

STORYTELLING AND CREATIVE WRITING

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Storytelling and history of math

- ▣ The genesis of knowledge in the individual must follow the same course as the genesis of knowledge in the race? (Spencer, 1854; e.g., history of calculus)
- ▣ Sequences of learning should be geared to the interests and needs of students because their motivation is of great importance.
- ▣ Combination of subject-matter aims of instruction and the socialization of students

Storytelling and modeling

- ▣ **STEAM**: Science, Technology, Engineering, Arts and Mathematics
- ▣ Contextual real-life examples and motivations emanating from **STEAM** make mathematics more accessible, easier, and more flexible.
- ▣ Advantages of interconnections between mathematics and **STEAM**
- ▣ The goal of math education is a logical reasoning rather than memorization
- ▣ Ministry of Education: 1 and 2

Storytelling and SCAMP project

- ▣ Listening-Reading-Communicating-Writing
- ▣ SCAMP (Story about a Cultural Artifact from a Mathematical Perspective) project (Neel, 2005)
- ▣ Cultural artifact: “It is an item that has cultural significance to you. It could be a basket, carving, musical instrument, painting, picture, piece of rug, statue, toy, food item, fruit, and so on.”

Possible Items

- ▣ Historical items: the Chinese abacus, a pyramid, a Mayan calendar, a sundial, and origami
- ▣ Sports artifacts: a baseball bat, a hockey puck, a soccer ball, a basketball, a billiard table, and a skateboard
- ▣ Game artifacts: monopoly, mah-jongg, and chess
- ▣ Edible items: Pizza, a doughnut, M&M's, Coke, and a pineapple
- ▣ Others: Russian dolls, a face mask, a diamond, fireworks, a guitar and a nutcracker

How to address diversity in class?

- ▣ Students from diverse backgrounds such as ethnicity, culture, gender, language, learning style, socioeconomic level, intellectual ability and physical capability
- ▣ *The project, with the use of cultural artifacts and creative stories, enables ones to teach and assess mathematics in an imaginative and creative way that both respects diversity and extends the understanding to a personal context*

Adapting for Diversity

- ▣ “Mathematics is not about numbers, but about life. It is about the world in which we live. It is about ideas. And far from being dull and sterile, as it is so often portrayed, it is full of creativity.” (Devlin, 2000)
- ▣ “Equity does not mean that every student should receive identical instruction; instead, it demands that reasonable and appropriate accommodations be made as needed to promote access and attainment for all students” (NCTM, 2000)

The “SCAMP” Project

Step 1 – Selecting a cultural artifact

Step 2 – A detailed description of the mathematics behind the artifact

Step 3 – A mathematical problem based on your chosen artifact, at a skill level appropriate to your class

Step 4 – Imagine a story, song, or poem that is centered on the artifact

Project Scoring Rubric

Appendix 2

"SCAMP" Project Project Scoring Rubric

Group Members: _____ Mark: _____

Artifact: _____

	EXCELLENT	GOOD	SATISFACTORY	UNSATISFACTORY
Outline (4 marks)	Original, creative detailed description	Well planned	Complete, clear	Incomplete, unclear
Section 1 (4 marks)	Creative and detailed description of artifact; unique reason for choosing it	Detailed description of artifact and reason for choosing it	Complete, accurate description	Incomplete description
Section 2 (8 marks)	Thorough, well-documented description of mathematics behind the artifact	Adequate description of mathematics behind the artifact	Minimum description of mathematics behind the artifact	Incomplete description of mathematics behind the artifact
Section 3 (8 marks)	Excellent use of mathematics in the problem; goes beyond requirements	Adequate use of mathematics in the problem	Minimum use of mathematics in the problem	Poor effort, incomplete, inaccurate
Section 4 (8 marks)	Unique, entertaining, imaginative story that connects well with the artifact	Good story that makes connection with the artifact	A story that makes some connection with the artifact	Inaccurate, unrealistic story
Presentation (4 marks)	Interactive, interesting, engaging presentation	Organized and interesting presentation	Complete presentation with all the sections	Incomplete presentation
Effort and reflection (4 marks)	Excellent effort and reflection	Good effort and reflection	Minimum effort and reflection	Little care or thought for project

Total possible marks (40)

Teacher comments:

Possible Projects

- ▣ *Fibonacci sequence*
- ▣ *Application to a Korean school context*
 - *Taegeukgi: binary notation, golden ratio, and integration*
 - *Bicycle: Cycloid*
 - *Makgeolli: volume and integration*
 - *Pottery: volume and integration*

Reference

- ▣ Devlin, K. (2000). *The Math Gene: How mathematical thinking evolved and why numbers are like gossip*. New York: Basic Books.
- ▣ National Council of Teachers of Mathematics (NCTM) (2000). *Principles and Standards for School Mathematics*. Reston, VA: NCTM.
- ▣ Neel, K. S. (2005). Addressing diversity in the mathematics classroom with cultural artifacts. *Mathematics Teaching in the Middle School*, 11 (2), 54-61.

Q&A