BCSPCA Learn at Home

Additional Resources

Grades: 6 - 9

Home Sweet Home?

Overview Students will use their math skills to examine different housing systems for chickens. Students will be provided with measurements for a barn and will determine the number of hens, eggs and income per month for each housing system.
This activity will allow students to solve mathematical problems, think critically and make choices that are in sync with their values.

Materials: *Cluck*! video, "Home Sweet Home worksheet" (optional: calculator)

Key Questions:

- What are the living conditions for egg-laying chickens in caged, free run, free range, SPCA certified and organic systems?
- Do hens deserve the same 5 freedoms as our pets? Why?
- Are hens able to express their natural behaviours in each housing system? Why or why not?
- What are the different conditions in which chickens are typically raised in?
- Why would a farmer choose to house hens in a way that is more expensive than other housing systems?
- How much living space is necessary for chickens to have good welfare?

Big Idea:

- Solve Mathematical problems in contextualized situations
- All living things sense and respond to their environment
- Questioning what we hear, read and view contributes to our ability to be educated and engaged citizens

Activity: Have students watch the 30 minute ***Cluck!*** Video series. Alternatively, students can watch Episode 5. Living Conditions, a 5-minute segment that contains the minimum information necessary to complete this activity.

Students will use their math skills to fill in the table on the "Home sweet Home?" worksheet. With the measurements provided for each housing system, they will need to calculate the number of hens, eggs and income per month for each housing system.

Students will calculate the number of hens as if the whole housing system space was used entirely for hens.To give a more realistic comparison in hen numbers (6:1 ratio of caged birds to free range birds as seen in the video) the students will calculate the caged hens at three cages stacked even though the video showed four cages stacked. Please discuss this information beforehand with the students.

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Background Information:

The battery cage farm in the video housed approximately 33,000 hens and is 14,400 ft2 (13,378,038cm2). The barn at Rabbit River Farms houses 5,000 hens and is 12,160 ft2 (11,297,009 cm2). The space in these barns is not used entirely for hens. There is space dedicated to equipment and walking paths. Each farm employs a similar number of employees. The mortality rate of hens in each housing system is also very similar.

Questions for Discussion:

- Why would a farmer choose to house hens in a way that is more expensive than other systems?
- What do the majority of consumers buy, and why?
  - Note: Most consumers buy the cheapest eggs, these are produced by caged hens. However, if the demand changes then producers will have to change their methods.
- Should animal welfare be considered when raising animals for food? Who should determine the level of welfare required?
- Based on your knowledge of animal welfare and the numbers that you have just calculated, if you were starting an egg farm business which would you choose and why?
- What mathematical techniques did you use to get your answers, and why?

Modifications:

- Give students the activity with a table that has a few answers already provided. It will allow students the opportunity to check their work.

Extensions:

- Have your students imagine they were starting an egg farm. Have them write a brief statement on which housing system would they choose and why, then calculate what their yearly income could potentially look.
- Have students research the typical housing systems for another farm animal and determine the average amount of space provided for them. Ask your students: Is this informationton easy to find? If you were able to find all of the necessary housing information, could you use the same mathematical techniques to determine the number of animals kept in that housing system? What about the farmer's monthly earnings?

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Home Sweet Home? Answer Key

	Caged	Free Run		Free Range	
		slats	litter	slats	litter
hens	83,100	14,000	7,000	14, 000	7,000
eggs	2, 493, 000	420,000	210,000	420,000	210,000
dozen eggs	207, 700	35,000	17,500	35,000	17,500
income	$500, 600	$99,800	$49,900	$122,900	$61,400

	SPCA Free Run		SPCA Free Range		Organic
	part slats	litter	part slats	litter	
hens	12,000	7,000	12,000	7,000	8,000
eggs	360,000	210,000	360,000	210,000	240,000
dozen eggs	30,000	17,500	30,000	17,500	20,000
income	$85,500	$49,900	$105,300	$61,400	$85,200

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Home Sweet Home?

cm²/hen

		all wire/slats	all litter	partial slats
Caged*	483			
Free Run*		950	1900	
Free Range*		950	1900	
SPCA Certified (free range or free run)			1900	1111
Organic (always free range)			1666 + 2500 outdoor space	1666 + 2500 outdoor space

* as outlined in the Canadian Codes of Practice for Poultry-Layers

All wire/slats are used so that the birds are separated from their droppings, as they fall below. Without litter hens are not able to engage in dust bathing and foraging behaviour.

More space is required if a farmer uses **all litter** in order to provide absorption for the droppings. All litter or partially littered floor, must be monitored and wet litter removed regularly or more litter added to prevent the hens from walking in their droppings. Litter also allows hens to engage in foraging behaviours, as well as dust bathing .

Partial slats is a combination of slats and litter. This means not as much space is required as an all litter floor because this system helps keep most of the droppings out of the litter area.

Calculate as if the **entire** space was used for the hens

1. On a separate piece of paper, use the table above to determine the number of hens that can be kept in a 13,378,038 cm2 barn for each housing system**. Remember that for cage systems, cages can be stacked.** To calculate this, determine the number of hens for floor space x 3 cages stacked. Round your answers to the nearest 100. Write your answers in the tables on the next page.

Tip: On average, there are 30 days in a month

2. Using the numbers from your table above, calculate how many eggs are produced in one month, based on one hen laying an egg every 24 hours. Write your answers in the tables on the next page. Then calculate how many dozens of eggs this equals, and input the result into the tables.

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3. Here is the price farmers get per dozen of large eggs. Calculate the monthly income for the farmer for each housing system. Write your answers in the tables below.

Price per dozen of large eggs:

- Caged: $2.41
- Free Run: $2.85
- Free Range: $3.51
- Organic: $4.26

Remember to round your answers to the nearest 100

	Caged	Free Run		Free Range	
		slats	litter	slats	litter
hens					
eggs					
dozen eggs					
income					

	SPCA Free Run		SPCA Free Range		Organic
	part slats	litter	part slats	litter	
hens					
eggs					
dozen eggs					
income					

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Home Sweet Home?
Additional Help Sheet

		cm²/hen		
		all wire/slats	all litter	partial slats
Caged*	483			
Free Run*		950	1900	
Free Range*		950	1900	
SPCA Certified (free range or free run)			1900	1111
Organic (always free range)			1666 + 2500 outdoor space	1666 + 2500 outdoor space

* as outlined in the Canadian Codes of Practice for Poultry-Layers

The numbers in this table are the area needed per hen in cm2

1. Using the table above, determine the number of hens that can be kept in a 13, 378,038 cm2 barn for each housing system**.** Round your answers to the nearest 100. Write your answers in the blank tables.

Housing system area divided by area needed for each hen based on the type of housing system (i.e., the number given to you in the table above).

** **Remember that caged hens are stacked, so you need to multiply the number for caged hens by 3.**

2. Using the numbers from your table above, calculate how many eggs are produced in one month, based on one hen laying an egg every 24 hours. Write your answers in the tables on the next page. Then calculate how many dozens of eggs this equals, and input the result into the tables.

Multiply the number of hens (that you just calculated) by 30 (as 30 represents one egg per day for 30 days).
Divide the number you got by 12 to determine how many dozens of eggs it represents.

3. Here is the price farmers get per dozen of large eggs. Calculate the monthly income for the farmer for each housing system. Write your answers in the tables on page 2.

Price per dozen of large eggs:

- Caged: $2.41
- Free Run: $2.85
- Free Range: $3.51
- Organic: $4.26

Multiply how many dozen eggs by the price per dozen to determine the monthly income.

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Home Sweet Home? Curriculum Links

Curricular Competencies and Content:

Math:

- Use reasoning and logic to explore, analyze, and apply mathematical ideas
- Demonstrate and apply mental math strategies
- Model mathematics in contextualized experiences
- Apply multiple strategies to solve problems in both abstract and contextualized situations
- Develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving
- Explain and justify mathematical ideas and decisions
- Communicate mathematical thinking in many ways
- Represent mathematical ideas in concrete, pictorial, and symbolic forms
- Reflect on mathematical thinking
- Connect mathematical concepts to each other and to other areas and personal interests
- Use mathematical arguments to support personal choices

Social Studies:

- Use Social Studies inquiry processes and skills to - ask questions; gather, interpret and analyze ideas; and communicate findings and decisions
- Construct arguments defending the significance of individuals/ groups, places, events or developments (significance)
- Differentiate between short- and long-term causes, and intended and unintended consequences, of events, decisions, or developments (cause and consequence)
- Make ethical judgements about events, decisions, or actions that consider the conditions of a particular time and place, and assess appropriate ways to respond (ethical judgement)

Core Competencies:

Communication:

- I communicate clearly and purposefully, using a variety of forms appropriately.

Thinking:

- I can evaluate and use well-chosen evidence to develop interpretations; identify alternatives, perspectives, and implications; and make judgments. I can examine and adjust my thinking.
- By exploring their own basic needs and comparing them to the needs of animals, students think critically about how their personal decisions also affect other lives, their community, and the environment.

Personal and Social:

- I can take purposeful action to support others and the environment.