Students Save Shad! (Part III)

(Based on a true story.)

Carol Montgomery

Performance Time = less than 9 minutes

Readability = grade 4.2 (grade 3.8 without the words “announcer” and narrator”)

Cast (10-12+):

Announcer #1

Announcer #2

Narrator #1

Narrator #2

Nick

Julia

Teacher

Mr. Cummins

Student #1

Student #2

Student #3

Student #4

Class (chorus)

Vocabulary:

Protector
polluted
Guardian
grand
Volunteer
valuable
yesterday
waterways
boggles
environment
adventure
adopted
monitored
water quality
Atlantic Ocean
perils
oxygen
bubblers
ammonia
brine shrimp
developing
microscope
spike
interrupted
conversation
dismayed
everyone
fishway
enough
completed
difference
temperature
biologists
otoliths
antibiotics
tetracycline
medicine
ultraviolet
Native Americans
Europeans
tongs
senior
attached
generation
hauling
predicted
process

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By Carol Montgomery

Announcer #1: This is Kids' World News with Part III of this week's top story, "Students Save Shad!" Hey, what's with the costume?

Announcer #2: Oh, this? I'm going to a party later and I thought I'd go as Super Green–Protector of the Polluted, Guardian of the Grand, and Volunteer for the Valuable!

Announcer #1: What got into you?

Announcer #2: Oh, nothing--except that student cheer from yesterday:
Clean the river, save the stream,
Rescue our waterways. Yea, shad!
I was dreaming about fish all night and when I woke up, I thought my head was on a fish belly! This shad stuff boggles my brain.

Announcer #1: Maybe that's good--IF you learn to care more for your environment.

Announcer #2: Oh, I care, all right! Why would I be dressed as Super Green–Protector of the Polluted, Guardian of the Grand, and Volunteer for the Valuable, unless I cared?

Announcer #1: True. But, if you REALLY care you'll take action and not just dress up.

Announcer #2: What do you mean?

Announcer #1: You've been asking for days about "The Great Shad Adventure" and shad eggs. Today's your day!

Announcer #2: Another video?

Announcer #1: You got it, Super Green! Today we'll share Part III of "The Great Shad Adventure."

Announcer #2: Then, let's roll the video for the REST of the story... Here comes the narrator...

Narrator #1: Nick and Julia returned to their shad-loving school for fifth grade. They joined the Aqua Eagles Stream Team to help take care of their adopted stream, Little Falls.

Narrator #2: The Aqua Eagles Stream Team worked hard to clean up their stream. Once a week they picked up trash, monitored water quality, or planted trees.

Narrator #1: When spring came students and teachers were trained how to raise shad in trashcan fish tanks with oxygen bubblers. They learned how to test the water for oxygen and ammonia, plus how to raise tiny brine shrimp for shad baby food. Everyone had a job, including Julia and Nick.

Julia: I'll bring ice to keep the water cool. I don't want those baby fish to die because the water temperature is too warm.

Nick: Great! I'll feed the baby shad these teeny-weeny, itsy-bitsy, little-wittle brine shrimp. I'm sure glad I don't have to eat those things. How could anything get full with those teeny-weeny, itsy-bitsy, little-wittle brine shrimp? I'd be hungry all the time!

Julia: I think they are hungry a lot. Their mouths are so tiny I can't really see them; so they must eat small food.

Nick: Not just small. Those brine shrimp are teeny-weeny, itsy-bitsy, little-wittle guys.

Julia: (*laughs)* I get it!

Narrator #2: Julia and Nick's teacher interrupted their conversation...

Teacher: All right. Let's review our chart of what has happened so far with the eggs. Day One?

Class: The little eggs look like pearls. We remove the dead eggs.

Teacher: Day Two?

Class: The eggs look like a wiggle in a gel-like shell, with two eyes developing. We can see them under a microscope. We remove dead eggs.

Teacher: Day Three?

Class: The eggs are now swimming fry, tiny fish babies that wiggle. We remove dead eggs.

Teacher: Now, we're up to Day Four. What have you noticed today?

Student #1: There are lots more swimming fry, wiggling all over.

Student #2: And there are quite a few dead fry. Do we have to take out the dead baby fish like we took out the dead eggs?

Teacher: Yes. Every day we must remove the dead ones so they don't pollute the water and kill the rest. Dead eggs or dead fry can cause the ammonia level to spike and cause a mass die-off.

Class: Ooooooooooo.

Teacher: But, tomorrow is Day Five and we'll be releasing the fry.

Class: Hooray!

Student #3: I sure hope they don't all die. It's no fun when they die.

Student #4: I know. I want them to live free, grow up to be happy shad, and come back to lay more eggs.

Narrator #1: The next day the children were dismayed to see all the dead baby shad. But, after they removed them, there were still enough shad fry for everyone to have a cup or two of baby fish to release.

Narrator #2: Year after year hundreds of baby shad were raised and released above the Little Falls Dam at Great Falls. In January 2000 the fishway freeway was completed.

Narrator #1: Biologists had dipped the first baby shad into water containing the antibiotic tetracycline. That medicine was taken into the fish's body where some of it marked the small ear bones, called otoliths, of the fish.

Narrator #2: Those ear bones are in rings, kind of like the trunk of a tree. When an otolith marked with tetracycline is cut and put under an ultraviolet light, the ring that contains tetracycline grows yellow-green in color. Mr. Cummins, the biologist, came back to talk to students at the school.

Mr. Cummins: As you all know, it's been five years now since the first baby shad were released into the river. We had some trouble finding adult shad. But, we decided to try catching fish the way the Native Americans and early Europeans did.... Do you know how?

Student #1: By hand?

Mr. Cummins: We used our hands some.

Student #2: By throwing a line into the water with bait on it?

Mr. Cummins: No bait. But, we had something in the water.

Student #3: A fishing pole?

Mr. Cummins: We used a pole, too.

Student #4: Two poles like giant salad tongs, grabbing the fish?

Mr. Cummins: You're close. What could you use to scoop fish up with on the end of a pole?

Class: A net!

Mr. Cummins: Right! I stood on some steep rocks above the river with a dip net--a circular net on a long pole. Then, I dunked the net in the water several times. Finally, I felt a pull, and guess who showed up?

Class: A grown-up shad?

Mr. Cummins: Right again!

Class: Hooray!

Student #1: How do you know it was one of the shad the school released?

Mr. Cummins: Great question! You remember the otoliths were marked with tetracycline, right?

Class: Yes.

Mr. Cummins: Well, we caught three shad that day and one of them had the tetracycline glow. Glowing ears after five years!

Class: *(laughs)*

Mr. Cummins: Other shad were caught down the river, on their way up to the fishway freeway that would take them past Little Falls Dam.

Class: Yea!

Narrator #1: In 2003 Julia, now a high school senior, visited her old fourth grade classroom where she had first carried ice cubes to the fish tank.

Julia: Wow! Now you have chillers to keep the fishtanks cold like the river water. And, look at that TV screen! Those little pearls look like shad eggs. Some of them look like they've already hatched and are swimming with their egg yolks attached. Two eyes and a wiggle on the screen! This project keeps getting better and better!

Narrator #2: Almost a week later Julia and Nick, both high school seniors, joined the school to release the seventh generation of baby shad.

Nick: I remember hauling a bucket down to the river to release baby shad fry years ago. But, I think the bucket was bigger then.

Julia: I think WE were smaller then.

Nick: That's for sure.

Narrator #1: The students gathered at the river's edge dipped their cups in the buckets to gather the shad fry. Then, Julia spoke...

Julia: When we released our baby shad, we knew it would be a long, difficult journey, filled with perils. Those little wigglers would have to travel all the way to the Atlantic Ocean and back here again to lay eggs.

Nick: Somehow we knew they could make it if the fishway was built past the dam. I guess we predicted correctly.

Narrator #2: Mr. Cummins stood next to Julia and Nick. He exclaimed,

Mr. Cummins: We caught another marked shad at the base of Great Falls! It's been almost sixty years since shad has successfully made it to Great Falls. We've seen more shad in the river this year than ever!

Class: Yea!

Mr. Cummins: Let's do it again! Carefully dump your cups of the small fry and say, "Good-bye, baby!"

Class: Good-bye, baby!

Nick: See ya when I'm out of college!

Teacher: Before we go let's do our American shad cheer with Mr. Cummins...

Teacher & Class: *(cheers)* Clean the river, save the stream,
Rescue our waterways. Yea, shad!

Teacher, Class & Julia & Nick: *(louder)* Clean the river, save the stream,
Rescue our waterways. Yea, shad!

Teacher, Class, Julia, Nick & Mr. Cummins: *(louder)* Clean the river, save the stream,
Rescue our waterways. Yea, shad!

Class, Julia, Nick: Yea!

Announcer #1: That's the end of the Part III video of "The Great Shad Adventure."

Announcer #2: Incredible!

Announcer #1: What do you mean, Super Green?

Announcer #2: They take little pearl-like eggs. Let them hatch into wiggly baby fish. Feed them teeny-weeny, itsy-bitsy, little-wittle brine shrimp. Release them into wild waters that will be shark-infested in the ocean. Then those same fish somehow come back to the river all grown up to lay eggs and start the process all over again. That IS adventure. But, I'm glad I'm not Shad.

Announcer #1: Me, too. I kind of like Super Green.

Announcer #2: Really?

Announcer #1: Really.

Announcer #2: Let me practice for the party. Ask me who I am.

Announcer #1: Okay, who are you?

Announcer #2: *(proudly)* Super Green, Protector of the Polluted, Guardian of the Grand, Volunteer for the Valuable, and Action Taker. I'm going to find a way to make a difference!

Announcer #1: Great! Let us know when we can do a story about YOU! This is Kids' World News. Good day!

* Let the River Run Silver Again by Sandy Burk tells the story of the first elementary school in the nation that helped in the restoration effort of the American shad in the Potomac River by Washington D.C.

Background Information:

In the late 1800s eggs from shad were collected and place in “hatching” jars. Workers put the jars on a train in special fish cars with stands to hold the jars. When the train left Washington D.C., the shad eggs would hatch on the way. The young shad can live off of its egg sac for several days. When the train arrived in San Francisco, California, the shad were ready to be released into local rivers, like the Sacramento River. Thousands of baby shad were released into the Sacramento River between1888-1889. Since then shad have multiplied in the Pacific Northwest.

Science Information:

Shad food chain =
shad lay eggs
Algae= producer
Brine shrimp= first order consumer. shad fry feed off their yolk sac until released.
Hatcheries feed shad plankton like brine shrimp until fry are released.
Shad fry= second order consumer
Sunfish = third order consumer

anadromous fish = spend most of their adult lives at sea, but come from about every river along the Atlantic (and now Pacific) coast.

Schools from other rivers along the Mid-Atlantic region from NC to NJ have raised shad.

Eagle cams show eagles feeding young. Young need to feed about every 2 hours until they fledge and their primary food is fish--including shad and other herrings for coastal eagles.

NCTC eagle cam: www.fws.gov/nctc/cam
Follow the links to the live feed:
http://outdoorchannel.com/Conservation/EagleCam.aspx
I saw two baby eagles, one sleeping and one preening and stretching. Looks like he was getting ready to take off, but didn’t know how yet! :)
“Be an eagle biologist for a day.”

Schools in Schools program for shad restoration:
www.livingclassroomsdc.org/shadrestoration.htm
Living Classrooms is a non-profit with the motto Learning By Doing.” They have worked with more than 85 schools in the DC area to raise shad in the classroom each spring. The latest press release here is about the 2009 program.

Curriculum Links (Valid in 2012):

http://www.growingnative.org/pcgn_gncurr.html
Click on Educational Resources, Growing Native Curriculum (related to the Potomac River watershed). In Section 3, lesson 3.3 you'll find student page 3.3.5 for printable activity flash cards about the food web in the Potomac River.

www.potomacriver.org/cms/wildlifedocs/shad4teachers.pdf
2011 Potomac River.org's excellent PDF on the restoration project. There's something for everyone here. It looks like these were slides to a PowerPoint presentation. LOTS of great photos, including historic photos and photos of big shad. Plenty of educational information for every level (e.g., graphs of different difficulties for both younger and older students). No lesson plans. No questions. A bit technical at the end.

www.potomacriver.org/2012/.../CumminsShadSchools2012.pdf
2012 Potomac River.org's excellent PDF on the restoration project from the local hero of saving the river, Jim Cummins. This is almost identical to the presentation above, but I LIKE IT BETTER FOR TEACHERS and students. It is more to the point for teachers, with LOTS of great photos, including historic photos and photos of big shad. Plenty of educational information for every level (e.g., graphs of different difficulties for both younger and older students). No lesson plans. No questions.

http://www.fws.gov/raleigh/sis_resources_articles_papers_journals.html
U.S. Fish & Wildlife Service page of links on "Shad in Schools--Articles, Reports, Journals, Profiles." The third one in the list "Shad Tank Food Web" includes a nice photo montage done by a student of the food web showing producers and consumers clearly on one page. The next one is a nice picture of the "Life Cycle of a Shad" hand-written in italic font. Many of these articles are on NC shad info, so I didn't read them.

http://www.fws.gov/raleigh/sis_resources.html
"Shad in Schools--Resources" First article, "Just Keep Swimming," is an article on the first shad students in North Carolina by Patty Matteson, USFWS Raleigh Field Office. I used this detailed article to glean lots of information and ideas for student comments.
2nd article: "Fish Farming" is the newspaper article from NC where they adopted the program done in DC.
3rd Article: "Helping the Bay's Rivers Run Silver Again," by Karl Blankenship from the Chesapeake Bay Alliance's Bay Journal.
4th article: River of Hope by Sandy Burk, USFWS Journal, focuses on VA, but has some interesting bald eagle info and great classroom photo showing a classroom shad hatching tank.
5th link starts with The Shad Foundation's Shad Journal, from Feb. 1997 and includes an article entitled "One Night with Shad" by elementary students, an article called "Oceanography of The Pacific Shad Invasion" in 1871, and an article called "The Shad Project" written by one of the first students to participate in the shad restoration pilot program with schools.

http://www.fws.gov/chesapeakebay/SHAD.HTM
Chesapeake Bay Field Office page on American Shad. Lots of information, but no pictures. Shares briefly about George Washington's troops being saved from starvation at Valley Forge because of dried shad.

http://gwpapers.virginia.edu/articles/boyle.html
"The Valley Forge Fish Story" from the Shad Foundation's Shad Journal. Information re: historical primary sources for this "fish story."

http://www.dnr.state.md.us/fisheries/fishfacts/americanshad.asp
Department of Natural Resources page on the American Shad filled with bullet points and a big profile picture.

http://www.flickr.com/photos/jayparedes/page3/
Second row of photos, far right, shows an osprey carrying a partially eaten American Shad "back to its nestlings."

http://www.dgif.virginia.gov/fishing/shad-restoration/
Virginia's Department of Game and Inland Fisheries page "On the Road to Recovery: American Shad Restoration." Includes info from 2011 and a link to the "Shad Tagging Study."

http://www.dnr.state.md.us/fisheries/recreational/hatchery/shadrestoration.html
Maryland's Department of Natural Resources Fisheries page on "Shad Restoration." Lovely photos, plus a You Tube video from a biologist about collecting hickory shad for the hatchery. (4:12) Links to shad identification sheets at the bottom of the page.

http://www.fish.state.pa.us/education/shad_inpa.htm
Pennsylvania's page on "American Shad in Pennsylvania." **Includes link to lesson plan PDFs for grades 3-8:**
"Where Have All The Shad Gone" (Data or Activity)
"Shad Scents" (Activity)
"Dam Design"
"Hooks & Lifts"
"American Shad Restoration Overview"
"Publication and Background Information"

http://fishandboat.com/shad_schu.htm
Pennsylvania's Fish and Boat Commission's page on "Schuylkill River American Shad" restoration showing a map of 4 fishways.

http://www.crwa.org/projects/shad_stocking.html
Massachusetts' Charles River Watershed Association page on their American Shad Restoration Project with 2011 information and photos. (Small print.)

You Tube:

http://www.youtube.com/watch?v=cdCT7CoJS9Y
"Seining with Chris Nack for the Sad Restoration Project" for the American shad in the Hudson river. He talks about several fish predators. Not super engaging video, but several still shots mixed in the video. 2:49

http://www.youtube.com/watch?v=tmLF-MD5OVY
Here's a photo slide show with video of students and the Anacostia Watershed Society Education Team from 2010. **Great MOVING video of the shad babies and the students releasing the baby shad fry. Shows the babies from the view of a microscope.** Mostly instrumental background. Well done! 2:43

http://www.youtube.com/watch?v=tc50aH5QOQY
"Returning the Silver: American Shad," an **inspirational documentary** about the restoration of the American Shad to the Potomac River. Amazing video of Great Falls. Shows **Jim Cummins (biologist in our script),** Native Americans, local watermen, student helpers, **Sandy Burk (author of Let the River Run Silver Again)**, explanation by students of the classroom tank set-up and the process, live photos of catching shad, hatching shad babies, explanation of ammonia levels, shadbush and other plantings, student release of fish, story of student lobbying for fishway ladder through the dam, shad egg sharing, wildlife (including bald eagle and osprey), eagle cam pictures of baby eagles, and **the positive impact that students can have on the world.** Excellent! (Audio a little variable, but that's minor.) This video matches the scripts perfectly. 23:40

http://www.youtube.com/watch?v=rPO0bDsUeVc
"Shad Migrating Up the Susquehanna River. Holtwood Dam. 2009" Shows the "fish lift" for the fish working. Note: A fish lift is kind of like an elevator filled with water and fish. They dump the contents of the elevator (fish and water) over the hydro-electric dam. Odd banjo song in the background that mentions dousing in the story of wanting silver to be rich. Video done at 5 minutes basically, but it goes to 6:12 for the song.

