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real-life problem solving: examining the effects of alcohol within a community on the navajo nation

Abstract

TASC, DISCOVER, PBL, and Prism models were integrated and applied in a Community Awareness Unit designed for sixth grade. The students listed different problems they considered important in their community and then selected a theme that was of the greatest interest to them: The effects of alcohol on the community. The teacher wrote a problem based scenario to explain the theme and the students divided into six stakeholder groups to investigate and gather information on the essential question from their stakeholder group's viewpoint. At the end they presented their results to their peers and the community. The students developed realistic solutions to a community problem that affected all of them. The students gained valuable skills from the required curriculum as outlined in the Arizona State Standards in language arts, science, math, and technology. They applied these skills and concepts in an integrated way and exercised their creative problem solving abilities to propose innovative solutions to persistent problems.

Keywords: TASC, DISCOVER, PBL, Prism, problem solving, Navajo Nation, sixth grade

In a previous article Maker and Zimmerman (2008) described a project in which teachers in the role of learners solved a real-life problem; experiencing the interaction of factors and principles, while learning content. They used a three-part model integrating three similar but different learning models: (a) Discovering Intellectual Strengths and Capabilities while Observing Varied Ethnic Responses (DISCOVER), (b) Problem Based Learning (PBL), and (c) Thinking Actively in a Social Context (TASC). In this project, the learning

experience was carried one step further, to the students. The students selected a real-life problem that was a concern to them and began to solve the problem and generate solutions. The teacher acted as a facilitator, guiding the students as they examined the issues related to the problem and recommended potential solutions. In this paper the integration of the models (including a fourth model, Prism), the approach the students took and way the teacher guided the problem solving experience are presented.

Methods

Population

A self-contained sixth grade accelerated class, Tuba City Unified School District, Tuba City, Arizona, was selected for this project. The class was comprised of 24 Navajo students, (17 boys and 7 girls). This group of students was social, extremely talented, and highly motivated to create positive changes in their own personal lives, the community, and the world.

Arizona State Standards

Throughout the problem solving experience, the students met several of the Arizona State Standards in language arts (reading, writing, writing application), Science (inquiry process, history and nature of science, science in personal and social perspectives), Math (data analysis, probability, and discrete mathematics), and Technology (conventional and current tools, materials and processes, problem solving by using current technologies to conduct research, analysis of solutions, and presentation of results).

Strategies, Concepts and Resources

The strategy was to integrate TASC, DISCOVER, PBL, and Prism models and apply them to the Learning Unit (Table 1). Four main concepts were covered during the unit:

- Historical and cultural uses of alcohol,
- Effects of alcohol,
- Alcohol abuse within the community, and
- Alcohol related accidents within the community.

Students had the following resources available: nonfiction books, informational articles and magazines, internet, audio

recordings, community resources such as health services, guest speakers, and interviews with local community members.

Problem Selection

This exercise was embedded in the Community Awareness Unit designed for sixth grade. The students listed different problems they considered important in their community and then selected a theme that was of the greatest interest to them: The effects of alcohol on the community. The essential question they asked was *What kinds of solutions could be implemented to solve the problems caused by alcohol use in the Tuba City community?* Then the teacher wrote a PBL case scenario to explain the problem and act as a guide for students.

Summary of Case Scenario: What's Up with Taleya?

Taleya was an energetic, happy child. She did well in school and was a responsible sibling at home. Her teachers liked her. She was helpful and kind to her classmates. Her family included grandparents, aunts and uncles. Taleya was the eldest in her family of five and being the only girl, she was daddy's girl! Even though it seemed like Taleya had the perfect life, one day things changed. Taleya wasn't that happy go lucky, carefree girl that she used to be. At school Taleya's mood changed. She was quiet and reserved. Her teachers became worried about her and her best friend Allysia found her crying one day at the baseball field. Even stranger, Taleya stopped inviting Allysia over to her house to hang out. Finally, Taleya couldn't hold her emotions in any longer. She cried her eyes out to Allysia, telling Allysia that one evening about a month ago her dad was on his way home from a long week of working out of town. He had been driving along Route 9 when a teenager had run out

Table 1: Integrated model using strategies from PBL, DISCOVER, TASC and Prism

Strategy	Definition	Goals
Problem Based Learning (PBL)	Knowledge and skills deemed important in a discipline are applied in a real-life situation, integrates the traditional analytic and synthetic abilities with practical ones	<ul style="list-style-type: none"> • Develop motivation to learn • Improve self-directed learning • Increase long-term learning • Increase ability to collaborate • Increase retention time
Discovering Intellectual Strengths and Capabilities while Observing Varied Ethnic Responses (DISCOVER)	Develop both knowledge and skills in academic disciplines and the ability to apply knowledge and skills in real-life settings. In addition, develop both critical and creative thinking.	<ul style="list-style-type: none"> • Develop skills in solving a variety of types of problems • Apply convergent thinking to solve well-defined problems • Apply divergent thinking to solve ill-defined problems
Thinking Actively in a Social Context (TASC)	Follow a clearly-defined, but flexible, set of steps working individually or in small groups to solve a real-life problem or develop a project.	Develop ability to <ul style="list-style-type: none"> • Gather and organize information • Clearly identify the task • Evaluate the outcome according to specified criteria • Reflect on what has been learned and how efficient the learning process has been
The Miracle of Learning Prism (Prism)	The use of creativity, logic, intuition, and metacognition as well as the nine types of human abilities: social/humanitarian, sensible/ emotional, somatic/bodily, visual/spatial, auditory/ sonance, rembolic/mathematical, verbal/linguistic, mechanical/ technical, and scientific/realistic to solve problems	Develop strengths in the 5 general capacities and in the 9 human abilities Use strengths to meet challenges due to general capacities and abilities that are not well-developed

in front of his truck. Her dad had swerved to miss the boy, but clipped him and rolled his truck. She told Allysia that her father had been severely injured and was in the hospital. He was bruised with broken bones and internal injuries. Everyone in the family was devastated. The teenager that her father hit had been drunk and didn't even know what had hit him. He was killed instantly. Her dad was in shock, and when he learned that the boy he had hit died he was overcome with grief and guilt. Taleya was worried about her father and wanted to help him. She began to investigate. She wanted to know who the boy was, why he had been drinking, and why he had such extreme behavior. Taleya wanted answers. She wanted to know how the teenager had gotten alcohol in the first place. Why was he hanging out beside the highway intoxicated? What was this thing called alcohol abuse? Why was it so prevalent in her community?

Investigate with Taleya and her best friend Allysia to search for clues and answers to this tragic event so that Taleya can help her family, and herself gain insights and understandings of alcohol and alcohol abuse, and its prevalence on the Navajo Indian Reservation.

Stakeholder Groups

Students were divided into six stakeholder groups to investigate and gather information on the essential question from their stakeholder group's viewpoint.

The stakeholder groups were the following:

- **Victims**—Taleya and her family: A Navajo family had extended family members living close by. Both parents worked; the father was a construction worker and the mother was a teacher.

They lived in a community on the Navajo Indian Reservation.

- **Teenage Boy (Roger)**—Alcohol-related fatality: Roger came from a single parent dysfunctional home environment. His mother had drug and alcohol problems and his father was in prison. Roger was living with his grandmother when he died.
- **Community Advocates:** Community agencies such as Alanon, A.A. Alateen, C.P.S Counselors, and Psychologists were available in the community to help teenagers and families.
- **Behavioral Health Services:** These were governmental agencies that provided education, counseling, and support for children and families.
- **Navajo Law Enforcement:** The goal of this agency was to protect the citizens of the Navajo Indian Reservation and enforce Tribal Laws. They worked diligently to reduce alcohol related crimes on the reservation.
- **Bootleggers:** The Yazzie family was third generation bootleggers.

All stakeholder groups considered the following questions throughout the learning unit.

- What is going on?
- What are we supposed to do?
- What seems to be the main problem?
- What seem to be the key pieces of information?
- Why is it a problem?
- What other problems do we see?
- Where can we find the answers to our questions?

Implementation of Ill-structured Problem and Actions

Students met in their groups and developed a KWL chart (what we know, what we want

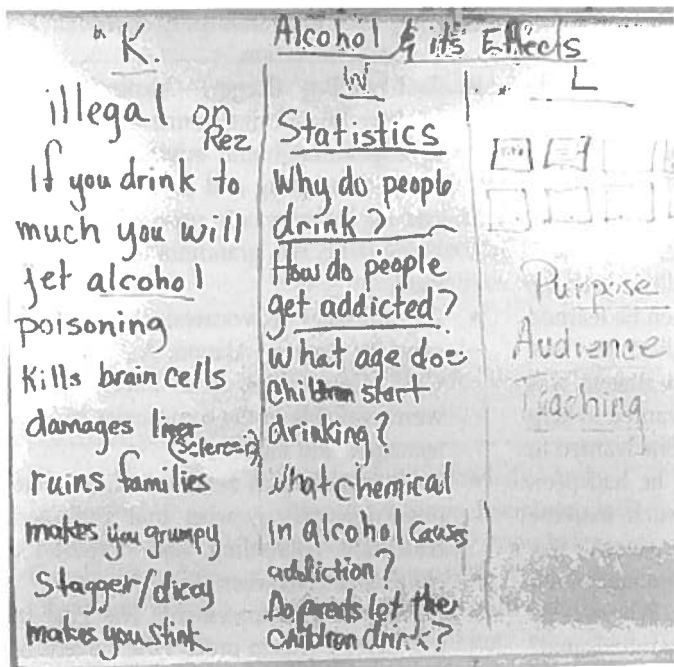


Figure 1: KWL Chart for Alcohol and its Effects

to know, and what we learned) (Figure 1). The KWL chart was used as a means to begin using the TASC Wheel (Figure 2), as well as a process to see continuously where they were in the development of their project. They discussed the new information they found and answered any questions on their KWL Charts. For example, did the new

information raise novel questions they needed to answer, and if so where would they find the new information?

During the first part of the unit the students were at TASC steps Gather/Organize, Identify, and Learn from Experience (Figure 2). They were gathering information from a variety of sources, identifying the problem from their stakeholders' perspective, and sharing information about their own experiences.

After two days of research the stakeholder groups considered the following questions:

- What questions did we answer with the new information?
- What new questions do we have?
- What questions do we still need to answer?
- Is the problem different from what it was 2-3 days ago?
- How are we going to solve the problem?

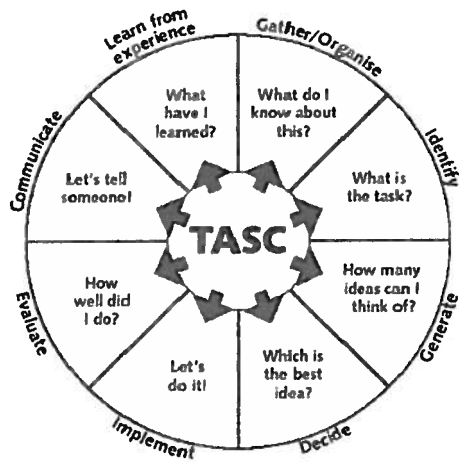


Figure 2: TASC Wheel



Figure 3: Prosecutor giving talk about what would happen if you went before him or the judge as a juvenile in trouble with alcohol or drugs

- What sort of strategies should we use?
- Who will investigate what questions?

They then continued their investigations and used their individual Journal Logs to help summarize what they found out and what they needed to do next.

Lesson Plan

A summary of the Lesson Plan for the Unit is presented in Table 2. The lesson plan shows how the four models were integrated into activities each day.

Guest Lectures

Members of the community presented information related to alcohol and its effects on people (see Table 2 and Figure 3). The students were required to take notes and record important information about the topic presented. They analyzed, evaluated and synthesized what they learned, and created new ways to use the information. They used a graphic organizer of their choice when note taking and evaluating the presentations (e.g. Concept Map, Cluster Map, or Target Map).

Table 2: Lesson plan and models used: DISCOVER problem types, PBL, TASC steps, and Prism human abilities

Lesson Plan	DISCOVER	PBL	TASC	Prism
<p>Day 1 & 2. Introduction to the problem, handouts on KWL charts, making a problem statement, beginning to use planning form and Journal Log; Stakeholder groups organized, and students beginning to gather data Science 1: Understanding Alcohol, Engaging Alcohol, Separating Fact from Fiction Video "Understanding Self"</p>	Problem Type V	Introduction to case scenario and gathering data	Gather/ Organize, Identify, and Learn from Experience	Verbal/Linguistic Mathematical/ Logical
<p>Day 3. Guest Speaker: Health Service Topic, Alcohol within the Family and Coping Skills Science 2: Exploration: A Drink Is a Drink, but People are Different</p>	Problem Type II	Gathering data from local agencies and individuals	Gather/ Organize, Identify, and Learn from Experience	Verbal/Linguistic Mathematical/ Logical Spiritual/ Emotional
<p>Day 4. Guest Speaker: Behavioral Health Services Topic: Alcohol and It's Effects Science 3: Responding to Alcohol: What's Important? Begin to compile research for presentations</p>	Problem Type II	Gathering data from local agencies	Gather/ Organize, Identify, and Learn from Experience	Verbal/Linguistic Mathematical/ Logical
<p>Day 5. Guest Speaker: Alcohol and It's Effects (cont.) Science 3 (cont.): Work on defining the problem and presentations</p>	Problem Type II	Defining the problem from stakeholder perspective	Gather/ Organize, Identify, and Learn from Experience	Verbal/Linguistic Mathematical/ Logical
<p>Day 6. Review TASC Wheel and begin to develop PowerPoint presentations</p>	Problem Type III	Developing presentations	Identify, Generate and Decide	Verbal/Linguistic Mathematical/ Logical
<p>Day 7. Guest Speaker: Navajo Law Enforcement, Bootleggers, Alcohol Related Crimes and Statistics. Alcohol Use, Abuse and Alcoholism</p>	Problem Type V	Gathering data from local agencies	Identify, Generate and Decide	Verbal/Linguistic Mathematical/ Logical Auditory/Sonance
<p>Day 8. Power Point Presentations and Discussion</p>	Problem Type VI	Presenting solutions	Evaluate, Communicate and Reflect	Verbal/Linguistic Social/ Humanitarian Auditory/Sonance
<p>Day 9. Problem Resolution: Community Meeting</p>	Problem Type VI	Communicating to a real audience	Communicate and Evaluate	Verbal/Linguistic Social/ Humanitarian Auditory/Sonance

After the presentations the students were divided into small (non-stakeholder) groups in which they shared and reflected about their findings. Then students summarized the data and added it to their Journal Logs.

Scientific Inquiry

Throughout the Community Awareness Unit the students paid particular attention to the concept of Scientific Inquiry. They

- Identified the questions and concepts that guide scientific investigations;
- Developed descriptions, explanations, predictions, and models using evidence;
- Learned to think critically and logically to understand the relationship between evidence and explanations;
- Recognized and analyzed alternative explanations and predictions;
- Communicated scientific procedures and explanations;

- Used mathematics in all aspects of scientific inquiry; and
- Examined how different kinds of questions suggest different kinds of scientific investigations.

Some parts of the unit involved observing and describing objects, organisms, or events; some involved seeking more information; some involved discovery of new objects; and some involved making models. For example, on Day 3 the students participated in a science interactive student activity unit from the National Institutes of Health (NIH) and National Institute on Alcohol Abuse and Alcoholism (NIAAA) Curriculum Supplement for Middle School, *Understanding Alcohol: Investigations into Biology and Behavior* (NIH/NIAAA, 2010) (Figures 4-7).

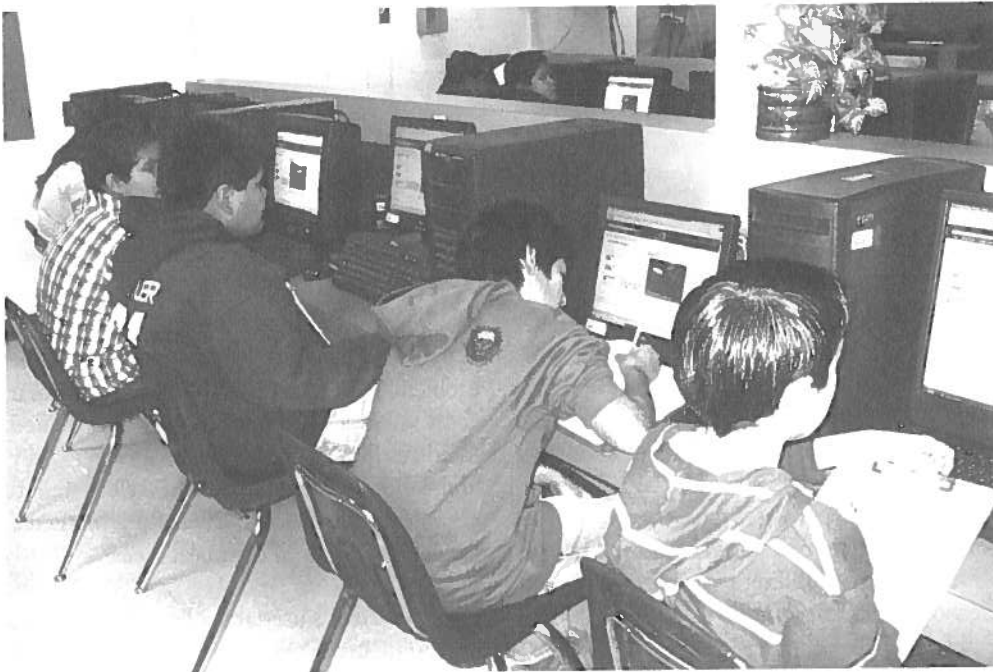


Figure 4: Students working on NIH Curriculum Supplement for Middle School - *Understanding Alcohol: Investigations into Biology and Behavior*



Figure 5: Teacher helping student with the a math problem related to the effect of dose on the movement patterns of mice

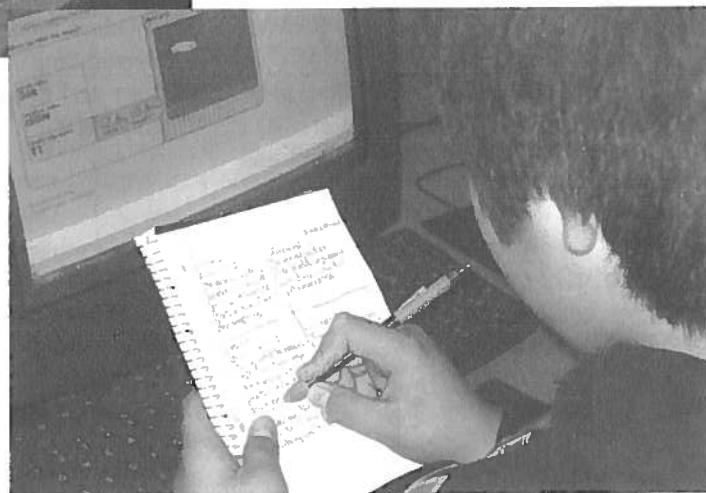
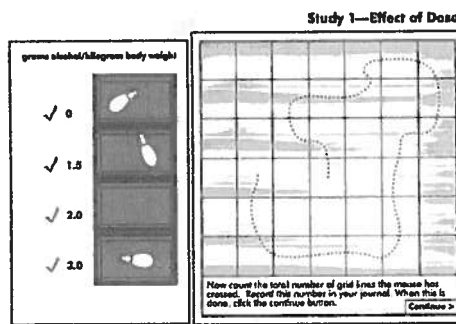


Figure 7: Student observing the behavior responses showing the effect of alcohol on mice

On Day 4, the school counselor presented the topic “A Drink Is A Drink, but People Are Different,” an activity in which the students examined the differences in alcohol content of various types of alcoholic beverages and how alcohol distributes in the human body (Figure 8). This set of experiences gave the students a common conceptual understanding from which to begin building their knowledge on alcohol and its effects.

On Day 6, they reentered the TASC Wheel at the Identify step and each stakeholder group met to discuss, identify and define the



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Figure 6: Close up of the effect of dose on the movement patterns of mice. Pattern of movement is for the mouse with 2.0 grams of alcohol/kilogram body weight

problem from their stockholder’s perspective. They then began to generate solutions to the problem. Finally, the groups decided on their “best solution” to the problem and shared their results with the other groups. They brainstormed ideas, discussed, selected, and organized information. Then they predicted the consequences of their best ideas.

The students used the following questions as a guide to selecting their best idea:

- Dependent upon your stakeholder group, what are some ways in which



Figure 8: School counselor demonstrating the differences in alcohol concentration among different types of alcoholic drinks (wine, whisky and beer)

your group can help to curb the problem of alcohol abuse within our community?

- Why did you choose this idea or solution?
- In what way can you follow up or pursue your ideas?
- What sources can you consult in solving the problem?
- What other alternative plans and methods can you use?
- What do you think are the consequences of your actions, solutions, and ideas?

From this information they began to develop a PowerPoint presentation to explain their "best solution".

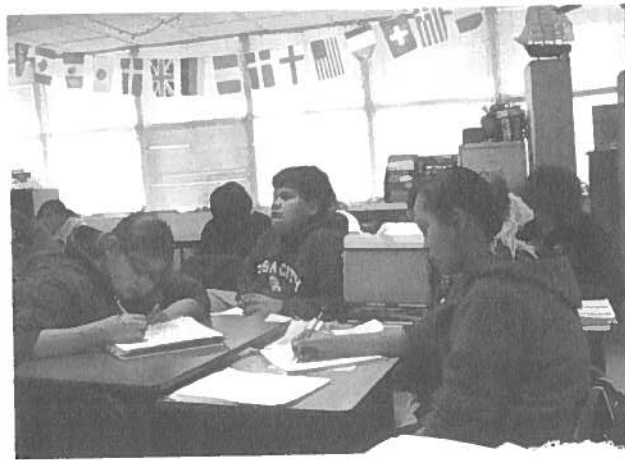
One way to increase creative thinking and to experience a real life situation is to introduce a twist in the case scenario. A fictitious article in a local paper was given to the students in which a reporter said that alcohol would become legal throughout the Navajo Nation. The students had to respond to this change as they developed their best ideas.

To respond to the new development, the Community Advocates Stakeholder Group reviewed an article taken from the *Great Falls Tribune*, August 23, 1999 "Making

reservation 'dry' is no guarantee". According to the article, data collected from two reservations, the Crow and Blackfoot demonstrated that banning alcohol made little difference in rates of alcohol and alcohol abuse. Alcohol-related crimes still occurred with or without the ban. If alcohol were legalized, people would still drink, according to studies reported in the article. However, the norms of drinking would change; instead of binge-drinking, the author stated that people might drink in moderation. However, the stakeholder group's opinion was that kids their age and teenagers would still binge-drink and get addicted to alcohol. Also, the group believed that the best weapon against alcohol and its negative effects was to educate everyone about its health impact and how alcohol abuse can kill you. They recommended more drug and alcohol programs and classes in school at the primary and intermediate levels.

On Day 8, all groups returned to the TASC Wheel and evaluated their ideas, communicated their results to the class, and reflected on what they had learned up to now (Figure 2). Each group talked about how well they had done and what they would do differently in the future.

Figure 9: Students evaluating presentations



On day 9, they communicated their stakeholder results to the community. The students' results and the presentations were evaluated by a three member committee of adults: a classroom teacher and two school counselors. The students also evaluated each other's presentations using a presentation rubric (Figure 9). Then they discussed what they learned. They considered the following questions:

- What are the main points being made by each group?
- Did the groups all identify the same problem? If not, how were the problems different?
- Do the different groups realistically present the solutions?

As a class they made the following conclusions:

- Making alcohol illegal is just like sticking your head in the sand.
- Making alcohol illegal encourages a bootleg industry in which kids are involved.
- Bootlegging is a family business.
- People in our community have to be safe. When they go off the Nation with the intention of drinking they might get hurt

or harm others.

- Making alcohol legal and taxing would be relevant because the taxes could go toward educational programs in the community.

All stakeholder groups believed that the only way to solve the problem would be through education for everyone: families, community, and students. They decided that the Navajo Nation needs a good program. Suggestions were made to create a comprehensive community-wide effort. Also, a lack of facilities for treatment on the reservation complicates the problem.

One of the judges of the student presentations commented that if alcohol were legalized on the Navajo Nation people might not be involved in as many traffic accidents and pedestrian accidents along the highways because they would stay on the reservation to drink. Others disagreed, stating they might still drive and drink in the community.

On the last day students again reflected on "What have I learned?" (Figure 2).

Conclusion

As a result of this teaching unit, students showed enthusiasm and involvement in developing realistic solutions to a community problem that affected all of them. The students gained valuable skills from the required curriculum as outlined in the Arizona State Standards in language arts, science, math, and technology. In addition, they learned valuable skills and gained important information from the fields of psychology and social studies. They applied these skills and concepts in an integrated way and exercised their creative problem solving abilities to propose innovative solutions to persistent problems. Most importantly, perhaps, they now have a clear understanding of the fact that what they learn in school will be valuable to them now

and in the future regardless of the careers they choose or the circumstances of their daily lives.

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