**Submitted by John Schellenberg, 7th Grade Life Science**

Photos -

-**Alyssa & Ellie in lab** - procedures, process, results, sealed container with filter for analysis later.
-data sheet for fluorescence tests
-doesn't matter who is recording and who is processing. Help each other out with issues that arise.
-remind each other of protocols - rinsing, which filters to use, samples to freeze, etc

Salt marsh

-shot of entire frame of marsh - can you count everything?
-inset of crabs, Spartina shoots, periwinkles - can you count this much and estimate the rest?
-bias of areas that you sample - more crabs in sparse areas, less in highly vegetated.

Drones/Little Sapelo

-importance of notes to show hypothesized flow and actual flow
-review method and analyze errors - dyes, lemons, hypotheses, blocking flow with kayak, spring tide
_____***Need drone photos from Collin***-----

Garden -

-impact of a single person, personal projects
-food deserts and local food access for Sapelo Island residents

BIG PICTURE

- Almost all hypotheses were incorrectly predicted - flow in and out of marsh at Little Sapelo, eH at ends of marsh
-take careful notes of EVERYTHING! Draw pictures, use your tech to take pics or record things
-you run the risk of losing all your data if you don't follow protocols for storage or steps for conducting your research the right way - froze all samples vs just the right ones.
-technology changes allow us to explore new things and discover/understand how things work. We couldn't have done some of these studies without technology allowing us to do them - drones, DNA sequencing, enzyme assays, etc.

**Specific tasks/lessons**

- Measuring and accuracy/consistency/precision -
  - Which tool do we use and why? How do we use it correctly? - have rulers, scales, tapes, micrometers, etc for each station. 3 stations of mixed objects, 3 with sorting of same objects.

_____****make data recording sheet***

    - Use shells from S.I. and have students measure and sort/group them accordingly -FIND lesson from NSTA that is similar and follow that as method.
    - Can we estimate missing parts or how large something was based on what is there vs. missing? How large is a dinosaur if we just find one bone? - horseshoe crabs, sand dollar parts, other animal bones from TX, raccoon skulls, etc.

- Warm ups - use bioacoustics websites to do brain teasers--
    - What makes this sound? Play fish and bird calls/sounds and take guesses as to what makes it, how it makes it and why it makes it (If I can find answers to all 3, each day will vary.)

- Lab procedures and safety -
    - Alyssa and Ellie lab photos, use as discussions for group roles and how people should act within a lab group for performing labs as a team - successfully!

- Who is a scientist?
    - Use random pictures of everyone working on their jobs - include lab shots, field shots and “typical” scientist shots (lab coats, etc), use HHMI videos - even split male/female, races, etc.
    - Goal here is to make all feel included and worthy of conducting science and learning how the world operates in various ways by participating.

- Nature field guide for Renfroe Middle School
    - Using various nature guides to show students how to identify unknowns - shells, plants, insects, etc. from pictures and from field studies.
    - Eventual goal is to produce a field guide to our campus so that students know the plants and common animals around our campus - created by students for students - scientific names during that unit, life cycles during that unit, seasonal changes and pictures during that unit.

- Biomes -
    - Salt marsh/Estuary -
        - Use pictures of different marsh areas to show tide, types of grasses, protective barriers from land and other important facts about salt marshes.
    - Discuss biodiversity, carbon capture

- Populations and communities
    - Use pictures of fiddler crabs in marsh to talk about different species and how those are different populations because they are different species.
    - Use pictures to illustrate the importance of sampling to estimate
    - Discuss bias in sampling and how it can affect your results positively and negatively.
    - Show Trophic Cascades HHMI video of Dr. Silliman and his study
    - Use the “$1m^2$” lessons from earlier LTER