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Raising the Bar: At-Risk Prevention for Urban Students in Middle School Science and Math Classrooms

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Raising the Bar: At-Risk prevention for Urban Students in Math and Science Classrooms

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Fayetteville, NC
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Who are students at risk?

• **students** or groups of **students** who are considered to have a higher probability of failing academically or dropping out of school.

The Glossary of Education Reform
• edglossary.org/at-risk/
  Aug 29, 2013
Purpose

• To illustrates best practices for enhancing student success in science and math classrooms.
Reducing the risk, (Wehlage, 1989)

• (1) successful schools created a supportive environment that helped students overcome impediments to membership and engagement

• (Relationship)

• (2) impediments to engagement include absence of economic pay-off after graduation, a narrow conceptualization of learning, and a superficial curriculum

• (Engagement)

• (3) successful programs matched student needs and problems, and took advantage of student interests and strengths

• (Expression)

• (4) teachers at successful schools accept a proactive moral responsibility for educating at-risk youth

• (Representation)
Theoretical Framework

• **At-Risk education**
  • “Reducing the risk: Schools as communities of support”, Wehlage (1989)
  • “Student at risk”, Manning, Baruth, & Tobin (1995)
  • “Impact of a Career Intervention on At-Risk Middle School Students' Career Maturity Levels, Academic Achievement, and Self-Esteem science non effective for future”, Legum, Hoare (2004)

• **Theory of third space**
  • Urban Latino students, Moje (2004)
  • School science curriculum and student’s personal interest, Wallace (2004)
  • Role-play in Elementary schools, Cook (2005)

• **Culturally responsive pedagogy**
  • Embraces diversity as a virtue, Ladson-Billings (1995)
  • Evokes cultural responsiveness in all students, Irvine (2003)
  • Enhance success and reduce classroom conflicts, Thomas (2006)
Terminology:

• Theory Third Space =
  • The area of focus for teaching that connect out of home, community, peers knowledge (first space)
  • to school, church, work (second space)
  • to a place where the competing knowledge and discourses are brought together (third space).

(Bhabha, 1989; Soja, 1989; Moje, 2004; Wallace, 2004; Cook, 2005)
Third Space Theory

First Space

Second Space

Third Space

(Soja, 1989; Bhabha, 1994; Moje, 2004; Wallace, 2004; Cook, 2005)
Hybridized knowledge

1st Space

2nd Space

3rd Space

Wallace, 2004
Science

• Theory of third space is used to explore inquiry-based classroom engagement as a means of ensuring continuity between prior knowledge and experiences and the standardized school curriculum.
Inclusion

• Science inquiry requires students to do authentic investigations of their choice

• Whole Group Projects
  • Design a garden (vegetable/flower) on campus
  • Design a culminating activity following a class project
Engagement

Lab Work
- Making Silly Putty
- DNA distraction from Strawberry
- Bubble experimentation
Expression

- Individual Projects
  - Science project
  - Science fair
  - PBL
  - STEM
• Use Web-based Apps
  • Glogster
  • Steller
  • iMovie
  • Padlet

Representation
Multiple Means of Representation

Ratios & Proportions

- Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.
- Explain a part to part ratio and a part to whole ratio.
- For example, “The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak.”
- “For every vote candidate A received, candidate C received nearly three votes.”
Multiple Means of Expression

**Ratio & Proportion Feedback**
Made with serendipity

*Tanya Hudson • 4m*

Please read the question carefully, write an answer and an explanation how you came up with your answer.

If the number of guppies is represented by black circles and the number of goldfish is represented by white circles, how can this ratio be modeled?
Multiple Means of Engagement
Science & Math Centers

1. Prior Knowledge (1st Space)
2. Content Knowledge (2nd Space)
3. Hybridized Knowledge (3rd Space)
Theory of Third Space

1st Space
- Home
- Teacher’s and Student’s Prior Knowledge and Experiences
- Culturally Responsive Pedagogy

2nd Space
- School
- School Curriculum and Standardization
- Culturally Relevant Pedagogy

3rd Space
- Hybridization
- Learning and Achievement

Teacher Model
The End!