Folio 2: Exemplary School and Classroom Practices

This folio is one in a series of four designed to collect and present evidence of exemplary implementation of the Urban Advantage Middle School Science Initiative as documented by NCREST, (The National Center for Restructuring Education, Schools and Teaching, Teachers College, Columbia University) in a sample of Urban Advantage Demonstration Schools. The focus of this folio is Exemplary School and Classroom Practices.

What is Urban Advantage (UA)?

Started in 2004, the Urban Advantage Middle School Science Exit Project Initiative (UA), is a science education initiative that partners eight New York City science-rich cultural institutions with the New York City Department of Education and many of its middle schools across the city. In addition to the American Museum of Natural History, which houses Urban Advantage Administration, partners include the Brooklyn Botanic Gardens, New York Botanical Garden, New York Hall of Science, Queens Botanical Garden, Staten Island Zoo, Wildlife Conservation Society-Bronx Zoo, and the Wildlife Conservation Society New York Aquarium. Middle school students enrolled in NYC public schools, particularly 8th graders, are the focus of this alliance and benefit directly from its efforts.

Funded by the New York City Council and a private donor, Urban Advantage captures, shares, and celebrates the wonder and excitement of scientific discovery by engaging learners in authentic inquiry-driven contexts. The teaching and learning experiences of adults and children participating in Urban Advantage are enriched through high quality teacher professional development, direct access to scientific knowledge through firsthand experiences at UA Partner institutions, classroom resources chosen for their value in promoting scientific inquiry, family participation, and direct support of students throughout the Exit Project process.

Urban Advantage is a fluid mosaic consisting of six components, each essential to maximizing the partnership between the NYC Department of Education and science-rich institutions to benefit the science education of NYC middle school students. These six components include: UA Administration, UA Partners, UA Principals, UA Lead Teachers, UA Teachers, and UA Parent Coordinators. The success of Urban Advantage is achieved through the effective and ongoing communication among these essential supports, each with its primary area of focus, yet all members of a learning community committed to continuous improvement.
What pedagogical practices are most frequently employed in exemplary Urban Advantage classrooms?

The Urban Advantage classroom extends beyond NYC middle school classroom to include all UA Partner Institutions. UA learners are not just NYC middle school students—they are middle school teachers, building principals, parents of middle school students, Parent Coordinators, UA administrators, and staff from UA Partner Institutions. Exemplary Urban Advantage Teachers embed a variety of instructional practices to support science learning.

**Journal Writing**

**Peer Review**

**Embedded Fieldtrips**

**Constructing Knowledge**

**Portfolio Assessment**

**Differentiated Instruction**

**Critical Thinking**

**Inquiry**

Student entry: “My Exit Project is about food. I chose my project because food gives us energy... food [energy] is something every human being or living creature needs no matter where they are on earth. My project asks, “Which type of food has the most starch?” I am going to test this and I will use Iodine...to see which one has the most starch. I'll prove this as I will see which one changes the most purple will have the most starch...”

Teacher entry: “Can you tell how much starch is in a certain food with this test? Perhaps you could choose a variety of foods that you enjoy and then use this test to see if there is any starch in them. It will be difficult to see exactly how much starch is in each food. 3-22-07.”

Source: Student Journal Entry, Urban Advantage Demonstration School

“Students maintain journals throughout the development of their Exit Projects. Many journals begin with student responses to the question, “What are you interested in? How does this interest relate to science?”

Source: UA Teacher Interview, Urban Advantage Demonstration Schools.
“I just realized I’ve got a problem – since my partner isn’t doing exactly the same thing as me our results might not be as consistent as they might be if we tested it out the same way. She won’t tell me what she is using to test it out. I am using a CD player…I have some questions that I have on my experiment. [They are] Does the time you leave a battery uncharged affect the amount of time to recharge? Does brand name affect the time? What about the different types (AA, AAA, etc.)?”

Source: Student Journal Entry, Urban Advantage Demonstration School

“Other questions are developing in my head: Does the speed and the force of rubbing affect it? Does the test affect it? How come my results and my partner’s results are different? I mean obviously they should be different – but my rocket proved to be…”

Source: Student Journal Entry, Urban Advantage Demonstration School

**Western Lowland Gorilla Behaviors**

**Hypothesis:** If gorillas are in captivity, they will behave differently than when they are in the wild.

**Background:** We went to the zoo. We learned from the person at the zoo that there are only a few hundred Lowland Gorillas left in the wild. They are becoming extinct and we are hoping that our information about gorillas will help people to put some efforts into saving them.

**Methods:** We will take photos, and use the ethogram. We will make three visits to the Bronx Zoo to the Congo Gorilla Forest for two hours each time. We will observe and take notes.

Q: “How can you tell how the Gorillas will act in the wild if you only see them in captivity?”
A: “We will do some research on the Internet.”

Q: “Finding out what they do on line isn’t going to be as effective as watching them in captivity…if you are just getting them [information] from what someone else says.”
A: “It is difficulty to find information on Gorillas not in captivity…online research will be valid enough for secondary research. We will be back at the zoo at the same time everyday. The gorillas get fed at 10 and 11 o’clock…it isn’t exactly going to effect our project.”

Q: “Are you going to use a scanning method?”
A: “We are going to time and list their different behaviors to see what they do and how many times they do it.”

Q: “How many of them are there?”
A: “There are two…two different groups and they are separated because the males would fight.”

Source: Excerpt from NCREST Documentation of Classroom Observation, Urban Advantage Demonstration School

**Peer Review**

The process of sharing work with one’s peers (classmates) for the purpose of assessing for accuracy, clarification, feedback, and improved quality.

“This instructor introduced a K-W-L, a type of chart, used to surface and record what students Know (K) and Want (W) to know about a given topic – in this case DNA and the participants were students. The Learned (L) column is usually completed at the end of the activity/lesson to assess what students gained from the experience/lesson, etc.”


**Constructing Knowledge**

Students construct new knowledge and deepen existing understanding when they are given opportunities to reflect on prior experience and tie these experiences to new learning.

**Critical Thinking**

Experiencing science engages students in the process of questioning, reflecting on, and reevaluating the convention and the accepted; science also seeks answers by maintaining objectivity, considering and analyzing data, and evaluating context.

“Thirty students are sitting in groups of five as they prepare to peer review – a critical attribute in the scientific community. Students are close to finalizing their Exit Project designs. They have collected preliminary data to test their thinking and to determine whether or not their question(s) are investigable. The teacher reminds students to support their assertions with evidence and to be respectful in their recommendations. Each group of students presents and shares their plans with the class.”

Source: Excerpt from NCREST Documentation of Classroom Observation, Urban Advantage Demonstration School
“The topic that I am doing is lights and lasers. I am researching about the types of lights and lasers and how they are alike and so on. But the reason I chose this topic is because I want to know more about lights and lasers. This looked like a very interesting topic to research on since it includes atoms and reflection. My five questions for my topic are: What are lights and lasers made of? How are lights and lasers alike? What types of materials can light reflect back on? What types of materials can lasers reflect back on? How do lights and lasers affect the world today?”

Source: Student Journal Entry, Urban Advantage Demonstration School
“As members of a collaborative science faculty, high quality student portfolios are of great importance to teacher and student reflection...student portfolios will travel yearly from teacher-teacher to provide a more in depth look at scientific learning...suggested items for portfolio development include: minimum of three lab reports, minimum of three article reflections, student designed graphic organizers of scientific concepts, persuasive essay on a scientific controversy (stem cells, cloning, global warming, etc.), written biography of a scientist, science fair project, and Exit Project.”

Source: UA Teacher Interview, Urban Advantage Demonstration School

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**Portfolio Assessment**

Portfolio assessment is a collection of student work and teacher observation that is selected for its representation of specific learning goals and growth overtime.

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“UA kids do science...think like scientists...behave like scientists.”

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“...exposure to what they have behind the scenes at the Partner Institution...it’s the difference between learning something in a classroom and a first hand experience...talking to nutritionist at the zoo who feeds the animals...talking to exhibit designers about maintenance [for example] at the aquarium—the tank design did not account for major algae growth so they have to have scuba divers go into tank to clean...first hand accounts of seeing these issues—promotes observing, questioning, journaling and drawing—this helps the Exit Project unfold and increases inquiry and observation skills.”

Source: UA Teacher Interview, Urban Advantage Demonstration School

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“Inquiry

Creating opportunities for learners to think and behave as scientists- to question and seek answers through the processes of science- is the essence of the UA experience.

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“Student scientists were challenged to use scientific inquiry and creativity to design simple machines that were able to lift a can of soup one inch [2.54 cm] off of the counter.”

Source: UA Teacher Interview, Urban Advantage Demonstration School

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“Students come up with list of topics that interest them in September or October. They narrow their topic by coming up with an investigable question and then state their purpose—why they want to do this topic. Then they come up with a hypothesis—I show them how to do a proper hypothesis; they then do research behind their topic; their final hypothesis comes after their research; they gather materials for their project; they begin the collection of data; then they synthesize and come up with a conclusion—throughout I check it to make sure they are on task; they conclude and then work on final written and visual and oral presentations.”

Source: UA Teacher Interview, Urban Advantage Demonstration School
### What school conditions and practices best support the implementation of Urban Advantage in Demonstration Schools?

“Through UA Professional Development sessions we met teachers from other nearby schools. We decided it would be good to meet with other UA Teachers from that school to support both schools. We have met several times after school to discuss what we learned in training sessions and the many ways to support students as they work on their Exit Projects.”

*Source: UA Science Teacher Interview, Urban Advantage Demonstration School*

### Opportunities for Internal and External Professional Communities

“We set up a study group in our school. We meet during our department meeting time. We each develop our own Exit Project which reminds us of what the kids are required to do. We talk about the different project ideas that they kids come up with and how to support them so that they can ask their own questions.”

*Source: UA Science Teacher Interview, Urban Advantage Demonstration School*

### Dedicated Space

“…A room on-site for conducting long term experiments and demonstrating how they are run; experimentation should be done outside of school, but there needs to be a place in school to model it—so a dedicated space in school.”

*Source: UA Science Teacher Interview, Urban Advantage Demonstration School*

### Leadership Support

“Administration provides funding for substitute teachers to cover your other classes so you can take out a class without it burdening other teachers; taking more classes together on field trip diminishes kids’ exposure to interaction with teacher we take more fieldtrips with smaller groups of students.”

*Source: UA Science Teacher Interview, Urban Advantage Demonstration School*

### Classroom Materials

“Urban Advantage provides approximately $2500 of materials to UA Schools in their first year of UA participation. Materials include: Grow Lab, Bottle Biology (text), science notebooks, digital cameras, stopwatches, magnifying lenses, Capsella kits, rock kits with rocks indigenous to the NYC area, and a digital microscope.”

*Source: UA Administration Interview, Urban Advantage Demonstration*