

CHICKEN COOP CONSTRUCTION*

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Abstract

Student groups will design a model for a simple chicken coop and use volume, area, and perimeter calculations to determine how much material is required for their given model.

1 Challenge: Chicken Coop Construction

Unit: Volume

Subject: Math

Description: Student groups will design a model for a simple chicken coop and use volume, area, and perimeter calculations to determine how much material is required for their given model.

Phase I

Teacher Instruction: Divide your class into several groups of 3 or 4 students and present the Part I of the following problem of designing a chicken coop. Encourage the students to be create and to think about important elements of a chicken coop, including:

- Number of chickens you want the coop to be able to hold
- Basic size requirements (example in content section below)
- Preferable materials
- Security and protection for the chickens
- Accessibility for farmer

Give the students approximately 45 minutes to design and sketch a basic model for their chicken coops. Then bring the class together and discuss the models the students came up with. Review the criteria discussed previously as well as whether or not their models are reasonable. Express the strengths and weaknesses of the different models, focusing on a few good examples. Have the students critically think of ways they can improve their models and give them 15 minutes to make any improvements to their models.

Scenario: You've recently decided to raise chickens so that you can sell their eggs and eventually sell them on the market. In order to protect and keep track of the chickens you must design and build a chicken coop. The amount of chickens you want to raise will determine the size of the coop you need to design.

First, decide the amount of chickens that you want to keep inside of the coop.

Second, design a model for you chicken coop. Use paper and pencil to sketch your model showing the dimensions (length, width, and height) in meters (or cm).

Phase II

Teacher Instruction: After the students have finalized their models, present Part II of the challenge discussed below. Review the basic formulas and calculations (noted in Content Section below) for perimeter,

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volume, and area and give a quick example of each. Then give the students another 30 minutes to calculate the amount of materials they will need.

After a half hour, bring the students together to discuss their calculations. Also discuss how much the different materials may cost and have the students discuss whether their models would be affordable.

Scenario: Now that you have a model created with dimensions you now need to decide how much materials you need to buy in order to create this model. Use your knowledge of area, perimeter, and volume calculations to determine how much materials you will need.

Time Limit: This challenge should take approximately two hours to complete.

Competencies

Core Competencies

- Calculate volume
- Calculate areas
- Calculate Perimeter
- Calculate unit conversions
- Use mathematical approach to find solutions to real-life problems
- Use basic algebraic skills to solve more complex problems

Cross-Curricular Competencies

- Utilize Decision Making skills
- Apply animal husbandry knowledge to solve a problem

Content

- Basic Knowledge of design and construction of chicken coops
- Volume Formula
 - $V = \text{length} \times \text{width} \times \text{height}$
- Area Formula
 - $\text{Area} = \text{length} \times \text{width}$
- Perimeter Formula
 - $\text{Perimeter} = 2 \times \text{length} + 2 \times \text{width}$
- Equivalent Units of Measure
 - $100 \text{ cm} = 1 \text{ meter}$
 - $1 \text{ liter} = 0.001 \text{ cubic meters}$

Possible examples of size requirements for a chicken coop:

- Each chicken requires 400 square centimeters of floor space
- The coop space for each chicken should be at least 100 centimeters in height.
- There needs to be 5 centimeters high of mulch covering the entire floor of the coop.

Open Educational Resources

- Example Chicken Coop
- Volume Formula Diagram
- http://www.curriki.org/xwiki/bin/view/Coll_cabocesmst/IntermediateLevelMeasurementMathKit¹
- Area/Perimeter Formulas Diagram
- http://www.curriki.org/xwiki/bin/view/Coll_MickiHR/VolumeFormulas?bc=XWiki.XWikiUsers;XWiki.jmarks;Coll_
- http://www.curriki.org/xwiki/bin/view/Coll_cabocesmst/CardstockModelingMathKit³

¹http://www.curriki.org/xwiki/bin/view/Coll_cabocesmst/IntermediateLevelMeasurementMathKit

²http://www.curriki.org/xwiki/bin/view/Coll_MickiHR/VolumeFormulas?bc=XWiki.XWikiUsers;XWiki.jmarks;Coll_jmarks.WebHome;Coll_

³http://www.curriki.org/xwiki/bin/view/Coll_cabocesmst/CardstockModelingMathKit

- Unit Conversion Table
- <http://www.csgnetwork.com/converttable.html>