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**Geo-science: Cultural, Learning, Introspection, and Pedagogy**

Why do some students want to learn and others find no interest in school? What role does environment play in shaping the learning and success of African American students? The home environment provides the foundation for development and learning, with classrooms the next most critical. What is more important than providing students with a quality education?

Imagine sitting in a classroom watching a video being narrated by Neil deGrasse Tyson, an African American astrophysicist. Within the context of his lecture, he would probably describe different aspects of earth sciences. His attention could be focused on astronomy. Connections would be made about the importance of planet earth, the oceans, and the moon. Follow this presentation with one on “Hidden Figures.”

The story of three African American women – mathematicians – who were key figures in NASA and America’s history. Without them and their knowledge and skills, John Glenn may have never been the first astronaut to orbit the earth. Their mathematical calculations were done at a time when today’s sophisticated computers were not available. Their calculations were done by hand.

Imagine connecting to a more “earthy” person such as George Washington Carver. His knowledge of agronomy and soil enabled him to change the economy of the south. These are a few examples of connecting culturally relevant individuals to African American children and youth as well as all other young American students. How would these images impact their wanting to learn? Would they provide opportunities that would connect them to subject matter and stretch minds? Motivation is a critical factor for learning. Introspectively, African American children can see these individuals and see themselves as one of them. Can the imagination trigger a student to think about the possibilities of dreaming big? While dreaming, the mind sees a succession of images. From these images thoughts and emotions evolve, saying “yes” I can. The limits of this essay will not allow a full blow discussion on culture, and learning styles. It is my belief that regardless of learning styles, African American students often fail because of the inequities in the delivery of any pedagogical material. Classroom instruction generally consists of traditional practices – convergent types of interactions between students and teacher, and especially with African American students. The research shows that teachers tend to demand less from those they perceive to be of low capacities. Teachers, in fact, follow a protocol of interactive behaviors that do little to stimulate excitement or motivation for learning at a higher level. Those teaching geosciences can change this. The four earth sciences offer an opportunity to raise the level of thinking for African Americans students.

Teachers can use the four earth sciences – geology, meteorology, oceanography, astronomy – as a vehicle to broaden the knowledge and skills of most students. Each area has a vast amount of information to be explored, i.e. words, locations, map reading, aspects of the environment and so forth. One of the short- comings in the classroom is that the encouragement of critical thinking. The skills of inference, prediction, determining cause and effect and the forming of opinions are not that difficult to teach. The four areas of earth science are a natural to teach these concepts.

An effective teacher always asks questions, but what type doe she ask? Questioning is a strategy as well as an art. Research tells us that teachers spend between 35-50% of their time asking questions. Are the questions broad or narrow? Within the construct of each area of earth sciences one can employ the following:

* Focused questions
* Prompting questions
* Probing questions
* Redirecting questions
* Evaluative questions
* Factual questions
* Productive questions
* Empirical questions
* Creative questions

Application of these types of questions to any one of the above persons, for example (- Neil deGrasse Tyson, Women from NASA, George Washington Carver) allows students to answer questions that require critical thinking about stories from each character. These are win-win situations. This kind of learning environment is productive and creative. Students sharpen their oral skills, listening skills, and evaluative skills. The concepts and terminology enables students to develop and use a wider vocabulary. They learn to formulate hypotheses and solve problems. They also learn to develop a logical argument to support their conclusions. They learn to make predictions. They begin to understand cause and effect. The opportunities are boundless.