



Harvard LTER Schoolyard Program

Teacher Developed Lessons and Documents that integrate Harvard Forest Schoolyard Ecology Themes into curriculum.

Lesson Title: Forest Ecology Unit

Project: Woolly Bully; Hemlock Trees and the Invasive Woolly Adelgid

Teacher: Anne McDonald

School: Toy Town Elementary School

Level: 5th Grade

Date: April 9, 2015

Toy Town Elementary School

Anne McDonald, Fifth Grade

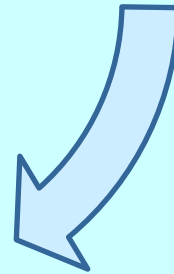
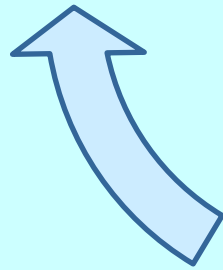
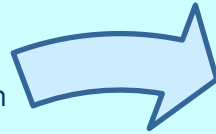
Forest Ecology

Essential Questions

What action can we take to preserve or make positive change in forest ecosystems?

What can we learn about ecosystems in the forest?

How do we do research in forest ecosystems?



Toy Town Elementary School Implements the Harvard Forest Schoolyard Ecology Program

Research Program:
**“Woolly Bully:
Hemlock Trees and
the Invasive Woolly
Adelgid”**

with Dr. David Orwig,
Forest Ecologist

Will the Hemlock
Woolly Adelgid
destroy our
hemlock trees
forever?

How will our forest
change if the
hemlock
disappears?

Dr. David Orwig meets with
Toy Town Fifth Graders
at Harvard Forest



Hemlock tree at Harvard
Forest with the Woolly
Adelgid

Research Study

➤ Each of 5 fifth grade classrooms has an assigned and tagged hemlock tree in our schoolyard.

➤ In fall, we measuring the new growth of tagged branches of our Hemlock trees.

➤ In Spring, we make observations to see if the woolly adelgid is present or not by looking for egg sacs.

No Adelgid has been found on our trees yet, but it has been found in other towns in the same region.

➤ Teacher and students provide data which is posted on the Harvard Forest website. Students can analyze their data and compare it to data from other schools.

➤ Teachers attend Professional Development workshops at Harvard Forest



**Collecting Data at Toy Town Elementary School
on Hemlock Trees for Harvard Forest**

*Research Project: The Hemlock Tree and the
Woolly Bully*

Other Forest Ecology Activities

Our Fall Field Trip to Otter River State Forest



**Toy Town Elementary Fifth Graders
Hiking the Wilder Mckenzie Trail,
Otter River State Park to Lake Dennison State Park**



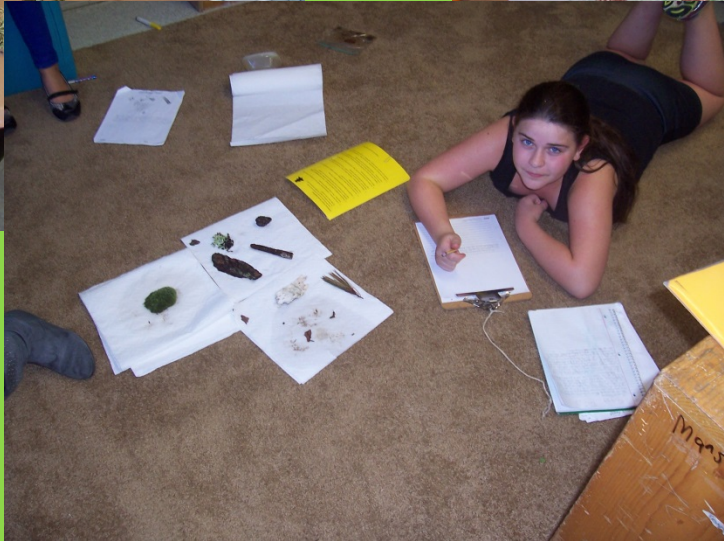
Making Observations with Journal Prompts in a Coniferous Area



Making Observations with Journal Prompts in a Deciduous Area



Integration: Classroom Writing from Journal Observations and Samples from the field



Spring PLT Field Activity

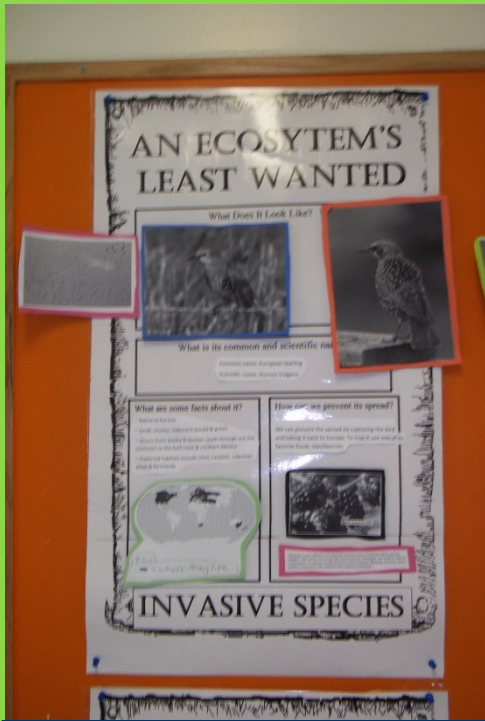
"The Fallen Log"

How does a forest ecosystem benefit from a fallen log?

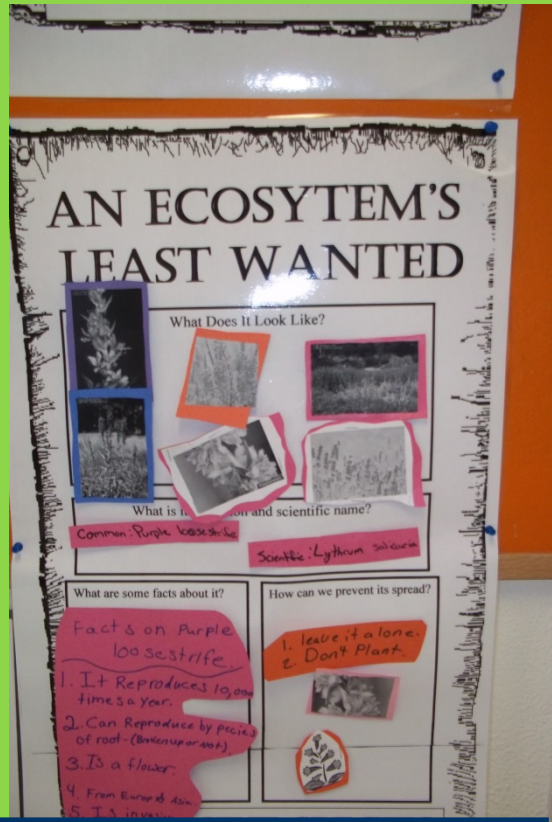
Mrs. McDonald and students



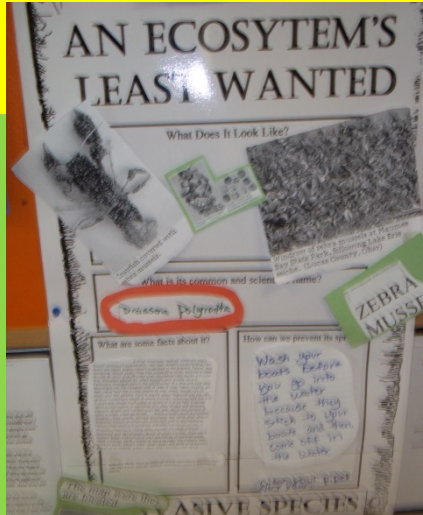
Examples of Mrs. McDonald's Fifth Grade Students' Research Posters of Invasive Species



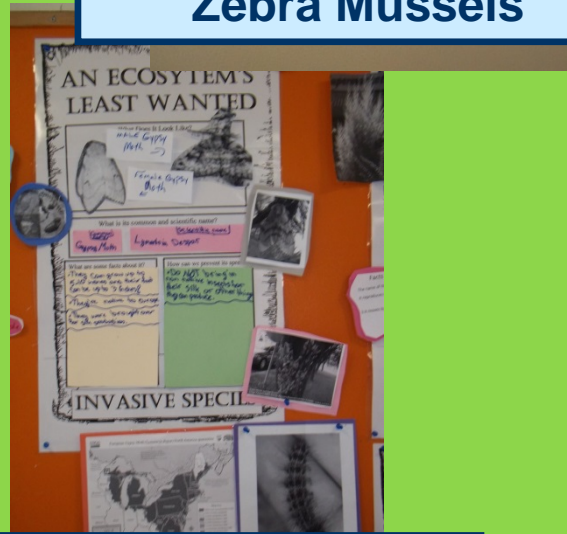
European Starling



Woolly Adelgid

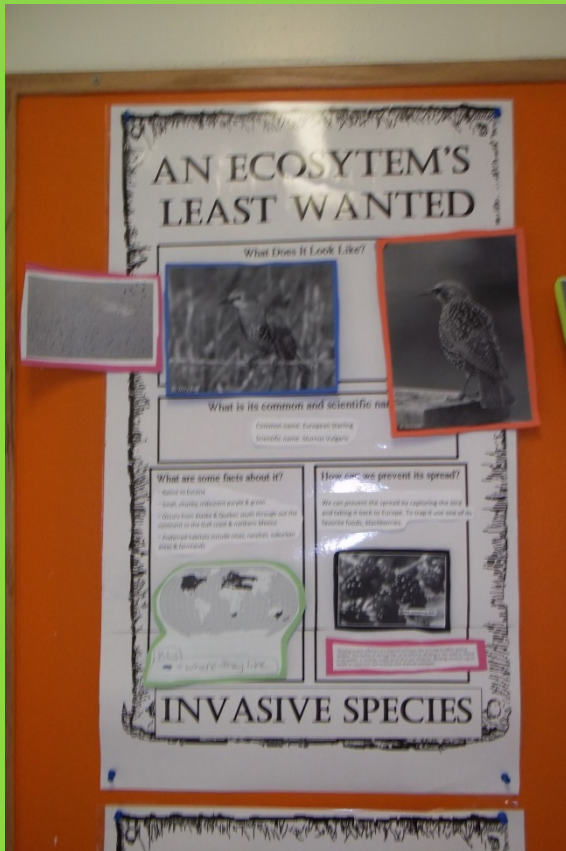


Zebra Mussels

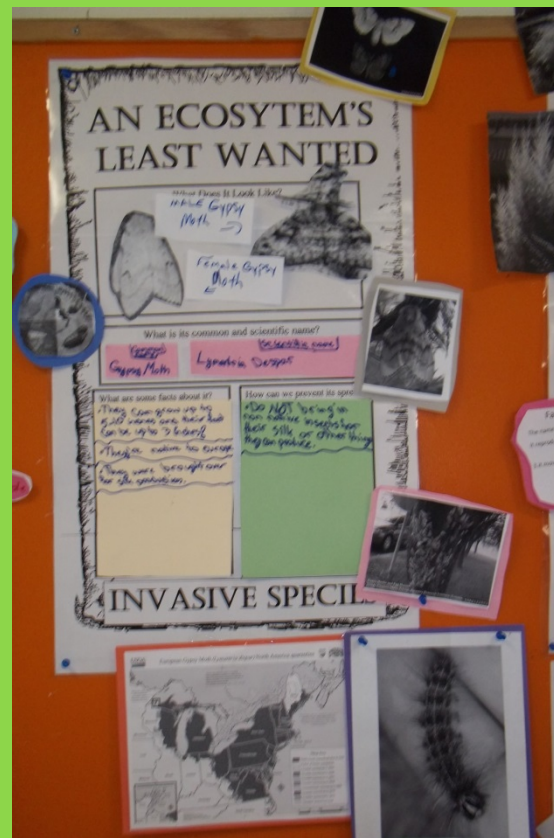


Gypsy Moth

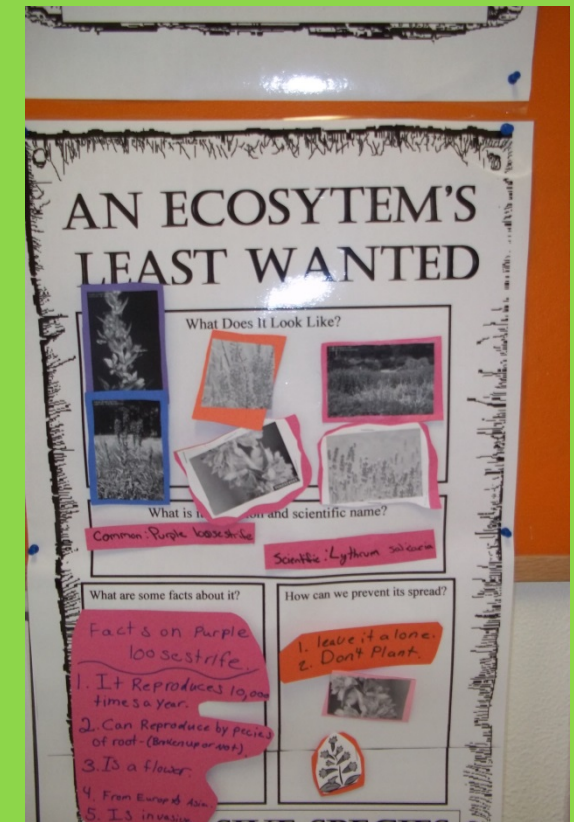
Examples of Mrs. McDonald's Fifth Grade Students' Research of Invasive Species and Persuasive Writing



European Starling



Gypsy Moth



Woolly Adelgid



Mrs. McDonald's students with posters and persuasive letters informing and persuading people to help prevent the spread of invasive species.



Building and Extending into Water Ecosystems

What action
can we take
to preserve
or make
positive
change in
water
ecosystems?



What can we
learn about
water
ecosystems?



How do we
do research
in water
ecosystems?



Spring Visit to Great Falls Discovery Center

**What is a
Watershed?**

**How Does
Water Move
and Collect
in a
Watershed?**



From Estuary to the Northern Woods: *What are the ecosystems in a watershed? How do organisms interact in them?*

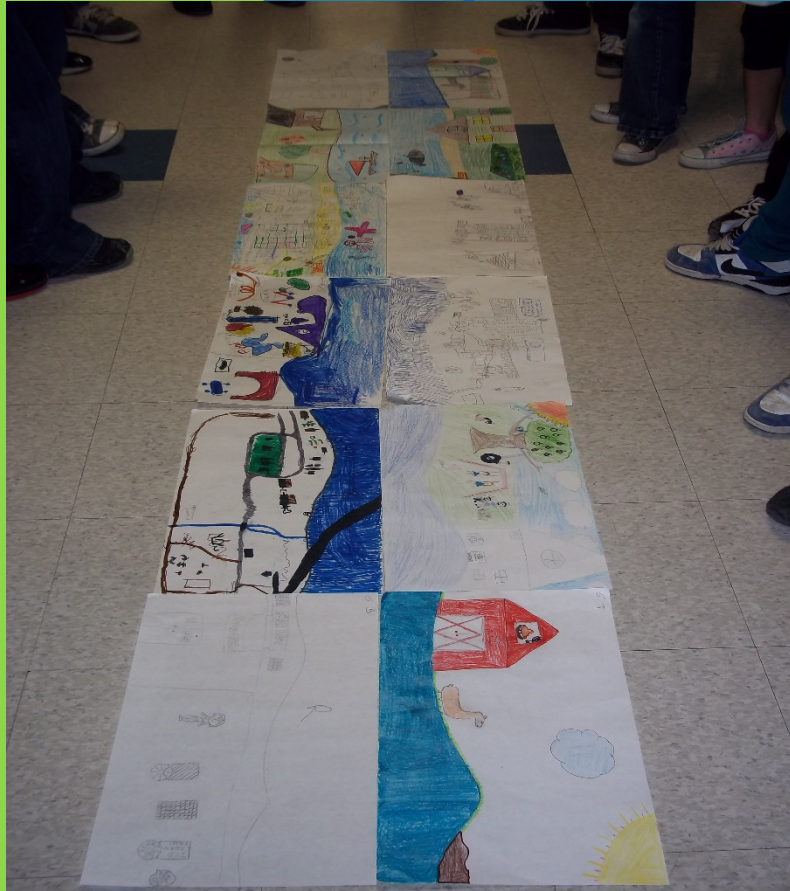


How do humans impact a watershed? *Point and non point sources of pollution. What steps can we take to minimize pollution?*



“Pollution is the Sum of the Parts” Classroom Activity from *Project Wet*

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Visit to the Turners Falls Fish Ladder

What physical and behavioral adaptations do native and anadromous fish have that help them to survive?

shad



sea lamprey



How does human development impact migrating paths at Turners Falls Dam?



Learning how to collect data on Lake Monomonac with NH State Limnologists in June.

