**Needs: •**PowerPoint [2017 56th NW Math GBs w Pihls.pptx ]

• Grow Beasts for everyone and 5 “exotic” GBs or whole classroom sets for door prizes. All GBs should come with a small handout attached with further information and the URL for the GB wikispace.

• 6 or 7 GBs in progressive stages of growth (4 hours, 1 day, …. 6 d, 10 d)

**56th NW Mathematics Conference 2017**

**October 12-14 - Portland, WA**

“Grow Beasts: Growing understanding of measurement and inquiry in the primary grades ”

**Session - 12:30 – 1:30PM 13 October 2017**

**Multnomah Room (capacity = 220!) – Red Lion – River Hotel**



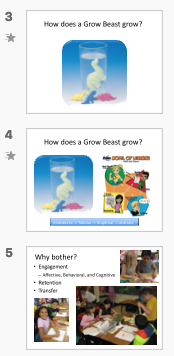
**Session description:** “*Want to get your K-2nd graders actively engaged in measurement and data? Centimeters and inches? Tables and line graphs? Creating their own experiments with their own dinosaurs? Three teachers show you how. Leave with a Grow Beast and a plan!” Pre-K – 3rd “*

Put the PowerPoint on with **Slide 1**



10 min Introduce ourselves.

[**Slide 2**] Go over the plan for the session. Make it clear that the heart of the session will be with Kathryn and Kristi Pihl describing and explaining their extensive work with GBs in their classrooms.

[**Slide 3**] Describe in a minute or less how the GBs work. If you have them, you should show GBs that have been growing for various periods of time, e.g., ten days, 6 days, 5 days, … and one that was started this morning. They are made from a super-absorbent polymer. It absorbs water. But it does so very slowly, like over the course of a week or more and so the GB grows very slowly. This is a key. If the process happened quickly we would lose the opportunity to get kids engaged in repeated measurements, gathering data over time, and maybe even graphing and seeing a pattern emerge.

The GBs also shrink to something like their original size when removed from water.

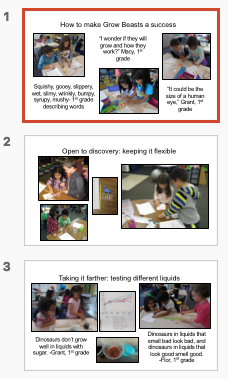
[ **Slide 4** ] One minute or two regarding how this process fits the AIMS model of learning in math/science. Learners encounter an affectively/emotionally engaging context that naturally leads to measurement, recording data, comparison and questioning, that can lead to inquiry and experimentation. In the primary grades the likelihood of generalization and abstraction is low. But this may set the stage for development in coming years.

[ **Slide 5** ] In two minutes or less, describe the benefits of integrative and engaged inquiry such as this in terms of increased engagement (affective, behavioral and cognitive), retention and transfer. These are important goals in learning.

Then turn it over to Kathryn and Kristi Pihl

30 min. Kathryn and Kristi Pihl

Kristi:

Brief overview of Grow beasts in my class (1st and 2nd), just the original experiment

* Diverse class, free/reduced lunch, behavior/academic
* Setting them up (45 minutes) question, hypothesis chart paper
* Schedule (30 minutes a day, 4 school days of growing, 4 school days of shrinking), 15 minutes to measure, hypothesis. Each time, modeled paper clips, had them measure, model inches, had them measure, modeled centimeters, had them measure
* Step back and letting kids discover (ie how are the dinosaurs growing and shrinking)
* Assessment, observations, their record sheets, possible speaking/listening, measurement test as part of unit
* Even though modeled, students were creating more efficient methods (I used one pencil to line up and them moved, they just used two pencils)

Kathryn: What happens when it does not go as planned. This is how it leads to another experiment with temperature, Goo beasts

* Behavior/academic piece
* Schedule not every day
* Part of the dinosaur falls off
* Melting them (too hot)
* Mark was coming, changing it into an experiment
* Hot (desert), cold (tundra), room temperature (temperate forest)

Kristi: Different liquids (with Kathryn jumping in as needed)

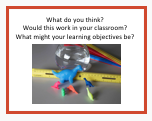
* Groups deciding liquids to grow (milk, strawberry smoothie, apple juice, pink lemonade)
* Class line graph to compare
* Class scientific journal
* The idea of control (Elsie and Tyree)
* Stepping back and letting kids discover and make decisions
* Determining why (sugar)

Back to Mark:

5 min. CCSS (math) and NGSS (science) Standards and Engagement

[ **Slide 9** ] Here are the math and science standards for practice. Ask the audience to take a look and see if they think any of these practice standards are being addressed….

**10 min. Turn and Talk**

2 minutes of turn and talk about ways you might use these in your classroom then 8 min. of whole group discussion.

**5 min. Door Prizes etc.**