THE GOLDEN COCKEREL
Rimsky-Korsakov

Math: Budget Experience

Students Will
- Use mathematical operations to solve real world situations
- Utilize charts and analyze data to answer questions

Copies for Each Student
- Performance Expenses chart
- Cost Report chart
- **Math Activity Worksheet #1 and #2**

Copies for the Teacher
- **Answer Key for Math Activity Worksheet #1 and #2**

Getting Ready

Prepare your students by leading a discussion about the many roles and duties necessary to put on a full opera production. Gather pencils, notebook paper, and calculators as needed.

Introduction

Depending on your grade level and the ability of your students, you may choose to conduct this lesson as a class, small group, individually, or as a partner activity. You may decide to assign all or a certain number of questions on the activity worksheet. Remind students to ask for clarification of any unknown words or concepts.

Begin the discussion by having the class create a list of all the teams and skills necessary for a production. Be sure the students consider more than just the performers, including set and costume design, stagehands, coaches, marketing, and the orchestra in their list. After the list is complete, have the students compare their list with the Performance Expenses chart. Lead a discussion about the components on the chart that were not present in the students' lists.

Guided Practice

Present the Cost Report chart to find specific information about the items necessary for a production and their associated costs. Explain that the costs are listed by function. Have students pay attention to the details included, such as per performance, for all performances, or per load. Give the students a copy of **Activity Worksheet #1** and review the instructions, as they will need to calculate the amount of money necessary for successful performances using the staffing list. Discuss the different mathematical operations and conversions necessary to complete the assignment.

Independent Practice

Give students time to complete **Activity Worksheet #1** before moving on. After the students have completed **Worksheet #1**, give the students time to complete **Activity Worksheet #2** using the information calculated from **Worksheet #1**. Allow time to check the answers in class.

For Further Study

Have the students research a musical performance they would like to see at school and create their own production budget to make it a reality. Students can present their own budgets in class to share their research and explain why they chose the respective expense items.

Evaluation:

1. Did any of the students have prior knowledge about performance expenses?
2. Were the students able to complete the worksheet(s) with 80% accuracy?
3. Were any of the students able to complete their own production budget for the performance they chose?

TEKS: Mathematics

Grade 6
(1) Mathematical Process Standards. (A. B.)
(2) Number and Operations. (D)
(3) Number and Operations. (C. D. E.)
(5) Proportionality. (A. B.)
(14) Personal Financial Literacy. (C)

Grade 7
(1) Mathematical Process Standards. (A. B. C. D. E.)
(2) Number and Operations. (A)
(3) Number and Operation. (A. B.)
(6) Proportionality. (C. D. E. G. H. I.)

Grade 8
(1) Mathematical Process Standards. (A. B. C. D. E. F. G.)
(1) Number and Operations. (A. D.)

Grade 9-12
(1) Mathematical process standards. (A. B. C. D. E. F. G.)

Correlates: Math, Music, Theatre

Gardner's Intelligences: Visual/ Spatial, Logical/Mathematical

Bloom's Taxonomy: Comprehension, Application, Analysis, Synthesis, Evaluation

Production Expenses

Directions: There are multiple steps and teams necessary to create an opera production, including costumes, rehearsals, lighting, and staging. Once the production is ready, the performances can begin! Below are the items listed for different expenses needed for an opera production. Compare the class list with the list below.

Expenses
Rental of Costumes
Shipping for costumes
Hair Stylist and Make-Up Artists
Rental of wigs
Shipping of wigs
Shipping of scenery
Loaders (for the set and costumes)
Airfare for singers, conductor, lighting designer
Performance fee for 1 principal singer
Performance fee for 1 secondary singer
Rehearsal Accompanist Fee
Per performance fee for conductor
Per performance fee for orchestra
Director's fee per performance
Technical Director's fee per performance
Fee for Lighting Designer per performance
Prop Master's fee per performance
Stage/Lighting Crew
Chorus fees
Cost of lighting & special effects
Rental or purchase of props
Rental or cost of performance space
Rental of orchestra music per performance
Fee for ushers
Curriculum, Training, and Supply Packages
Facilities Maintenance Fee

Performance Expenses – Cost Report

Expenses	Cost
Rental of Costumes – each costume	$105.00
Shipping for costumes per load (6 costumes per load)	$283.33
Each Hair Stylist and Make-Up Artist per performance	$400.00
Rental for each wig for all performances	$57.85
Shipping of wigs - per load (8 wigs per load)	$138.00
Shipping of scenery - Flat rate for all performances	$2,000
Loaders - per Loader (Two times per performance)	$188.00
Round-trip airfare for each singer, crew member, director, conductor & accompanist	$463.97
Performance fee for 1 principal singer per performance	$2,200.00
Performance fee for 1 secondary singer per performance	$1,370.00
Accompanist Fee for all performances	$2,963.00
Per performance fee for conductor	$1,500.00
Fee for orchestra for all performances	$22,940.25
Director's fee per performance	$1,750.00
Technical Director's fee for all performances	$3,500.00
Fee for Lighting Designer per performance	$450.00
Prop Master's fee per performance	$765.50
Stage/Lighting Crew fee per performance	$350.00
Chorus Member fee per performance	$350.00
Cost of lighting & special effects for all performances	$1,050.00
Rental or purchase of props for all performances	$1,175.75
Rental or cost of performance space per venue	$2,350.00
Rental of orchestra music per performance	$312.50
Fee for ushers - per usher, per hour	$10.00
Curriculum, Training, and Supply Packages flat rate, per opera production	$225.00
Facilities Maintenance Fee per venue	$1,564.10

Name: _____   **Date:** _____

Math Activity Worksheet - #1

Directions: Your school is performing 3 shows at the Winspear Opera House Complete the budget below to submit to the Principal for approval. Complete the chart using the staff list below and the Cost Report to calculate the total budget for all three performances at the Winspear Opera House. Answer the following questions to prepare for your meeting with your Principal.

Performance Staff:

- 2 Directors
- 1 Conductor
- 2 Accompanist
- 1 Prop Master
- 16 chorus singers
- 2 principal singers

- 3 secondary singers
- 6 Loaders
- 5 Stage Crew
- 4 Lighting Crew
- 1 Lighting Designer
- 5 Hair Stylists

- 3 Make-Up Artist
- 10 Ushers – 4 hours per performance
- 3 days for venue rental and maintenance

Budget Report			
Expenses	**Quantity**	**Cost for 1 Performance**	**Cost for 3 Performances**
Rental of Costumes (singers and chorus)			
Shipping for costumes to venue per load			
Hair Stylist and Make-Up Artist			
Rental for each wig			
Shipping of wigs - per load			
Shipping of scenery			
Loaders - per Loader			
Round-trip airfare for each singer, crew member, director, conductor & accompanist			
Performance fee for principal singers			
Performance fee for secondary singers			
Accompanist Fee			
Fee for Conductor			
Fee for Orchestra			
Director's fee			
Technical Director's performance fee			
Fee for Lighting Designer			
Prop Master's fee			
Stage/Lighting Crew and Chorus Member			
Cost of lighting & special effects			
Rental or purchase of props			
Rental of performance space			
Rental of orchestra music			
Fee for Ushers			
Curriculum, Training, Supply Packages			
Facilities Maintenance Fee			

Name: _____   **Date:** _____

Math Activity Worksheet - #2

1. What is the total expense for all three performances? _____

2. What is your highest expense? _____

3. What is you lowest expense? _____

4. What is the total cost of shipping and rental items? _____

5. If 5 of your chorus singers get sick after the first night, list which expense items would be acquired to replace the singers?

   _____

   _____

   _____

6. If you earn $350,000 in revenue from all three performances, what would be your profit after expenses?

   _____

7. Which expense items were at a flat rate, meaning the fee remained the same regardless of the number of performances?   _____

8. If you have to add 13 new ushers for the second and third performance, what would be your new expense cost for that item? _____

9. What is the cost for one performance for all singers hired? _____

10. If you began to go over budget and /had to cut back on your expenses, what 3 expense items would you choose to cut first and why?

    _____

    _____

    _____

    _____

    _____

ANSWER KEY

Budget Report			
Expenses	**Quantity**	**Cost for 1 Performance**	**Cost for 3 Performances**
Rental of Costumes	21	$2,205.00	$2,205.00
Shipping for costumes to venue per load	4	$1,133.32	$1,133.32
Hair Stylist and Make-Up Artist	8	$3,200.00	$3,200.00
Rental for each wig	21	$1,214.85	$1,214.85
Shipping of wigs - per load	3	$414.00	$414.00
Shipping of scenery	1	$2,000.00	$2,000.00
Loaders - per Loader	12	$2,256.00	$6,768.00
Round-trip airfare for each singer, crew member, director, conductor & accompanist	35	$16,238.95	$16,238.95
Performance fee for principal singers	2	$4,400.00	$13,200.00
Performance fee for secondary singers	3	$4,110.00	$12,330.00
Accompanist Fee	2	$5,926.00	$5,926.00
Fee for Conductor	1	$1,500.00	$4,500.00
Fee for Orchestra	1	$22,940.25	$22,940.25
Director's fee	2	$3,500.00	$10,500.00
Technical Director's performance fee	1	$3,500.00	$3,500.00
Fee for Lighting Designer	1	$450.00	$1,350.00
Prop Master's fee	1	$765.50	$2,296.50
Stage/Lighting Crew and Chorus Member fees	25	$8,750.00	$26,250.00
Cost of lighting & special effects	1	$1,050.00	$1,050.00
Rental or purchase of props	1	$1,175.75	$1,175.75
Rental of performance space	1	$2,350.00	$2,350.00
Rental of orchestra music	1	$312.50	$937.50
Fee for Ushers	10	$400.00	$1,200.00
Curriculum, Training, Supply Packages flat rate	1	$225.00	$225.00
Facilities Maintenance Fee	1	$1,564.10	$1,564.10

Math Activity Worksheet - #2 – ANSWER KEY

1. What is the total expense for all three performances? $144,469.22

2. What is your highest expense? Stage/Lighting Crew and Chorus Member fees

3. What is your lowest expense? Curriculum, Training, and Supply Packages

4. What is the total cost of shipping and rental items for the production? $11,430.42

5. If 5 of your chorus singers get sick after the first night, list which expense items would be acquired to replace the singers?
   Plane tickets, costumes, wigs, and shipping fees.

6. If you earn $350,000 in revenue from all three performances, what would be your profit after expenses? $205,530.22

7. Which expense items were at a flat rate, meaning the fee remained the same regardless of the number of performances? Rental of Costumes, Shipping for costumes to venue per load, Hair Stylist and Make-Up Artists, Rental for each wig, Shipping of wigs - per load, Shipping of scenery, Round-trip airfare for each singer, crew member, director, conductor & accompanist, Accompanist Fee, Fee for Orchestra, Technical Director's fee, Cost of lighting & special effects, Rental or purchase of props, Rental of performance space, Curriculum, Training, Supply Packages, and Facilities Maintenance Fee.

8. If you had to add 13 new ushers for the second and third performance, what would be your new expense cost for that item? $1,840.00

9. What was the cost for one performance for all singers hired? $14,110.00

10. If the budget began to run out and you had to cut back on your budget, what 3 expense items would you choose to cut first and why? (Answers with an explanation are valid.)

    _____

    _____

    _____

    _____

    _____