TRAINING FELLOWS TO COMMUNICATE CROSS-CULTURALLY WITH IMAGES

WORKSHOP & GHANA

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CROSS-CULTURAL GRAPHICS WORKSHOP

Learning Outcome:

Upon completion of the workshop, each fellow will have a basic outline of a narrative for developing one or more handouts that teach different scientific processes or concepts in a culturally-appropriate manner for middle school students and their teachers.
CROSS-CULTURAL GRAPHICS WORKSHOP

Instructions:

Communicate a scientific process or concept to a diverse group of middle school students through the form of a worksheet that:

- Describes the scientific process or concept
- Engages the student in active learning
CROSS-CULTURAL GRAPHICS WORKSHOP

Step 1: User Analysis (students/teachers)

Bill: The student audience consists of 6th, 7th, and 8th graders. At Hackett Middle School, the majority of the target audience is African American. The gender mix is roughly evenly split. Holding the attention of the students is really a challenge...

Chris: The students have a very low attention span, approximately 5 minutes for the 8th grade and 10 minutes for the 7th grade, before another event is required...male students interested in sports (BB, football) Female students track

Tian: A lot of people play sports: female soccer/ basketball, male: football, hockey...Like movies/tv shows...“cool” things

David: Strong and intricate sense of respect and dignity...They play a lot of video games. WoW Your xbox gamer ID may be more important than a phone number... Very artistic. Many of them can draw very well. Enjoy hands-on sensory learning but have a hard time recognizing a pre-designed figure...Don’t all speak English... They are musical...

Dan: Mainly female with some males. All white. Tend to be conservative with strong ties to Italian-American identity. School background is in Education with a preference in the subject they teach. Strong “Law And Order” orientation towards students. Concerned with economic benefit of education.

Louis: Some students wear glasses, some dress as if they’re parents still shop for them, while others dress as if straight out of hip hop videos. Most students prefer pizza during lunch, so I hear, and chocolate milk. There is a group of students who complain about lunch time, and come up to have lunch with myself and the teacher. These students will probably be bumped to honors classes next year.
CROSS-CULTURAL GRAPHICS WORKSHOP

Step 1: User Analysis
Step 2: Invent a character.
CROSS-CULTURAL GRAPHICS WORKSHOP

Step 1: User Analysis

Step 2: Invent a character.

Step 3: Tell a story about your scientific process or concept.
  • Dramatic Want
  • Obstacle
  • Resolution
CHRIS’S STORY

Character:
Miner

Story:
…The walls of the cave rattle. “Is it happening again?” Jose whispers, the hope escaping his lips. “Are we finally done for?” Nine men went down that day, through the layers of sedimentary rock, through the sandstone and the granite and the limestone…all to get to that precious vein. That precious mineral, that speck of gold from the hard cold rock beneath our feet. But, only if they had known…known that day the plates were moving. Moving slowly, but moving still. That they were floating on the convection currents of the mantle and colliding with each other, crushing each other, and causing the disaster. Maybe, if they knew maybe they wouldn’t be in the situation they are in. “Jose,” Carlos whispers. “The rocks…they are moving again.” “I know,” Jose answer. “I know.” “Juan, slow down the drill,” Thomasina yells. “
BILL’S STORY

Character:
Skateboarder

Story:
For the computer dissection project, I could create a computer box character that would tie into the project. The worksheet could include the component parts as a matching exercise. **Dramatic Want:** The computer case character says – help me identify my components. I need to assemble myself or I won’t be able to play ‘x’, therefore creating a dramatic want. **Obstacle:** Character encounters obstacle. The components are all jumbled. **Resolution.** Perhaps the order of the component choices spells a word, what’s necessary is that the work and effort provide a reward. Maybe the sequence decodes into something.
DAVID’S STORY

Character:
“Mike” The Microscope- Mike is tricky. He shows you things in the opposite way. Move your slide to the left, and you’ll see it move to the right. Everything is backwards! Try to learn his tricks so that you can master the power of the microscope. How can you get him to show you things more clearly? How about a higher magnification?

Stories
Their unit on plate tectonics was boring. Tell a story about escaping a crumbling building in an earthquake, and what features of the building are lifesaving. Why is the building shaking in the first place? Why do are the continental plates colliding? Where is this person? What places are susceptible to Earthquakes?
DAN’S STORY

Character:
Bobby the miner

Story:
Bobby the miner needs diamonds. Like, he needs it like a fish needs water and if he does not find any gold in order to bring back to his family, they will starve and his dog will go out on the street and his chance to be a wealthy diamond prospector/make awesome jewelry out of said mineral so that it can be worn as the biggest diamond in the world. So, he goes out into the world and knows that the mineral he is looking for is found near particular kinds of other minerals. Diamonds, for example, aren’t found near talc and so he has to learn the properties of the minerals he is looking at in order to figure out if he should even bother digging where he is. Once, he found a glittery golden rock and was convinced that he had struck gold! But when he came back to the city, he realized that all he had was a worthless hunk of Pyrite…
Character: A line named “Straight”

Goal: to teach the concept of basic geometry

Story: Straight wants to be cool and wants to dress fanciers like triangle “Sharp”, circle “Round”, but he doesn’t know how to change his shape to become a triangle or circle in order to fit their clothes. He needs help to successfully dress them
LOUIS’S STORY

Character:
A clever rat with a winning smile, effervescent personality, but a knack for deception and mischief.

Topics:
Metric System, Part of a Molecule, Classifications

Narrative:
Scientist like rappers and football stars, where a math test is like 4th and long, and good grades are like the roars of the crowds. Like all Hollywood movies, there’s a protagonist, and like any good protagonist he/she is flawed, struggling to unleash the potential hidden within. After conflict, the protagonist overcomes his/her obstacles and discovers his/her infallible strength. Instead of choreographed fight scenes, this character uses math.
CROSS-CULTURAL GRAPHICS WORKSHOP

Step 1: User Analysis

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  • Dramatic Want
  • Obstacle
  • Resolution

Step 4: Visual Translation

Step 5: Production
CURRICULUM

Over the course of the program, fellows will design, in a participatory manner, a compilation of classroom worksheets that document the science curriculum developed by fellows/teachers for students. Each worksheet will either relay information like describing a scientific process or concept; or, it will be interactive.

The compilation of worksheets are published below as pdf documents and are available for public download gratis.

**Worksheets: The Mathematics of Kente Cloth** by William Babbit
*Student | Instructor*

**Worksheets: Thinking Like a Scientist** by William Babbit
*Student | Instructor*

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**Fellow's Journals**

**All Fellow Journals**

*Bill Babbitt*
*Chris Shing*
*Dan Lyles*
*David Banks*
*Eric Sterner*
*Louis Gutierrez*
*Tian Gao*
*Uncategorized*

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**Additional Resources and Pages**

*Apply to the Program*
*Bachouse: A Virtual Design Studio*
*Culturally Situated Design Tools*
*Culturally Situated Community Sensing Project*
*Rensselaer*
*National Science Foundation*
*Press*

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**About the GK-12 Triple Helix Program**

In RPI's Community Situated Research project, graduate fellows will examine the potential relations between their STEM research, and the social issues facing local low-income and minority communities (health, environment, poverty, crime, information access, etc.). These same local communities will also be the location for the fellows' middle school collaborative teaching program. Thus graduate fellows will gain a greater awareness of the connections between their research disciplines and pressing social issues, as well as the training that enables them to communicate these connections to the public. On the GK-12 side, studies show that many minority students are disinterested in STEM academics because they do not see its relevance to their particular lives. By working with graduate fellows trained as ' civic scientists', (along with content from our international program) GK-12 teachers will gain new opportunities to engage those disenfranchised students. It is critical that graduate teaching fellows and their faculty mentors are empowered to select projects situated at the frontiers of STEM research, and not merely applications of established knowledge. Science and Technology Studies graduate students and community mentors will be researching the social and environmental issues in these communities to help find the intersections with STEM research. A studio class will create new educational technologies that translate the grad fellows’ STEM research into learning labs for the middle school students. Rather than a one-way trickle-down of knowledge, we will explore the possibilities for a ' triple helix' collaboration between university, GK-12, and community knowledge production.
Thinking Like a Scientist
How does a Scientist approach a problem?

**Scientists ask questions.**

**Scientists formulate a hypothesis.**

**Scientists test their hypothesis.**

Let’s do it...

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Thinking Like a Scientist
How does a Scientist approach a problem?

**Scientists ask questions.**

Scientific inquiry begins when a scientist asks a question about something that he or she has observed. These questions often include how, what, when, who, what? Why, or Where? Scientists then do background research to see how much is known about what they are interested in.

**Scientists formulate a hypothesis.**

The central purpose of scientific inquiry is to develop explanations of natural phenomena in a continuing creative process. Construct a hypothesis means to make an educated guess about how something works. “If I do this, then [this] will happen.”

**Scientists test their hypothesis.**

When Scientists test their hypothesis, sometimes they need to invent new ways to do so. Other times they are able to make measurements to compare characteristics of the objects being observed. Scientists carefully construct these experiments so as to change only one variable at a time. A variable is a measured quantity or quality that can be either increased, decreased, or left the same.

Once a Scientist has completed their experiments and tested their hypothesis, they communicate their findings to other Scientists by publishing their results in scientific papers and journals.

Let’s do it...

One possible activity to get students thinking like Scientists is to use the Skateboarder CSDT program and have students modify the parameters one at a time. The available parameters are the initial X and Y position of the skateboarder character, the X and Y position of the board that the character will ride down, the friction of the board, and the elasticity of the board. Students can be arranged in groups. Each group collaboratively decides which skateboarder parameter they would like to change. In working with the scientific method, only one variable should be changed at a time. The instructor works their way around the room, with each student group contributing the change they would like to make to the program. As changes are made, the program will provide feedback for further adjustments by pressing the ‘Begin’ button at the top left of the application.
The Mathematics of Kente Cloth

The History of Kente Cloth

Legend tells us that Kente cloth was first made by a pair of friends who observed a spider weaving its web. They worked to become skilled at their newfound craft, and once they were good at it, they shared the discovery with the Chief. The Chief liked it so much that Kente cloth was from that day forward, kept and used only for special occasions.

Scientists tell us that Kente weaving probably grew out of earlier weaving traditions in the kingdoms of western Africa.

What do the colors mean?

black - symbolizes maturity
blue - peace, harmony, and love.
green - planting and plants, growth, renewal.
gold - wealth, royalty, glory.
grey - associated with healing and cleansing rituals.
mauve - the color of mother earth, healing.
pink - female, mild, gentle.
purple - usually worn by women.
red - political and spiritual moos, bloodshed.
silver - serenity, purity, joy.
white - purification, festive occasions.
yellow - royalty, wealth, fertility.

Where's the Math?

There is lots of math going on in Kente cloth. One of the first things you can find is the counting numbers. The numbers 1, 2, 3, ... are present in the triangles. Like this:

To sum the first N numbers, you use the formula:

\[ S = \frac{N \times (N + 1)}{2} \]

There are triangles done in bright colors that display the odd numbers. Like this:

To sum the first N odd numbers, you use the formula:

\[ S = \left( \frac{N(N + 1)}{2} \right)^2 + N \]
CROSS-CULTURAL COMMUNICATION ON HIV/AIDS IN GHANA

Summer 2010: Laying the groundwork

- Participatory design workshop with KNUST students in Kumasi, Ghana
CROSS-CULTURAL COMMUNICATION ON HIV/AIDS IN GHANA

Summer 2011

• Designing the red card in “Show AIDS the Red Card.”
HIV/AIDS ADINKRA SYMBOLS
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