

Problem-based Learning Experience: Writing Outline

Title:

Author(s):

Learning Objectives:

Target Population:

Problem Statement:

Focus Questions: (These are questions that you want the students to consider after reading the scenario. They are often broken into stages; however we have not used them in stages in our classes).

Resources: (These are resources that you are providing for the student to help them answer their “what I need to know” questions).

Creating Word (Story) Problems Related to PBL: Example Scoring Rubric

All problems must have more than one step; that is, a solution strategy must include more than one step or the problem asks more than one question where a solution to one question is used in answering another question.

Criteria (3)	0 Points	0.5 points
<u>Creativity</u>	Routine Problem Not related to PBL scenario	Non-routine, meaning no solution strategy is immediately known. Related to PBL scenario
<u>*Level of difficulty</u>		
Steps required	Single step	Multiple steps
Mathematics content	Below or beyond expectations of MATH 1410 students	Appropriate for MATH 1410 Ss
Strategies required	Below or beyond expectations of MATH 1410 students	Appropriate for MATH 1410 Ss
Reading level	Below or beyond expectations of MATH 1410 students	Appropriate for MATH 1410 Ss
Length	Below or beyond expectations of MATH 1410 students	Appropriate for MATH 1410 Ss

Solution

0 points	0.5 points	1.0 points
None submitted or work submitted is meaningless	Sufficient detail demonstrates that the student is approaching a rational solution, but major errors obstruct reaching a valid solution	Appropriate method is applied to yield a valid solution

*Level of difficulty is measured by five attributes: 1. Steps required; 2. Mathematics content; 3. Strategies required; 4. Reading level; and, 5. Length.

Example Problem-based Learning Experience

Title: Paws for a Cause

Author(s): L. Diane Miller, Ph.D.

Learning Objectives:

1. Students will use estimation skills to make reasonable assumptions about the time needed to care for the dogs, the amount of food and water consumed by the dogs, and the amount of other supplies needed to care for the dogs while they were at the Fairgrounds.
2. Students will use basic arithmetic operations to calculate the amount of food and water needed to care for 121 dogs for ten days (addition, subtraction, multiplication, and division of whole numbers, common & decimal fractions).
3. Students will demonstrate knowledge of percents, ratios, and proportions as applied to the context of a puppy mill rescue operation.

Target Population:

Pre-service elementary teachers taking Concepts and Structure of Elementary School Mathematics

Problem Statement:

One hundred twenty-one dogs were rescued from a Warren County puppy mill in March 2011 by the Animal Rescue Corps (ARC). They were temporarily sheltered at the Nashville Fairgrounds until a court hearing was held to determine if the dogs should be returned to the owner or become wards of the ARC and put up for adoption. The dogs were held at the Fairgrounds facility for nine days. The ARC asked volunteers to donate food, water, crates, beds, bowls, towels, money, and time to care for the dogs until the court date. The owner was charged ten dollars per dog per day for the care and services received at the Fairgrounds.

Stage 1 Focus Questions: (Questions students may/should raise.)

1. What is a puppy mill?
2. How can/does the ARC take custody of dogs away from a private owner?
3. What considerations should be given to the care and health of the dogs?
4. What happens to the dogs if the owner is not allowed to keep the dogs?

Stage 2 Focus Questions: (Questions students may/should raise.)

1. What breeds are the dogs? (This relates to size and how much food/water is needed.)
2. What are the ages of the dogs? (puppies, middle-aged, older)
3. What are the health needs of the dogs? Are any pregnant, ready to deliver?
4. All will need a physical examination by a veterinarian. What is this cost?
5. Do any need immediate medical care; e.g., surgery, vaccinations?
6. Volunteers contribute crates, crate pads, bedding, bowls, towels, toys, water, food for volunteers, drinks for volunteers, food for animals, water for animals, etc. How should this be organized?
7. Dogs need socializing which means volunteers need to pet, handle, talk to dogs, etc. Too many volunteers may show-up @ one time period. How can responsibilities be assigned to volunteers?
8. Do some dogs need soft food? A mix of soft and dry food?
9. How much food does each dog eat per day?
10. How many times per day are dogs fed?
11. What is the “next step” for the dogs if they are legally removed from the owner?
12. Survey local animal shelters to see how many accept rescued dogs. How many are “no kill” shelters? Does a shelter charge for accepting a dog?
13. How does the ARC find homes for rescued dogs?
14. How much time is needed to examine a dog? (Leads to how many vets are needed.)
15. Measure length/height/weight of each dog on first day and last day before leaving the Fairgrounds. Why?
16. How long will it take to find homes for these dogs?
17. How many puppy mills have been disbanded by ARC during the last year?
18. Do any States prohibit puppy mills?
19. How many pet stores sell dogs in TN?
20. What is the average monthly cost of owning a pet dog? What is the annual cost?

Resources:

Nashville Paw Magazine, June/July 2011

www.NashvillePaw.com

animalrescuecorps.org

facebook.com/nashvillepaw

Local veterinarian offices

Humane Shelter of your county

Breeds rescued:

2 pugs

A few Chinese Crested

A pair of Brussels Griffons

3 Schipperkes

1 Cavalier King Charles Spaniel

2 Cocker Spaniels

1 Italian Greyhound

Some Yorkshire Terriers and Papillons

A Host of Chihuahuas, Pomeranians, Maltese, Poodles, Shih Tzus and mixed breeds

1 Great Pyrenees/Australian Shepherd mix

Follow-up activity: Write an article for a newsletter appealing for contributions. Include quantitative reasoning in the article.