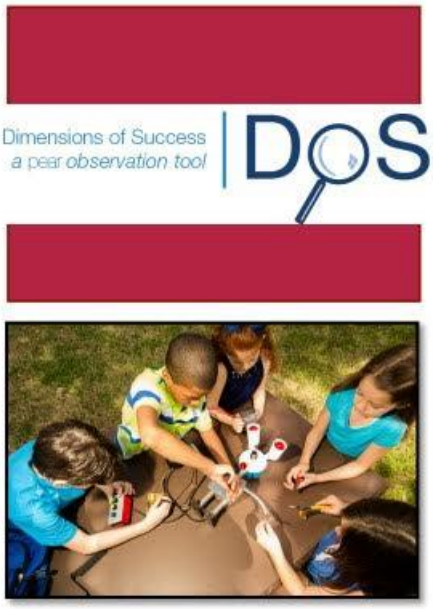
Dimensions of Success
a pear observation tool

DoS Review Report



Program in Education, Afterschool and Resiliency (PEAR)

at Harvard University & McLean Hospital

HARVARD MEDICAL SCHOOL TEACHING HOSPITAL

McLean HOSPITAL
HARVARD MEDICAL SCHOOL AFFILIATE

Report Prepared for *Project Scientist* August 2016

Report Prepared by:
Dr. David Pugalee, Director
Center for STEM Education,
University of NC at Charlotte

Session Overview

Date of Observation:

June 23, 2016

Site/Location Name:

UNC Charlotte, Uptown Center

STEM Focus (science, technology, engineering, or mathematics program?):

STEM: Science Focus

Activity Name/Description:

Camouflage Inquiry; Essential Question: How does color protect animals?

Context/Background of Lesson:

Unit on Animals, Bugs, Botany

Description of Setting:

Standard classroom; outdoor green area adjacent to building

Description of Program Participants:

PK-K, Female elementary students

Dimension Ratings

Dimension	Summary of Evidence	Overall Rating (1 – 4)
Features of Learning Environment		
Organization	Materials were organized on table in central location. The facilitator had media loaded on computer and ready for sharing. Material for outdoor activity were prepared and divided for ease in distribution. The flow of time was conductive for the activity. Students transitioned from video overview to outdoors activity with ease. Transitions were carefully orchestrated.	4

Dimension	Summary of Evidence	Overall Rating (1 – 4)
Materials	The materials were appropriate for the age level and generated participant engagement. Slide slow showing animals in camouflage was colorful and attention grabbing as evident in students' time on task during this segment. Materials for outdoor activity were appropriate with students having an opportunity to select the type of insect they would use in the outdoor component of the activity. Materials provided multiple ways to engage students. The PowerPoint was visual. The outdoor activity was active and hands-on.	4
Space Utilization	Space is conducive to group and team work and is a large room with adequate room to move around. The arrangement allowed students to easily work with the materials for the activity. There were no obvious distractions for the students as they participate in both the indoor and outdoor components of the activity.	4
Activity Engagement		
Participation	Students are consistently participating. No students appear off task. Even in part of activities where students worked with a partner, there was consistent observation that students worked equally in the activity and shared ideas and outcomes.	4
Purposeful Activities	Facilitator uses question to lead events, "What is camouflage?" A student responds "It matches something." This interaction sets the stage for the day's activities. Facilitator maximizes learning opportunities for students. This is consistently evident as the concepts of camouflage and habitat are made in the PowerPoint introduction, the outdoor activity which emphasized habitats, and the butterfly activity extending to camouflage in predator/prey relationships.	4

Dimension	Summary of Evidence	Overall Rating (1 – 4)
Engagement with STEM	Students were actively engaged in all aspects of the activities. Enthusiasm is evident in student comments such as "Yes. It is cool!" and "Camouflage is protection from predators." In the outdoor activity, students were engaged in hands-on application as they found a location which would maximize the camouflage potential of their insect. Instructor regularly asks questions to engage students such as "Why did I pick these butterflies?" and "Why is camouflage important for animals?"	4
STEM Knowledge and Practices		
STEM Content Learning	The facilitator accurately presented information and engaged students in thinking about the STEM content in the activities. "Did you draw a picture of it in its habitat?" reflects the consistent focus on the language and practices of science. Student comments and questions reflected their deepening understanding of the content. For example when one student was finding an area outdoors for her insect she replied, "Hmm… not dark enough" as she tried to match the color of the insect to the color of the surrounding environment.	4
Inquiry	Students were consistently making observations in these activities. In the outdoor activity, students had to make comparisons between characteristics of their insect and the immediate outdoor environmental features, particularly color and texture. In the butterfly activity, students had to construct a rationale for why they placed their butterfly in that particular location drawing on their understanding of habitat, camouflage, and the characteristics of the butterfly.	4

Dimension	Summary of Evidence	Overall Rating (1 – 4)
Reflection	There were two strategically planned opportunities for students to reflect on the STEM content in the lesson. In the outdoor activity, students had to draw a picture of their insect in its environment. At the conclusion of the activities, students returned to their seats and wrote in their science journals about what they learned about camouflage.	4
Youth Development in STEM		
Relationships	The facilitator demonstrated a positive repertoire with the students. Her tone was appropriate and she provided sufficient time for students to answer question. She deliberately engaged all students in conversations. Students clearly respected each other and collaborated with no problems. The facilitator effectively used procedures to refocus students and to transition to various components of the lesson.	4
Relevance	The activities were masterfully linked to the larger content focus of camouflage. The instructor made connections to camouflage and the characteristics of the animals, their habitats, and the benefits and purpose of camouflage. The outdoor component gave students a structured opportunity to think about camouflage as it applied to their own surroundings.	4
Youth Voice	There were two program components that effectively promoted youth voice. In each week students were engaged in at least one activity which involved a product which they would take home. Secondly, each Friday was a parent day when students would present one or more of their learning activities and engage the parents in learning about the central focus of the week. These provided programmatic and systematic evidence that students were encouraged to express ideas and ask questions.	4

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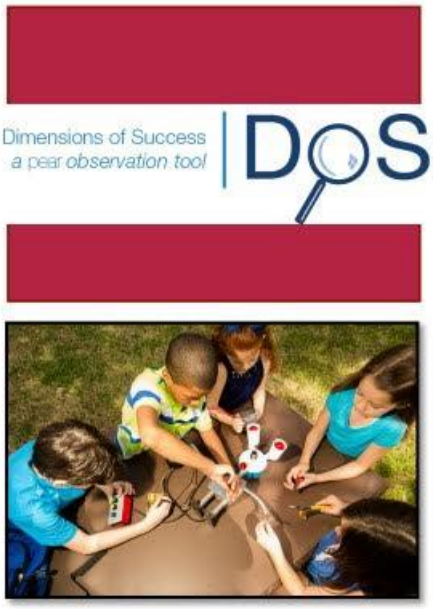

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Report Prepared for *Project Scientist* August 2016

Report Prepared by:
Dr. David Pugalee, Director
Center for STEM Education,
University of NC at Charlotte

Session Overview

Date of Observation:

June 23, 2016

Site/Location Name:

UNC Charlotte, Uptown Center

STEM Focus (science, technology, engineering, or mathematics program?):

STEM: Science Focus

Activity Name/Description:

Oil Spills and Wildlife; Essential Question: How do oil spills harm wildlife?

Context/Background of Lesson:

Unit on Animals, Bugs, Botany

Description of Setting:

Standard classroom

Description of Program Participants:

Grade band 3-4, female elementary students

Dimension Ratings

Dimension	Summary of Evidence	Overall Rating (1 – 4)
Features of Learning Environment		
Organization	The activity involved water and oil so tables were covered with a large plastic sheet. Materials for the student investigation were readily available and additional supplies were organized neatly on a side table. The activity finished somewhat earlier than planned but the facilitator was prepared with components of previous activities that she planned to revisit. .	4

Dimension	Summary of Evidence	Overall Rating (1 – 4)
Materials	Materials were appropriate for the activity. The materials provided the opportunity to simulate real-world events. The materials were appropriate for the age level and presented no issues with use. The materials supported student interest. Students were engaged in exploring the effect of oil on the feathers and investigating how to best remove it.	4
Space Utilization	Space was used appropriately to group students at long tables in pairs. The tables were adequately spaced and allowed students to easily move around during the investigation. There were no observed distractions that distracted students from the exploration.	4
Activity Engagement		
Participation	Students were engaged and discussing their approaches for removing the oil from the feathers. "Oh my goodness. It is getting clean" remarked one student. All students were observed on task during the activity. Even the clean-up component was done with minimal time with students listening to directions and working together. .	4
Purposeful Activities	Facilitator guided explorations with appropriate questions such as "How do we help animals after an oil spill?" Activities appropriately provided opportunities for exploration focused on this overarching question. Facilitator used a short video dealing with how real scientists figured out the problem of removing oil from bird's feathers during an oil spill. While the video from the International Bird Rescue Research Center complemented the activity, the lack of a debrief following the video may have resulted in lost opportunities to make the purpose explicit.	3/4

Dimension	Summary of Evidence	Overall Rating (1 – 4)
Engagement with STEM	Students were presented with a hands-on opportunity to observe the effect of oil on a bird feather and to explore possible solutions for removing the oil safely. The activity was student-centered with students making observations. Students were engaged in answering the facilitator's question, "Is the oil coming off the feather? What else could we use?"	4
STEM Knowledge and Practices		
STEM Content Learning	The components of the activity were accurately developed with interesting resources and explorations. After the exploration, the reading of a story on how soapy water can clean oil off a pelican reinforced the findings from the student exploration. Students were making observations and noting changes in how water, oil, and soap were either absorbed or repelled on the feather. A student commended "Ours isn't oily at all" after using a toothbrush and dawn liquid to clean the feather coated with oil.	4
Inquiry	The core of the exploration required exploration, making conclusions, and recording. Students were observed completed a table summarizing their exploration. The activity was designed to simulate the real effects of oil on animals. The exploration focusing on how to remove oil from a feather focused on real-world events. The facilitator highlighted how scientists discovered that dish detergent (such as Dawn) was effective, yet safe, in removing oil from birds feathers, allowing them to be returned to their habitats.	4

Dimension	Summary of Evidence	Overall Rating (1 – 4)
Reflection	Opportunities for reflection were provided but it was not apparent that all students were actively engaged in forming important connections. Students were asked to respond to the prompt "From our experiment I learned …" in their journals. Most students were observed writing in their journals; however, there was no clear whole class debrief of the reflections. The lack of a debrief after the video showing scientist struggling with the same question driving the day's explorations also limited students' opportunities to build connections.	3
Youth Development in STEM		
Relationships	The students and the facilitator worked well together. There was a demonstration of mutual respect. Students cooperated with each other to complete the exploration and to clean their areas and put away the supplies. There was an obvious protocol for working together and keeping materials organized.	4
Relevance	The activities linked to topics that were of interest to the students. Connections to the world of scientist and real-world parallels were made through selected components to the activity. During the exploration students were heard making comments about animals and how it was important to try to save them during disasters such as oil spills.	4
Youth Voice	There were two program components that effectively promoted youth voice. In each week students were engaged in at least one activity which involved a product which they would take home. Secondly, each Friday was a parent day when students would present one or more of their learning activities and engage the parents in learning about the central focus of the week. These provided programmatic and systematic evidence that students were encouraged to express ideas and ask questions.	4

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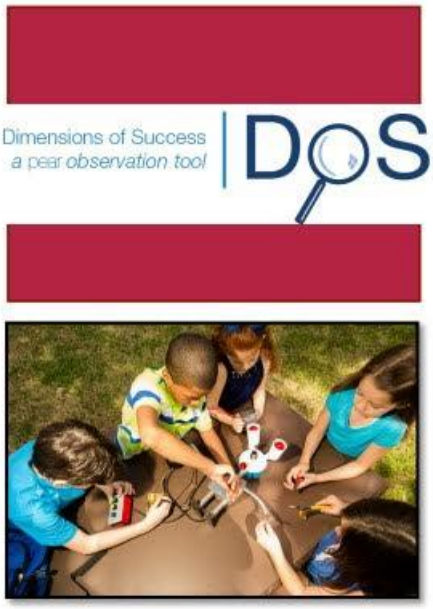

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Report Prepared by:
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Center for STEM Education,
University of NC at Charlotte

Session Overview

Date of Observation:

June 30, 2016

Site/Location Name:

UNC Charlotte, Uptown Center

STEM Focus (science, technology, engineering, or mathematics program?):

STEM: Science Focus

Activity Name/Description:

Create a Kaleidoscope; Essential Question: How does light reflect?

Context/Background of Lesson:

Unit on The Speed of Light

Description of Setting:

Standard classroom

Description of Program Participants:

Grade band 1-2, female elementary students

Dimension Ratings

Dimension	Summary of Evidence	Overall Rating (1 – 4)
Features of Learning Environment		
Organization	Materials were organized and available at each table for students. Facilitator had instructions and presentation materials ready at the front of the room. A KWL chart on the wall highlighted the continuation of activities supporting the essential focus of the lesson.	4

Dimension	Summary of Evidence	Overall Rating (1 – 4)
Materials	The materials for students to make their own kaleidoscope were age appropriate. Students demonstrated high interest in the activity particularly when the facilitator used the doc camera to show a kaleidoscope. Students enthusiastically asked if they were going to be able to take their kaleidoscope home.	4
Space Utilization	Space was used appropriately so students could work on their kaleidoscopes but also collaborate on questions and support each other. Though the students were excited and talkative, there were no observed distractions that interfered with the facilitator's instructions or with students sharing ideas and resources.	4
Activity Engagement		
Participation	Students were actively engaged and showed enthusiasm for building their own kaleidoscope. No students were observed not actively participating in the discussions and constructions. The facilitator gave clear instructions and students were observed effectively using the instructions and information. .	4
Purposeful Activities	Facilitator introduced activity with a review. "What are the characteristics of light we already know something about?" Student answers "It is reflected." Facilitator used various objects (already at student tables) to get students to think about light. A small mirror was one of the objects. The facilitator led students in a discussion about how the light and mirror interacted. This served as a springboard for student to better understand how light is reflected. The facilitator communicated the goal of the activity – observe light and how it is reflected – and implemented the activity to support this goal.	4

Dimension	Summary of Evidence	Overall Rating (1 – 4)
Engagement with STEM	Students were engaged in hands-on activities to explore the key focus of the lesson from the initial exploration with common items such as mirrors, writing in their journals, and then constructing their own kaleidoscope. When the kaleidoscope construction was introduced, a student enthusiastically shouts out "Wow. We are going to make a kaleidoscope." The facilitator engaged the students in exploring and describing the behavior of light. Though she provided clear information about the goal of the lesson, she effectively used questioning and exploration to get the students to make conjectures and discoveries on their own. "I am going to let you explore with your mirror to experiment with reflected light."	4
STEM Knowledge and Practices		
STEM Content Learning	Content was accurately developed. The charts on the wall, including the KWL, and diagrams clearly indicated that students were engaged in identifying key properties of light. Reflected, Refracted, and Blocked were observed in artifacts around the room. Facilitator developed idea of reflection using mirrors before students engaged in making their kaleidoscopes. This tied the idea of reflected light to the kaleidoscope so that the lesson was a cohesive whole. Student questions and comments indicated they were developing ideas about light. Holding one of the small mirrors, a student remarks, "If you hold it at an angle you can see stuff." Students discussed the orientation of images reflected in the mirrors.	4

Dimension	Summary of Evidence	Overall Rating (1 – 4)
Inquiry	The explorations were characterized by observation and describing. Students were participating in the experiments and discussing what they were observing. Through the activities, students were observing the effects of light and analyzing the interaction of light with objects that promoted reflection. The activity was implemented in a way that promoted systematic discussion of reflected light and descriptions explaining how materials and placement affected the path of the light.	4
Reflection	The facilitator effectively used two deliberate tools to promote student reflection. First, the KWL chart was an organizational tool that helped students reflect on their experiences. When recording information in their own charts, the facilitator encouraged the students to "leave some space under your W because our exploration may answer one of the questions you want to know." Secondly, students used their journals as a place to record ideas and make sense of the STEM content. When writing in their journals the facilitator instructed the students to underline key words (reflect) and to discuss these ideas in the journal.	4
Youth Development in STEM		
Relationships	The classroom atmosphere was energetic and collaborative. Students worked effectively together and attentively discussed and shared ideas. The facilitator made deliberate efforts to engage all students and it was evident that students respected the facilitator. There was no sarcasm or judgments observed. The facilitator called students by their names and students took turns responding to questions or sharing ideas.	4

Dimension	Summary of Evidence	Overall Rating (1 – 4)
Relevance	The activities were clearly linked to topics that were part of the larger unit on how light travels. Connections to everyday events, such as the mirrors, gave students opportunities to see how reflected light is part of their own experiences; however, these connections were not made explicit. Career connections were not observed; however, the program includes a field trip focused on the unit to develop connections to the real-world including careers.	3/4
Youth Voice	There were two program components that effectively promoted youth voice. In each week students were engaged in at least one activity which involved a product which they would take home. Secondly, each Friday was a parent day when students would present one or more of their learning activities and engage the parents in learning about the central focus of the week. These provided programmatic and systematic evidence that students were encouraged to express ideas and ask questions.	4

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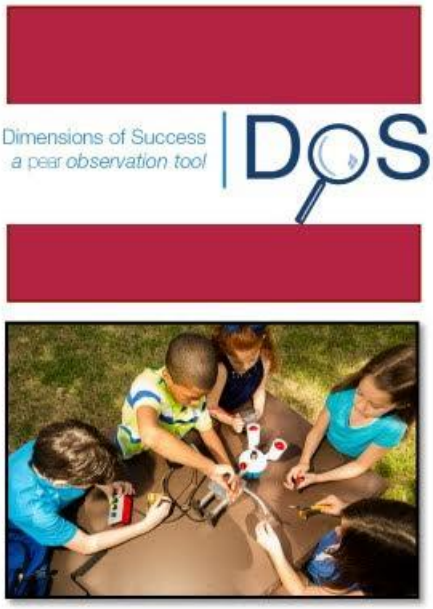

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Report Prepared by:
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Center for STEM Education,
University of NC at Charlotte

Session Overview

Date of Observation:

June 30, 2016

Site/Location Name:

UNC Charlotte, Uptown Center

STEM Focus (science, technology, engineering, or mathematics program?):

STEM: Science Focus

Activity Name/Description:

Exploring a Cow's Eye; Essential Question: How do eyes sense light?

Context/Background of Lesson:

Unit on The Speed of Light

Description of Setting:

Standard classroom

Description of Program Participants:

Grade band 5-7, female elementary students

Dimension Ratings

Dimension	Summary of Evidence	Overall Rating (1 – 4)
Features of Learning Environment		
Organization	Materials were ready and distributed to student pairs in an efficient manner. The facilitator had support materials organized in the front of the room. The projector system was ready and the resources to be used were loaded and easily accessible. The facilitator and assistant did an excellent job assisting students with transitions between various parts of the cow eye dissection.	4

Dimension	Summary of Evidence	Overall Rating (1 – 4)
Materials	The cow eye dissection used materials and resources that were age appropriate and generated enthusiasm among the students. Student interest in the activity was very high. The activity was supportive of STEM learning goals focusing on how light and sight are related. The facilitator used visuals (eye diagram handout), video (cow eye dissection), and hands-on materials (an actual cow eye for dissection) to support STEM content development.	4
Space Utilization	The facilitator used the space effectively pairing students together at tables but allowing enough space for her and the assistant to assist and monitor student progress. This particular day a local reporter was present listening to the students and taking photographs. Yet, there were no obvious distractions to the students.	4
Activity Engagement		
Participation	Throughout the activity, students were actively engaged. There were no observations of students not focused on exploring the cow eye. Students were attentive and paused to get new instructions (supported by video) for the next part of the eye dissection.	4
Purposeful Activities	The facilitator prepared the students for the activity by reviewing the parts of the eye (with a diagram) that they would focus on during the dissection activity. The structure of the activity required students to find the various parts of the eye. The development allowed students to progress in an efficient manner; however, the focus on how the various parts of the eye interacted with light to support sight was not always explicit. The goal of the dissection and the structure of the eye and how it allows light to produce sight was mentioned, but the role of the various eye structures in this process was	3

Dimension	Summary of Evidence	Overall Rating (1 – 4)
	not always clearly developed. Students were observed eagerly identifying the parts of the eye but not discussing how that part was involved in supporting sight.	
Engagement with STEM	The activity was hands on and allowed students to develop some ideas about eyes and the production of sight. Students were active and each student was observed sharing the dissection responsibilities with their partner. Students were observed referring to their diagrams and asking questions of each other as they found each relevant part of the eye. The facilitator provided clear information and directions monitoring the pairs to ensure that students were engaged. Student comments indicted engagement with the process. "I found the cornea."	4
STEM Knowledge and Practices		
STEM Content Learning	The facilitator used various materials to accurately develop the key ideas for the lesson. Students had a visual for the parts of the eye that corresponded to the key parts identified through the various steps in the video that appropriately segmented the dissection into manageable steps. The video and the facilitator provided general ideas about the role of various eye parts in sight. "The lens allows light through and can change shape so that we can focus on objects close up or far away." Student questions and comments indicated they were developing an understanding of the structure and components of an eye. Students' comments during the dissection focused mostly on correctly identifying the parts and did not provide insights into whether they understood the overall process of how light is involved in the production of sight which was the lesson focus.	4

Dimension	Summary of Evidence	Overall Rating (1 – 4)
Inquiry	The dissection process provided students multiple opportunities to observe and describe. Students were required to pay attention to detail so they could find the relevant eye structure. Students were allowed to experience their own eye dissection with a video to explicate the process. Though the dissection involved a procedure, the students were working with appropriate instruments and were clearly intrigued by the structure of the eye as evidenced in students' verbal responses of satisfaction when they felt they had successfully located the part of the eye for that segment of the investigation.	4
Reflection	The structure of the activity allowed time for reflection. Students were often stopped to clarify what they were supposed to be focusing on in the dissection. The video provided another opportunity for the students to reflect and compare their process with the one used by the scientist. Students shared ideas and discussed their procedures with partners in an effective way. Students were heard talking about their work and comparing their cow eye with the diagram in making decisions about whether they had successfully located a particular eye component.	4
Youth Development in STEM		
Relationships	The pairs of students worked well together demonstrating a sense of respect and appreciation for contributions. This respect was also evident in how students interacted with both the facilitator and the assistant. Students raised their hands if they had a question or needed assistance and waited patiently for a response. The facilitator had established a warm and inviting environment that allowed students to explore ideas in a friendly environment.	4

Dimension	Summary of Evidence	Overall Rating (1 – 4)
Relevance	Students were heard making connections between human eyes and the cow eye. "I know their pupil is in the same place as our eye." Students expressed amazement at the size of the cow eye, yet one student said "This is so much bigger than my eye, but it a lot the same." Career connections were not observed; however, the video provided some connection to science and veterinary study.	3/4
Youth Voice	There were two program components that effectively promoted youth voice. In each week students were engaged in at least one activity which involved a product which they would take home. Secondly, each Friday was a parent day when students would present one or more of their learning activities and engage the parents in learning about the central focus of the week. These provided programmatic and systematic evidence that students were encouraged to express ideas and ask questions.	4

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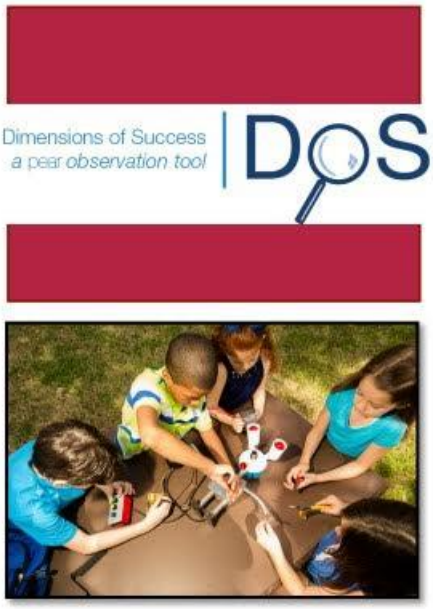

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Report Prepared by:
Dr. David Pugalee, Director
Center for STEM Education,
University of NC at Charlotte

Session Overview

Date of Observation:

August 2, 2016

Site/Location Name:

UNC Charlotte, Uptown Center

STEM Focus (science, technology, engineering, or mathematics program?):

STEM: Science Focus

Activity Name/Description:

Fingerprinting; Essential Question: How unique are an individual fingerprints?

Context/Background of Lesson:

Unit on Science of Crime and Chemistry

Description of Setting:

Standard classroom

Description of Program Participants:

Grade band 1-2, female elementary students

Dimension Ratings

Dimension	Summary of Evidence	Overall Rating (1 – 4)
Features of Learning Environment		
Organization	The materials were ready for the student investigation with each student having the necessary materials at their seats so that they could complete individual fingerprint profiles. Visual materials were displayed on the projector screen so that students could see the various types of fingerprint patterns. The facilitator had planned the activity well including hand wipes so students could clean their fingers. Student materials were organized and prepared for use.	4

Dimension	Summary of Evidence	Overall Rating (1 – 4)
Materials	The fingerprinting activity was structured so that it was appropriate for this age group. The use of pencil lead for the fingerprint impressions was used instead of ink or other materials. T Cards for creating the fingerprint impressions for each of the ten fingers were large enough for the students to use without any difficulty. The materials created interest among the students whom showed great interest in completing their cards and comparing their prints to the patterns projected on the screen in the front of the room. This activity related directly to a previous activity where students considered evidence in a simulated crime scene. A PowerPoint with crime scene photos from the previous simulation was available for part of the activity review.	4
Space Utilization	Each student had the appropriate amount of space to complete the activity without appearing crowded with other students; yet, the students were close enough to compare their cards. The classroom space allowed the facilitator and assistant to circulate and check on students' progress. No distractions to the activity were observed. There were no noise issues and movement around the classroom was minimal.	4
Activity Engagement		
Participation	Each student had their own materials which promoted participation from every student. All students were observed completing their fingerprint impressions and identify the number of whorls, loop, or arch patterns. Once student commented, "I have a big thumb. Look at that." Once the fingerprint cards were complete by most students, the facilitator reminded the class to "talk to your	4

Dimension	Summary of Evidence	Overall Rating (1 – 4)
	neighbor and compare your prints." Transitions were smooth and students were able to understand and follow the detailed instructions for completing the activity.	
Purposeful Activities	The facilitator provided a large projection of fingerprint impressions showing loop, arch, and whorl patterns. The facilitator talked about each and provided a comparison point for the students to use once they had their own fingerprint impressions. The teaching assistant distributed pencils with the facilitator commenting that "this if for when you're ready to write what kind of print patterns you have." The outcome of the activity was clearly communicated.	4
Engagement with STEM	Students were actively engaged in making personal records of their prints and then comparing those with the patterns on the projected examples. The facilitator developed ideas about genetics and patterns including which patterns were common and which were the least common. Observing for patterns and classifying are critical skills in STEM learning. The facilitator asked a student what kind of print is that one. The student commented "an arch" to which the facilitator prompted "What percent of people have that pattern?" Students were focused on the activity and showed enthusiasm. One student commented "This is awesome!"	4
STEM Knowledge and Practices		
STEM Content Learning	The opening PowerPoint on fingerprint patterns reinforced key ideas related to fingerprints including genetics and individual uniqueness. Students had their own charts and were engaged in comparing patterns and making decisions. The activity, including the writing component, supported the	4

Dimension	Summary of Evidence	Overall Rating (1 – 4)
	development of observation and recording skills. Student comments supported that they were engaged in classifying and comparing. "I have more than you for whorls. How many do you have?"	
Inquiry	Students were actively recording data and making decisions about what that data said compared to a model and statistics on the commonality of various fingerprint patterns in the general population. Students had to make decisions based on the data and the model. The facilitator pushed one student who questioned the type of pattern in one of their prints to "You have to look at the shape of the ridge and compare it to the diagram on the screen. What does it look most like?	4
Reflection	The facilitator asked the students to take out their journals and place their record sheets on a page by using the glue stick. She engaged the students in a discussion on where fingerprints might be found in the simulated crime scene (showed photographs of the scene on the screen). Now write in your journal all the places where the forensic specialist might find fingerprints." Students were observed making lists of places where they might find fingerprints in the simulated crime scene. Students made connections between the day's activity and the previous day's investigation of a crime scene.	4
Youth Development in STEM		
Relationships	Students worked well independently when necessary such as making their individual fingerprint cards. When it was time to compare their prints to a classmate, students were observant and reported how they had quantified the number of patterns for each of their ten finger prints. The facilitator had a good relationship with the students. She responded to any questions while still pushing the student to think about their understanding and the activity.	4

Dimension	Summary of Evidence	Overall Rating (1 – 4)
Relevance	Students were able to personalize the forensics study by analyzing their own fingerprints. The facilitator made clear connections between fingerprints and crime scene investigations. Students were actively engaged in collecting information, systematically analyzing and comparing, and classifying. This type of thinking was related to actual STEM professional thinking. The teaching assistant remarked "This is how real forensic scientists think about information."	4
Youth Voice	There were two program components that effectively promoted youth voice. In each week students were engaged in at least one activity which involved a product which they would take home. Secondly, each Friday was a parent day when students would present one or more of their learning activities and engage the parents in learning about the central focus of the week. These provided programmatic and systematic evidence that students were encouraged to express ideas and ask questions.	4

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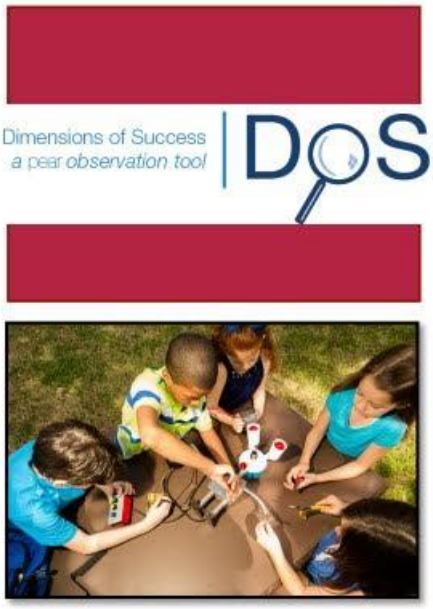

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Site/Location Name:

UNC Charlotte, Uptown Center

STEM Focus (science, technology, engineering, or mathematics program?):

STEM: Science Focus

Activity Name/Description:

Science of Smell. Essential Question: How do we think about smells?

Context/Background of Lesson:

Unit on Science of Crime and Chemistry

Description of Setting:

Standard classroom

Description of Program Participants:

Grade band PK-K, female elementary students

Dimension Ratings

Dimension	Summary of Evidence	Overall Rating (1 – 4)
Features of Learning Environment		
Organization	Materials were organized and prepared for the activity. Students had received a rating sheet for their smell experience. The facilitator had prepared a collection of small containers with lids containing cotton balls with materials to produce a smell. Video materials were loaded and ready to use. The activity was planned well with the classroom assistant available and informed about the distribution of materials and assisting student pairs.	4

Dimension	Summary of Evidence	Overall Rating (1 – 4)
Materials	The activity was appropriate for the students. A blindfold was used so that the student smelling the material in the small sealed container could use their minds to identify the smell, rate it, and associate memories. The blindfold was an effective tool to stimulate interest. The activity was directly related to how one uses their senses and how the processing of that information is important in investigation processes such as when a crime occurs. A recording sheet provided a way for students to think about their experience and quantify it.	4
Space Utilization	The space was used appropriately by the facilitator to implement the activity. Materials were available at a front table and each pair of students had appropriate space at a table to work with the materials. There were no observed distractions. The level of noise generated by students during the experience did not distract others in their work.	4
Activity Engagement		
Participation	Students were consistently engaged in the smelling activity and were observed collaboratively taking turns with the dozen or so containers to be the 'blindfolded' observer. No students were observed not focusing on the task. Students transitioned through each part of the activity with ease and did not have to be prompted by the facilitator.	4
Purposeful Activities	The facilitator prepared the students for the activity by sharing a video from the kids health website (animated) showing the role the nose plays in smell. Students used their senses to best identify the smell in the container. Students also rated the smell and recorded ideas or illustrations about memories they associated with the smell. The facilitator connected this process to	4

Dimension	Summary of Evidence	Overall Rating (1 – 4)
	scientific observation. The goal of the activity was communicated and the rating sheet provided a tool for recording observations (smells). Students displayed curiosity as they participated. "It is a new smell. I like it. It is neutral."	
Engagement with STEM	Students were required to consider each of the containers and carefully reflect to complete the rating chart. The ratings and observations were the students. The teaching assistant was heard reminding a pair of students who identified a smell as "bananas" by saying "What memories to bananas bring to mind?" Each student participated in being blindfolded and observing the smell in the sealed container. "It is bad" remarked one student when she removed the lid. Students recorded their observations. One student looked at her chart after removing her blindfold and said "This smelled a little like this one. But that was peppermint." Clear information was provided. Students showed interest in all aspects of the activity. During the video on the role of the nose students were heard remarking "Oooooo. That is gross." when the role of mucous was highlighted.	4
STEM Knowledge and Practices		
STEM Content Learning	The opening video on the role of the nose in smells was used effectively to connect the smelling activity to specific science content. The rating chart moved student into developing a way to quantify observations. The activity fit well within the week unit on crime scene investigations by focusing on developing observation and recording skills. Students had few questions. No question and answer period summarizing the activity was observed.	3/4

Dimension	Summary of Evidence	Overall Rating (1 – 4)
Inquiry	This activity was focused on observation and recording thus fit naturally with the inquiry model. The rating system which students had to use to rate the smell was open-ended and required justifying their choice. In recording their observations students had to identify a memory related to the smell. They could describe that memory in words or draw a picture. This information became part of their 'rating' process captured in the rating sheet and included in their journals.	4
Reflection	Students were observed thinking of the smells and relating them to their own experiences. "I'm rating this smell as good. It reminds me of food." During the activity students shared their observations and their thinking about the smells in the containers. The procedures were shared in an effective way and students made comments relating this activity to a previous activity where they investigated a mock crime scene.	4
Youth Development in STEM		
Relationships	As noted the students worked in pairs and were very cooperative in taking turns during the smelling activity (the student smelling was blindfolded). They demonstrated respect but also engaged effectively in sharing information and adding their own perspectives and memories. Students and the facilitator and her assistant demonstrated a good working relationship. Students asked questions politely. Bothe the facilitator and the assistant asked questions to prompt students instead of giving answers. "So what does the smell of playdough remind you of?" Such approaches resulted in an atmosphere where students were encouraged to explore and share.	4

Dimension	Summary of Evidence	Overall Rating (1 – 4)
Relevance	Students freely shared the memories they associated with the smells. This was an effective part of the activity in providing opportunities for students to develop observation and description skills. The activity was appropriately positioned after the mock crime scene investigation, so students expressed an awareness of the role of observation in forensics. Career connections were made as part of a forensics field trip the next day.	4
Youth Voice	There were two program components that effectively promoted youth voice. In each week students were engaged in at least one activity which involved a product which they would take home. Secondly, each Friday was a parent day when students would present one or more of their learning activities and engage the parents in learning about the central focus of the week. These provided programmatic and systematic evidence that students were encouraged to express ideas and ask questions.	4

Dimensions of Success
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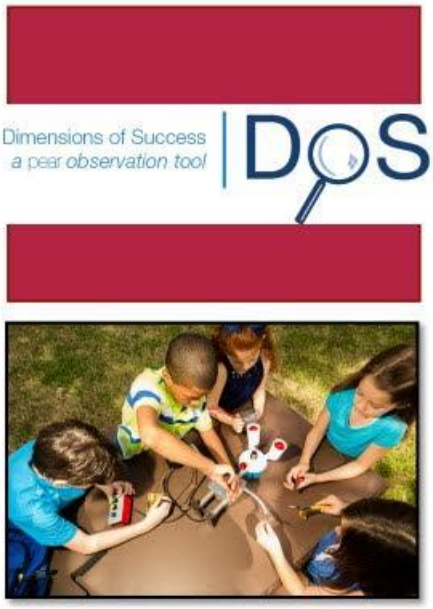
DoS Review Report



Program in Education, Afterschool and Resiliency (PEAR)

at Harvard University & McLean Hospital

HARVARD MEDICAL SCHOOL TEACHING HOSPITAL

McLean HOSPITAL
HARVARD MEDICAL SCHOOL AFFILIATE

Report Prepared for *Project Scientist* August 2016

Report Prepared by:
Dr. David Pugalee, Director
Center for STEM Education,
University of NC at Charlotte

Session Overview

Date of Observation:

August 11, 2016

Site/Location Name:

UNC Charlotte, Uptown Center

STEM Focus (science, technology, engineering, or mathematics program?):

STEM: Science Focus

Activity Name/Description:

Tech Maker/Code Week; Essential Question: How does code help computer work?

Context/Background of Lesson:

Unit on Technology and Computing

Description of Setting:

Standard classroom

Description of Program Participants:

Grade bands 3-4 and 4-5, combined, female elementary students

Dimension Ratings

Dimension	Summary of Evidence	Overall Rating (1 – 4)
Features of Learning Environment		
Organization	Materials for the technology exploration were separated so that they could be easily distributed. All instructional support materials were set up on the projector with multiple resources loaded and ready on the computer. The facilitator had a sequence for the activities and had additional explorations ready for students who proceeded	4

Dimension	Summary of Evidence	Overall Rating (1 – 4)
	more quickly with the task or to use as a backup as necessary.	
Materials	The materials were appropriate for this age group. The emphasis on raspberry pi and code.org provided entry points for students with limited exposure to computing. These materials were appealing and provided varied experiences for students including programming, gaming, and knowledge of hardware (review of various computing/technology components). The activities built on previous work during the week on computers and coding.	4
Space Utilization	Work was done in a computer lab which provided adequate space for students to work together at a station. The tiered arrangement did not present any challenges for delivery of the activity. There were no distractions that inhibited the flow of the lesson. There were 8 volunteers from Bank of America present to assist students with technology question. The students utilized these volunteers and the large number of adults in the room presented no observed distractions.	4
Activity Engagement		
Participation	All students were observed fully active during the exploration. They went quickly to the front table to retrieve their computer supplies and hardware and were observed quickly returning to their stations and beginning the activity. Student pairs were collaborative and transitions were smooth. Though students were working in pairs, they were observed taking turns and collaborating with no observed problems or evidence that any student was 'left out'.	4

Dimension	Summary of Evidence	Overall Rating (1 – 4)
Purposeful Activities	The facilitator posed a challenge to engage students in exploring coding. "How could we get a computer to flip a coin ten times and count the number of times it comes up heads or tails?" The facilitator projected instructions for coding and related information on the large screen in the front of the room. The key steps were made clear and the teaching assistant and volunteers worked with students to make sure the activity flowed smoothly.	4
Engagement with STEM	The students were given time to complete set-up and begin the coding process before asking for assistance. Students worked cooperatively to develop the algorithm for the simulation. "Yeah. It works." Students showed excitement and success. Students progressed through the activity and were engaged in recording outcomes. "I flipped seven times. Ten! Now I will tally my results."	4
STEM Knowledge and Practices		
STEM Content Learning	Students not only explored coding and technology but the concept of random. "It is random. It could be a head or a tail" one student replied to her partner who said "I bet it will be a heads." The facilitator urged student to assign a code word for head and tail and to program a variable to record. A short video from Google code was shown to provide students with some context about coding. This allowed the students and the facilitator to engage in a review of the steps necessary to complete the coding activity. The comments the students made were indicative of their ability to understand the information presented and their enthusiasm to engage in the activity. One student says to her partner, "We can create an algorithm. Let's get started."	4

Dimension	Summary of Evidence	Overall Rating (1 – 4)
Inquiry	Throughout the activity students were observed trying their hand at coding and asking for assistance if something didn't work. The volunteers did not solve the problems for the students but provided a suggestion about what they might check or what changes they might make to their coding. "Got it!" was one response to a suggestion. Students consistently worked to solve problems and explore paths to success. Comments such as "We already tried it" and "We copied in the address and it worked" demonstrated the focus of the students on progressing through the activity.	4
Reflection	The facilitator asked the students to take out their journals and place their record sheets on a page by using the glue stick. She engaged the students in a discussion on where fingerprints might be found in the simulated crime scene (showed photographs of the scene on the screen). Now write in your journal all the places where the forensic specialist might find fingerprints." Students were observed making lists of places where they might find fingerprints in the simulated crime scene. Students made connections between the day's activity and the previous day's investigation of a crime scene.	4
Youth Development in STEM		
Relationships	Students were highly engaged in sharing their ideas and recommendations. If the students encountered a problem they discussed it and thought about possible routes to success. The students worked well together and cooperated to solve problems. Students were observed sharing responsibility for assembling hardware components such as in raspberry pi and taking turns coding and executing their work.	4

Dimension	Summary of Evidence	Overall Rating (1 – 4)
Relevance	Gaming was also used to connect to students. Students enjoyed playing with Mind Craft which had been explored in a previous activity. A focus on coding as a career was a focus throughout the week. The bank volunteers were an excellent model of relevance. The volunteers worked with students throughout the week allowing student to understand that technology skills are important in a range of various jobs in the banking industry.	4
Youth Voice	There were two program components that effectively promoted youth voice. In each week students were engaged in at least one activity which involved a product which they would take home. Secondly, each Friday was a parent day when students would present one or more of their learning activities and engage the parents in learning about the central focus of the week. These provided programmatic and systematic evidence that students were encouraged to express ideas and ask questions.	4

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Report Prepared for *Project Scientist*
Observation Dates (2016): 6/23, 6/30, 8/2, 8/11

Prepared by Dr. David Pugalee, Director
Center for STEM Education, University of NC at Charlotte

Dimension	Average Rating	Representative Evidence
Features of Learning Environment		
Organization	4.0	Materials were prepared and organized prior to the activities. Activities were well-structured and transitions between components were smooth.
Materials	4.0	The materials used in the activities were appropriate for the age levels. The materials generated student interest and promoted collaboration.
Space Utilization	4.0	Students had the appropriate space to complete the planned activities. There were no distractions.
Activity Engagement		
Participation	4.0	Students were consistently engaged in the activities. Often students worked in pairs and were observed sharing ideas and outcomes.
Purposeful Activities	3.8	Activities were positioned explicitly within a larger unit. Facilitators shared an essential question or focus to direct students' thinking during the activities.
Engagement with STEM	4.0	Activities were hands on allowing students to develop ideas and extend concept understanding. Critical STEM skills such as observing and classifying were emphasized.
STEM Knowledge and Practices		
STEM Content Learning	3.9	Introductory segments reinforced key ideas. Content was accurately developed. Students constructed conclusions or described ideas based on explorations.
Inquiry	4.0	The core of the activities required exploration, recording and observations, and making conclusions. Students worked to solve problems and answer questions.
Reflection	3.9	Students routinely used their journals as a record of their learning. Students made connections to between STEM ideas and other activities.
Youth Development in STEM		
Relationships	4.0	Students consistently collaborated with each other showing respect and appreciation. Facilitators and assistants established warm and inviting environments.
Relevance	3.9	Career connections were made including field trips related to the week's topic. Emphasis was placed on developing thinking and skills reflected in STEM fields.
Youth Voice	4.0	Students had opportunities to take products home to promote dialogue with others. Each Friday was a parent day where students shared their work.

The DoS Protocol was Developed by PEAR