

Using Presentations
to Assess Extended
Inquiry Projects
AETS - 2000
Akron, OH

Jonathan Singer & Joseph Krajcik

University of Michigan

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Air Quality Student Presentations:

Helping Students "put it all together"

Teacher Overview

Why do student presentations?

Student presentations are one avenue for providing an "authentic" final assessment of student understanding. The presentations can be considered authentic for several reasons. First presentations are activities that are done in the real world by scientists and health professionals. Presentations allow for student learning "beyond the classroom walls" by interacting with interested community members. This situation will ideally allow the students to use the presentations as a potential learning experience.

Finally, presentations allow students to review various pieces of evidence they have collected and science content they have

~~Putting the presentation together: Student support issues~~

Question (What affects the air in my community?).

A quality assessment piece can be described as containing three phases 1) a preparation period, 2) the actual assessment task, and 3) a feedback or reflective phase. **A quality assessment should be a learning experience for the student.** All three phases need to

be carefully constructed in order to maximize the learning experience. Since this is the student's first attempt at doing formal science presentations, they will need strong support in all

~~Phase 1 (preparation)~~ assessment. Students will need to be provided supports for

Reviewing previously collected data and learned content

- What to look for (health effects, sources, chemical properties,
- ~~where~~ to look (prior worksheets, the play, walk summary sheet, etc.)

Phase 2 (actual task)

Organizing the presentation

- What to say?
- Who says it?
- What props to use?
- How to incorporate the technology?

How will I be graded?

- Rubrics (evaluation forms)
- How much of my grade does this count

Phase 3 (feedback and reflection)

Student Reflection

- What did I learn from this experience?
- What would I do differently next time?

Assessment Prep. Part

To be started at the end of
Learning Set 2 (Reflection
Assessment Day 28 -30)

Presentation Preparation Day 1 - Describing the Task to the Students

Explain the presentations to the students. This explanation should include at least the following points:

- **Overview-** Provide students with a brief description of the final presentation of the "Air Quality project" groups of students will be giving oral presentations on what you learned about our Driving Question, "What affects the quality of air in my community?" During this presentation you and your group members will have to tell the class and other visitors (teachers, parents, community members, etc.) about what you have learned. I will pass out a checklist of all the things your presentation will have to include. We will also have some time during class to work on these.
- **Parameters**
 - length - approximately 10 minutes
 - date - To be determined by teacher, although plan on taking at least 2 days for the actual presentations
 - group - groups of 4, or partners (teacher determines what is best for the class)
 - audience - Who will be coming to listen, other students, parents, community members, etc.
- **What information the presentation needs to include**

Provide students with a checklist with the due dates of the various parts of the presentation
- **Describe the format**

Students may do a traditional stand-up presentation or may develop something more creative such as a skit or song, however regardless of the format the grade will be based upon how well you cover the items on your checklist.
- Assign or have students form groups/partners and assign/ pick a **Pollutant** to use for presentations may include:
 - Particulate Matter
 - Sulfur Dioxide
 - Nitrogen Dioxide
 - Carbon Monoxide
 - Carbon Dioxide
 - Ozone (bad) and (good)
 - CFC's
 - Toxins
 - Acid Rain
- **Assign students to a Date and order**

e.g.

Thursday November 13 (presentation 1 - 4)

Friday November 14 (presentation 1 - 5)

- **Describe how the students will be graded**

Completion of Presentation Development pages (**Preparation Phase**) Presentation (**Task Phase**)

Completion of Post Presentation Questions (**Reflection Phase**)



Teacher Note: If possible, speak with the language arts teacher to see if they can assist you in the preparation of student presentations.

Presentation Preparation Day 2 - Organizing the content

- **Have students:**

Develop a chemical word equation that uses their pollutant as either a product or reactant. e.g. Gasoline plus Oxygen

MakesmCaebbeDsoxidespofstwaterpaporapplus heat

Determine the effects caused by their pollutants

Describe the physical and chemical properties of their pollutant (e.g. what state of matter, color etc.)

Write a hypothesis concerning if their selected pollutant affects the quality of air in their community. Students also need to provide a reason for their hypothesis.

- **Teacher support strategies**

Teacher may take first 10 minutes of class to model the days. Have each group first determine their pollutant, then have them develop their word equation.

Ask students where they can find the information for each of these items (play, pollution summary sheet, model-it

Remkndegrpustt that they can split up the various tasks and have different people do different parts.

Provide an opportunity for groups to share some of their answers with the class a separate or new folder to keep the information they are going to use for their presentations.

When presentation items are completed teacher can perform a quick check and mark it off on the group's presentation checklist.



While students are constructing their presentations they can be assessed upon how well the group is collaborating as well as on the completion of the assigned presentation portions. If work is being saved in a central group folder collect it and provide group members with feedback and evaluations. Make students aware that putting together the presentation is part of their assessment.

Presentation Preparation Day 3- Student Reflection

Overview

At the completion of each Learning Set, the students need to reflect upon what they have learned. To facilitate this process the students are provided with three questions. These questions help the students to focus specifically on three main areas: Science content (chemical physical changes, word equations, etc.), Air Quality (Pollutants and how their sources, effects, etc.) and Science Process (how to conduct investigations, collect information, write conclusions, etc.) Each one of these reflection areas should be written on a separate sheet of paper with the date. At each additional reflection day, the students review what they wrote previously and then enter a new entry. This process allows the students to monitor how they have grown over the course of the project. Write a reflection of their present understanding of the Driving question: What affects the quality of Air in my community. The reflection should include three parts:

• Have students:

What new science concepts (i.e. chemical and physical changes, chemical reactions, etc.) have you learned and how do they relate to the Driving Question? (causes, types, sources, effects, etc.) and how do they relate to the Driving Question? What have I learned about doing investigations (experiments, making observations, etc.) and how does it help me understand the Driving Question

• Teacher support strategies

Students may have difficulties knowing what to write, what to include in their reflections, and/or how long the reflection should be. The following strategies may alleviate some of these student concerns.

- Hold a class brainstorm, in which students share things the class have done recently
- Provide students with an example of each reflection question
- Provide students with a rubric of the criteria of a good reflection

Possible Criteria for a good reflection may include:

Level of knowledge growth (does the reflection describe what the student learned)

How gained (does the reflection mention or describe specific classroom activities)

Connection to question (does the reflection explain how it is relate to the Driving Question)

The number of things learned (1 concept versus 3

Changes) (Is the reflection readable, no misspellings, why that information, they learned is important to know



Collect student reflections, provide written feedback and allow them an opportunity to make revisions.

Assessment Prep. Part

To be started at the end of

Project Learning Set 3 & 44

Presentation Preparation Day 4 - Expanding the Depth of Chemistry

Understanding

Have students:

Determine the atomic formula for their pollutant and other compounds in their word equation
Turn their word equation in to an equation using atomic
Determine the type and number of elements, atoms, and
Develop a pictorial equation of "gum drop" models to represent your chemical equation and how the various atoms combine

Teacher support strategies

Teacher may take first 10 minutes of class to model the days
Ask students where they can find the information for each of these items (play, pollution summary sheet, model-it
Remind groups that they can split up the various tasks and have different people do different parts.
Provide an opportunity for groups to share some of their
Answers with the class a separate or new folder to keep the information they are going to use for their presentations.
When presentation items are completed teacher can perform a quick check and mark it off on the group's presentation checklist.

Presentation Preparation Day 5- Integrating Model-it

• Have students:

Review the
sources of their pollutant,
affects of their pollutant

Select a model-it model from within their group and determine if they have factors which represent their
relationships in the model they are using includes
relationships that contain the factors associated with their pollutant.

• Teacher support strategies

Teacher may take first 5 - 10 minutes of class to model the
Ask students where they can find the information for each of these (object factor sheets, relationship sheets, test
Sheets) will have to work together today. They may have to
Advise that other groups to share some of their
Answers with the class. model they are going to use in their presentation as a present.mdl

When presentation items are completed teacher can perform a quick check and mark it off on the group's presentation checklist.

Presentation Preparation Day 6- Student Reflection

Overview

At the completion of each Learning Set, the students need to reflect upon what they have learned. To facilitate this process the students are provided with three questions. These questions help the students to focus specifically on three main areas: Science content (chemical physical changes, word equations, etc.), Air Quality (Pollutants and how their sources, effects, etc.) and Science Process (how to conduct investigations, collect information, write conclusions, etc.) This reflection starts with the students reviewing what they wrote previously followed by a new entry. This process allows the students to monitor how they have grown over the course of the project.

Have students: Write a reflection of their present understanding of the Driving question "What affects the quality of Air in my community. The reflection should include three parts:

1. What new science concepts (i.e. chemical and physical changes, chemical reactions, etc.) have you learned and how do they relate to the Driving Question?
2. What have you learned about Air Quality? (causes, types, sources, effects, etc.) and how do they relate to the Driving Question?
3. What have I learned about doing investigations (experiments, making observations, etc.) and how does it help me understand the Driving Question

- **Teacher support strategies**

Students may have difficulties knowing what to write, what to include in their reflections, and/or how long the reflection should be. The following strategies may alleviate some of these student concerns.

1. Hold a class brainstorm, in which students share things they have learned.
2. Provide students with an example of each reflection part (all three parts).
3. Provide students with a rubric of the criteria of a good reflection

Use the same reflection assessment rubrics as used at the end of Learning Set 2



Collect student reflections, provide written feedback and allow them an opportunity to make revisions.

Assessment Prep. Part

To be started ³ at the end of Learning Set 4 or just prior to the ~~Project Day 5~~ ⁴ presentation

Presentation Preparation Day 5 - Preparing the presentation Script

Students will need to have a written Script or plan of their presentation. This plan must be checked and approved by the teacher. The following structured plan below is for a "traditional - show and tell type presentation". If the students wish to do something more creative that is fine, however, be sure to tell them that they are still responsible for covering all the required content. It is strongly recommended that these ~~Presentations~~ ^{Plans} be structured and straightforward to maintain student focus on the necessary content.

Introduction:

- Needs to contain
 - Statement welcoming audience
 - Statement introducing group members
 - Statement of the pollutant their presentation will focus upon
 - Hypothesis concerning if pollutant affects air quality in their community



Example

Hello, My name is Charlie, and this is Frieda, Lucy, and Snoopy. We have been studying the question What affects the quality air in my community? The pollutant we are going focus today is X. Our group believes that this pollutant affects air quality in our community. Lucy will continue our presentation by describing the physical properties of this pollutant.

Pollutant Chemistry

- Needs to contain
 - Word equation,
 - atomic structures for products and reactants
 - pictures of the atomic structure (eg. Gum drops model or ~~description~~ ^{picture} of the physical and chemical properties of the pollutant
- Must use some type of visual of visual aids
 - pictures
 - gum drop model



Example

This is pollutant (Lucy holds up a picture which shows a picture and a gum drop model). It is made up of 3 different elements two atoms of element X, one atom of element Y and 5 atoms of elements Z). This pollutant is a product of the following chemical reaction. Oil is burned it makes Pollutant X. Lucy holds up another picture that shows the word equation, under each word is the atomic symbols a gum drop picture for each compound. I will now let Frieda talk about how this pollutant is formed.

Sources and Effects

- Must Contain
 - A description of the pollutant's sources
 - A description of the pollutant's effect
 - Possible way to decrease the amount of the pollutant
- Must use the following visual aid
 - Model-it (show relationship between at least 3 factors)



Example

Snoopy barks to the audience: Pollutant X gets in to the air from oil refineries, diesel trucks and power plants that burn oil. Pollutant X causes people to get skin cancer, have runny eyes and get stomach cramps. It also causes certain types of tree leaves to turn purple. Snoopy shows the audience a Model-it model pointing to factors "Pollutant X", Air Quality and the "amount of people with skin cancer". Snoopy shows the relationships - as the amount of pollutant X increase the air quality decreases and the more people get skin cancer.

Evidence for Pollutant affecting the quality of air in the

community

- Must Contain
 - Evidence from an investigation or activity conducted in class or as homework
- Must show the audience graphs, charts, observations or other pieces of work as evidence



Example

Charlie starts talking. We did 2 major investigations. The first one, we walked around our school looking for evidence of polluted air. During this walk we noticed many trees with purple leaves. We also noticed a smoke stack across the highway that was smoking. We also conducted an investigation on vehicle exhaust. During this investigation (Charlie shows a graph) we found that the older the car the more oil it burns and the more of pollutant X is released. These observations support our belief that pollutant X is in the

Conclusion

- Must Contain
 - Restate Driving Question
 - Restate hypothesis of pollutant
 - Restate if there was evidence to support their hypothesis
 - Statement from each group member on one thing they learned from doing this project and how it relates to the driving question
 - Group asks audience if they have any questions
 - Group thanks audience and sits down.



Example

Snoopy Barks, For the last 10 weeks we have been studying what affects the quality of air in our community. Our group thinks pollutant X affects air quality. There is evidence from both the school walk and our vehicle exhaust investigation. The amount of purple leaves is very strong evidence that pollutant X affects air quality. Does any one have any questions? Linus raises his hand. I was wondering if your pollutant cause acid rain. Charlie answers, As we stated early our pollutant is not an acid forming pollutant, so it does not form acid rain. Any other questions? Snoopy barks, Before We sit down I would like to say that I learned a lot about chemistry while doing this project. I learned the difference between a chemical and physical change. When oil is burned and produces pollutant X that is an example of a chemical change because

Assessment

To be completed during Presentation presentations

Teacher Overview:

During the actual student presentations the issues of how to maintain student focus and engagement during their peers presentation needs to be addressed. Several strategies are possible. A few examples include:

- Students can partake in the assessment by providing them with a rubric score sheet and having them assess their peers. This may be modified by having certain students assigned to evaluate only certain other groups
- Require students to take notes, so they can turn in a final report, which must incorporate information from other group's presentations (other classes, parents, or other community members). A list of potential interested community agencies should have been circulated a few weeks ago.

These are only suggestions. The goal is to devise a strategy that will keep the students focused and engaged during the presentations.

Using the Presentation Rubrics

Page 13 of this packet contains a rubric that may be used to assess the student presentation. The rubric is essentially a checklist that has all the items that the students should include in their presentation. The rubric is arranged by presentation section (introduction, chemistry, sources and effects, etc.) in order to make the assessment easier to evaluate. Each presentation item is evaluated on a 3 level system (Poor, weak/partially complete, and good/ complete). As the presentation begins place an "X" or check mark in the appropriate row and

	Poor/ incorrect	Weak/ incomplete/ or partially correct	Good/ correct/ complete
For example, if the students write their word equation correctly, but mix up the products and reactants when they explain it, they would score a partially correct		X	
Describes physical properties of pollutant			

Use a new rubric for each group. Be sure to place the group name and members on the top of the page. Determining a score. One method to determine an overall presentation score is to assign points to each level and then tally up the total score. For example give the students 1 point for each "poor" response, 3 points for each "weak" response, and 5 points for each "good". Add up the points for a total score. If desired you could determine the total points possible (number of items multiplied by 5) and divide the points a group earned by total possible to determine a percentage grade.

Assessment Reflection

To be started at the completion
of the presentations

Teacher Overview

As stated earlier quality assessment provides the students with a learning experience. In order to support this learning experience a post-presentation reflection is utilized. A key aspect to this reflection is providing the students with a clear and concrete set of prompts to focus their thinking. The suggested prompts focus upon both the presentation and the greater project. Anywhere a combination of these prompts may be used.

Possible post-presentation prompts

- If you had to do your presentation over again, what would you do differently and why? Be sure to include specific examples (evidence) of things that you would change. Don't forget to include a reason why you would make these alterations.
- Provide the students a copy of their presentation rubric and have them describe how they would improve on the portions of their presentation which were not rated as "good / complete"
- Describe a part of another group's presentation, which you thought was very well done, and explain why you think that it was well done. Be sure to include specific examples (evidence) of things that you liked. Don't forget to include a reason why you think these things are good.
- Describe how the presentations helped you to make sense of the Driving Question, "What affects the quality of Air in my community?" Be sure to include specific examples (evidence) of things that you heard from the presentations. Don't forget to include a reason why or how these things helped your understanding.
- Describe how your understanding of the Driving Question, "What affects the quality of Air in my Community?" has changed since the beginning of the project. Your answer should include three portions:
 - What new science concepts (i.e. chemical and physical changes, chemical reactions, etc.) have you learned and how do they relate to the Driving Question?
 - What have I learned about air quality? (causes, types, sources, effects, etc.)
 - What have I learned about doing investigations (experiments, making observations, etc.) and how does it help me understand the Driving Question

Presentation Checklist

Item	Group member assigned to complete	Comments	Date completed	Teacher initials
Pollutant				
Word Equation				
Sources				
Effects				
Physical Properties				
Chemical Properties				
Hypotheses and reason				

Item	Group member assigned to complete	Comments	Date completed	Teacher initials
Chemical Formula				
Chemical Equation				
# of Atoms Elements & Compounds in equation				

Picture or gum drop model of equation				
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Item	Group member assigned to complete	Comments	Date completed	Teacher initials
Model-it factors for sources				
Model-it factors for effects				
Model-it relationships				
Relationships tested				

Item	Group member assigned to complete	Comments	Date completed	Teacher initials
Introduction And Hypothesis				
Pollution Chemistry				
Sources and Effects				
Evidence from walk				
Conclusion				

Presentation Rubric

INTRODUCTION	Poor/ incorrect	Weak / incomplete/ or partially correct	Good / correct / complete
Welcomes audience			
Introduces group members			
States pollutant			
States hypothesis			
States reason for hypothesis			

POLLUTION CHEMISTRY	Poor/ incorrect	Weak / incomplete/ or partially correct	Good / correct / complete
Word equation (includes both products and reactants)			
Describes physical properties of pollutant			
Chemical structures			
Diagram of chemical structures			
Describes # of atoms, elements and compounds			

SOURCES AND EFFECTS	Poor/ incorrect	Weak / incomplete/ or partially correct	Good / correct / complete
Describes sources of pollutant			
Describes effects of pollutant			
Shows model-it model			
Tests relationship which shows how to decrease/increase the amount of pollutant			

EVIDENCE	Poor/ incorrect	Weak / incomplete/ or partially correct	Good / correct / complete
States evidence from walk describing if pollutant may be present			
Uses visual aids to support statement			

CONCLUSION	Poor/ incorrect	Weak / incomplete/ or partially correct	Good / correct / complete
Restate Driving Question			
Restate hypothesis of			
Restate Restate if there was evidence to support their hypothesis			
Statement from each group member on one thing they learned from doing this project and how it relates to the driving question			

Group asks audience if they have any questions			
Group thanks audience and sits down			

Presentation Rubric

Performance (Complete immediately after presentation)

Performance	Poor	Weak / Inappropriate	Good / Appropriate
Visuals - Effective use of pictures, graphs, models, charts, etc.			
Equal Participation			
Preparedness (group prepared everyone knows parts and acts professional)			
Voice (Clear, easy to understand, not too fast, words are not mumbled)			

Reflection Rubric

Write a reflection of their present understanding of the Driving question "What affects the quality of Air in my community. The reflection should include three parts:

What new science concepts (i.e. chemical and physical changes, chemical reactions, etc.) have you learned and how do they relate to the Driving Question?

Amount of conceptss

Number of concepts mentioned _____ 1 pt each

Depth of understanding

No explanation of concept	0pts per concept
Explanation is unrelated to concept	1 pt per
Explanation is partially correct	2 pts per
Explanation is correct	3 pts per concept

Connection to Driving Question

No connection to Driving Question	0 per concept
Partial Connection to Driving Question	2 pts per
related connection Driving Question	3 pts per

What have I learned about "air quality" (causes, types, sources, effects, etc.) and how do they relate to the Driving Question?

Amount of Air Quality items

Number of concepts mentioned _____ 1 pt each

Depth of understanding

No explanation of item	0pts per concept
Explanation is unrelated item	1 pt per concept
Explanation is partially correct	2 pts per
Explanation is correct	3 pts per concept

Connection to Driving Question

No connection to Driving Question	0pts per
unrelated connection to Driving Question	1 pt per
Partial Connection to Driving Question	2 pts per
related connection Driving Question	3 pts per

What have I learned about doing investigations (experiments, making observations, etc.) and how does it help me understand the Driving Question

Depth of understanding

No explanation of item	0pts per concept
Explanation is unrelated item	1 pt per concept
Explanation is partially correct	2 pts per
Explanation is correct	3 pts per concept

Connection to Driving Question

No connection to Driving Question	0pts per
unrelated connection to Driving Question	1 pt per
Partial Connection to Driving Question	2 pts per

Related connection Driving Question
concept

3 pts per