My Rows and Piles of Coins portrays the daily life of Saruni, a child in Tanzania, who saves his coins to buy a bicycle to help his mother bring produce to sell at the market. The story explains Saruni’s determination, his disappointment for not having enough money, and his parents’ appreciation and support. The book is used as a springboard for a thematic mini-unit that has been implemented in a sixth grade class and modeled for pre-service elementary teachers taking social studies methods classes in their pedagogic block. The mini-unit delves into Tanzania’s culture, economy, geography and climate, while helping students and pre-service teachers understand their own and other people’s social and cultural experiences. The model of the mini-unit could be used to study any country.

About the Authors

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Citation for this Article

### Book Title

*My Rows and Piles of Coins*

Written by Tololwa M. Mollel (1999). Illustrated by E. B. Lewis

New York, NY: Clarion Books

ISBN-10: 0395751861


Age level for the book: Seven and up

We recommend using this mini-unit in a sixth grade class and for pre-service elementary teachers. This mini-unit will take between five and seven class periods.

### Book Summary

*My Rows and Piles of Coins* portrays the daily life of Saruni, a Tanzanian boy who helps his mother carry produce to sell at the market. Saruni's mom gives a few coins for his help and encourages him to spend it at the market to buy something he likes. Instead, Saruni chooses to save his money for a bigger prize --- a bicycle for him to help his mom bring more produce to the market. Every night, Saruni lines up his coins in rows and piles to count his money. One day, his parents discover that Saruni was selflessly saving money to buy a bicycle. They knew he was disappointed because it would take him a long time to save the money. Therefore, the parents surprised him with a bicycle as a present. The story is enhanced by the beautiful watercolor images depicting the housing, clothing, the market, and the natural environment. Ages 8 to 12; Grades 3 to 6.

### NCSS Standards

**Standard Topics**

- Culture
- People, Places, and Environments
- Individual Development and Identity
- Production, Distribution, and Consumption
- Global Connections

### Materials

1. Classroom copies of the book *My Rows and Piles of Coins*
2. Access to laptops or computer lab
3. World atlases and textbooks
4. Handouts with directions for the activities (Appendices B-E)
5. Copies of a political map of the world
6. Copies of physical and political maps of Tanzania
7. Paper, pens, colored pencils, notebooks
8. Materials for math lesson (listed in Appendix E)

Materials for possible differentiations:

- A recording of the book on tape for the students who need to listen to the story more than once.
Materials

- Enlarged copies of the text to be provided for students who have visual impairments to follow along.
- A copy of the book for an English as a Second Language (ESL) teacher or teacher assistant to be read to English Language Learners (ELLs) before the lesson. This will help them to get familiar with vocabulary and the story. A recording of the book on tape could be provided to ELLs.
- Differentiated handouts: Handouts with directions written with simplified language for ELLs and students with special needs.
- Directions for students at a lower academic level may also include less complex tasks according to the students’ needs.

Objectives

Students in the sixth grade will …

- Identify main themes of the story such as family ways of life, family relationships, roles of individuals in the family, and differences between “wants and needs.”
- Communicate the information obtained from the story and illustrations such as the countryside, clothing, and the market place.
- Identify similarities and differences between Saruni’s experiences as described and depicted in the story, and their own daily experiences in the United States.
- Work in cooperative groups to locate and record information about geography, climate, and other aspects of Tanzania to complete a Webquest project.
- Present the information from their Webquest. Work in cooperative groups to create an artifact that organizes, summarizes, and communicates the information obtained about Tanzania. The artifact conveys correct information and written/visual communication is appropriate.
- Note: The objectives for the related mathematics lesson are included in Appendix E.

Procedures

Introducing the lesson, and reading and discussing the book, will take one period.

Exploration/Introduction

1. Tell students that they will be reading a book about a child in Tanzania, a country in East Africa. Show the country on a world map or globe.

2. Complete with students parts K and W of a class “Know-Want to Know-Learned” (KWL) chart to engage and help them access previous knowledge (see Appendix A). Save the KWL chart to revisit it at the end of the unit.

3. Introduce the book My Rows and Piles of Coins to the class, name the author and illustrator. Do a book walk and have students predict what the book will be about. Read the story aloud, posing questions about the story and the illustrations.
**Exploration/Introduction**

4. After reading the book, have students share their ideas about the story line and the information they gathered from the illustrations. Guide students to identify main themes such as relationships within the family, roles of individuals in the family, saving money, and “wants and needs”. Have students describe what they have observed about the countryside in Tanzania, the market, and people’s clothing, encouraging them to relate to their own experiences. Write the main themes and other information on a large piece of paper to be used the following day.

**Development**

Completing Venn Diagrams (One period)

1. The following day, after the discussion of the book, place students in groups of four. Give each student a handout with directions, which include a *Venn diagram* made of two circles (see Appendix B).

2. The groups will brainstorm and write words or phrases about what they think Saruni’s daily life experiences are, and how this relates to *their own* daily experiences in the United States. Then, using the list of words or phrases, each student will complete his or her own Venn Diagram as explained in the directions.

3. When all the students in the groups finish, have the class sit in a circle and ask each student to share his/her Venn Diagram. This is an opportunity to acknowledge the commonalities and differences among students’ experiences. If the class includes students who are immigrants from other countries, it would be interesting to highlight (if shown in the Venn Diagrams), that even when living in the United States, the families keep many traditions, holidays, or games and continue cooking traditional dishes from their native countries. At the end of the conversation, have students tape their Venn Diagrams on the walls of the room for later reference.

4. Examples of Possible Differentiations

   For ELLs, the teacher or the ESL teacher can provide a list of words to facilitate communication. The words could be nouns and verbs they could use in the brainstorm and Venn Diagrams.

   Here are some examples:

   - **Nouns**: Market, supermarket, produce, stores, friends, bicycle, family, mother, father, house chores, t-shirt, jeans, coins, money, piles, rows.
   - **Verbs**: ride (the bicycle), save (money), help (the family), buy/sell, go shopping.
**Development**

Note: The story nicely leads to the discussion about saving money and “needs and wants.” This may be a delicate topic to relate to students’ own experiences, especially in culturally and socio-economic diverse classrooms.

**Expansion**

Webquest on Tanzania (at least two class periods)

1. To motivate students for the Webquest activity, show visuals such as photos, video clips or a video on Tanzania, that highlight its major cities, wildlife on the Serengeti Plain, rivers and mountains such as Mt. Kilimanjaro, and its indigenous people such as the Maasai (see, for example, http://www.tanzaniaodyssey.com/video-console/tanzania-odyssey-video.htm and other sites mentioned in Appendix C-3.)

2. Place students in the same groups of four from the previous lesson. Give each student a copy of the handout with directions for the activity: Webquest: Exploring Tanzania (Appendices C-1 to C-3). Have physical and political maps of Tanzania available for each group.

3. Clarify the tasks the students should complete. Remind students to take thorough notes to share within their groups.

Examples of Possible Differentiations

1. Monitor the groups when they distribute the tasks, to make sure that each student contributes to his/her group’s Webquest completion.

2. If needed, make groups with more than four students. Thus, students who need support can work with a partner who will facilitate communication and participation.

3. Some students may be given a “differentiated handout”, that is, a handout with simplified directions, written in straightforward language and requiring less demanding tasks. For example, students who are at a lower academic level may be provided a list of questions that ask for information, more than an elaboration on information. This will allow these students to contribute to the group.

Presentation and Elaboration of the Information (one period)

4. The day after all groups have completed the Webquest, each group will present the information they have gathered. When not presenting, students should take notes of additional information given by the presenters.

5. Pose questions that will allow students to elaborate on the information, and compare/contrast with other countries they have studied.
Expansion

6. Conclusions to close the discussion. After the presentations, have students reflect on their own culture (home culture, school culture), and experiences.

7. Guide students to realize and comprehend that there are cultural universals such as norms, folklore, social institutions and customs, arts, and economies in every culture.

Note: Students’ conclusions and inferences from their findings might reveal their biases, prejudice, and/or misconceptions. This provides an opportunity to clarify misconceptions, to teach about diverse cultural experiences, and talk about some issues related to social justice and Third World countries.

Assessment

Are students in the sixth grade able to ---

- Identify main themes of the story
- Communicate the information obtained from the story and from the illustrations
- Identify similarities and differences between Saruni’s experiences and their own
- Work in cooperative groups to locate and record information for the Webquest project
- Present the information from their Webquest in an organized manner
- Work in cooperative groups to create an artifact using the gathered information.

Student learning will be evaluated throughout the mini-unit by their ---

- Participation and contributions to the conversation during the KWL – Reading – Venn Diagram introductory activities
- Appropriate completion of the Venn Diagrams
- Ability to find information, understand written, numerical and visual data, and appropriate recording of the information
- Presentation of the information from their Webquest
- Group’s write up of the Webquest (completion, accuracy, and writing skills.)

Suggested Extension Activities

Making a Traveler’s Guide to Tanzania (at least two class periods)

1. When the Webquest work is returned to the students, give the groups (same as before) the assignment described in Appendix D. This assignment requires students to process the information and integrate their new knowledge in a creative way.

2. After the groups work for about two periods creating their guides, they will present their product to the class.
3. As a final conclusion, lead a conversation with students, have them reflect at the KWL chart and their Venn Diagrams to see how much they have learned, and if the knowledge they had expected, written on the KWL chart, was attained.

4. Assess the groups’ Traveler’s Guide to Tanzania using the given rubric.

5. Mathematics skills will be assessed throughout the lessons as students make a variety of calculations and organize data.

A Mathematics Extension

1. An extension to mathematics, relevant to the sixth grade curriculum, is described in Appendix E. It includes a problem and the solutions, possible differentiations and extensions and the corresponding objectives based on the National Council of Teachers of Mathematics (NCTM, 2000).

2. The activity involves finding a variety of three-dimensional arrays of coins (rows and piles of coins), promotes multiplicative thinking and the use of multiple representations, connections, and problem solving strategies.

3. The Mathematics task should be assessed informally, evaluating students’ ability to interpret the problem, and problem solve in groups to map out possible solutions.

Additional References


This article suggests activities for teachers to set up a sixth-grade classroom as a “Travel Agency”. Students must find all kind of data to create "passports" and plan trips as they study various countries around the world.


This story depicts a rich sultan who learns from a poor man the secret of keeping his wife happy.

This is a counting book, 1 to 10, written in English that includes some words in Swahili. Readers can learn Swahili words such as the numbers 1-10 and the names of animals that live in African. Although the book is very basic, it would be interesting for students to notice how this counting book is relevant to children in Tanzania and Kenya, as African animals are present in their daily lives. The book includes a map of Tanzania and facts about the Maasai people.


This is a story about a young Maasai girl who is taught to be patient by an old spirit woman by having to pluck three whiskers from a lion.

**Weblinks**

Tanzania Odyssey: Specialists in Travel to Tanzania
http://www.tanzaniaodyssey.com/

Africa Guide - Our Guide to the whole African continent
http://www.africaguide.com/

Atlapedia Online
http://www.atlapedia.com/

Central Intelligence Agency-The World Factbook

Country Reports-Cultural, Historical, and Statistical Country Information
http://www.countryreports.org/

Countries and Their Culture
http://www.everyculture.com/

Exploring Tanzania
http://www.geographia.com/tanzania

Travelocity Travel (an online travel agency)
http://www.travelocity.com/

National Geographic
http://www.nationalgeographic.com/

U.S. Department of State
http://www.state.gov/
BBC News-Timeline: Tanzania
http://news.bbc.co.uk/2/hi/africa/1072386.stm

Tanzania-BBC Timeline, 25 July 2001
Appendix A

KWL CHART: Learning About the African Country Tanzania

<table>
<thead>
<tr>
<th>K: What do we know?</th>
<th>W: What do we want to know?</th>
<th>L: What have we learned?</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="https://via.placeholder.com/150" alt="Map of Africa" /></td>
<td><img src="https://via.placeholder.com/150" alt="Map of Africa" /></td>
<td><img src="https://via.placeholder.com/150" alt="Map of Africa" /></td>
</tr>
</tbody>
</table>
Appendix B

VENN DIAGRAM: Compare and Contrast (one copy per student)

a. Brainstorm with your group and write words or phrases that tell what your group thinks that Saruni’s daily experiences are, and what everyone in the group says about his/her own daily experiences in the United States.

b. With those words or phrases, complete your Venn Diagram, writing the words/phrases in the appropriate places. The diagram should show similarities and differences between Saruni’s daily experiences in Tanzania and your experiences in the United States.

Daily experiences of a child in Tanzania  My daily life experiences in the USA

Questions or Comments?
Appendix C-1

Webquest: Exploring Tanzania

Directions

1. Your group’s members will work for two complete periods to investigate Websites or other resources (e.g., books, atlases, or encyclopedias, or you may ask an adult who knows about Tanzania) to obtain the information listed in the following two pages. If you find any additional information that you would like to share, you may record that as well.

2. Divide the task among the members of your group, or ask the teacher if you need help to do it. You can work individually or with a partner.

3. Each member of the group, or pair of students, should write down detailed notes recording the information. When each student finishes his/her part for the day, the group will meet to revise the information and make sure that everything is complete.

4. At the end of the second day, your group will rewrite all the information on a computer word processor. You can split the task and then combine the files. You should write the questions and then the answers. Leave two blank lines after each answer. Your paper should like this:

<table>
<thead>
<tr>
<th>Group members:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Location, Geography and Climate</strong></td>
</tr>
</tbody>
</table>
| 1. Where is Tanzania located?  
_Tanzania is located_ ... |
| 2. What are the surrounding countries and bodies of water of Tanzania?  
_The surrounding countries_ ... |
| **Peoples and Culture** |
| 1. What different peoples live in Tanzania, including indigenous peoples? |

5. After all groups finish the Webquest, you will share your group’s answers with the class. At that time, you may add notes to complete your information if you need to (you have blank lines to do that).

6. The typed paper and extra notes will be evaluated for completion, accuracy, and appropriate grammar and spelling.
Appendix C-2

Webquest: Exploring Tanzania (continued)

Required Information (To be completed in two or more days)

I. Location, Geography and Climate

1. Where is Tanzania located? Color Tanzania on a political world map.

2. What are the surrounding countries and bodies of water of Tanzania? Label them on a political world map.

3. What is the climate of Tanzania?

4. What are some natural wonders and wildlife in Tanzania? Describe each of them in a few sentences. Indicate with a circle and label each of the places that you mention, on Tanzania’s physical map. Copy and paste pictures to illustrate the selected places and natural wonders.

5. What is the capital of Tanzania? Place it on the political map. What are the latitude and longitude of the capital?

6. What is/are Tanzania’s time zone/s? What is the time difference between Tanzania’s capital and the time in our state? What are the dates of the four seasons in Tanzania? Compare with those in the United States. Explain why they are the same or different.

II. Peoples and Culture

1. What different peoples live in Tanzania, including indigenous peoples?

2. What are some important and unique problems that these peoples face in this nation?

3. When appropriate, relate your answers to the different peoples that you mentioned in the previous question

   a. What languages are spoken in Tanzania?
   b. What languages are used at the different educational levels (Primary, secondary, tertiary)?
   c. What religions are practiced in the country? (Include percentages)
   d. What are special customs and what/when are some of the main holidays held in Tanzania?
   e. What are some typical and some popular foods?
   f. What is some traditional clothing? Copy and paste illustrations from the webs or make your own illustrations depicting traditional clothing.
III. Economics: Production, Distribution, and Identity

1. What is the population of Tanzania?

2. What is the area of Tanzania? What state or combination of states in the United States has an equivalent area?

3. How do people in Tanzania earn a living? When appropriate, relate your answers to the different peoples who live in Tanzania (see question 1 in the previous set of questions.)

4. What is the official currency of Tanzania? How do the coins and bills look like? What is the exchange rate with the U.S. dollar?

5. List any natural resources of Tanzania and explain how these resources are used to benefit its economy.

6. What are Tanzania’s exports?

IV. History

Find a website to read about the history of Tanzania and write down information that you consider important. After you consider that you have good information about the main events in the history of Tanzania, you will make a timeline to place the events listed below.

You will use a strip of construction paper, a marker, and a ruler (cm) to make your timeline. Begin the timeline at the year 1800 and end it at the year 2020. Make marks for the beginning of each century, 1900 and 2000, and for the year 2020.

To better understand the events in history, it is important that you can interpret the chronology of events and have a sense of how much time had passed between the events. Thus, to make the timeline more meaningful, the length (in cm) of each century should be the same, and all the events should be placed on the timeline proportionally. That is, for each event, the ratio between the number of years from the beginning of the corresponding century to the year of the event, and 100 (years in a century) should be the same ratio than the one between the length from the beginning of the corresponding century to the event, and the length of the century (in cm.)

For example, the length from the year 2000 to the year 2020 (20 years) should be one fifth of the length of the century. This is because 20 years is one fifth of 100 years (20/100 = 1/5).

The following diagram should help you clarify this idea.

Place the following events on your timeline with a short vertical line (as shown in the diagram above). Beneath that line, tape a label for the event as described below.
1. The years that indicate the beginning and end of the period in which Tanzania was a German colony. Tape a label beneath the period between these two years that says “German Colony”.

2. The years that indicate the beginning and end of the period in which Tanzania was a British colony. Tape a label beneath the period between these two years that says “British Colony”.

3. Beneath the year in which the British Colony period ended, tape three labels. The first should say “Tanzania's Independence”. The second should tell the name of the first president of Tanzania, and the third label should tell the name of the first capital city of Tanzania.

4. The date when the capital of Tanzania changed. Tape a label that says "New capital of Tanzania: (name of the current capital)."

5. Find two other important events in Tanzania’s history, draw a short line for the events on the timeline and tape a label with the name of the events.
APPENDIX C-3

Suggested Websites to Explore in Your Webquest

Tanzania Odyssey: Specialists in Travel to Tanzania
http://www.tanzaniaodyssey.com/
This is another tourist website, but it offers information on Africa countries’ people, beaches, climate, languages, history, geography, and economy.

Africa Guide - Our Guide to the whole African continent
http://www.africaguide.com/
Although a commercial website, it provides basic information on all African countries – maps, wildlife, flags, national anthem, photos.

Atlapedia Online
http://www.atlapedia.com/
This website will provide a thumbnail sketch of basic information on any country including Tanzania.

Central Intelligence Agency-The World Factbook
This website gives basic info on Tanzania and any other country.

Country Reports-Cultural, Historical, and Statistical Country Information
http://www.countryreports.org/
It is suggested that the teacher sign up for a few days or months for a nominal charge. It provides extensive information on the culture, religion, language, customs, foods, government, and even their flag and national anthem.

Countries and Their Culture
http://www.everyculture.com/
This website will provide information on the regions explored on safaris.

Exploring Tanzania
http://www.geographia.com/tanzania
This website provides maps, information on planning safaris, current time, articles, slideshow of photos and images.

Travelocity Travel (an online travel agency)
http://www.travelocity.com/
This website was used to provide students with an idea the costs of flying to Tanzania, including itineraries, cities where the planes would stop. The students can outline the itineraries on a world map to make sense of the trip.

National Geographic
http://www.nationalgeographic.com/
This website provides an overview and video on Mt. Kilimanjaro, and information on cultures and features of Tanzania.

U.S. Department of State
http://www.state.gov/
This website is created by the United States Department of State providing facts about the land, people, history, government, political conditions, economy, and foreign relations with Tanzania.
Appendix D

Traveler’s Guide to Tanzania

Directions
With your group, create a booklet or titled Traveler’s Guide to Tanzania. The booklet should provide information for a person interested in traveling from JFK airport in New York City, USA to Dar es Salaam airport (DAR), Tanzania. The trip should take ten days total, between December 15 to January 10. Include the information requested below. Add appropriate illustrations and/or maps to make the information clearer and the trip exciting.

1. Flight and Hotel
   Find a good “package” for one adult to travel from New York to Tanzania, and hotel/s to stay in the country for seven nights. You can use http://www.travelocity.com/ or http://travel.yahoo.com/ to find the flights and possible hotels.

2. Things to pack for the trip
   Explain to the potential traveler the difference between the time zones of NY City and Dar as Salaam. Thus, the traveler would be able to interpret the travel time of his/her trip and the number of nights he/she would spend in Tanzania.

   Explain what season it will be in Tanzania during the December/January trip. Give suggestions about the clothing or special attire the passenger should bring according to the weather and possible activities and visits suggested in the guide (Things to do …).

3. Things to do in Tanzania
   Suggest a few special attractions and describe them briefly. For example, you may suggest a safari (give specific info, place, days, what is there to see), visits to national parks (all info), or visiting a Maasai people's school. Include appropriate illustrations. On a map of Tanzania, show all the places you suggest the traveler to visit.

4. Currency
   Explain to the traveler what Tanzania’s currency is and illustrate what the coins and bills look like. Give the exchange rate of Tanzania’s currency with American dollars.

5. Greetings
   Finally, let the traveler know that greetings are very important in Tanzania. It would be very polite if he or she could learn these important words to communicate with people in Swahili. Include nice pictures or your own illustrations to enhance this part of the guide.

<table>
<thead>
<tr>
<th>Hello</th>
<th>Habari</th>
</tr>
</thead>
<tbody>
<tr>
<td>Please</td>
<td>Tafadhali</td>
</tr>
<tr>
<td>Thank you</td>
<td>Asante</td>
</tr>
<tr>
<td>Goodbye</td>
<td>Kwa heri</td>
</tr>
</tbody>
</table>
Rubric for your group’s Traveler’s Guide to Tanzania

<table>
<thead>
<tr>
<th>Guide’s Appearance and Usefulness</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>The guide is appealing.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The font and size help make reading pleasant.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>It is easy to find the information.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>There are good and appropriate pictures that illustrate the suggested places to visit.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The guide is visually appealing, but the font or the size might make it difficult to read the guide.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Some information cannot be found.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>There pictures that illustrate the suggested places are not very appropriate</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The guide is poorly done.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>It might not be appealing to travelers.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>It would not be easy for travelers to find the needed information.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Information</th>
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<th>2</th>
<th>1</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>All the required information is included in the guide.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All the information is correct.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Some required information is missing.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Some information is incorrect.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Several pieces of required information are missing.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Several pieces of information are incorrect.</td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Writing Style</th>
<th>3</th>
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<th>1</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explanations are clear.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>There are no major grammar errors.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>There are no spelling mistakes.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Some explanations might be unclear.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>There might be some major grammar errors and spelling mistakes.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Writing style is not appropriate because it lacks clarity, has major grammar errors or many spelling mistakes.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix E

A Mathematics Extension

Introduction to the lesson

1. Show the pages in the book *My Rows and Piles of Coins*, where it shows how Saruni arranged his coins. Ask students to describe the arrangements. If needed, model the vocabulary for the students—organized, arrangement, array, lining up, making rows, columns, and piles.

2. Revisit previous knowledge of rectangular arrays made with square tiles (2-D) and rectangular prisms constructed with interlocking cubes (3-D). Compare the names of the dimensions of a rectangular prism (length, width, and height) with equal rows, and piles of coins (or rows, columns, and piles).

Main activity of the lesson

3. Pose the following problem to the students

**Making Rows and Piles of Coins**

*Scenario:* The school wants to collect $100 to buy books for the library. There are 10 classes in the school. Each class is in charge of collecting $10.00. Each grade must give the money to the librarian using only 1-dollar coins.

When the classes collect the coins, they want to figure out all the ways in which they can arrange the 10 coins in the way that Saruni has done it; that is, in equal rows of equal piles of coins. We will call them 3-dimensional arrays of coins. Note: the coins must lay on one of the circular faces.

To name the arrays, you should write its “dimensions.” That is, the number of rows in the array, the number of piles in each row, and the number of coins in each pile. Below are two examples of arrays with 12 coins $2 \times 3 \times 2$ and $3 \times 2 \times 2$ respectively. Note that these arrays are considered the same, because we can rotate one to make it look like the other.
Work with your partners to answer the questions below. You may use coin manipulatives or counters and make sketches on the graph paper.

The questions are:

a. What are some possible three-dimensional arrays that the students can make?
b. Do you think you could find them all? Explain why or why not.
c. Dare to try? What are some three-dimensional arrays that the students could make if they have to give the $12.00 to the librarian, only using 1-dollar coins?

4. Students work in groups of three to solve the problem. They will use the following materials:

- round counters; interlocking cubes (for the differentiation)
- paper and pencil
- graphing paper
- calculators

The teacher moves around the room posing probing questions and helping students when needed. The teacher may suggest to some students to try the problem with two and three coins. This will clarify why the problem with coins is different from the problem using cubes (see differentiation below) and the meaning of “if you rotate the array, it is still the same array.”

**Closure of the Lesson/Discussion** (Time for the teacher to informally assess students’ understanding)

- When all the groups finish solving their problems (may take more than one class period), the teacher leads a “class congress” where students share the group’s solutions. Even if the solutions are repeated, all groups should show their work.
- They should show the solutions in the form of 2 x 3 x 2 and the actual array of coins or counters.
- Below are the five solutions for the 3-D arrays that can be made with 10 coins
During the discussion:

- Encourage students to share the solutions and strategies that they used to find the possible arrays. How did they think about the problem? What did they know about number 10 that helped them find the arrays? Throughout the conversation, highlight the concepts of factor and factor pairs and the commutative and associative properties.
- Ask students if, as a strategy, they used one solution and moved the coins around and find another solution.
- Ask students when they realized that the height of the coin is smaller than the length and width, which are the same as the diameter. How did this finding help them in finding the solutions?
- How did they know if they had all the solutions?

Note: If differentiated problems were also given to some students, these students should present their solutions too.
Differentiation

To differentiate the task but still highlighting the concept of factors, students can be given this simplified problem:

Every time you collect $1.00, you will put an (interlocking) cube in a bag.
Once you collect 10 cubes, you have to make rectangular prisms.
What rectangular prisms can you make with the 10 blocks? Can you find them all?

There are fewer possible arrays, because the cubes have three equal dimensions. If one array can be turned into another by rotating it in any direction, then the arrays are considered the same. There are only two different rectangular prisms: one has dimensions 1, 1, and 10; the other has dimensions 1, 2, and 5. Below are the illustrations that justify this answer.

**The factors of 10 are 1, 2, 5, and 10**

Three products that give 10 as a result and the corresponding rectangular prism are $1 \times 1 \times 10 = 1 \times 10 \times 1 = 10 \times 1 \times 1$

These are considered the same prisms, as each one can be rotated to look like the others.
The other three products that give a result of 10 and the corresponding rectangular prisms are:

\[ 2 \times 5 \times 1 = 5 \times 2 \times 1 = 1 \times 2 \times 5 = 2 \times 1 \times 5 = 1 \times 5 \times 2 = 5 \times 1 \times 2 \]

These are considered the same prisms, as each one can be rotated to look like the others.