



Transcript for *Up the Creek* written by Nicholas Oldland (Kids Can Press)

Introduction (approximately 0:00 – 4:05)

Hi everyone! It's Colleen from the KU Natural History Museum, and I am here for today's Story Book Science. We will be reading *Up the Creek* by Nicholas Oldland. I do want to give a little bit of time for people to join us. So while we wait I do want to remind you about the activity that we'll do at the end of the reading and after we've looked at some specimens. So if you don't have a piece of paper: go grab one! It can be anything. I'm using a part of a paper bag. It can be any scrap piece of paper, um, anything that you would be totally fine with, um, if it were to be ripped apart. So if you don't have that, please go grab one; and while we wait, what we are going to do is, we're going to look at the cover of the book. So this is the cover of the book. We have three animals on the cover, and these animals, they are paddling up a creek to go on an adventure. One of the things I want you to think about is the creek itself. Do you think the animals want to canoe in a clean creek? Or do you think they want to canoe in a dirty creek? I also want you to think about what type of creek you would want to canoe or swim in or walk by or even just look at a picture of. Do you want a canoe – oh I'm sorry – do you want a creek that is dirty? Or do you want a creek that is clean? Because I personally would want a creek that is clean; and the aquatic macroinvertebrates that we will be talking about after the reading, they would also want to have a clean creek.

So the macroinvertebrates we'll be talking about: they include the stonefly, the caddisfly, the dobsonfly, and the mayfly. They are sensitive to pollution. So what that means is that their creek, so their aquatic habitat, if it gets just a little bit dirty, they don't like that because it makes it really hard for them to live and to survive. So they are sensitive to pollution, and they would want a clean creek as well.

Alright. So everyone should have had an opportunity to grab a scrap sheet of paper that we will use in the activity at the end of our reading and our looking at specimens.

So I just want to remind you expectations for Story Book Science. Make sure that you are kind and considerate, um, when you either post questions or comments; just because we want to make sure that we are still following those museum rules even if we aren't in the museum. So please feel free to post those questions or comments, but also remember I may not have an opportunity to respond to them, uh, just because I'll be reading or showing you specimens.

As a reminder, we're going to be reading *Up the Creek* by Nicholas Oldland. We are reading this book with permission from Kids Can Press. So thank you to Kids Can Press for giving us permission. I also want to talk about why I like this book. I think it's great because it shows us the importance of listening to one another, not just in difficult situations but all the time.

Uh, as a reminder, if you would like to see a partial transcript of this reading it will be available on the museum's website after the reading, so later today; and also you should be able to put closed captions on the recording in your own settings. But without further ado, let's get started! *Up the Creek*.

Reading from *Up the Creek* (approximately 4:06 – 9:34)

Up the Creek includes copyrighted materials, and we do not have permission to include the written text of the book in this transcript.

Conclusion (approximately 9:35 – 23:08)

Alright, so that's the end of that story, and what a wild story about three animal friends going on an adventure!

Now I'm not going to talk about beavers or moose or bears, instead I'm going to be talking about aquatic macroinvertebrates; and they live in creeks just like the creek that the bear, moose, and beaver had their canoe adventure on; and there are a lot of different aquatic macroinvertebrates, but I'm only going to be talking about a few. I'll be talking about the stonefly, the caddisfly, the dobsonfly, and the mayfly.

So I'm going to start by talking about the stonefly. Now this is a stonefly, and I know it's a stonefly because it has these two tail-like appendages; and that is a good indication that you're looking at a stonefly. Stoneflies have a really interesting life cycle. So they have a life cycle that's only three stages, and we call it incomplete metamorphosis; and what we mean by those three stages are that the stonefly will start out as an egg – opps – as an egg; and then it will grow as a nymph, and then become an adult. So the nymph, it looks kind of like a miniature version of the adult. So it's much smaller, um; It doesn't have all of the features, like if the adult has wings, the nymph will not have wings; and then it will continue to grow until it reaches that full adult size and develops wings. So again this is the stonefly as a nymph, and this is a picture of the stonefly as an adult. So it looks pretty similar. There are a lot of similarities, but that main difference is those wings on the adult.

Now another aquatic macroinvertebrate that goes through this incomplete metamorphosis is the mayfly. So the mayfly – this is what that looks like; and I know this is a mayfly because it has these three tail-like appendages at the end. So that's a good indication that you have a mayfly. So again the mayfly starts out as an egg; and then it goes through these nymph stages; and then it becomes an adult. So remember this is what the nymph looks like; and then this is what the adult looks like. So it looks – the nymph looks pretty similar to the adult. You still see those kind of tail-like appendages at the end of the mayfly's body, but that main difference is the wings.

Now I wanted to show you photos of what these macroinvertebrates look like because when we look at actual specimens, they're very small. So although they're macroinvertebrates, it just means that we can see them with our naked eye; but they're still pretty small. And so I'm going to bring this close to the camera. So it's a little difficult to see, but I'm going to point here. That is the stonefly, and that is the mayfly. They're very small. They're about the size of my fingernail; but again, when we say macro, we just mean we can see it with our naked eye. It doesn't mean that it's gigantic.

Now the stonefly that we looked at. We know that it goes through this incomplete metamorphosis – so we just saw the nymph. This is the size of an adult stonefly; and I'll put it close to the camera, and I'll turn it around. You can see those wings, and you can see just how much bigger that adult stonefly is compared to the nymph we just saw. Alright.

Now we have two other macroinvertebrates to talk about, and we're going to focus now on the dobsonfly and the caddisfly. Now dobsonflies and caddisflies; they go through complete metamorphosis. That means that they have four stages in their life cycle; and they start out as an egg, but then they go through a larval stage.

After the larval stage is a pupal stage, and then they become an adult; and with the larval stage for these macroinvertebrates, they look very different from what the adult looks like.

And we're going to start by looking at the dobsonfly. So here's a photo of the dobsonfly. It kind of looks like a centipede- or a millipede-like creature, but this is the larval stage of the dobsonfly. After the larval stage, it then goes through a pupal stage; and that's what the dobsonfly looks like in that pupal stage; and then it becomes an adult. And this is what the dobsonfly looks like as an adult. Now this right here is the male, and this is the female; and what I want you to focus on are these appendages right here. Those are called mandibles; and normally when we talk about mandibles we're talking about chewing mouth parts of macroinvertebrates and insects; but what I find really interesting is for the male adult dobsonfly these mandibles are not used as chewing mouth parts. In fact scientists who study dobsonflies, they say that those very large mandibles, those are used to fight other adult male dobsonflies. So they're not even used for food! I just thought that was really interesting and wanted to share.

So that is the dobsonfly, and again it's going through that complete metamorphosis; and now I want to share photos with you of the caddisfly. This is the caddisfly in the larval stage; and then it goes through a pupal stage; and then after the pupal stage, it becomes an adult. And just so that we are familiar again with what that larval stage looked like, here is the caddisfly in the larval stage; and it is quite different from the caddisfly in the adult stage.

And one other thing I want to share with you about caddisflies, is that you'll notice that they have this long body in that larval stage; and for many caddisflies, what they do is they kind of build their home on their back; and so they have these cases that they create, and I have just a photo of a couple of examples. So they take these things that they find in the creek like leaf litter, stones, twigs, and then they make these cases that they then carry on their back; and I just think that's really interesting. I also learned that it kind of depends on the species of caddisfly, what their case looks like. It can differ by so much as to where you find them in a creek or what creek they live in, and I wanted to share that with you.

Now I want to also share the specimens that I have with you. Again they can be pretty small. So I wanted to make sure you saw photos first; and we'll start right here. So that is a dobsonfly larva. Now it's much bigger than the stonefly and the mayfly that we saw; and we'll talk a little bit more about it in just a second. Next we have our caddisfly larva. So it's curled up, uh, but at the front would be where its head is, and then the back part is where it would grow and carry its case; and then lastly I wanted to show you an example of a case of a caddisfly. So this caddisfly used twigs that it found in order to make that case; and I wanted to share that with you just because I think it's so neat how caddisflies build these cases that they then carry on their backs.

I have one other thing that I want to go over before we get to our activity; and that's going back to a word we discussed earlier. We talked about mandibles, and when we looked at them we saw them on the photo of the adult male dobsonfly that had very large mandibles that scientists say are not actually used for eating; but when we look at the larval stage of the dobsonfly it does have mandibles. It has these chewing mouth parts that it uses to eat; and those mandibles for the dobsonfly larva are really good because it's a predator; and we'll put that right there. So what that means is that the dobsonfly has very strong mandibles, and the larval stage of the dobsonfly will eat things like minnows, tadpoles, other aquatic macroinvertebrates. So dobsonfly have these chewing mouthparts, and they are predators.

Now, the stonefly and the caddisfly; and not all caddisflies, but some species. They also have chewing mouthparts, but what they do instead of being categorized as predators is they shred. So we're going to put

shredders under the photos of these macroinvertebrates; and so what they do is they take their chewing mouthparts, and they use them to shred organic matter that they find in creeks, so usually that means leaf litter. So leaves that have fallen from trees that line the creek, uh, the shredders will shred the leaves as they fall into the water; and that is really beneficial for mayflies.

So mayflies, they also have chewing mouthparts, but they use them in a little different way. We categorize mayflies as collectors and gatherers; and so what that means is they are collecting the shredded bits of leaf that were made by some species of caddisflies and our stoneflies, and they make them even tinier and filter them out.

So all of these aquatic macroinvertebrates have chewing mouthparts, but they use them in different ways, and eat different foods; and this is where our piece of paper comes in. So we know that stoneflies and some species of caddisflies are shredders, and I wanted to model what that is like. So our scrap piece of paper – this represents leaf litter; and what we'll do – and I want to do it together so just hold on tight – is we're going to use your hands, and we're going to pretend these are, uh, shredding, chewing mouthparts. So you can hold your hands out in front of you, and shred your paper like this. Or, if you would like, you can use your hands and pretend they are chewing mouthparts near your face, but don't touch your face with your hands; and then grab the piece of paper, and shred it as if you were a stonefly. Alright? So we're going to do this together. On the count of 3 – 1, 2, 3! Shred your paper! Shred your leaf just like a stonefly! Alright. So that models how the stoneflies and some caddisflies will shred leaf litter in order to make it much smaller for our other macroinvertebrates that are collectors and gatherers.

So that is all I have for you today. Thank you so much for joining me! I do want to remind you that next week we will have another Story Book Science. We are going to read another story featuring our beaver, moose, and bear friends; and it's called a *Walk on the Wild Side*. It's also by Nicholas Oldland, and we'll also be reading it with permission from Kids Can Press. So I hope to see you next week here on Facebook Live at 10am. Again we'll read *Walk on the Wild Side*. Thank you for joining me today and I will see you next week. Bye!