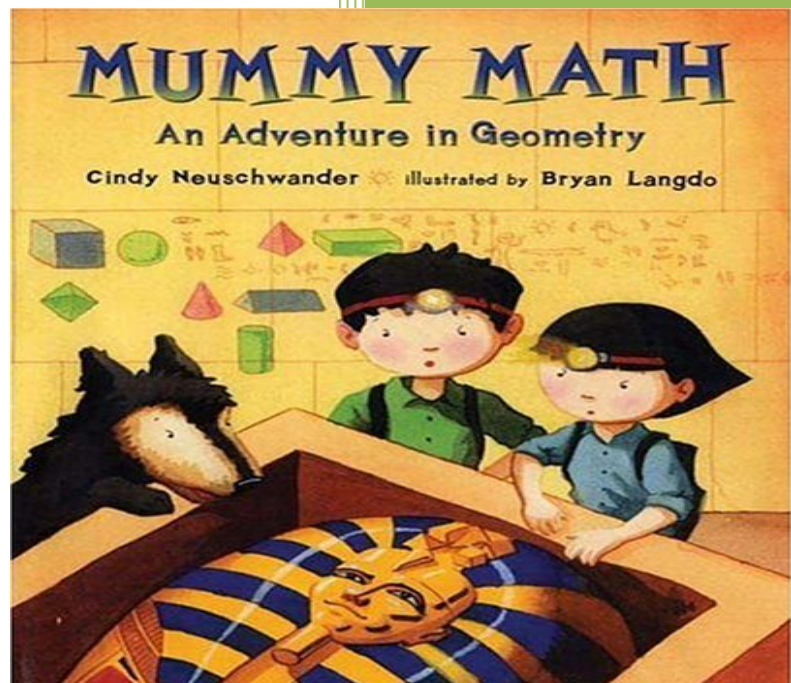
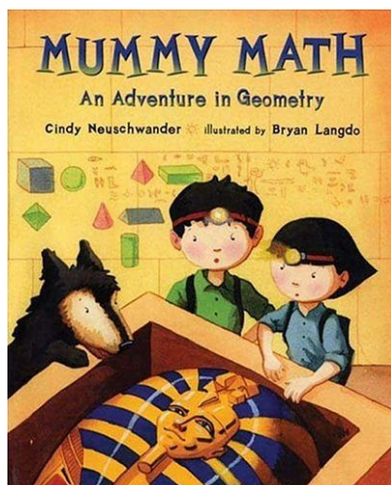


A3: Children's Literature and Mathematics



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Children's Literature and Mathematics: Mummy Math an Adventure in Geometry



Book Summary:

The Zill's family is invited to Egypt to help find the hidden burial chamber of an ancient pharaoh. Matt and Bibi, our two main characters are lucky to have two famous scientists as parents because they get to go on all sorts of adventures. The family travels to Egypt only to be separated when Matt and Bibi get trapped in the pharaoh's pyramid by themselves. Although they must figure a way out of the pyramid, they discover a greater mystery. With only each other, their dog, Riley, and the geometric hieroglyphics on the walls to help them, the brother and sister team must use their math skills to locate the burial chamber which happens to be the way out. Luckily, Matt and Bibi know their stuff when it comes to geometric solids.

Bibliographical Information:

Neuschwander, C. (2005). *Mummy Math an Adventure in Geometry*. New York: Henry Holt and Company, LLC. ISBN 0-8050-7505-4

Assessment of Literature:

According to Hellwig, Monroe and Jacobs (2000), books allow students to interact with mathematics in a new context as they draw meaning from the connections in the classroom and life outside the classroom. By providing situations in which mathematics concepts are appealing and relate to the student's day to day life, we are helping students see how math exists in our society. Concept books, like *Mummy Math an Adventure in Geometry*, which explore specific mathematical concepts provides teachers with an interesting and appealing way to teach students. Using the scale for evaluating mathematics trade books designed by Hellwig, Monroe and Jacobs (2000), *Mummy Math an Adventure in Geometry* is analyzed to discover its teaching potential.

Accuracy

1	2	3	4	5	6
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The mathematical information presented in the book is accurate. This book introduces reader to geometric shapes while utilizing the proper terminology e.g. cones, spheres, pyramids, tetrahedrons and prisms. This text offers readers a chance to see

the geometric shape alongside its proper name, in turn depicting relations correctly. The illustrations of the geometric shapes are precise throughout the entire book and furthermore, these pictures allow readers to see the edges, faces and vertices. This book also promotes deeper thinking as our two main characters must search and discover a variety of geometric shapes based on varying clues. In turn, the reader begins to analyze and construct geometric shapes in their mind as they try to solve the mystery.

Visual and Verbal Appeal

1	2	3	4	5	6
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This book has a strong visual appeal that invites readers to both begin and continue reading. The pictures within this book work strongly to its advantage as they enhance the text allowing for deeper connections in the book. An excellent example of this technique can be on page 7, where a wide variety of geometric shapes are etched into the wall of the pyramid. The pictures enhance the text as students can visually match the pictures with the proper geometric terms.

This book also has a strong verbal appeal as it contains the reader's interest. This story is not overly predictable, as we often second guess our answers to the clues, just as Matt and Bibi are sometimes wrong. The reader is engaged throughout the story as they eagerly wait for the uncovering of the pharaoh's burial chamber.

Connections

1	2	3	4	5	6
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When we begin to look for quality literature that can help us teach mathematics, it is important that there are meaningful relationships between mathematics and real-life scenarios. Although *Mummy Math an Adventure in Geometry* helps illustrate the real-life connections between geometric shapes and the world, it can be said that the real-life scenario in this story is not very common. The majority of children in a Canadian classroom have probably never visited Egypt, so the mathematic relationship to real life may be a little far-fetched. While many of our students may never have experienced geometric shapes as they apply to Egypt, we can still utilize this book to show how geometric shapes exist within our everyday life. As teachers, it is important that we expand the knowledge that a text provides so that it suits all of our students. We can continue to expand the concept of geometric shapes to include those objects that surround us at home and at school.

Audience

1	2	3	4	5	6
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This book is appropriate for a range of ages. Individuals of all ages can enjoy wonderful story and colourful illustrations. Children of all ages and adults for that matter can enjoy and be exposed to the different mathematic concepts of this book. Depending on the readers' age, some mathematic concepts may be a little hard to grasp, e.g. the proper terminology of the geometric shapes as some may have learned about shapes with improper terminology. Geometric concepts will be planted inside the readers' mind and if necessary, further connections can be made at a later time.

Mummy Math an Adventure in Geometry takes the audience into consideration as it appeals to both genders. It is particularly interesting to note that the main

characters of this story are a young boy and girl. The book's ability to create a mathematical adventure with both genders cements its position of appeal to children. Every reader wants to picture themselves in the story, and having both male and female characters allows children this opportunity.

The "Wow" Factor

1	2	3	4	5	6
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According to Hellwig, Monroe and Jacobs (2000), the majority of books do not have the "wow" factor; however that does not mean that they cannot be used for teaching mathematics. *Mummy Math an Adventure in Geometry* provides readers with a new outlook on geometric shapes, one that they may not have thought of previously. Books that apply multilayered connections to existing material provide the readers with a new opportunity to learn.

Although the book is interesting and effective in its mission to expand the reader's knowledge of geometric shapes, it does not have a big "wow" factor. The pictures are rich and the text is engaging but the connection to one's personal life is a little far-fetched. The story is interesting and intriguing which provides a small "wow" effect.

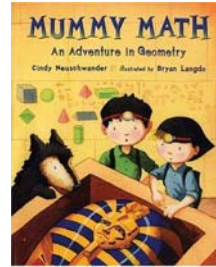
1. Lesson Plan Information	
Subject/Course: Math	Name: Dawn-Marie MacDonald Stephanie Dominelli
Grade Level: 3	Date: February 5, 2009
Topic: Geometry and Spatial Sense – Classifying 3 dimensional shapes	Time and Length of Period: 9:00-10:10 (70 min)

2. Expectation(s) and Learning Skills
<p>The students will:</p> <ul style="list-style-type: none"> • Compare and sort prisms and pyramids by geometric properties using concrete materials (3m53). • Describe and name prisms and pyramids by the shape of their base (3m58). <p>Today, students will:</p> <ul style="list-style-type: none"> • Describe and name prisms and pyramids. • Compare and sort prisms and pyramids using Venn Diagrams.

3. Pre-assessment
<p>A. (i) Students</p> <ul style="list-style-type: none"> • Know geometric properties (edges, vertices, faces). • Knowledge of various geometric solids. • Knowledge of graphic organizers. <p>(ii) Differentiation of content, process, and/or product (may be accommodations and/or modifications)</p> <ul style="list-style-type: none"> • Students will be working in groups to complete the application. Pre-determined groups will match students based on their differing abilities. • S likes to help D
<p>B. Learning Environment</p> <ul style="list-style-type: none"> • During instruction period, students will sit on the floor at the front of the classroom facing the blackboard. • During the application, students will work together in groups at their desks. • During the application, teacher will circulate from group to group in order to ensure that all group members are on task.

C. Resources/Materials

- Mummy Math: An Adventure in Geometry.
- Venn Diagrams
- 3-D Shapes (prisms and pyramids)



4. Content (The What)

Teaching/Learning Strategies (The How)

A. Introduction (motivational steps/hook/activation of students' prior knowledge) (10 min)

- Read *Mummy Math an Adventure in Geometry* by Cindy Neuschwander
- Display book cover to students and have them predict what it will be about.
 - Ask: *“What might this book is going to be about?”*
- During Read Aloud:
 - Stop after reading page 7 (“...look at all these geometric solids”). Ask students: *“Which types of geometric shapes are on the wall?”* For support, encourage students to look around the classroom utilizing the math bulletin board.
 - Stop after reading page 10 (“...we’re totally lost”). Ask students: *“What do you think the clue was talking about when it said there are many faces inside this pyramid?”*
 - Stop after reading page 15 (“...look for six identical faces”) Ask students: *Which geometry shape has six identical faces?*
- After Read Aloud:
 - Ask Students: *“How might you tell geometric shapes apart?”* Allow time for thinking.

B. Content for New Learning

- Three-dimensional shapes.
 - Cube
“A 3-D shape with 6 congruent square faces.”
 - Prism
“A 3-D shape with opposite congruent bases; the other faces are 4-sided. Example: triangle-based prism”
 - Pyramid
“A 3-D shape with a flat base; the other faces are triangles that meet at a vertex. Example: a rectangle-based pyramid”

B. Teaching/Learning Strategies for New Learning (15 min)

- Display each 3-D shape to the students and have volunteers provide the names for each figure and describe them.
 - Ask: *“What is this shape called?”*
 - Ask: *“Who can describe the shape for me?”*
 - Ask: *“Which shapes can you stack on top of each other to make a tower?”*

<ul style="list-style-type: none"> ○ Sphere “A solid shaped like a ball.” ○ Cylinder “A solid with 2 congruent circular bases joined by a curved surface.” ○ Cone “A solid with a circular base, a curved surface and a vertex.” 	
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5. Consolidation/Recapitulation Questions (Check for understanding/scaffolded practice)

(5 min)

- Ask students: “If you were describing a geometric shape to a friend, how might you do it? Which words would you use?”

6. Application (Moving from guided, scaffolded practice to increasingly independent practice and understanding / gradual release of responsibility)

(35 min)

Mathematics Activity:

Working in groups of four, students will sort geometric shapes based on two geometric properties. For example, prisms with more than 6 vertices, or pyramids with an odd number of vertices. Students will choose the appropriate organizer such as Venn Diagram, matrix or tree diagram.

Students will be asked to set up the two Venn Diagram hoops at their tables so that they can sort their geometry figures. Students will sort figures based on a rule that the group has come up with. Once all groups have the rule and have sorted their shapes according they will be asked to walk around the classroom trying to guess the rules at other tables. Students will record their finding on the attached handout entitled “*Guess the Geometric Rule*”

This activity can be accommodated by changing the amount of Venn Diagram hoops the students can use.

7. Lesson Conclusion

(5 min)

- Students gather at the front carpet to discuss their thoughts on geometric shapes
- Ask students: “*Name the different attributes that can be used to describe geometric shapes*”
- Ask students: “*Are there objects in the classroom that are geometry shapes? If so, name the object and describe its geometric properties*”

8. Assessment (collection of data) / Evaluation (interpretation of data)

- A rubric will be used for evaluation.
- Anecdotal notes will be made noting student participation, co-operation within the group, completion of activity and the creation of a rule.

Rubric for Mathematics Activity:

Criteria	Level 1	Level 2	Level 3	Level 4
<ul style="list-style-type: none">• Knowledge and understanding• Thinking• Communication• Application	The student will have difficulty deciding on his or her own sorting rules. They will have difficulty determined the sorting rules of other students. They will have problems naming the figures.	The student will be able to sort on two or more properties. When describing the regions in the organizer, some mistakes will be made. Naming the figures with the common bases (e.g., triangle) will be well done, but not so for other bases such as octagon.	The student will sort on more than two properties using appropriate organizers. They will name the figures according to the shape of their base.	The student will sort the figures on various properties, some of which will be involved. Proper organizer will be selected.

Adapted from Tuck, B. (2005). *Geometry and Spatial Sense*. Near North Educational Services Inc

Guess the Geometric Rule!

Your Mission:

Travel around to the different group tables (look at the centre of the table for the group number) and uncover the mystery of the Venn Diagram. Fill out the following chart with your educated guess.

Hint: Remember to think like Matt and Bibi and analyze all the attributes of the geometric shapes

GOOD LUCK ON YOUR MISSION!!

GROUP NUMBER	VENN DIAGRAM SORTING RULE
ONE	
TWO	
THREE	
FOUR	
FIVE	

References

Hellwig, S. J., Monroe, E. E., & Jacobs, J. S. (2000). Making informed choices: Selecting children's trade books for mathematics instruction. *Teaching Children Mathematics*, 7(3), 138-143.

Neuschwander, C. (2005). *Mummy Math an Adventure in Geometry*. New York: Henry Holt and Company, LLC. ISBN 0-8050-7505-4

Tuck, B. (2005). *Geometry and spatial sense*. North Bay: Near North Educational Services.

Self-Assessment: Assign yourself a grade out of 20 marks with a brief rationale for your assessment.

Criteria/Level	Level 4	Level 3	Level 2	Level 1
Level of Completeness	Assignment has all required components in greater detail (book abstract, expectations, exploratory student activity/ task, questions, book critique, self-assess)	Assignment has all required components (children’s book abstract, expectations, exploratory student activity/task, questions, book critique, self-assess)	Assignment has some required components (children’s book abstract, expectations, exploratory student activity/task, questions, book critique, self-assess)	Assignment has few required components (children’s book abstract, expectations, exploratory student activity/task, questions, book critique, self-assess)
Questions	Includes before/during/after questions; discussion questions are likely to interest learners and foster conceptual understanding. Most are open-ended and exploratory in nature.	Includes before/during/after questions; discussion questions are likely to interest learners and foster conceptual understanding. Some are open-ended and exploratory in nature.	Includes one/few of before/during/after questions; some discussion questions may interest learners and foster conceptual understanding. One/few are open-ended and exploratory in nature.	Lacks before/during/after questions; discussion questions are not likely to interest learners and foster conceptual understanding. None are open-ended and exploratory in nature.
Quality of Writing	The lesson has very few spelling/grammar errors. Overall writing quality is excellent and articulate. Activity is clearly defined and clear connections made to the expectations.	The lesson is mostly free of spelling/grammar errors. Overall writing quality is clear and articulate. Activity is clearly defined and clear connections made to the expectations.	The lesson has a number of spelling/grammar errors. Overall writing quality is unclear and satisfactory. Activity is unclearly defined and lacks connections made to the expectations.	The lesson has many spelling/grammar errors. Overall writing quality is poor and unsatisfactory. Activity is missing/unclear and lacks connections made to the expectations.
Book Critique	Critique of the book is very well-written, and is based on HMJ article. Each of five categories is treated separately and includes much detail.	Critique of the book is well-written, and is based on HMJ article. Each of five categories is treated separately and in adequate detail.	Critique of the book is somewhat articulate, and is based on HMJ article. Categories are not treated separately and lacks specificity.	Critique of the book is poorly written, and/or not based on HMJ article. Categories are not treated separately and lacks any specifics.

Comments:

Overall Assessment: 19 / 20%

We have given ourselves a mark of 19/20. We feel that we have completed all aspects of the assignment to the best of our abilities. We meet the expectations laid out by the above rubric and have created a lesson that we can use during our practice teaching placements. We feel that the critique of the book was well-written and is based on the HMJ article. Overall, we feel that we have completed a lesson plan and book critique that will be useful to our follow Education students.