

# McCarthy Vernal Pool: Mini Research Projects





# Out at MVP





# Stages of the Project

- Building background information
- Planning projects
- Collecting data
- Data analysis





# Building Background Information

- Students had no idea what a vernal pool was
- Ecology backgrounds were limited
- Introduced students to vernal pools through a PowerPoint presentation and discussion





# Building Background Information

- Reading assignments
- Attended vernal pool outing with Chelmsford Conservation Commission
- Top 25 vernal pool organism presentations
- Water sampling and microscopic observations
- Quadrat sampling near vernal pool
- Site visits to our pool of study

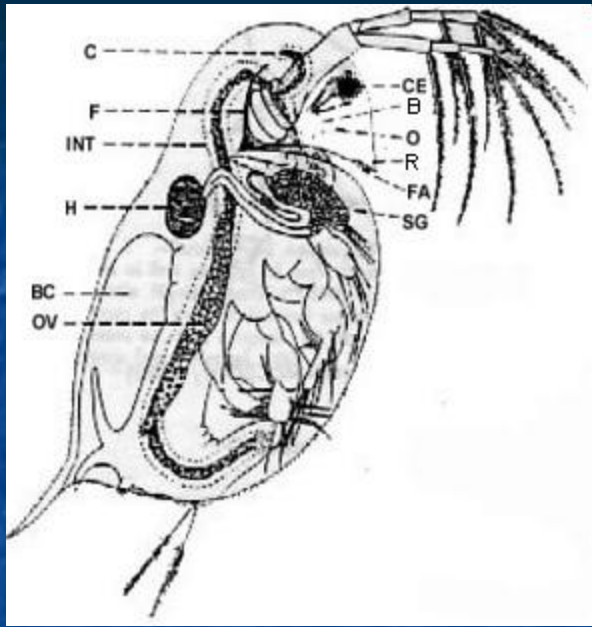




# Student Samples of Top 25 Organisms Project







# Daphnia

Amanda Chang



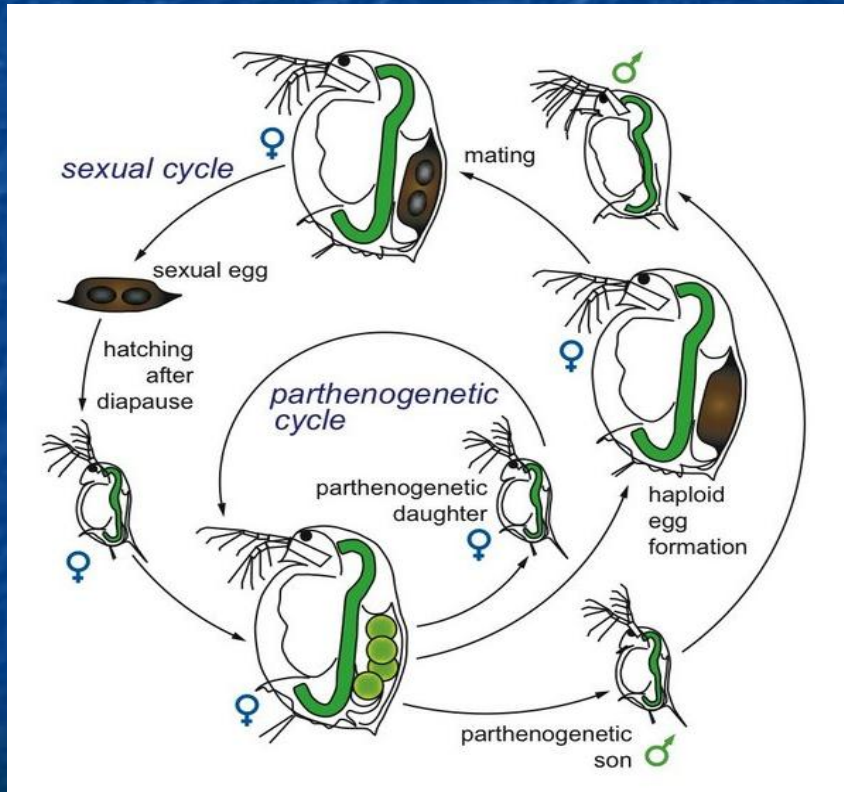


# Despite the pretty name....

- Daphnia are also known as "water fleas"
- Are actually crustaceans
- Named because they have jerky movements (like fleas)
- Clear shell, carapace, means all internal organs can be seen
- Interestingly enough, are virtually disease-free in areas without fish (vernal pools!)



# Daphnia development



- Usually asexual, producing daughters that brood (100 eggs) every 3 days
- In adverse conditions, will produce males and sexual reproduction will occur
- First brood at 4 days old
- Live for less than 1 year, but is highly variable depending on species and temperature



- Males appear when the vernal pools start drying up
- Eggs are in air matrixes on female
- Female releases eggs, eggs float to pool edge, remain there until next wet season
- When pool fills, females hatch and cycle repeats





# Around the neighborhood

- Eggs can be found at vernal pool edges
- Most active when there is a large concentration of algae
- Best time to see them is before dusk in shallow water
- Most abundant in vernal pools



# Eat and be eaten

- They eat:
  1. Algae (number of daphnia usu. proportional to number of algal blooms)
  2. Yeast
  3. Bacteria
  4. Bran
  5. Wheat flour
  6. Dried blood (seriously)
  7. Plants
  8. Decaying organic matter

They are eaten by:  
Larval amphibians  
Insect larvae  
invertebrates





# Sources

- <http://www.evolution.unibas.ch/ebert/publications/parasitismdaphnia/ch2f9.htm>
- <http://web.cecs.pdx.edu/~davidr/discus/articles/daphnia.html>
- <http://www.caudata.org/daphnia/>
- [www.ovpp.org/files/micro\\_odyssey\\_drawings.pdf](http://www.ovpp.org/files/micro_odyssey_drawings.pdf)



# Eastern Garter Snake



Keah Hazel  
Mrs. Sparks



# *Where is it found within a VSP?*

- ◊ *Under logs*
- ◊ *Under rocks*
- ◊ *Under debris*
- ◊ *Under vegetation*
- ◊ *All cover used is very close to vernal pool*







# Food Chain

- What does it eat?
- Frogs and toads
- Salamanders
- Earthworms
- Small fish and tadpoles
- Mice
- Bird eggs
- Slugs
- Leeches
- Insects
- Small snakes

## What eats it?

Hawks

Skunks

Raccoons

Virginia Opossum

Larger snakes

Bull frogs



# When is it most active in VP?



- An Eastern Garter Snake is active throughout the year except winter (Late March - Early May)
- In winter, the snake hibernates
- It is most active during the spring because it is mating time





# Life Cycle



- Males leave hibernating den
- When females arrive later, males surround females in swarming mass called mating ball
- Female departs to summer habitat
- Eggs incubate inside female body, birth is given to live young
- Gestation take 2-3 months, litters between 10-40
- No parental care

# Interesting Info

- First snakes of their habitat to become active in Spring (have been seen in snow)
- Release bad odour when attacked
- Can live up to ten years in captivity





# Works Cited

- [http://www.fcps.edu/islandcreekes/ecology/eastern\\_garter\\_snake.htm](http://www.fcps.edu/islandcreekes/ecology/eastern_garter_snake.htm)
- [http://www.users.muohio.edu/boonemd/Garter\\_Shaun.pdf](http://www.users.muohio.edu/boonemd/Garter_Shaun.pdf)

# The Green Frog

## Description:

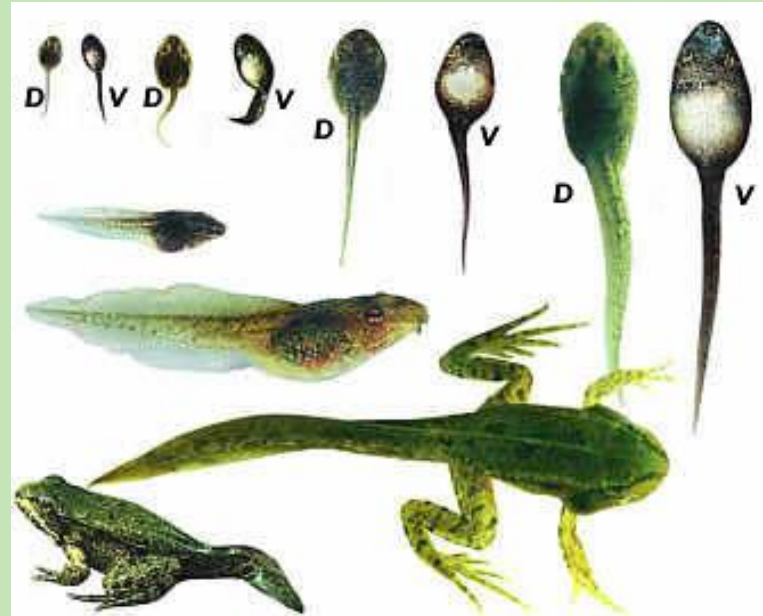
- Large
- Greenish/brown
- white belly
- black stripes on the legs
- black spots on top





# The LIFE CYCLE

- Females lay 4000 eggs in plants on top of water
- Tadpoles hatch in 7 days
- Go through 13 distinct growing phases until fully grown
- Takes more than a year (almost 400 days)



# To be or not to be (eaten)

## predators

- Reptiles: snapping turtles and red-sided garter snake
- wading birds like the great blue heron.



## Prey

- Insects
- Small invertebrates: snails and spiders



# Frog in the pool!

- Found near water in Eastern Central North America- often in more permanent Vernal pools, large ponds, lakes, or streams
- Spends all time in or near water
- Most active at night
- Hides near water plants and edge of pool in day
- Spend winter at bottom of bodies of water under ice
- Most active in pool from June to August- Mating season



# Wicked fun facts



- Tadpole is the second largest European tadpole
- Mating call sounds like a broken banjo string
- Male green frogs stay in their own small area rather than group to call for mates



# Thank you websites:

- <http://www.google.com/imgres?q=green+frog+tadpoles>
- <http://www.naturenorth.com/1np/Species/amphibian/1Ffrgr.html>
- [http://www.vernalpool.org/sly\\_7.htm](http://www.vernalpool.org/sly_7.htm)

# Planning Projects

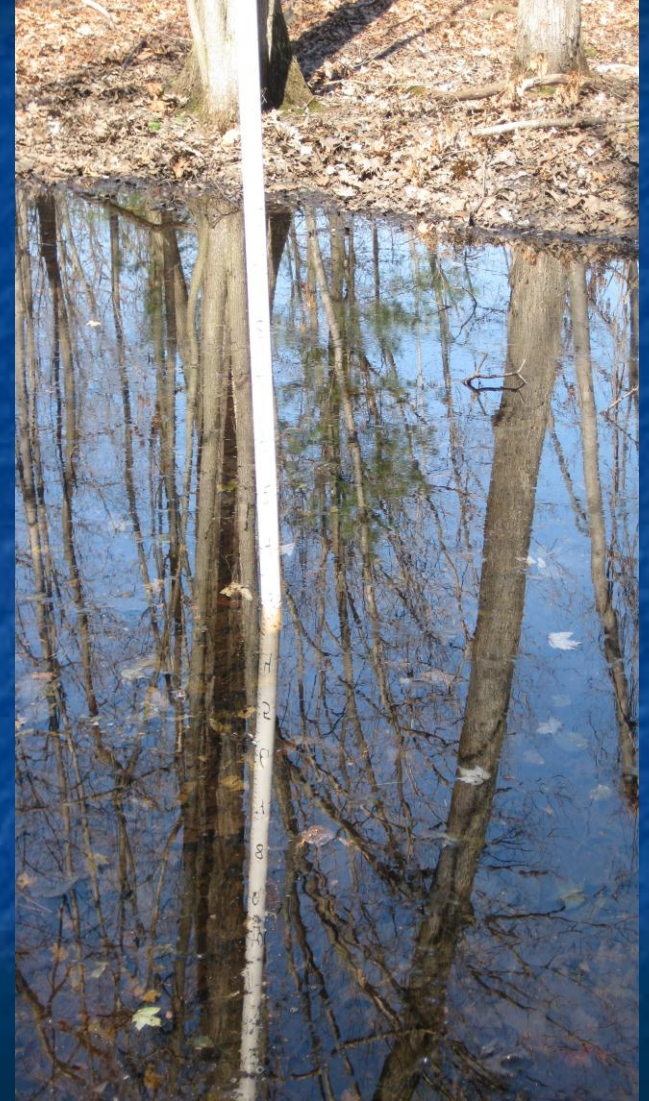
- Students were asked to design a mini research project centered around vernal pools (see handout)
- Enabled students to study a specific aspect of the vernal pool
- Inquiry based learning
- Differentiated learning – range of abilities in my classes





# Student Samples

- Are there varying salt concentrations in the vernal pool?
- Do the organisms within vernal pool water samples vary depending on where the water samples are collected from?
- Is the pH consistent throughout the vernal pool?
- How does weather impact the organisms within the pool?





# Data Collection

- Data collection will be taking place over the next few weeks
- Students will have multiple opportunities to collect data & analyze it





# Data Analysis

- Collected general data each trip to vernal pool; perhaps students will use this data as well
- Students will be working in groups to analyze data
- Hoping to have students generate graphs to enhance projects



# Project Summary

- Excellent opportunity for students
- Students genuinely liked doing their studies
- Great analytical practice for all students









# Challenges and Improvements

- Lots of paperwork to go outside (field trip)
- Need more time
- Perhaps do the project over the course of 2 years
- Students have a hard time coming up with ideas when project is open-ended
- Introduce project to students in the summer
- Always will be a work in progress