Strategies that will Impact Science Instruction in Your Classroom

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- What does effective science teaching Mean?
- How does it look?

Important Principles learning science:

- Assess for prior student understanding of the science concepts
- Actively involve students in the learning process
- Help student be more metacognitive so that they can acknowledge the science concepts they understand, the goals of their learning, and the criteria for determining achievement of the learning goals.
- Ensure that the learning is interactive and include effective classroom discussions

Five Features of Effective Science Instruction:

1. **Motivating Students**

   - Students won't learn without some level of motivation

2. **Assessing students prior knowledge**

   -find out what their ideas are what they already know or don't know

3. **Engage the students intellectually with the content**

   -link learning activities to the learning targets

4. **Help students to think scientifically**

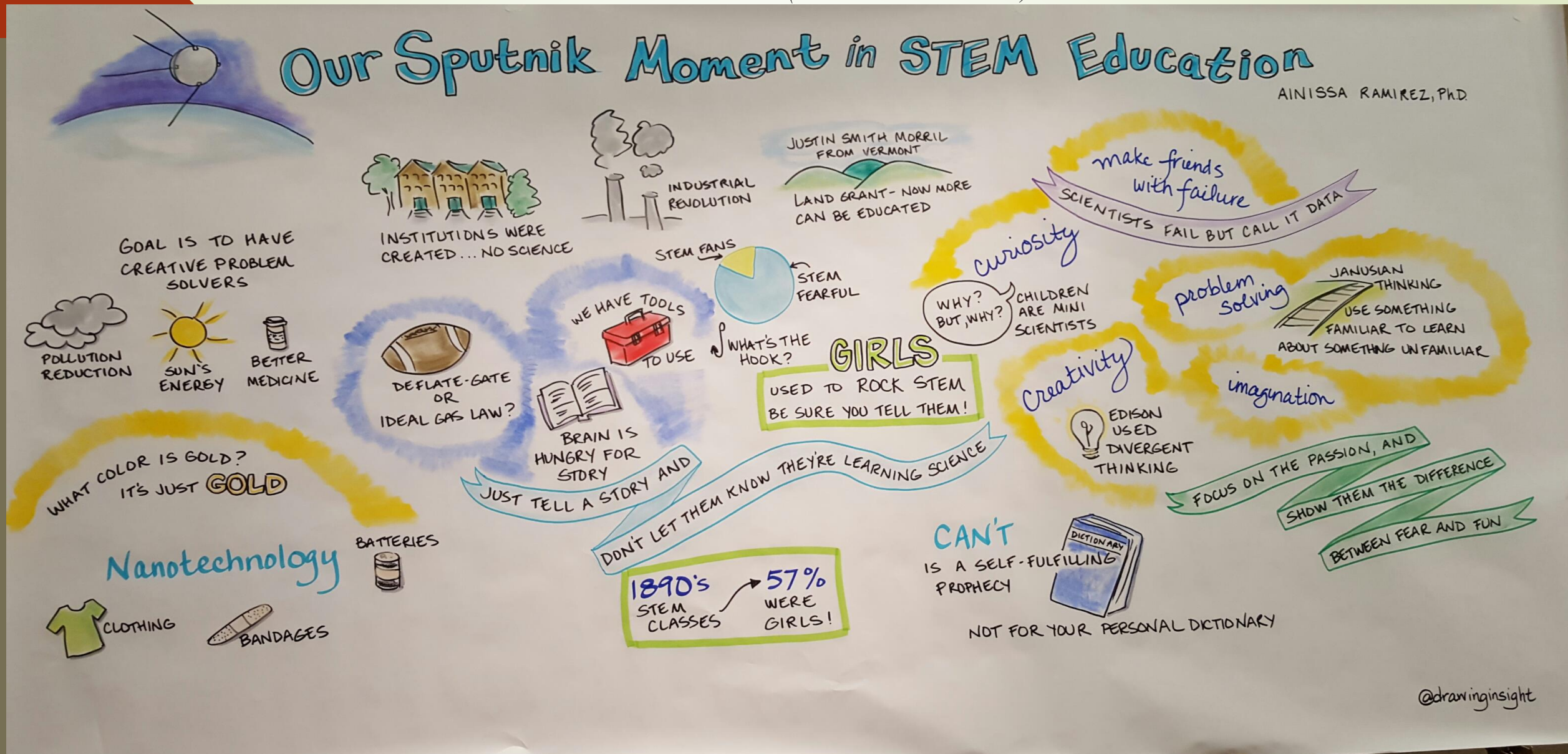
   -students can critique claims using evidence

5. **Allow students to make sense of what they are learning**

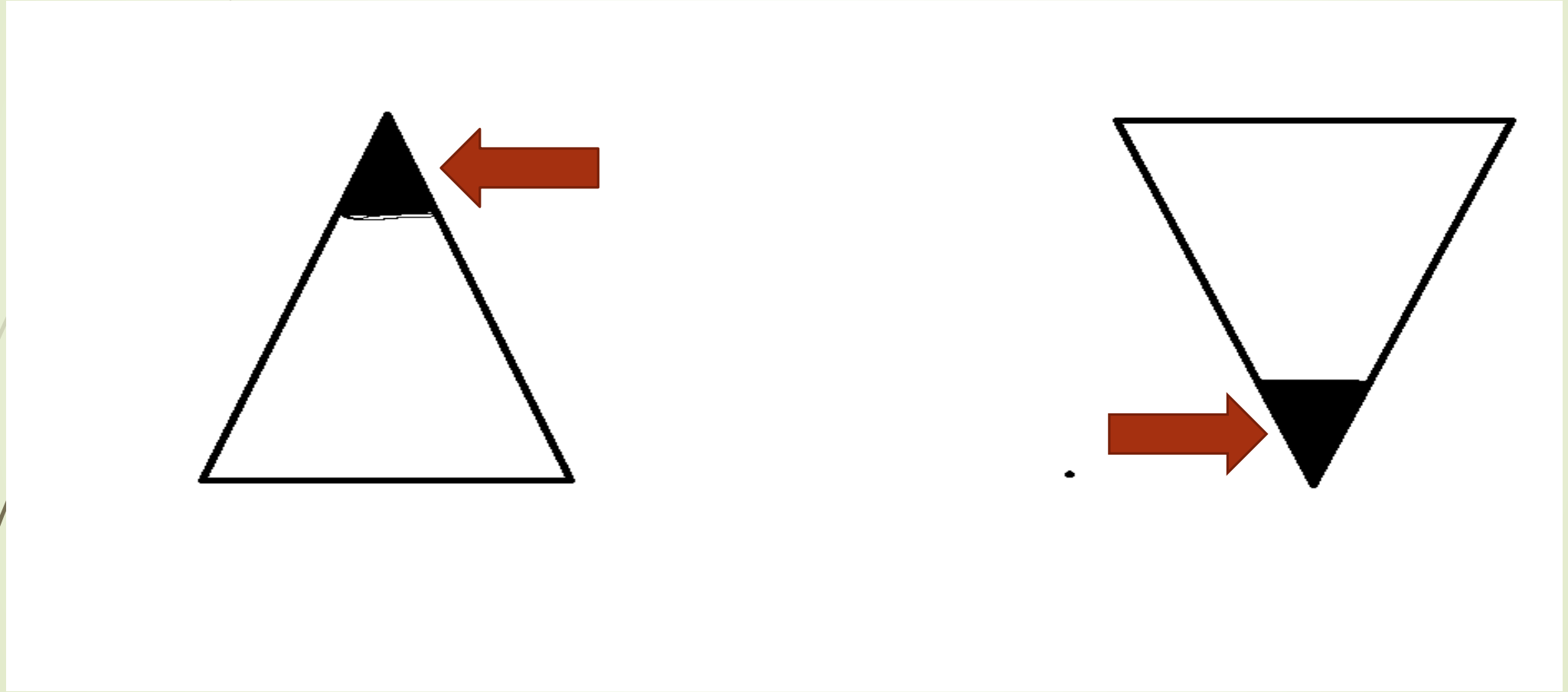
   -allowing students to compare their ideas to those that are being presented

Snarky is easy…Hope is hard

(Dr. Ainissa G. Ramirez)



You have to have a Hook!



Discovery Learning
Inquiry Based

Inquiry Learning?

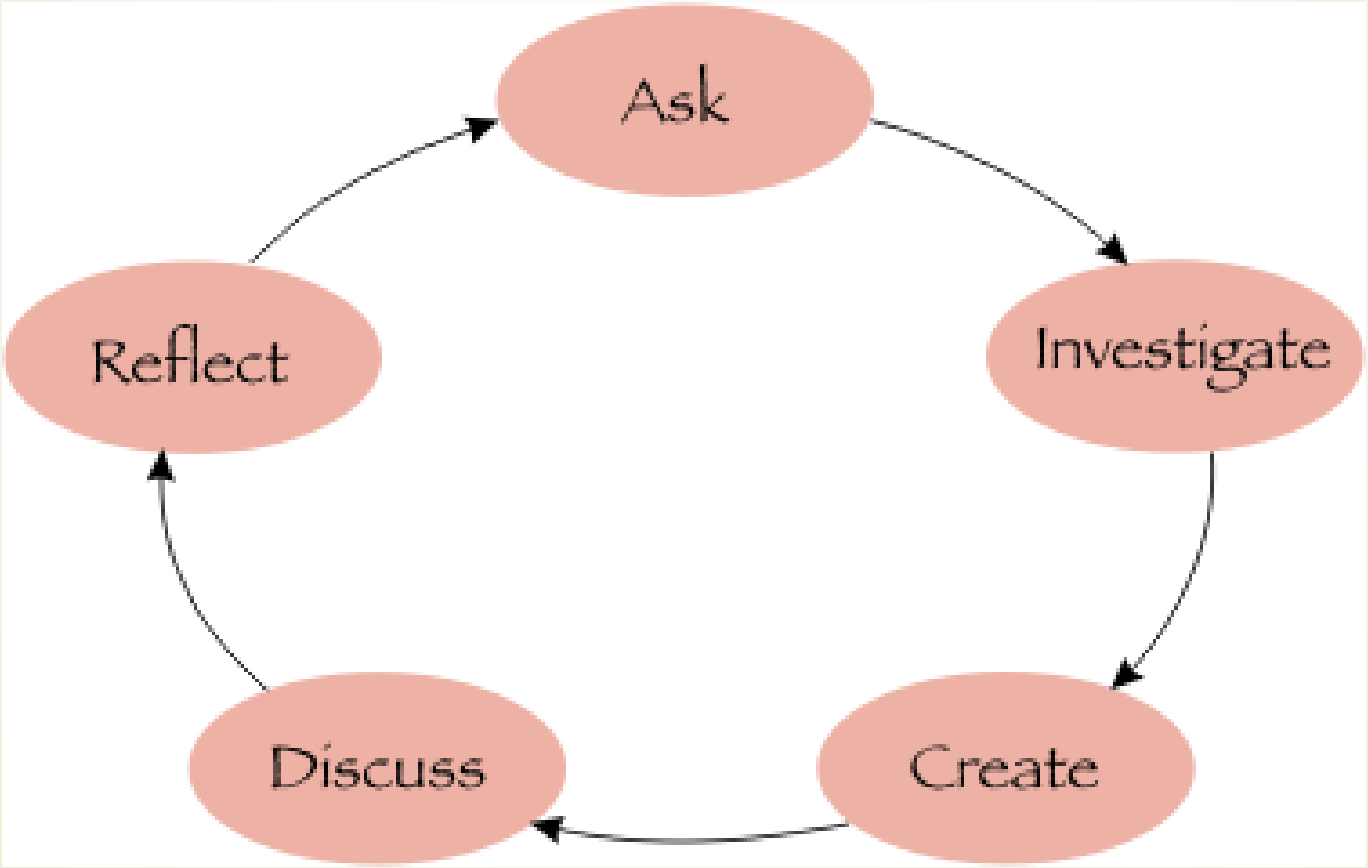
Learning through Discovery
Inquiry-based learning

… in which people construct knowledge based on the questions that arise in their lived experience

Inquiry-based learning

- ***Questions***: arising out of experience
- ***Materials***: diverse, authentic, challenging
- ***Activities***: engaging. hands-on, creating, collaborating, living new roles
- ***Dialogue***: listening to others; articulating understandings
- ***Reflection***: expressing experience; moving from new concepts into action

Inquiry cycle



How does this type of learning Begin?

- Why do cars speed up passing a stop sign?
- Why do things far away seem blue
- Why do my eyes water when I stare
- How does your body make tears
- Is salt in our tears the same as the salt we put on food
- What's that pipe from the silo to the barn?

By asking questions that will spark discovery

Discovery learning has four parts

- Curiosity and Uncertainty
- Structure of Knowledge
- Sequencing
- Motivation

Steps for Using Discovery/Inquiry Learning

- 1. Present students with a scenario that has a problem they can solve. Read the scenario aloud. Depending on the grade level will determine the type of scenario.
- 2. Grouping needs to be determined at this point. Option to work with a partner(s) or to work individually.
- 3. Give the task to the students and have them read over what they will be expected to complete. Here is where you can find if there are questions about what should be accomplished.
  - ESL- again meet with them to make sure that they understand the scenario or the task they are being asked to complete. ESL learners usually do well with discovery learning because it tends to be hands on, collaborative work.

- 4.Discuss the vocabulary by using graphic organizers. Students should use all resources that are available in the classroom. Dictionaries, each other even computers.
  - Below Grade Level and ESL – again meet with them to work on the graphic organizers and to continue to answer questions for a complete understanding of the task.
    - **Modify** definitions to one or two words long. Also the students could play a game of role-play vocabulary where they act out the vocabulary terms.
- 5. Provide the time in class to work on solutions.
- 6. Have the students to present their final projects to the class.

How does Inquiry Learning Benefit Students

- Students who are **above grade level** benefit from this strategy because they have the opportunity to delve deeper into the topic and analyze their discoveries.
- **On Grade level** students benefit because they will participate knowing that they can complete the task successfully.
- **Below Grade level** students can learn at their own pace in a non-threatening environment.
- **ESL** can complete the activities they are comfortable with, interact with their peers and feel comfortable to ask for assistance when needed.

Learn by Doing

Transition Fun!

Rate the following methods of sharing something you have learned (1 being your favorite and 5 being your least desirable).

- Write
- Sing
- Build
- Draw
- Perform/Speak

Regrouping

If Writing was your #5 go to…

If Singing was your #5 go to…

If Building was your #5 go to…

If Drawing was your #5 go to…

If Performing/Speaking was your #5 go to…

Task: You have been asked to create a commercial for our local education channel that features why science teachers are an asset to their school.

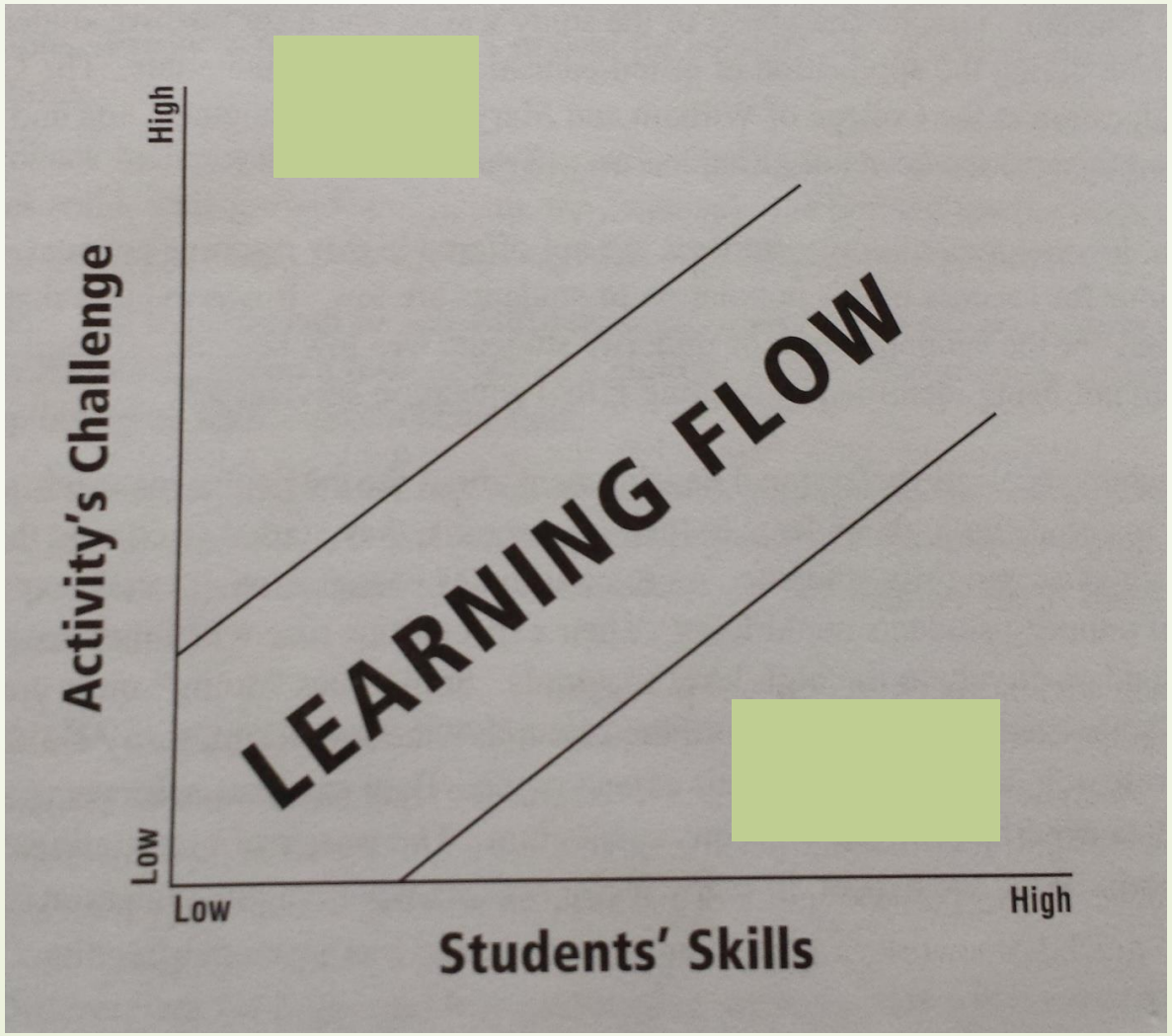
You must perform in the way you are grouped (write, sing, build, draw, perform/speak)

You will have 15 minutes to create your product.

Processing


How are you feeling?
Happy
Joyful
Content
Silly
Sad
Angry
Scared
Worried
Confused
Surprised
Hurt
Embarrassed

Connections: Why Differentiate?



How do you reach the needs of all the learners in your class?

Debunking the Differentiation Myth

- There is only one right way to differentiate.
- You have to differentiate all the time to be effective.
- Differentiation cannot include whole-group instruction.
- Differentiation does not really work when you have high-stakes testing for the students.
- Differentiation is best for students who are in special education.
- Differentiation means the same thing as individualization.
- Differentiating curriculum does not encourage mastery for all students
- Differentiation leads to unbalanced workloads.
- You have to group students and stick with those same groups to be successful.
- Above-grade-level students should be used as tutors for below-grade-level students.

How do you Differentiate?

- *Content*
- *Process*
- *Product*

Differentiating Content (What students learn)

- *Leveled Texts*
- *Varied materials and resources based on student level of ability*
- *Tiered Graphic Organizers*

Tiered Graphic Organizer

Differentiating Process (How students learn)

- Varying complexity of assignments
- Leveled Questions
- Self paced assignments
- Altering classroom environment
- Varied grouping techniques

Regrouping by a Chart

	Column 1	Column 2	Column 3	Column 4	Column 5
Row 1	Student A	Student B	Student C	Student D	Student E
Row 2	Student F	Student G	Student H	Student I	Student J
Row 3	Student K	Student L	Student M	Student N	Student O
Row 4	Student P	Student Q	Student R	Student S	Student T
Row 5	Student U	Student V	Student W	Student X	Student Y

What do you know about student M? student K? Student U?

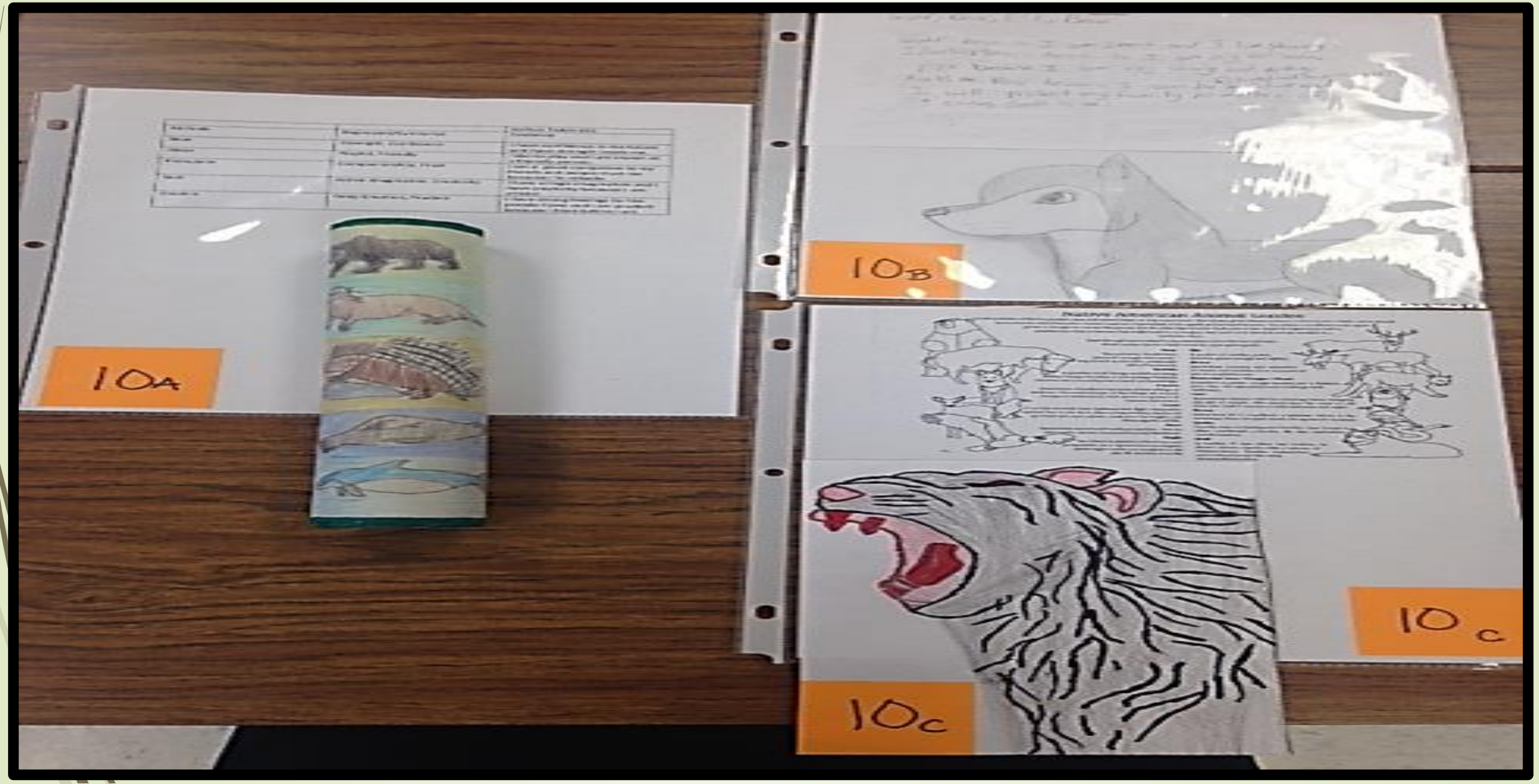
Grouping strategies that work (and save you time)
For this task, are we in Row Groups or Column Group

Teachers understand that student-centered planning and instruction requires differentiated practices.

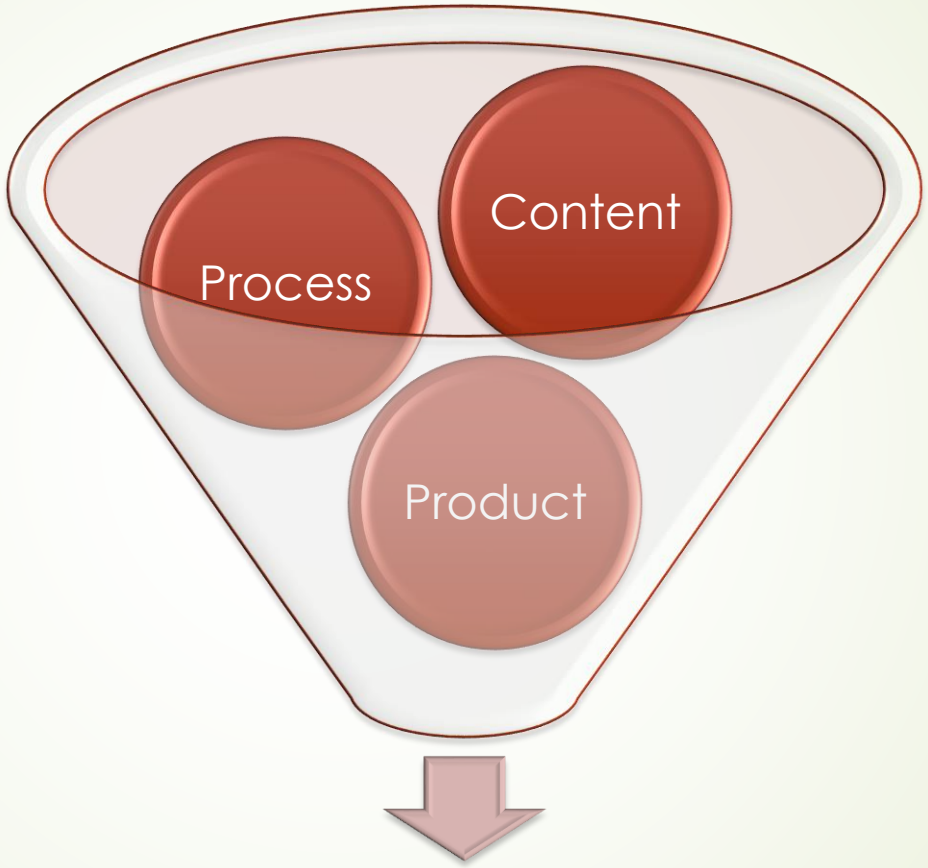
Differentiating Product (What students produce)

- Choice boards
- Leveled Learning Centers

Menu items



Developing Strategies



Differentiated Learning Experience

Summer Professional Development to look for!

- Tiered Assignments
- Tiered Graphic Organizers
- Leveled Questions
- Multiple Intelligences
- Menu of Options
- Interests Centers
- Discovery Learning
- Orbital Studies