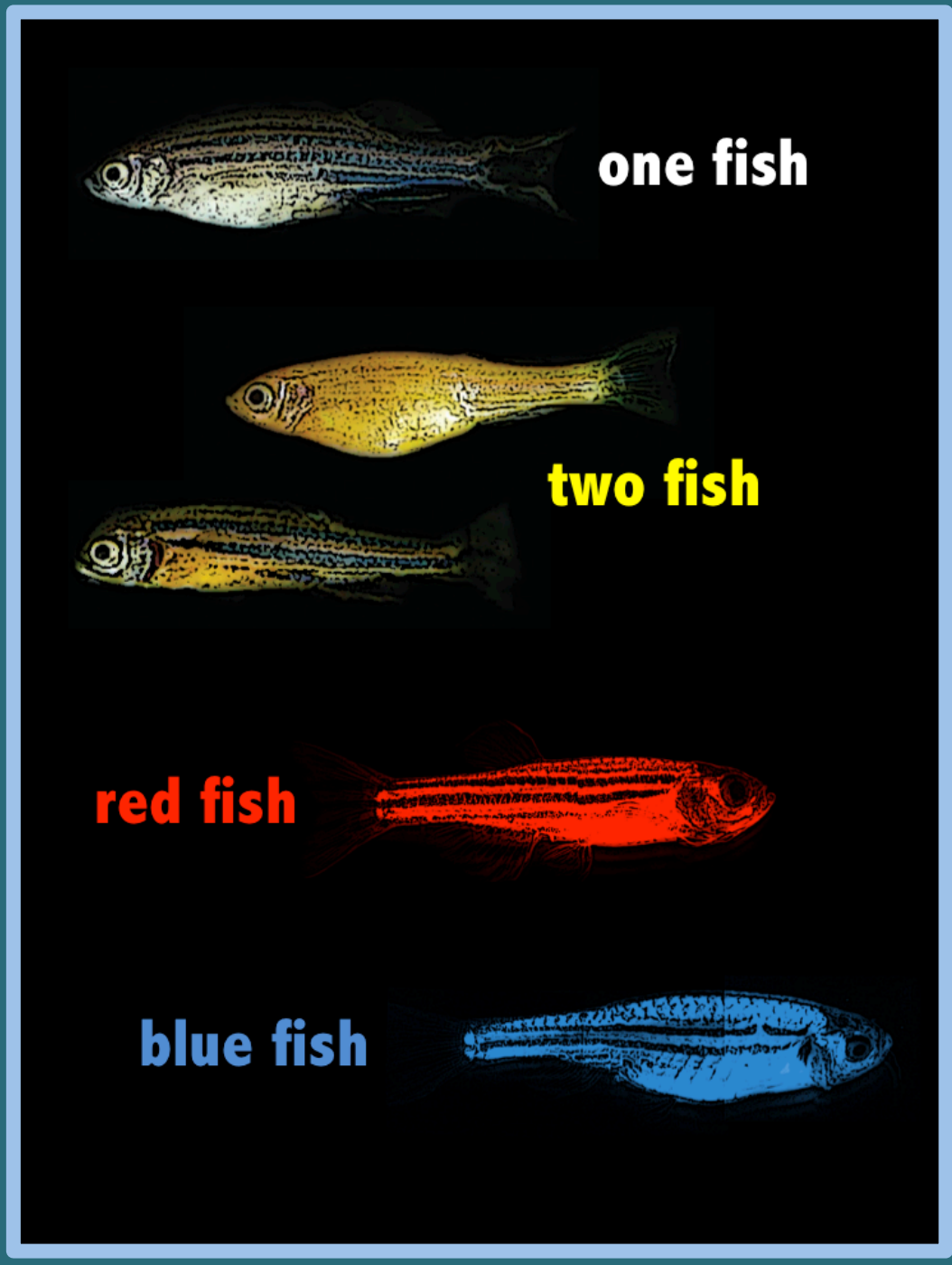
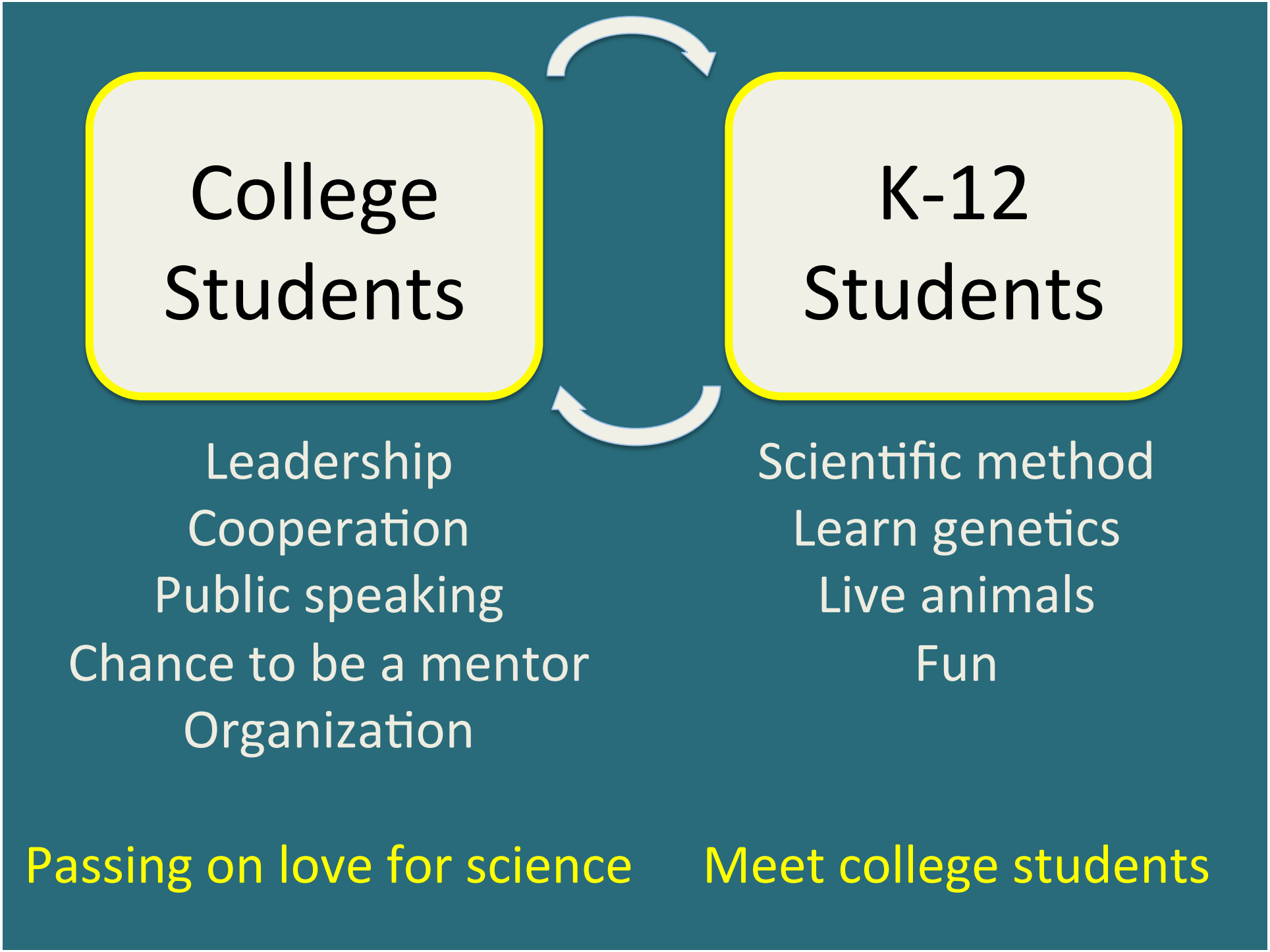
Talk given by Jennifer Liang at the 11th International Conference on Zebrafish Development and Genetics, June 2014, Madison, WI.




College Students
K-12 Students
Leadership
Cooperation
Public speaking
Chance to be a mentor
Organization
Scientific method
Learn genetics
Live animals
Fun
Passing on love for science
Meet college students

The Particulars

5 undergraduate students
2 undergraduate teaching assistants
1 professor

Discussion/Planning

Wednesdays 1:00-1:50
Fridays 1:00-1:50

Classroom visits/Practice

Fridays 9:00-12:50

One semester

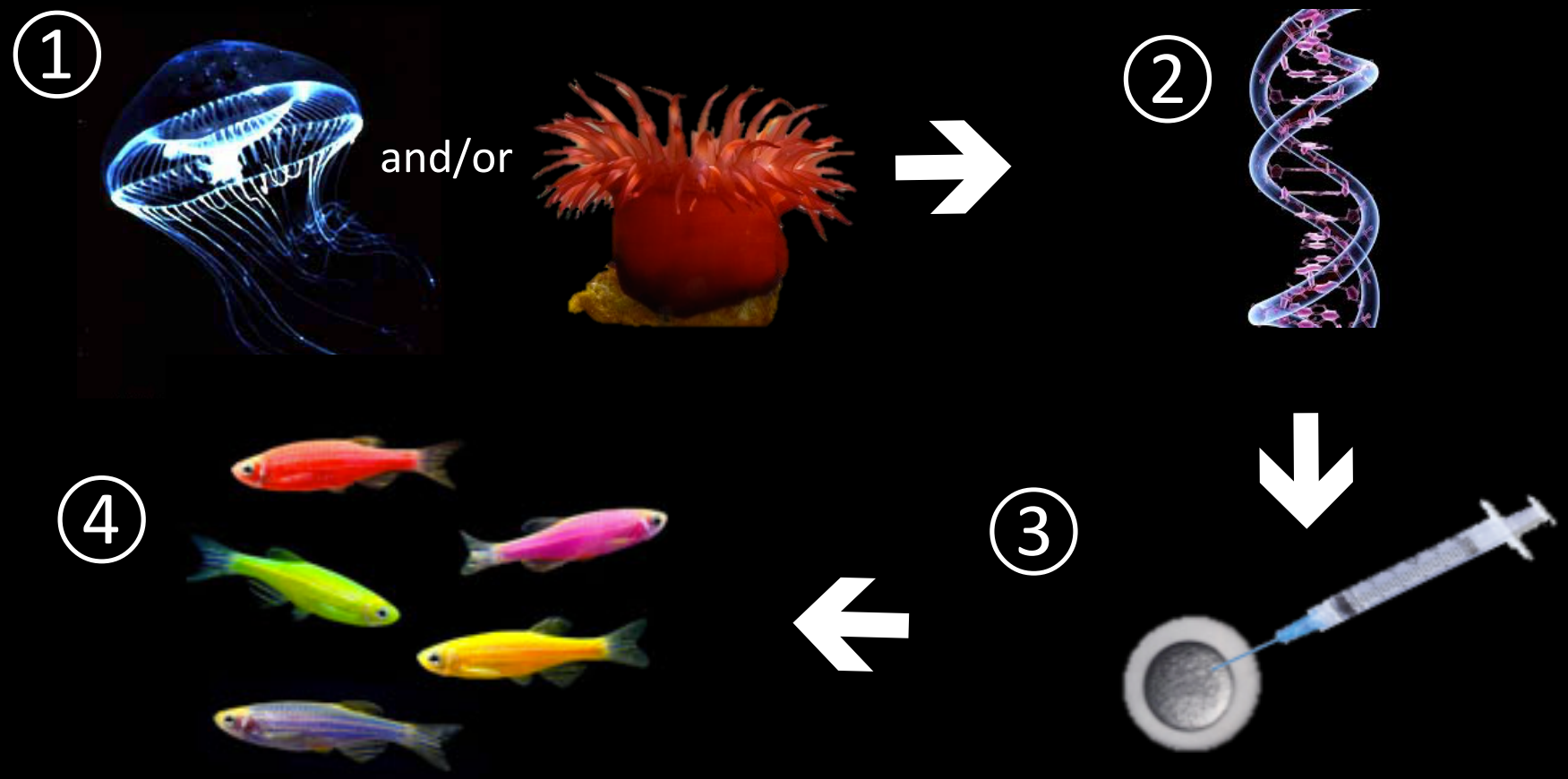
12 grade AP Biology	33 students
7th grade Biology	158 students
5th grade science	107 students
Kindergarten	43 students
1st grade	90 students
2nd grade	64 students
Total	**495 students**

All based on GloFish®

http:///www.glofish.com

Can buy them in almost any pet store
Can breed them for educational purposes
(http://www.glofish.com/our-company/license-notice/)
Beautiful colors under room lights
Glow/Fluoresce under specific wavelengths of light
Great for teaching genetics
Need animal protocol***

Why do Glofish fluoresce?



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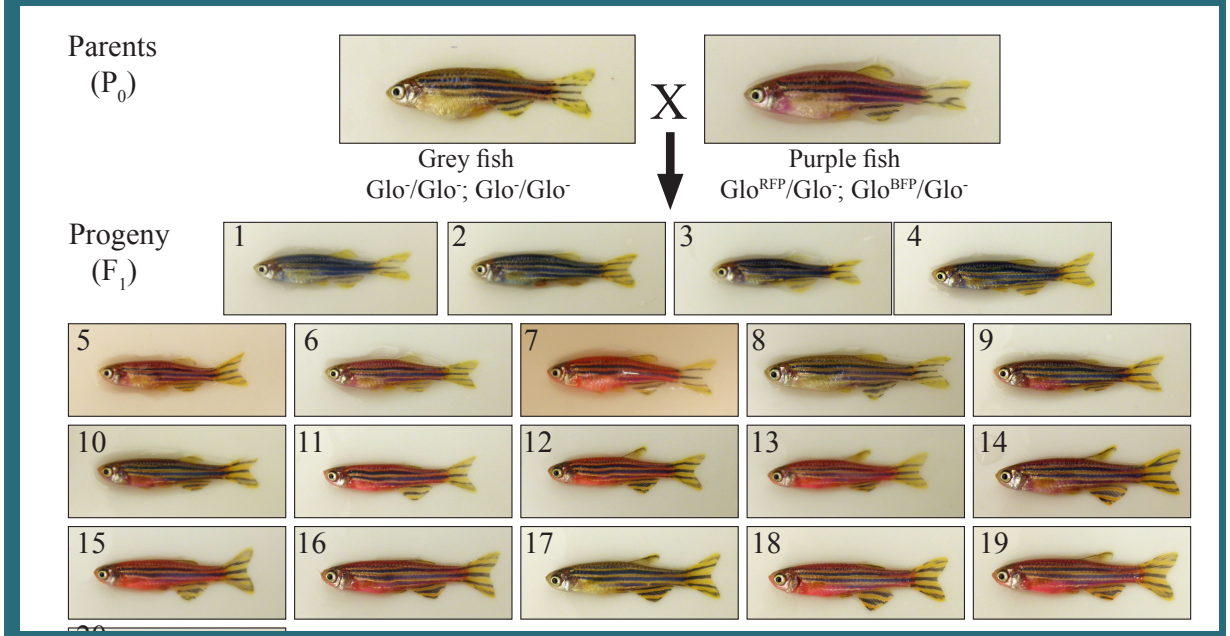
http://www.accessexcellence.org/RC/AB/BA/drug_testers/aequorea_win.php

http://www.worldanimalfacts.com/animal-flowers-of-the-sea/

http://www.mwdental.com/supplies/anesthetics/needle-syringe-combinations/5-8-length-25ga-3ml-luer-lok-tip-syringe-needle-combonation.html & http://denisezannino.wordpress.com/

Hands on

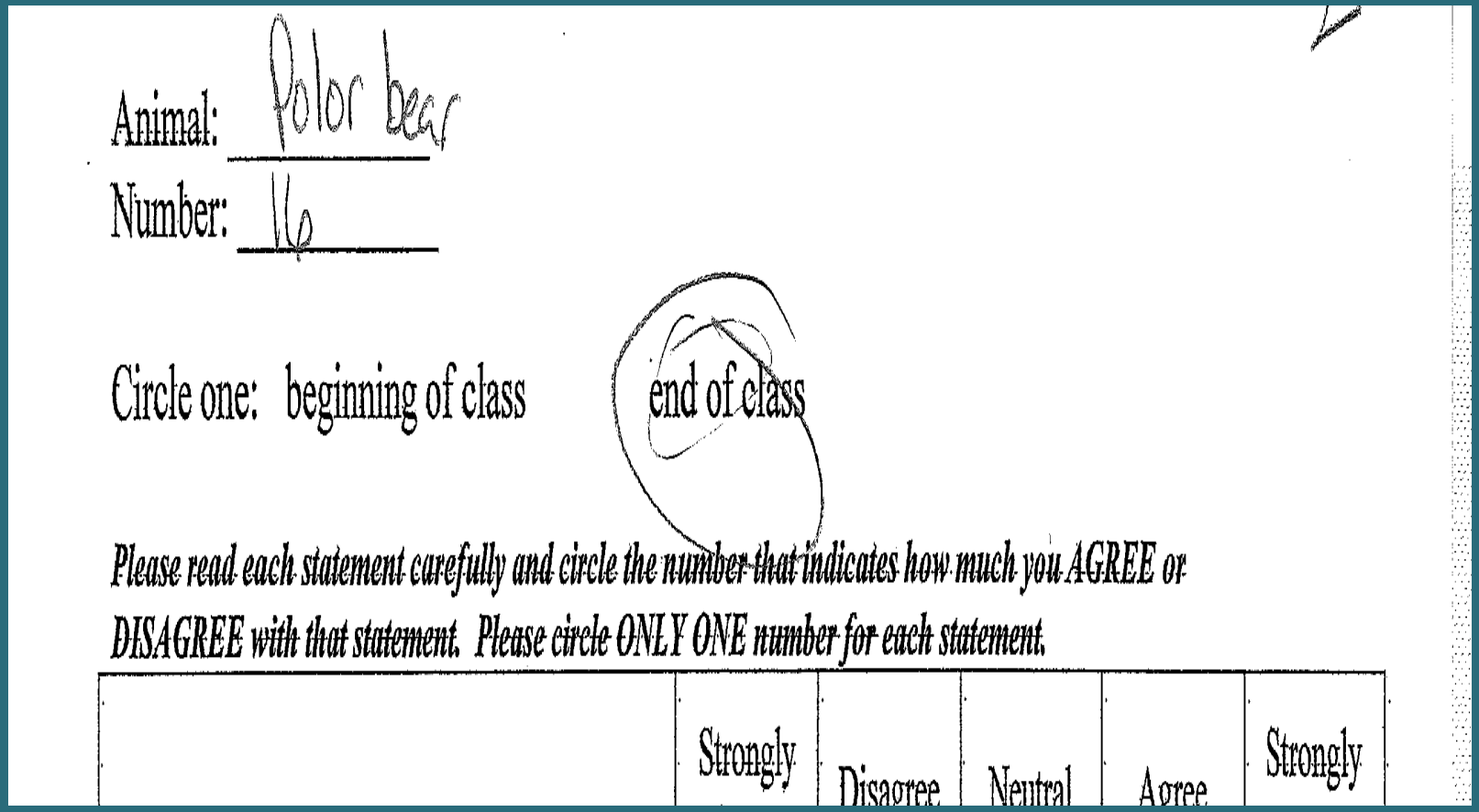


Pictures by Sooji (Katie) Jo, Bethanie Borg, and Suzzy Arika
Figure by Sooji Jo

Close match to AP Biology exam

Mendelian genetics
Punnet squares
Chi-square analysis

5th grade science at Marshall



Animal: Polar bear

Number: 16

Circle one: beginning of class end of class

Please read each statement carefully and circle the number that indicates how much you AGREE or DISAGREE with that statement. Please circle ONLY ONE number for each statement.

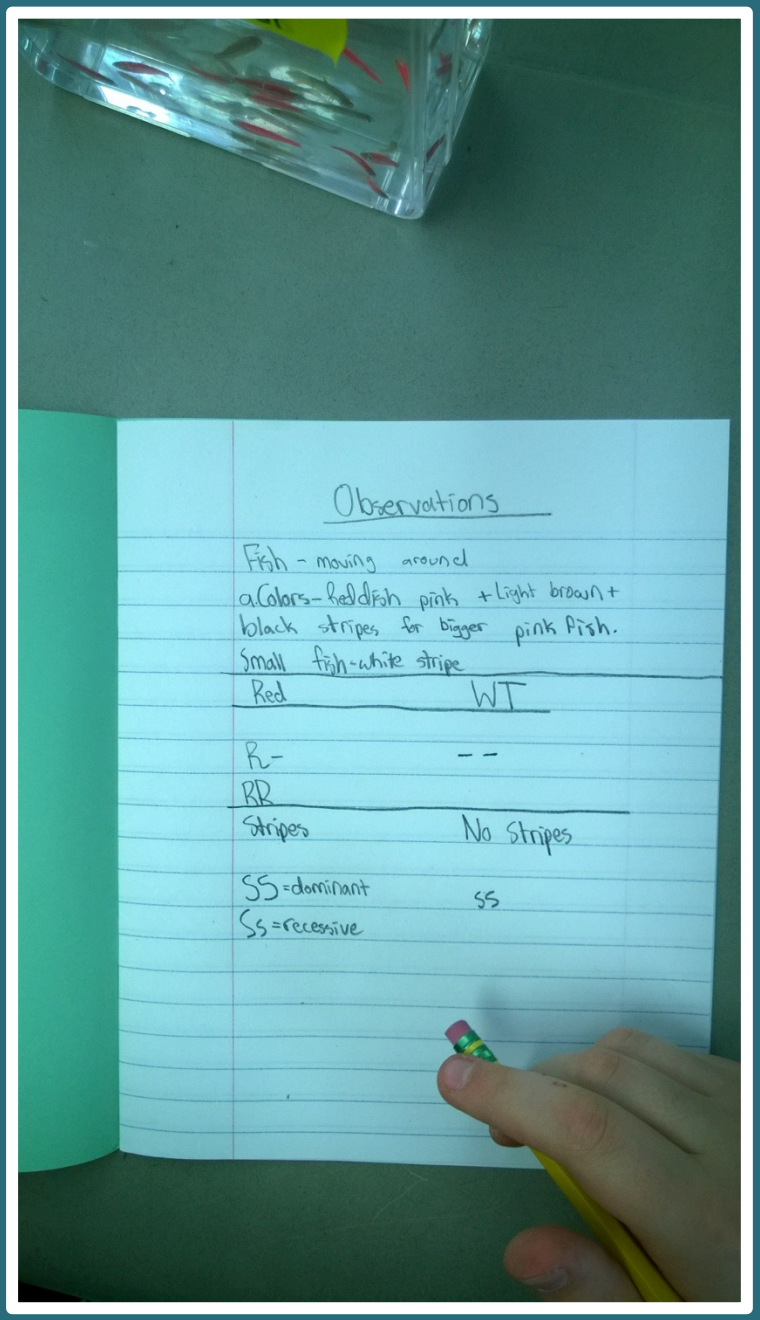
	Strongly	Disagree	Neutral	Agree	Strongly

Inheritance

MN Science Standard 5.1.1.2.
Scientific inquiry requires identification of assumptions, use of critical and logical thinking, and consideration of alternative explanations.

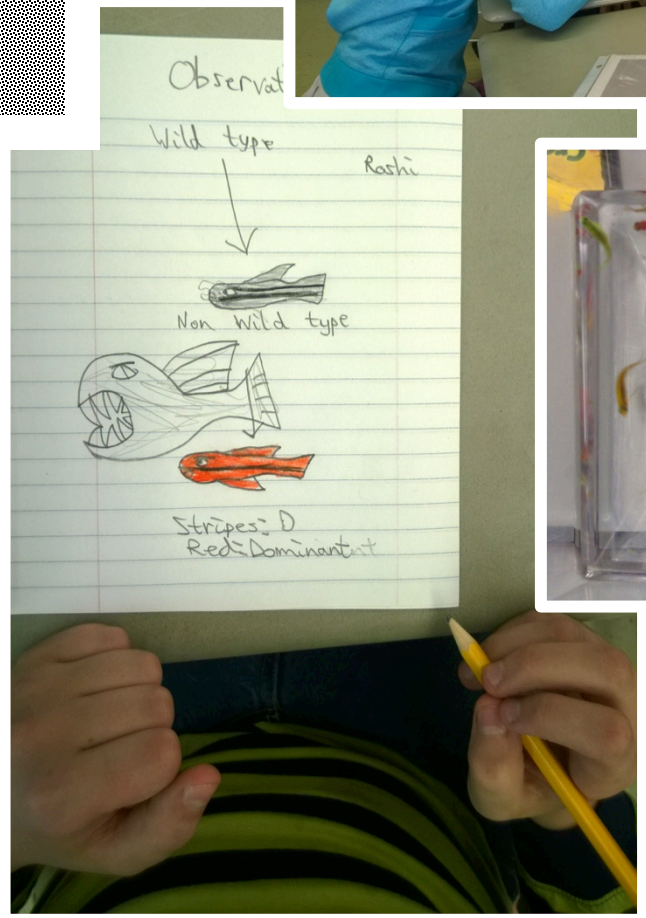
Genotype

MN Science Standard 5.1.3.4:
Tools and mathematics help scientists and engineers see more, measure more accurately, and do things that they could not otherwise accomplish.

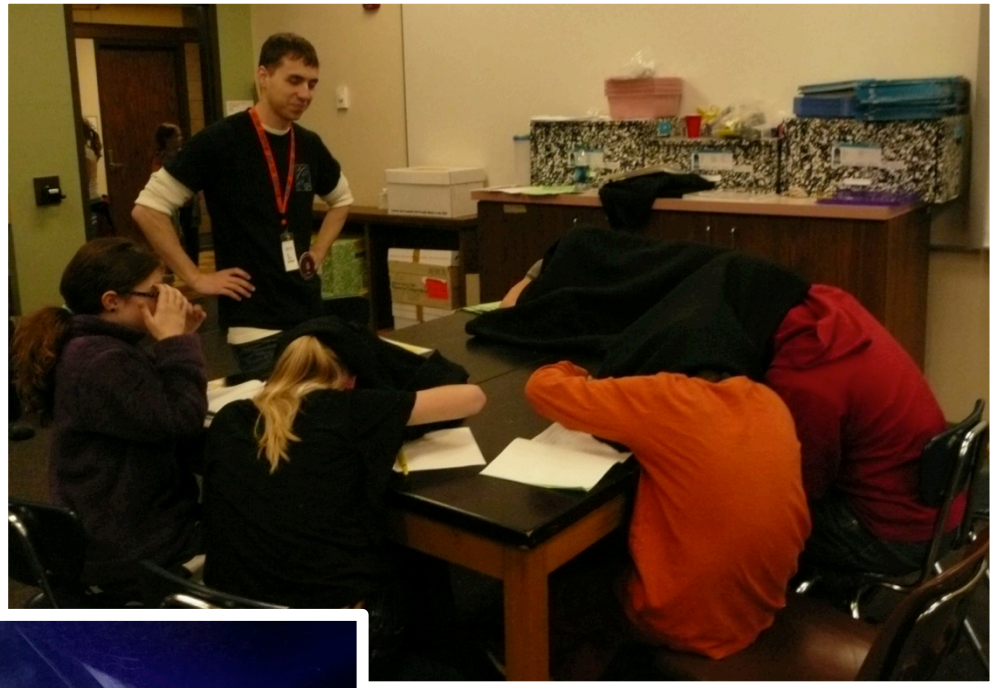


Phenotype

MN Science Standard 5.4.1.1. Living things are diverse with many different characteristics that enable them to grow, reproduce and survive.

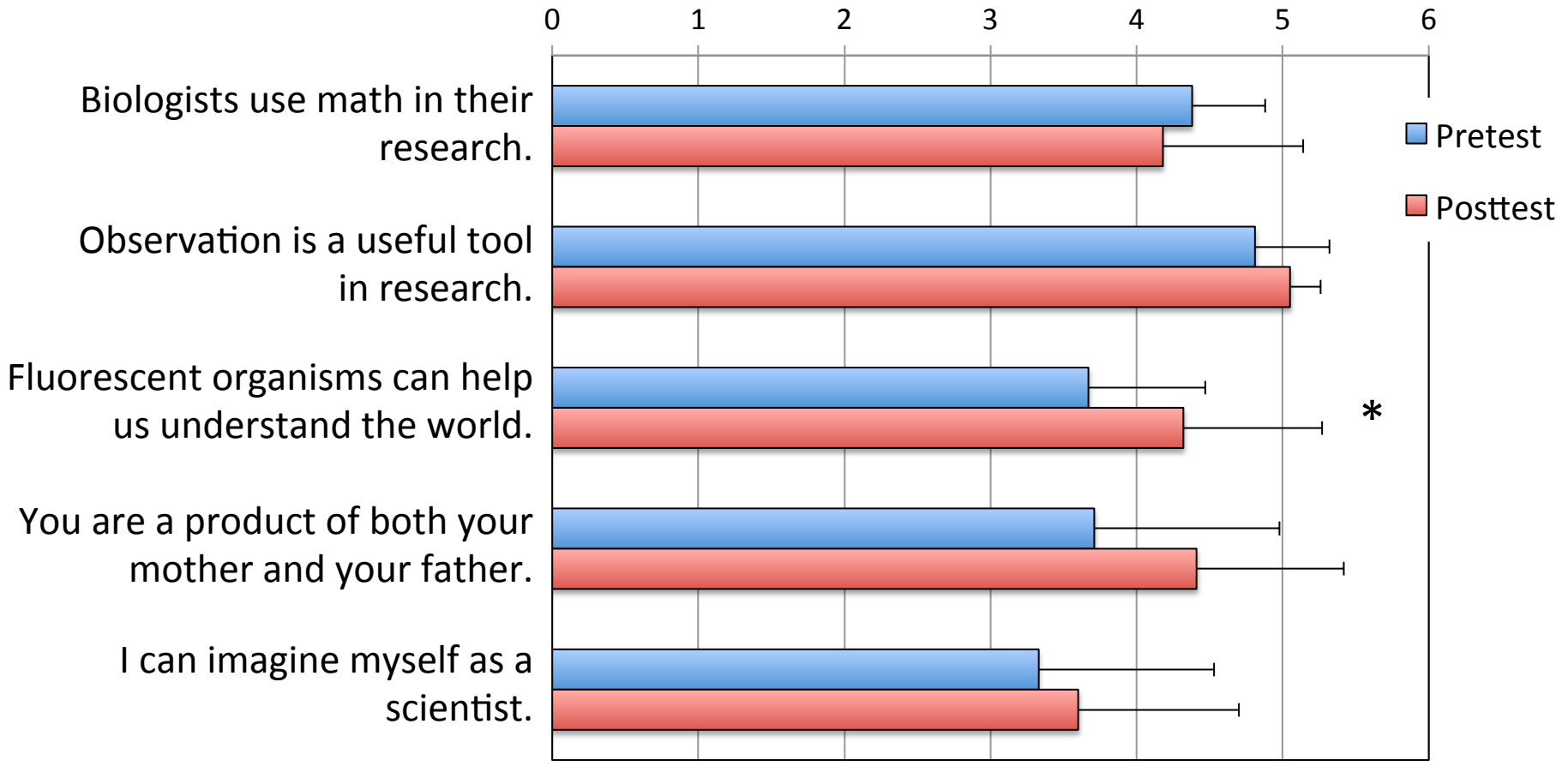


Fluorescence



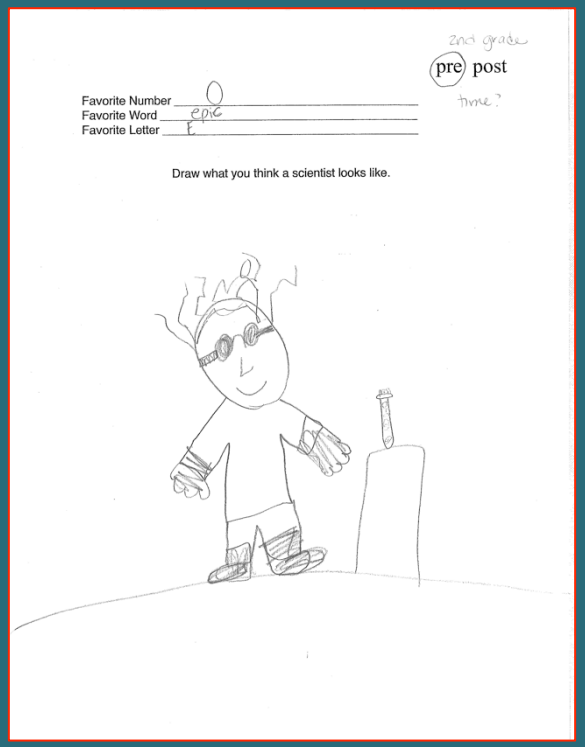
MN Science Standard 5.4.4.1. Humans change environments in ways that can be either beneficial or harmful to themselves and other organisms.

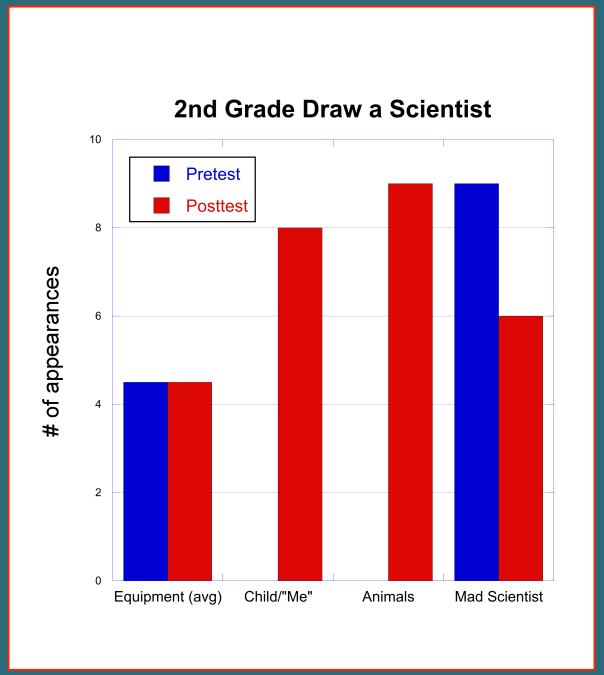
Small positive impact on student assessments

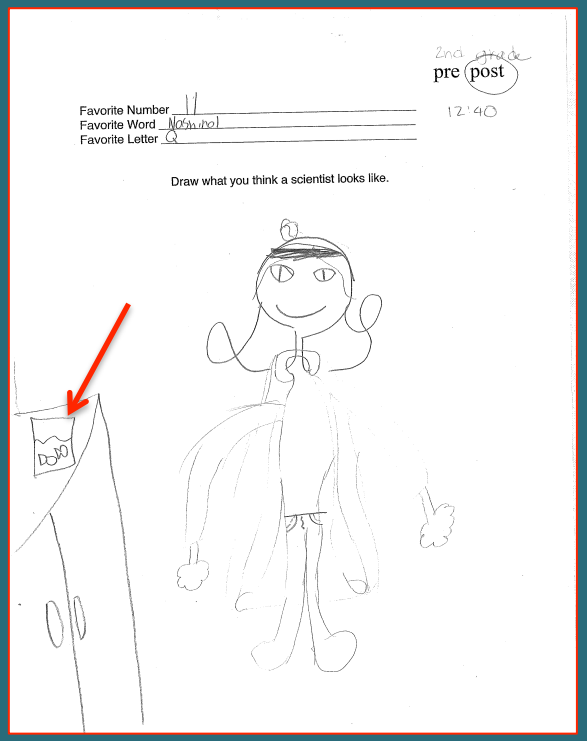


* $P < 0.05$

Draw a Scientist







Used with 2nd grade students

Thanks to Chris Pierret at InSciEd Out for this idea

Reflection and advice

Form a team that stays together for the whole semester

-group had time to develop a chemistry/group dynamic
-team members gets to try a variety of roles and tasks
-made it easier to walk into a new classroom with confidence

Why take this class

-Learn to think on your feet and adapt
-Will never be afraid to talk in front of a class again
-K-12 students will surprise you & excited to have you there

Insights into learning

-Complex ideas are better introduced in small groups
-Keep writing to a minimum (especially if time is short)
-45 minutes is a tough timeline – negotiate for more

Thank you

Amelia Anderson
Alisa Brakic
Jayce Brown
Rebecca Goeman
Mitch Johnson
Alison Kingsbury
Morgan Prochaska

Teachers: Cynthia Welsh, Cynthia Edwardson, Wendy Carter, Kathleen Lofstuen, Jeremy Freise, Heather Lindstrom

Zebrafish in the Classroom (www.zfic.org)

University of Minnesota Duluth Biology Department