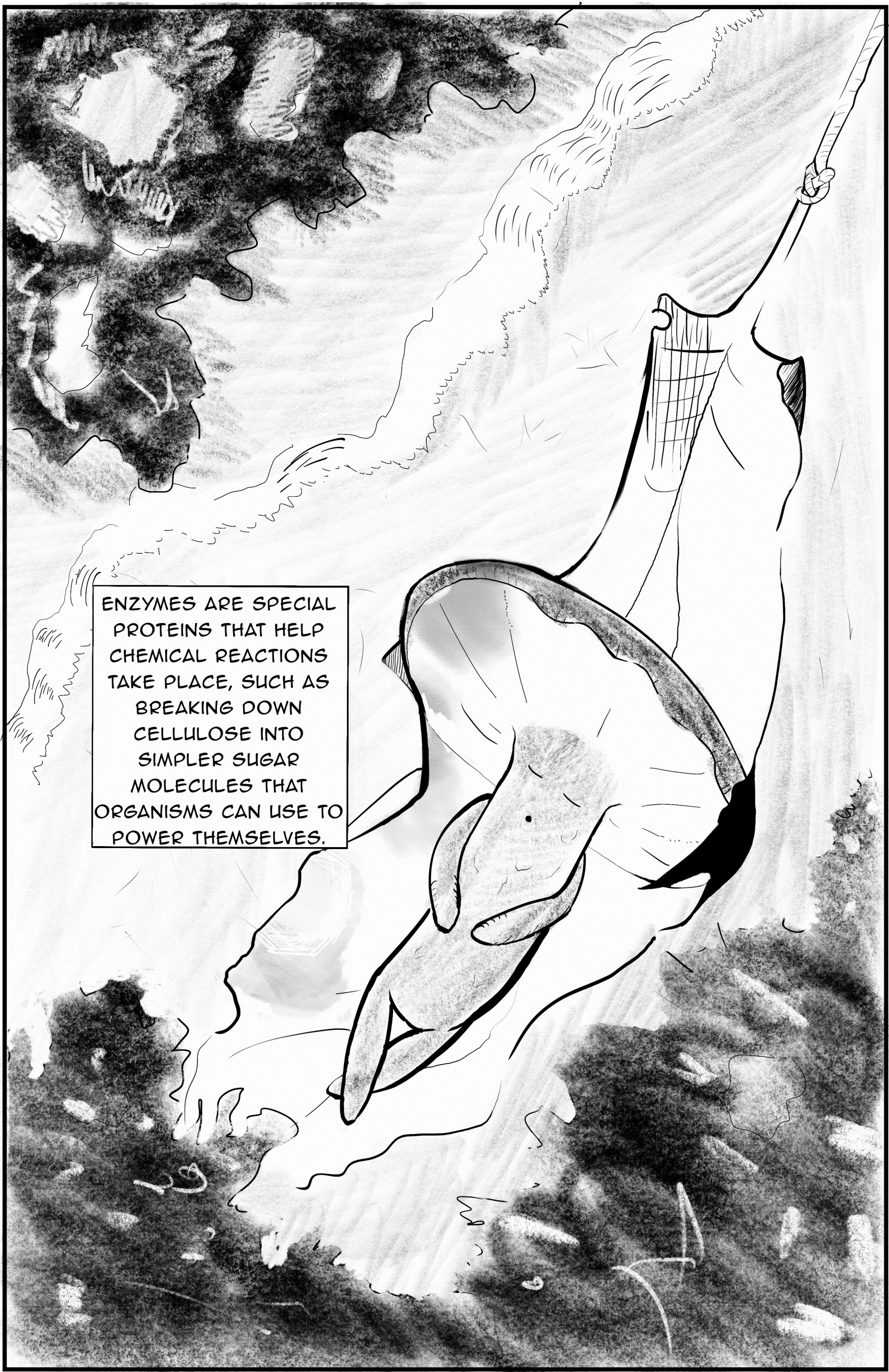




AND~ THE FUNGUS DOESN'T HAVE A MOUTH OR STOMACH SO IT USES DIGESTIVE ENZYMES THAT IT SECRETES OUT ITS CELLS.

YUP! BUT IN THIS CASE THE MYCELIUM GROWS IN AND AROUND THE SOLID FEEDSTOCK. THE FUNGUS BREAKS DOWN AND CONVERTS THE FEEDSTOCK INTO MORE MYCELIUM.

YEAH! HECKA INTRIGUING HUH??



ENZYMES ARE SPECIAL PROTEINS THAT HELP CHEMICAL REACTIONS TAKE PLACE, SUCH AS BREAKING DOWN CELLULOSE INTO SIMPLER SUGAR MOLECULES THAT ORGANISMS CAN USE TO POWER THEMSELVES.



AFTER THE FUNGUS GROWS, WE THEN HARVEST THE EXTRA SKIN-LIKE TOP LAYER OF MYCELIUM AS A TEXTILE WE CAN CUT AND SHAPE INTO OUR JACKETS.



OK, WE FEED WOOD CHIPS TO MUSHROOMS AND WAIT, THEN WE GET A JACKET??



RIGHT?? WE SHOULD PROBABLY DO MORE HOMEWORK. MAYBE EVEN TAKE A STROLL THROUGH THAT FOREST MY NANA SHOWED US A WHILE AGO.



XOCH, THIS IS TOO EASY.

Chapter 1: End