# Food Chains Compilation: Crash Course Kids

Compilation
https://youtube.com/watch?v=CZhE2p46vJk
https://nerdfighteria.info/v/CZhE2p46vJk

=====Intro (00:00)=====

Are you a living thing? If so, we should talk, because we have a lot in common. In fact, you and I both have a lot in common with all living things. Your teachers, trees. your pet parakeet, bumblebees, everything! And one of the most important things is: We. All. Eat. Everyone needs food. This is why one of the best ways to learn about life on earth... is to... follow the food. See where it comes from, and where it goes, while living things are eating and being eaten.

So here's the basics about the flow of food and the energy it contains, making life possible. Let's start with a simple question: why do we have to eat in the first place? We all eat, right? But have you ever wondered WHY we eat?

=====Gotta Eat (00:39)=====

I mean, some animals only eat plants. Others just eat other animals. And some creatures eat both plants, and meat. So, the thing is, all animals, including humans, eat. And we don't just eat because we're hungry, or bored. or tired, or it tastes good. Although, I could really go for a slice of pizza right now.

We eat because we need food to live. More exactly, we need the energy that food gives or bodies, to grow, move, and stay warm. You've probably figured this out already from the things you've heard about how, and when we eat. Like, you've probably heard that breakfast is the most important meal of the day. Or, you might know that runners will "carb load" before a big race. But food is necessary for ALL living things, ALL the time.

You may have noticed that your collection of cool rocks that you have under your bed never needs a lunch of club sandwich and baby carrots. That's because they're non-living things. But, food is most definitely a necessity for animals. And plants, too! Even though we don't think of plants as "eating" because they don't have mouths, they still need food to grow and repair themselves, just like we do. In fact, plants make a nifty model that can help us understand how the energy from food affects living things.

To see how food affects plants, we can test what happens when they more, or less food. Plants get most of their food from the sun, water, and carbon dioxide in the air(more on that another time). But to test how food affects plants for yourself, you can use lipid plant food, that way you can control how much food, or nutrients a plant gets. So consider this little investigation.

(Investigation)

Say you have 2 little plastic cups filled with potting soil. And you plant a lima bean seed in each one. Then, you give each plant a different amount of food. Plant number one would be your control. That means you don't give it any additional food at all, just a little water, and sunlight. And it'll do what plants do all on its own. Then you could make plant #2 your EXTRA FOOD plant. Ask your parent for some liquid plant fertilizer and ask the recommended amount to plant, too.

Now, if you kept watering, and feeding your plants the same amount for say, 4 weeks, what do YOU think would happen? Would you expect both of the plants to grow the same amount? Or, would one grow more than the other? So, which one?

(Conclusion)

Well, what you find is that plant 2 grew bigger than plant 1; because living things need food to give them energy so they can repair themselves, and stay healthy, and in this case, grow. So with more food, plant 2 got more energy. And that allowed it to grow bigger. Now go eat your vegetables!

Okay, so food is energy, plants can make their own food, while many animals swipe the energy from plants by eating them. But what happens to that energy once it gets eaten up? Well, you might say that is gets all tangled up in a FOOD CHAIN. And YOU are part of it.

**=====Fabulous Food Chains (3:31)=====**

Not everybody likes the same kind of food, right? That's probably a good thing. I mean, all the more pizza for me! But whether we eat milkshakes or, mangoes, Peaches or, pears. Tacos or, toast, we use the energy that's in our food to stay alive. But how did that energy get into our food in the first place?

The answer is that energy FLOWS between living things. Its almost like each form of food is a link in a CHAIN. A FOOD CHAIN. You might've heard that humans are at the TOP of the food chain because we eat pretty much everything, and except for the occasional video game monster and maybe the odd bear, no one likes to eat US. But what IS a food chain exactly?

(Big Question)

A FOOD CHAIN is a model that shows how energy flows between living things. You can thing of animals and plants in the same food chain, as all living in the same neighborhood, which scientists call a HABITAT, and they all have a job to do; interacting with each other day in, and day out.

Together, they form a kind of system, a self-contained collection of different things that all work together as a whole. And, they also interact with the NON-LIVING stuff around them: like the water, the air, the ground, and the sun. Put it all together and what do you get? A special system called an ecosystem. And food chains show us what is what in an ecosystem. Now, everything that's alive, is in a food chain, including YOU my friend. ACTUALLY most living things are in more than one food chain, depending on what, or WHO they're munching on at the moment.

I mean, you don't eat the same thing for dinner every night, do you? Didn't think so. Now, let's see how a food chain works by making a diagram or how these interaction happen in nature.

(Investigation)

First, all of the energy that's in a food chain starts with the sun. I can't stress that enough, people! Plants take the energy from the sun's rays and change it into chemical energy. So, when a nice patch of lush, green grass starts to grow, it's capturing some of the energy from the sun to do it. Then, when an animal, like a rabbit, wanders by and nibbles on that grass, the energy from the plant is transferred into the rabbit's body. Now, if a hungry hawk decides that the rabbit would make a yummy supper, then the energy from the rabbit is transferred to the hawk. And in this ecosystem, nothing is large or brave enough to take on the hawk, I mean, just look at her!

(Conclusion)

So, we've hit the top of the food chain and we've just made a nifty model of it. So, a food chain is a model that shows how energy flows between living things in an ecosystem. Energy in a food chain starts with the sun, which is turned into chemical energy by plants. And this energy moves up the food chain as animals eat the plants,

and then other animals eat those animals. And speaking of energy, I'm starving. So, I'm off to take my place in the food chain. See you next time!

So, a food chain is really a model of how energy flows among living things in an ecosystem, but in the real world things are a little more complicated than just "rabbit eats grass, and hawk eats rabbit." So let's see how the flow of food, and therefore energy, works within a habitat where many different plants and animals live.

**=====Home Sweet Habitat (6:57)=====**

Picture a polar bear... in the desert. No, what you're imagining is way too cute. Take off the sunglasses the swim trunks. There. He's hot, he's hungry, he's downright miserable. Why is he such a grumpy bear? Well, it's because he's not where he belongs. There aren't any tasty seals to eat, no cold water to enjoy and no snow to sleep in. The desert isn't his habitat.

You know that a habitat is the area where something lives, but from polar bears to porcupines, animals don't just need a place to live. They also rely on the other living and non-living things around them to survive, and life looks different in different places around the world. So, what makes a habitat a home?

(Big Question)

Well, what do you need? I need sandwiches, pancakes, carrots, maybe some nice peaches - so I need food, and I need water. I need a place to live, and I need a place to film Crash Course videos. You could say this is my habitat.

Animals need these things too: food, water, shelter, and space to live. For animals, their food comes from their neighbors - the other living things in their habitat. You know that plants and animals all fall somewhere along the food chain which is a model we use to describe the flow of energy between living things. But the real world is made up of lots and lots of food chains and those chains can get kind of messy.

I mean, look at our polar bear. Sure, his favorite food is seal but in a pinch, he'll eat walrus, dead whales, birds' eggs, and if he has absolutely no other choice, plants. The polar bear is at the top of multiple food chains, and that's not unusual most animals don't just eat one thing and neither do I. I'm at the top of the pancake food chain and the carrot food chain. It just so happens I prefer pancakes.

So you can see how food chains are actually all tangled around with each other, with many different ones overlapping kind of like a web, so we call this a food web. Food webs are big tangled systems that include every plant and animal in a habitat, and as you might guess, all food webs are different. Let's compare two different habitats to see how the food webs play out.

(Investigation)

First, we'll go back to our old stomping ground: the forest. Let's begin with (you know this people) the plants. Trees, grass, and other plants that change energy from the sun into sugar. But then you have some animals that eat other animals. This is where things get a little more complicated. Today an owl makes a mouse his lunch, but tomorrow it may be a rabbit. Today a snake snacks on a squirrel, but a few days later our owl friend might make a meal of another meat-eater like the snake.

Finally, the decomposers - insects, fungi, and bacteria are breaking down whatever's leftover, from uneaten rotten fruit to leftover animal carcasses. As they break down matter, they provide more nutrients for the plants.

It's a bit of a different story up in the Arctic, I mean look at all that ice. I know what you're thinking, where are the plants? How do we have a food web without plants? Zoom in on the seawater, zoom way in, further, further, stop! Can you see those tiny plants? They're called phytoplankton, and just like plants on land, they convert energy from the sun. Really small creatures called zooplankton eat the phytoplankton, and all kinds of small fish dine on the zooplankton. Larger fish eat the smaller fish. There are big marine mammals too, beluga whales eat fish while humpback whales eat the tiny plankton and krill.

And what else eats fish? Seals. That's our polar bear's favorite food, but up here you can't afford to be picky, so he may have to nibble on some whale carcass if necessary. As for decomposers, there aren't many bugs or earthworms in this cold climate, there are bacteria but since it's so cold the decomposers break down matter much more slowly than in the forest.

(Conclusion)

So you can see, food webs and the ecosystems that support them look different in different parts of the world depending on the habitat conditions. Flat or mountainous land, more or less water, these seemingly small changes in habitats affect what kind of plants and animals live there.

Up in the Arctic, a polar bear has the right conditions to keep him happy. First, he fits into his food web perfectly. The food that's available to him has enough fat and protein to keep his energy up. Second, he fits into his habitat perfectly. He has the body adaptations to not just survive, but feel really comfortable in the super cold. A polar bear isn't built to survive in the desert or the forest. So let's put out poor polar bear back where he belongs. I was starting to feel bad for the guy.

Now we're getting somewhere! An owl might eat a rabbit one day and a mouse the next, just like I might have pasta for dinner one night and the next night have a nice Caesar salad. So the flow of energy among living things doesn't just go in a straight line. Every living thing in a food chain might eat, or be eaten by someone else in another chain. So when you look across a whole ecosystem, the flow of energy is not so much a chain as it is a web.

**=====Food Webs (11:47)=====**

So last time we put a polar bear in the desert and I still feel bad about that. The good news is that in real life a polar bear probably won't just wander into the Sahara, but not everything stays in the same habitat all the time. A new species might come into a habitat, a species might die off, even the habitats themselves might change as a result of floods and droughts.

Point is, habitats, and the food webs they support, can get out of whack, and sometimes it's not pretty. Let's look at what happens when an ecosystem gets out of balance.

(Big Question)

Last week we learned that a habitat is home to a tangle of food chains called food webs. The animals depend on each other for food, but they don't just need each other, they rely on the non-living things in the habitat, too. This interaction of living and non-living things in a habitat is called an ecosystem.

The things in an ecosystem are all connected, just like when you touch one part of a spiderweb and the whole thing vibrates, when one link in the food web is threatened it can shake up the whole ecosystem. Let's see what might happen, for example, if an ecosystem loses a species.

(Investigation)

Since we're talking about food webs, I think we should look at spider monkeys. They're called spider monkeys because they hang upside down from their tails with their arms and legs dangling. This somehow completely adorable. Primates live in a tropical rainforest habitat, which is just bursting with some of the coolest creatures out there. Toucans, jaguars, sloths.

As we learned last time, these animals need each other to survive, and spider monkeys happen to play a pretty important role in the rainforest food web. They eat mostly fruit, which contains seeds, and we know that seeds are how plants make more plants.

When a spider monkey snacks on a berry, he gets to enjoy the tasty food while also doing the plant a solid favor. When the monkey moves on to another part of the forest and, um, passes the fruit, he leaves the seeds behind. Wait a while and then voila! You have a new plant.

Imagine thousands of monkeys eating thousands of fruits every day. More monkeys equals more plants and trees. Those trees support lots of other animals; insects and sloths eat those plants too. And more spider monkeys, insects, and sloths mean more food for carnivores. Leopards dine on the sloths and spider monkeys, while frogs eat the insects. And of course, our decomposers like fungi and bacteria break down leftover plant and animal matter. So, we're talking around 50,000 plant and animal species that rely on these plants.

Now imagine the spider monkey population starts to decline. Maybe they're hit with a strange new disease or maybe humans over-hunt them. If them monkeys aren't there to eat the fruit, then the seeds aren't scattered around and the forest stops growing, leaving fewer fruits for fewer monkeys. Not only that, but fewer plants means less food for other animals like insects and our sloth friends. That means that the insect and sloth numbers start to decline, and that means less food for the animals that eat them. All of the sudden, none of the animals in our ecosystem have enough to eat, all because of the loss of one species.

Do you see how this could get really bad? Remove one piece of the food web and you might knock down the whole thing. That's bad news for us, too. The good news is that ecosystems want to be in balance. After a natural disaster like a forest fire or a flood, things might be wacky for a while, but habitats can usually get back to normal.

But, if things get really bad, the habitat might change forever. The old species will leave, searching for a better place to live, new species will come in, life will keep going, but it won't look the same.

(Conclusion)

In every ecosystem, the plants and animals are connected. you can't mess with one species without affecting all the others. Food webs are delicate, like spider webs. We don't want to be all crazy-pants and just go knocking them down.

=====Outro (15:19)=====

Now you have the whole picture. All living things need food for energy. if they can't make it like plants do, they have to get it by eating other living things. On a small scale, you can think of this flow of energy like a food chain, but on a broader scale it's more like a food web. No matter how you look at it, food is energy, and energy is life.

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