

Intro:

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Erin Larson:

Welcome to Making Waves. I'm your cohost Erin Larson, and you're listening to part two of a four episode mini series on education and freshwater science. In each episode, freshwater scientists will talk about an activity they've used in their class ranging from activities that take just a few minutes to entire modules of a course. We hope these will help everyone from high school teachers through college instructors get new ideas to use in their classes. In this episode, I'll be talking with Amy Burgin, associate professor in ecology and evolutionary biology and environmental studies at the University of Kansas and also, an associate scientist at the Kansas Biological Survey about a short activity she does on freshwater science in the news that takes only a few minutes of class time. Welcome to Making Waves, Amy. It's great to have you with us today.

Amy Burgin:

Thanks, Erin.

Erin Larson:

I'm really excited to hear about the activity that you've been doing with your, is it your freshwater ecology class?

Amy Burgin:

Yeah, it's a variation on a fresh water ecology class. This one's called intro to aquatic ecosystems.

Erin Larson:

Very cool, and is it an upper level class or what's the class context where you teach?

Amy Burgin:

Yeah, it is a mostly junior, senior level class. It's a mixture, because my appointment is both in environmental studies and in ecology and evolutionary biology, it's a mix of students from backgrounds of both. Some are very science heavy, some are more on the environmental studies policy heavy area. So that's kind of what got me thinking along the lines of this activity too.

Erin Larson:

Can you describe this activity to us and what you call it in your class?

Amy Burgin:

Sure. It's an activity we call, "water in the news," and it came about in part because of kind of the split appointment that I have here, as well as just the sheer amount of time I spend paying attention to the news. I kind of felt like I should probably put that to use somewhere, and noticing some of these stories that are in the news about water and trying to think about how I can connect that what's in the news to the principles that we're learning and class. The first time I did this, when I taught intro to aquatic ecosystems, I set up special days for water in the news where we had a topic that was either of state,

regional, national or global importance. We read a variety of sources on that theme. So for example, the regional topic that we did was harmful algal blooms, which are an issue throughout the Midwest.

Amy Burgin:

We read a paper out of harmful algae about how land use patterns affect microsystem patterns in lakes. We read a number of public records, mostly newspaper articles about Toledo's water crisis, about some lakes specific to Kansas that were in Kansas newspapers. Then we read a policy document the Kansas Department of Health and the Environment directed the guidelines for how they issue health warnings and watches for lakes that are experiencing harmful algal blooms. For these, they read these kind of three different types of documents and we talk about how they inform each other, how the science informs the policy and how both the policy and the science are digested into news and kind of publicly consumable formats. So I try to kind of take these scientific problems from a variety of sources.

Erin Larson:

Awesome. Do you guys spend an entire class period doing this or it sounds like they're sort of scattered throughout the semester.

Amy Burgin:

Yeah. I did this, when I was teaching this intro class the first time, I did it once a month kind of as a break from what we were doing in the regular class, but also to integrate with the scientific principles that we were learning in the class to try to take what we learned in the textbook and make it like real, see how it affects the kind of daily life or the things that we see popping up in the news, and to make that connection more concrete so that what we're learning when we do lecture and kind of in class activities isn't quite so abstract, they can see it playing out their local environments and then the national world headlines. I started out doing this in this whole day thing and the students in my intro class really liked it was one of the things that they commented on being the most helpful.

Amy Burgin:

The next fall, I taught or co-taught principles of ecology, so basic ecology class with a colleague. I decided to inject this a little bit. We couldn't take whole days like I could when I'm teaching my own class, but at the beginning of each class, I tried to find a news article that related somehow to the concept that we were learning in class. For example, when we were going over biomes at the beginning of the semester, we were talking about climate and precipitation patterns, this was also about the time that Hurricane Harvey hit Houston. I showed some of the rainfall totals for Harvey and then showed some of the biome information for that area of Texas, and that really helps students understand the context and the severity of the amount of rain that you know. That was basically as much rain as that area should receive in a whole year coming down in two or three days. So that helps them understand the news, but also makes these kind of principles that seem very vague and abstract much more real.

Erin Larson:

Awesome. So it sounds like you've thought a lot about how to adapt this activity to other types of classes and you've actually done that as well. It sounds like something that folks could even think about doing in a high school class where you're talking about environmental science, wouldn't you say, or some very different kinds of context?

Amy Burgin:

Yeah. I think it's highly adaptable. You can take five minutes at the beginning of class, and this is often what I do in kind of the classes I'm co-teaching are kind of some of the guest classes and kind of give a short description of the event in the news. Some students follow the news very closely, some don't, so it's always good to kind of give them a source. I sometimes will play audio. I get a lot of stories from NPR. I pull the audio from that and then play it in class really briefly and then talk about how that relates to some of the principles that we'll be focusing on for that day. I think it's a really adaptable thing. You can either do it as kind of a big class discussion as I was describing with my intro to aquatic ecosystems class, or you can just make it kind of a nugget at the very beginning.

Erin Larson:

It sounds like students generally have been reacting positively to this activity, right?

Amy Burgin:

Yes. They really like it especially for some of the topics that are really hard to see the application of in some ways. So for example, last year when I was teaching principles of ecology, there was talk in the local news of Tyson trying to establish a large chicken slaughtering plant in Eastern Kansas. That would mean that we would have a lot more confined animal feeding operations and chicken. We have almost none of that in this area of the state now. It would really change some of the nutrient dynamics in some of the watersheds.

Amy Burgin:

So we're talking about nutrient cycling. This kind of thing can be really vague and abstract to students to grasp, but I started talking about this Tyson plant that was coming in and we start talking about how much waste the chickens produce and how that can impact area water quality. I think that that made the nutrient cycling part of the lecture that came afterwards much more engaging. It felt more real to them because they could see how changes might play out in their home area. On my student teaching evaluations, this is often the thing that gets praised the highest, not that that's necessarily what we should be teaching for, but it is evidence that it's something that students really connect with and appreciate.

Erin Larson:

That's awesome. I agree, nutrient cycling can sometimes be a hard concept and very abstract for students to grasp onto. Do you feel like there are some other abstract concepts that you teach in aquatic ecosystems where it might benefit from having this sort of news bit injected in?

Amy Burgin:

Yeah. Another example is in my intro to aquatic ecosystem ecology class, we were studying and working on the Teaching Issues in Ecology and Evolution, the TIEE. They have these kind of data labs that you can do exercises in class. So we were working on the Lake Mendota ice covered dataset at the same time. This can seem a little bit... You see the trend line. It's going down and you understand that that means less ice, but at the same time, almost that same week I think it was, there was a news story about how ice was relatively thin on some lakes that there were a number of ice fishermen on in Northern Minnesota.

Amy Burgin:

This was a new story on NPR. That was another one where I played that one at the beginning of class and I heard about these ice fishermen that shanties were falling through the ice and that makes it a little bit, "Oh, I see how these people who have been fishing in this area for their whole life expect the lake to behave one way, and now it's one year," obviously, so it's a bit anecdotal, but they can see how that fits into the larger trendline and how that concept is important to everyday life.

Erin Larson:

Yeah. That's awesome. So it sounds like you've had a lot of great opportunities to teach about aquatic sciences and do more intro type classes too. Another thing I was hoping to do with this series on education is to also offer advice to folks who might be teaching and the aquatic sciences for the first time, whether they're a new grad student and a postdoc faculty member who's getting together a course. So I was wondering if you had any thoughts of tips or tricks for teaching?

Amy Burgin:

Yeah, I think anything you can do to make it more real and concrete is a good thing; active learning kind of activities, working with data activities. I think it's also really important to learn to pace yourself. I think many people tend to put too much in the first few times I taught a class and so I develop more material than we can possibly master. Almost every time I teach it, I ended up paring it back and paring it back. It's about the third time I teach something, I feel like I hit the right spot. I also feel like my lectures are a lot more understandable if I front load them with the learning objectives. If I basically say, "This is what you should be getting out of this lecture. These are the key themes or the key highlights."

Amy Burgin:

So rather than just putting the learning objectives in the syllabus, obviously you can map those onto individual lectures. I feel like that makes my lectures a lot more important. From a purely kind of task management and time management strategy, I think it's also important to remember that even if you're starting with some material, it takes a lot longer than you think it does to prep a lecture. It takes me on average, four to six hours to put a lecture together and that's important the first time you're starting to teach and thinking about how you're going to get everything else done.

Erin Larson:

Yeah, definitely. I think it's tricky thinking sometimes about teaching in the aquatic sciences because you're trying to cram, like you said, so much information because geology is important, biology is important, chemistry's important, and trying to balance how much sort of new information you can really put in there can be really tricky.

Amy Burgin:

Yeah, I think that's something when we're so interdisciplinary, we struggle with a little bit how much do I have to make sure we've got this foundational concept, some just really important chemistry principles versus teach the connection between it, some of the other principles. I try really hard not to let that derail my classes, because I'm in an environmental studies department too, like to get students a variety of backgrounds, so students that haven't had any chemistry, I think can take limnology and get a lot out of it.

Amy Burgin:

Yeah, it's hard to strike that balance, but I think it's more important that we're open to people from a variety of backgrounds because we need all of that kind of perspective in order to deal with some of these really big problems. Some of the best students I've had in my intro to aquatic ecology have been students from econ majors that just can still parse out data and think about things in a really kind of data oriented way, but haven't necessarily had some of that chemistry and biology background, but still need to understand aquatic ecosystems because they're potentially going to be much more playing in the policy realm than the scientist is.

Erin Larson:

That's awesome. Yeah, your activity sounds like a great way to bring those folks in and create connections between their major or their interests and the aquatic sciences, which is really great. Thanks so much for talking with us today, Amy.

Amy Burgin:

Sure.

Erin Larson:

I really appreciate it.

Amy Burgin:

Happy to do it.

Outro:

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