

Doors to the World Mini-Unit
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Moth and Wasp, Soil and Ocean: Remembering Chinese Scientist Pu Zhelong's Work for Sustainable Farming

Author: Sigrid Schmalzer

Illustrator: Melanie Linden Chan

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2018 Freeman Book Award Winner

Notable Social Studies Trade Books for Young People 2019

Winner of The Sigurd F. Olson Nature Writing Award

Selected for the CCBC Choices 2019 list

I am an early childhood teacher, currently teaching Kindergarten in a rural school system in western Massachusetts. I want my students to be exposed to and appreciative of various cultures around the world. I am personally and professionally interested in East Asia, therefore, I am always looking for new material to expand my knowledge. What is life like in a small village in Japan or China? Are they self-sufficient? If so, then what do they do to obtain this standard of living? I recently read a wonderful book to find out

Contextualizing the Picture Book

Context- Descriptions and Resources

- Summary: This picture book is in essence a biography of the Chinese scientist Pu Zhelong, a champion of sustainable farming, told from a child's perspective. The child grew up in a village in Guangdong Province where the farmers grew rice and which was known for its lychee orchards. The villagers relied on simple, but not very effective, ways to kill the pests that ate the rice and lychees. Then they began to use chemicals. The chemicals worked for a while, until the insects became resistant to them. Pu Zhelong, who had studied at the University of Minnesota arrived in Guangdong in the 1950s, traveling to remote villages to show farmers sustainable ways to protect their crops by using nature itself.
- Genre: This picture book is a biography.
- Author's background: Dr. Sigrid Schmalzer is a history professor at the University of Massachusetts Amherst. She lived in China. She has two children. She has written several books focusing on social, cultural and political aspects on the history of science in modern China. Her other books include *Red Revolution, Green Revolution: Scientific Farming in Socialist China* (2016). She is interested in agricultural science.
- Illustrator's Background: Melanie Linden Chan has worked with many mediums such as watercolor, acrylic, pan& ink. She sometimes uses full bleed as well as bordered illustrations. This is her first book length project.
- Sources of Inspiration for the Author: Schmalzer lives near The Eric Carle Museum of Picture Book Art in Amherst, Massachusetts, where she learned about the Whole Book Approach. After visiting the museum many times, she was inspired to write a nonfiction book for children in addition to academic text books. She was also inspired by the Chinese theme of "soil and ocean"--the meeting between rural/traditional and modern life. Rachel Carson's *Silent Spring*, which pointed out the dangers of using chemicals to control insect pests, was also an inspiration.
- Sources of Inspiration for the Artist: Melanie Linden Chan used her husband's ancestral village in the Pearl River Delta in Guangdong Province, as the model setting for the art work. Her illustrations are inspired by Chinese paper cuts and feature Chinese characters.
- Geographical Region/ Time Period Represented: The story takes place in Guangdong Province in China in the 1960s-1970s.

- Cultural Themes in the Story: Using natural pest control trumps chemicals and pesticides; nature can sometimes control the pests by itself. The idea that farming has long been a part of life in China is a definite theme as the main focus is Pu Zhelong and his work in the rural provinces to assist in improving farming techniques. Using what is available locally is another main idea.
- Media of Illustrations: In full bleed and bordered illustration style, the life of a peasant boy is shown as the story of Pu Zhelong is told. A real propaganda photo was reproduced on one of the pages as well as some original photographs appearing as illustrations on several pages. The final illustration shows the transformation from rural to modern. The cover of the book can be seen in the lower right corner of the final illustration.

Learning Experience Design

* What learning opportunities does the text offer to support and engage children learning?

1. The poem about the helpful animals that utilize insects in the food chain:

By day watch swallows on the wing
In evening listen to frogs sing
While graceful webs the spiders string

would be a wonderful starting point for trying to generate a list of other creatures that might eat annoying insects. How many insect eating creatures can the class come up with? Once a list is generated, a class book might be compiled with an insect eating creature on each page, each page done by a different student. Research about each creature could accompany its page along with an illustration, addressing a common core objective to increase reading and writing about nonfiction topics.

2. The book mentions a wasp hatching from a moth's egg. Parasitoid wasps are considered beneficial as they naturally control the population of many insect pests. The class could explore what other insects and creatures can be parasitic. Cowbirds and cuckoos are examples of birds whose behaviors are parasitic. Female *Glyptapanteles* wasps lay their eggs inside the bodies of caterpillars. Hyperparasitoids will inject their own eggs into *Glyptapanteles*. There are many fascinating (although gruesome) videos on the internet that can be viewed.

Charles Darwin was fascinated by this parasitic behavior. Investigating the work of Charles Darwin might be interesting as well.

Harvard University's lab school, located in Petersham, Massachusetts, has a School Yard component where teachers submit data they classes collect on the hemlock wool adelgid, also known as the Woolly Bully. Dr. David Orwig spearheads the study of these destructive insects and is knowledgeable about the various attempts in finding a natural predator for them. <https://harvardforest.fas.harvard.edu/help-schoolyard-grow>

3. A wonderful science lesson involving natural pest control would be ladybugs verses aphids. Put out an APB to parents and the community for a plant invaded by aphids. There's usually one out there somewhere! While the unfortunate plant waits in your classroom, order some ladybugs from Connecticut Biological (<https://www.connecticutvalleybiological.com/>) or some other insect supplier. When the ladybugs arrive, corral some infested leaves in containers that can be individual or shared between two students. Distribute magnifying glasses and add a few ladybugs to each container. What a fascinating observation!

Families, Communities, and Local/National Connections

Families with gardens, communities with gardens or parks might be interested in natural pest control. The Hemlock Woolly Adelgid is an invasive species from Asia that has wiped out the hemlock population along the southeastern coast of the United States. Can we find a natural predator for this creature before it's too late for the hemlock trees?

Additional Multimodal Opportunities

- *The Grouchy Ladybug* by Eric Carle can be read to the class. It illustrates that as tiny as ladybugs are, they are predators for aphids.
- Make ladybugs from a large paper plate. Paint it red, add black spots. Add a black paper head and six legs.

- Show some videos of predatory insects and creatures. You Tube is a great resource, but always preview yourself. Some can be disturbing and gruesome.
- Many students may not know what lychee are. These fruits can be purchased at a local grocery store. Have a tasting party!
- Make a life cycle picture with uncooked pasta! Start with a green leaf at 12:00 and glue the egg on top of tiny macaroni like that found in minestrone. Then at 3:00, draw a green leaf and place a piece of penne pasta, the caterpillar on top. Color with fine tip markers if desired. At 6:00, place a piece of rigatoni pasta, the pupae stage. Then, at 9:00 glue a bowtie pasta butterfly. Add antennae and colorful strips or spots with a fine tip marker.
- Play a silly game. Divide the class into thirds. One third can be ladybugs, the rest aphids. Ready, set, run! The ladybugs tag (catch) as many aphids as they can. Tagged aphids can be deposited on a “leaf” or crouch down dead. When all the aphids are tagged, choose new ladybugs.
- Act out the life cycle of a butterfly, wasp, or other interesting insect
- Act out the stages of a plant: seed, sprout, stem, leaves, flowers, fruit, then repeat
- Create a model insect out of recycled materials: egg cartons, towel tubes, pipe cleaners, etc. Name it. What does it do? Helpful? Pest?

Interdisciplinary Opportunities

- Create math word problems! For example: There were X aphids. Along came six ladybugs. If the ladybugs each ate four aphids, how many aphids did they eat? How many were left?

Summative Learning Experience

- Each child creates a four-page book of their own to describe the stages of plant or butterfly life cycles.
- Each child chooses an insect to research. Each child creates a poster of that insect with life cycle information, what it eats, if it pupates, etc., including a large illustration of the adult, and any predators it might have. Is it a useful insect? Pest? Create a draft, which must be approved by the teacher. If approved, the student receives a LARGE poster board on which to write and draw his research insect. Display them!
- Students can each create together or separately a slide show using KidPix or Keynote. Even Drawing Pad on the iPad. Describe the insect as an adult, its life cycle, and its behavior.

Satisfying the Standards

The following standards are addressed:

Preschool

- LS2. Ecosystems: Interactions, Energy, and Dynamics
- PreK-LS2-1(MA). Use evidence from animals and plants to define several characteristics of living things that distinguish them from non-living things.
- PreK-LS2-2(MA). Using evidence from the local environment, explain how familiar plants and animals meet their needs where they live.
- PreK-LS2-3(MA). Give examples from the local environment of how animals and plants are dependent on one another to meet their basic needs.
- LS3. Variation of Traits
- PreK-LS3-1(MA). Use observations to explain that young plants and animals are like but not exactly like their parents.

Kindergarten

- K-ESS2-2. Construct an argument supported by evidence for how plants and animals (including humans) can change the environment.
- K-LS1-1. Observe and communicate that animals (including humans) and plants need food, water, and air to survive. Animals get food from plants or other animals. Plants make their own food and need light to live and grow.
- K-LS1-2(MA). Recognize that all plants and animals grow and change over time.

First Grade

- LS1-1. Use evidence to explain that (a) different animals use their body parts and senses in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water, and air, and (b) plants have roots, stems, leaves, flowers, and fruits that are used to take in water, air, and other nutrients, and produce food for the plant.
- LS1-2. Obtain information to compare ways in which the behavior of different animal parents and their offspring help the offspring to survive.
- LS3-1. Use information from observations (first-hand and from media) to identify similarities and differences among individual plants or animals of the same kind.

Second Grade

- 2-LS2-3(MA). Develop and use models to compare how plants and animals depend on their surroundings and other living things to meet their needs in the places they live.

Naming Next Steps in Your Learning

1. What other creatures are parasitic beyond our generated list?
2. How could we explore the life cycle of a silk worm?
3. I would go to the library, nearby colleges, use my computer.

Resources I would need to support my explorations: books, YouTube, Google, primary sources such as professors, the employees at Connecticut Valley Biological.

Additional resources

Webinar

Moth and Wasp, Soil and Ocean: Remembering Chinese Scientist Pu Zhelong's Work for Sustainable Farming, Presenter: Sigrid Schmalzer, author

<https://attendeegotowebinar.com/register/1637737251396678659>