Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

PLC Night

March 15, 2016

Harding University High School

Eliciting Students’ Hypotheses: Focus on Group Work

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**Agenda**

* Catalyst/Objective (10 minutes)
* What is Eliciting Hypotheses (15 min)
  + The Cycle of Intellectual Engagement
  + What is Eliciting Hypotheses
  + Video Example
* Creating Meaningful Group Work (15 min)
  1. Nature of the Tasks Assigned
  2. Assigning students to groups
  3. Fostering Student Ownership
  4. Interpersonal considerations
  5. Assessment and Accountability
* Work Time (20 min)

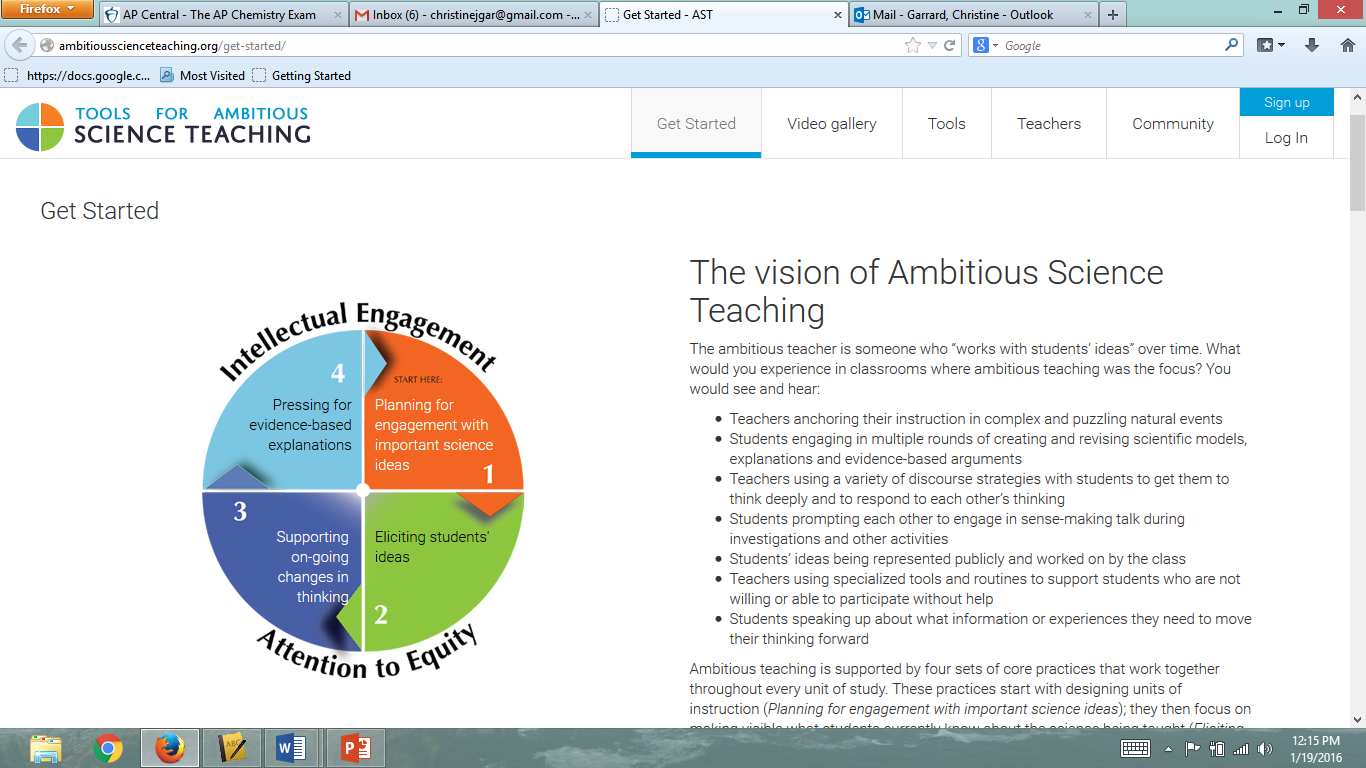
**Catalyst**

Think about last month’s session on eliciting observations, and the time in which you used it in your classroom**. If you did not attend last month’s session**, try to think of a time when you used a demo in class and you had your students observe changes. Answer the questions that you can!

1. What lesson objective did you elicit observations with?
2. What task or question did you pose to students for them to make observations on?
3. What evidence do you have that the task or question made observations accessible to all your students?
4. What did students say that you did not expect? How did you respond or how would you respond differently next time?

**Objective**

* CMWBAT articulate the need to elicit students’ hypotheses in a science classroom
* CMWBAT elicit their students’ hypotheses based on observations to describe natural phenomena and make science relevant
* CMWBAT create meaningful and effective group work for their students

**What is Eliciting Students’ Hypotheses?**

Part 2: Eliciting Students’ Ideas

* **Step 1: Introducing the puzzling event and eliciting observations (whole class)** 
  + Introduce task: “I recently saw something that puzzled me…” OR “Let’s think about this story and see what kind of sense you can make of it…”
  + Then, establish agreement about what whole class as observed. Begin to mark some specific features of ideas or of vocabulary if necessary. “Okay, so we agree that…”
* **Step 2: Eliciting hypotheses about “what might be going on” (whole class or small group)**

|  |  |
| --- | --- |
| **You ask:** | **What you need to listen for, plan to respond to:** |
| * What do you think is causing this? * What has happened here? (at level of inference) * What would happen if \_\_\_\_\_\_\_? | * What if students exhibit pre-conceptions? * What if students cite relevant facets of the big idea? * What if students do make connections to what they’ve experienced? |

* + Ask students to comment about observable conditions that led up to the event or process, ask what might be “responsible” for the event or process.
* **STOP AND THINK**: Do your students know the difference between observation and inference?
  + Picture example
* **Classroom Example**: Hot Air Balloons
  + Equipment: hot plate, balloon, Erlenmeyer flask
  + Sequence:
    - Step 1: Introducing puzzling event and eliciting observations (whole class)
      * What do you see going on here?
      * What did you notice when I put the flask on the hot plate? When I took it off?
      * When or where does the balloon expansion occur?
    - Step 2: Eliciting hypotheses about “what might be going on” (whole class or small groups)
      * What do you think is causing the balloon to expand?
      * What has happened here?
      * What would happen if I left the flask on the hotplate?
    - Share out whole group to start building to main idea.

*Use the space below to record your answers.*

**Creating Meaningful Group Work** (10 Minutes)

1. Nature of tasks assigned
2. Assigning students to groups
3. Fostering student ownership
4. Interpersonal considerations
5. Assessment and accountability
6. Nature of Tasks Assigned
   1. Short Term Work (1-2 class periods)
      * Make sense of something they have read
      * Co-construct a representation of an idea (model)
      * Apply existing knowledge to a new situation
      * Design an investigation
      * Critique an investigation
      * Collect, organize, and graph data
      * Interpret graphs
      * Develop hypotheses based on background reading
      * Examine and weigh out various forms of evidence
      * Others…
   2. Steps for Successful Short Term-Work Assignments
      * You need to make your intentions explicitly clear before students begin
      * Have check-in points
      * Monitor student activity after 10 minutes or so, making sure you’re listening to their conversations and not just checking to see if they are on-task
7. Assigning Students to Groups
   1. Ideal number: 3 or 4 people per group
   2. Groups of mixed ability, gender, and cultural background (without tokenism)
   3. Don’t have students self-select!
8. Fostering Student Ownership
   1. Assigning Roles
   2. Example roles:   
      1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
      2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
      3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
      4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
      5. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
      6. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   3. Talking Chips

* Have as many colors as you have group members, and when a student wants to speak, he puts his chip in the center of the table. Everyone must use all their chips.
  + The colors allow you to see who has talked, and also ensures that there is equal talk time among group members.

1. Interpersonal Considerations
   1. Think about building pro-personal skills into group work.

* Making sure everyone has a significant role to play (both procedurally and cognitively)
  + This means giving everyone a chance to voice their ideas and opinions.
* Commenting on the ideas of other without commenting on them as people
* Making ideas public and explicit without at first passing any judgement
* Building on ideas of others (kids get to listen to the thinking process of others—extremely valuable!)
* Asking on-task questions that go beyond procedures and are about ideas.
* Asking peers to clarify what they mean.
* Peers answering the specific questions asked by their classmates.
* Keeping sarcasm out of the conversation.
* Others…?

1. Assessment and Accountability
   1. Give students examples of what it means to contribute to group work
   2. Tell students that you will choose someone to randomly share-out
   3. Give everyone a group grade based on the average improvement of everyone within the group
   4. Peer evaluations (see pages 6 and 7)

**Self-Evaluation Form for Group Work Your name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Seldom Sometimes Often

|  |  |  |  |
| --- | --- | --- | --- |
| Contributed ideas |  |  |  |
| Listened to and respected the ideas of others |  |  |  |
| Compromised and co-operated |  |  |  |
| Took initiative when needed |  |  |  |
| Worked outside of class if necessary |  |  |  |
| Spent time browsing for appropriate material |  |  |  |
| Did my share of the workload/tasks |  |  |  |

My two greatest strengths from the list above are:

1.

2.

The two skills I need to work on from the list above are:

1.

2.

**Overall grade you would give yourself: (A+ - F)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Peer Evaluation Form for Group Work Partner’s name\_\_\_\_\_\_\_\_\_\_\_\_\_**

Seldom Sometimes Often

|  |  |  |  |
| --- | --- | --- | --- |
| Contributed ideas |  |  |  |
| Listened to and respected the ideas of others |  |  |  |
| Compromised and co-operated |  |  |  |
| Took initiative when needed |  |  |  |
| Worked outside of class if necessary |  |  |  |
| Spent time browsing for appropriate material |  |  |  |
| Did my share of the workload/tasks |  |  |  |

My partner’s two greatest strengths from the list above are:

1.

2.

My partner’s two skills they need to work on from the list above are:

1.

2.

Overall grade you would give your partner: (A+ - F)\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Workload Survey: *Your comments on this section will remain confidential. I will assign numeric score based on your responses.*

Your Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Lesson: \_\_\_\_\_\_\_\_\_\_\_\_\_ Date of Lesson: \_\_\_\_\_\_\_\_\_\_\_\_

Assess your own performance.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Earned | Possible | Comments |
| I did my fair share of work on this project. |  | 5 |  |
| The parts I contributed were high quality. |  | 5 |
| I was a good team member who communicated effectively. |  | 5 |
| TOTAL |  | 15 |

My contributions to the success of this lesson were…

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Group Member #1: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Assess GM#1’s performance.

|  |  |  |  |
| --- | --- | --- | --- |
| Group Member #1… | Earned | Possible | Comments |
| Did his/her fair share of work on this project. |  | 5 |  |
| Contributed high quality parts of the project. |  | 5 |
| Was a good team member who communicated effectively. |  | 5 |
| TOTAL |  | 15 |

How did GM#1 contribute to your overall success?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Group Member #2: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (*Optional*)

Assess GM#2’s performance.

|  |  |  |  |
| --- | --- | --- | --- |
| Group Member #2… | Earned | Possible | Comments |
| Did his/her fair share of work on this project. |  | 5 |  |
| Contributed high quality parts of the project. |  | 5 |
| Was a good team member who communicated effectively. |  | 5 |
| TOTAL |  | 15 |

How did GM#2 contribute to your overall success?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_