Nutrition Unit Project C. Kohn, Waterford WI

Group Names (F&L):

Hour Date: Why late? Score: + ✓ - If your project was late, describe why

**Introduction**: In this project, you will work in groups of 3-4 to develop a presentation pertaining to developing a healthy, balanced ration for a specific group of cattle. You should use a word processing program (such as Microsoft Word or Google Docs) to address the items below.

**Background**: After a riveting semester in your veterinary science class, you decide that you want to raise a herd of steers to earn some money for college. You go to an auction with the intent to purchase some animals. The steers for sale range in weight from 300 lbs. to 900 lbs. You decide that it will be simpler to choose one weight and only purchase steers at that weight. Your job will be to choose a weight for your steers and a desired rate of gain for those steers. Once you have done so, use the attached information to develop a feeding ration that includes one forage and one concentrate. You will also need to determine whether or not your ration, as calculated, provides the needed crude protein for your animals. If it does not, you will need to choose a second concentrate to provide the additional needed protein.

You and your group (*if you have one; you can work alone*) should address the following in your paper:

1. **Introduction** – What is the weight of your steers? What is your desired rate of gain? Why did you make these choices?
	1. Keep in mind that heavier steers are generally older and that you would probably have a lower profit margin than if you chose younger steers.
	2. There is also a tradeoff in regards to weight of gain; i.e. the fastest rate of weight gain may not always be the most profitable rate of gain, and trying to get a steer to gain weight too fast might result in a digestive disorder. A brief internet search might aid this work. Cite any sources you use.
2. **General Nutrition** – What are the major classes of nutrients and what do these nutrients provide to an animal?
3. **How the digestive tract of cattle works**, including…
	1. The path of food from mouth to anus.
	2. The major organs of the ruminant digestive tract.
	3. What occurs at each organ/stomach chamber in order to process the food consumed.
	4. How ruminant digestive tract differs from a monogastric, post-gastric fermenter, and avian digestive tract.
4. **Development of a feeding ration** – using the attached nutrient requirement tables and nutrient content tables, develop a feeding ration that includes one of the forages and one of the concentrates in the nutrient content table. Use a Pearson Square to determine how much of each ingredient (dry weight) will be included.
	1. You will also need to determine if your ration provides the needed crude protein.
	2. If it does not, choose a second concentrate and use a second Pearson Square to determine the amount of this concentrate that is needed.
5. **Disorders** – conclude your paper by identifying three nutritional or digestive disorders that could occur if you improperly balanced your ration.
	1. Provide a summary of each disorder and how it impacts the body of a ruminant animal.
	2. Then explain how an improperly balanced ration could result in this disorder.
	3. Finally explain how this disorder can be treated if it would occur and how it can be prevented.

**Grading:** Your grade will be determined using the following considerations:

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| --- | --- | --- | --- |
| **Item** | *Plus (100%)* | *Check (70-90%)* | *Redo (0%)* |
| **Accuracy** | No errors were detected in this work | This work contained a few errors, but overall was very accurate. | This work contained considerable errors.  |
| **Thoroughness** | No important information was omitted.  | A few more details would have enhance this work.  | Major topics were omitted that should have been included.  |
| **Applicability**  | This work could be used for an actual herd of animals without any expectation of problems.  | This is acceptable work for high school students but there is a chance that this would not completely be suitable for a herd of actual animals.  | This work is not applicable to a real world situation and falls below the expectations for a high school student in this class.  |
| **Professionalism** | This work is completely free of errors in regards to spelling, grammar, word use, vocabulary, plagiarism, etc.  | While this is acceptable work, there were at least a couple errors in regards to spelling, grammar, word use, vocabulary, plagiarism, etc. | Repeated errors were found errors in regards to spelling, grammar, word use, vocabulary, plagiarism, etc. |
| **Effort**  | Effort exceeds what would be expected of a high school student.  | Effort is acceptable for a high school student but room exists for improvement.  | Level of effort could have been much greater than what was presented.  |

A peer review may also be used to ensure that all group members have contributed equally to this work. Your individual grade may be raised or lowered from the group score if you have a very high or very low peer review score in comparison to the rest of your group members.

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| --- | --- | --- | --- | --- |
| Nutrient requirements of growing and finishing medium-frame beef calves  |  |  |  |  |
| **Body weight (lbs)** | **Average daily gain (lbs/day)** | **Dry matter intake (lbs)** | **TDN (%)** | **Crude Protein (%)** | **TDN (lbs)** | **Protein (lbs)** |
| 300 | 0.5 | 7.9 | 54 | 9.2 | 4.3 | 0.73 |
|   | 1 | 8.4 | 59 | 11.4 | 5 | 0.95 |
|   | 1.5 | 8.6 | 64 | 13.6 | 5.5 | 1.17 |
|   | 2 | 8.6 | 69 | 16.2 | 5.9 | 1.39 |
|   | 2.5 | 8.5 | 75 | 18.9 | 6.4 | 1.61 |
|   | 3 | 8.2 | 83 | 22.2 | 6.8 | 1.83 |
|   |   |   |   |   |   |   |
| 500 | 0.5 | 11.6 | 54 | 8.4 | 6.3 | 0.97 |
|   | 1 | 12.2 | 59 | 9.8 | 7.2 | 1.19 |
|   | 1.5 | 12.6 | 61 | 11.2 | 8.1 | 1.41 |
|   | 2 | 12.7 | 69 | 12.8 | 8.8 | 1.63 |
|   | 2.5 | 12.5 | 75 | 14.7 | 9.4 | 1.84 |
|   | 3 | 12.1 | 83 | 16.9 | 10 | 2.05 |
|   |   |   |   |   |   |   |
| 700 | 0.5 | 14.9 | 54 | 8 | 8 | 1.19 |
|   | 1 | 15.8 | 59 | 9 | 9.3 | 1.42 |
|   | 1.5 | 16.2 | 61 | 10.1 | 10.4 | 1.64 |
|   | 2 | 16.3 | 69 | 11.4 | 11.2 | 1.85 |
|   | 2.5 | 16.1 | 75 | 12.8 | 12.1 | 2.06 |
|   | 3 | 15.5 | 83 | 14.6 | 12.9 | 2.27 |
|   |   |   |   |   |   |   |
| 900 | 0.5 | 17.9 | 54 | 7.6 | 9.7 | 1.36 |
|   | 1 | 19.1 | 59 | 8 | 11.3 | 1.52 |
|   | 1.5 | 19.9 | 61 | 8.4 | 12.1 | 1.66 |
|   | 2 | 20.3 | 69 | 8.8 | 14 | 1.79 |
|   | 2.5 | 20.2 | 75 | 9.3 | 15.2 | 1.84 |
|   | 3 | 18.3 | 83 | 10.1 | 15.2 | 1.85 |
|   |   |   |   |   |   |   |
| (Source: Univ. of Florida Extension - http://edis.ifas.ufl.edu/an254) |   |   |   |   |   |   |

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| **Mean Nutrient Content of Feeds Commonly Used in Beef Cattle Diets a** |
| **Feedstuff** | **TDNs (%)** | **Crude Protein (%)** | **Crude Fiber (%)** | **Dry Matter (%)** |
| **Forage** | **Column1** | **Column2** | **Column3** | **Column4** |
| Alfalfa, Fresh | 62 | 18.9 | 26.5 | 23.4 |
| Fresh Alfalfa, late vegetative | 66 | 22.2 | 24.2 | 23.2 |
| Alfalfa Hay | 60 | 18.6 | 26.1 | 90.6 |
| Alfalfa Silage | 63 | 19.5 | 25.4 | 44.2 |
| Fresh Bermuda Grass | 64 | 12.6 | 28.4 | 30.3 |
| Bermuda Grass Hay, sun-cured | 49 | 7.8 | 2.7 | 93 |
| Corn Silage, well-eared | 72 | 8.7 | 19.5 | 34.6 |
| **Feedstuff** | **TDNs (%)** | **Crude Protein (%)** | **Crude Fiber (%)** | **Dry Matter (%)** |
| **Concentrates**  |  |  |  |  |
| Barley Grain | 88 | 13.2 | 3.37 | 88.1 |
| Beet pulp, dried | 74 | 9.8 | 20 | 91 |
| Brewer's grains, dried | 66 | 29.2 | 7.8 | 90.2 |
| Corn - Distiller's grains, dried | 90 | 30.4 | 6.9 | 90.3 |
| Corn - Grain, cracked+B34 | 90 | 9.8 | 2.3 | 90 |
| Cotton Seed | 90 | 24.4 | 25.6 | 89.4 |
|  Molasses, cane | 72 | 5.8 | 0.5 | 74.3 |
|  Oats | 77 | 13.6 | 12 | 89.2 |
|  Sorghum (*Sorghum bicolor*), grain | 82 | 12.6 | 2.76 | 90 |
|  Soybeans (*Glycine max*), meal | 84 | 51.8 | 5.4 | 90.9 |
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| Source: Merck Veterinary Manual, http://www.merckmanuals.com/ |  |

**The following assumptions were used in a profitability scenario created by the UW-Madison Animal Science Department and may serve as guide for choosing your steer starting weight and ideal rate of gain.**

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| --- | --- | --- |
| **Scenario variable** | **Beef stockers** | **Holstein stockers** |
| Purchase weight | 500 lbs. | 300 lbs. |
| Purchase price | $0.80/lb. | $0.90/lb. |
| Stocking rate | 1.4 head/acre | 1.5 head/acre |
| Death loss | 1 percent | 2 percent |
| Daily dry matter intake | 2.8 % of body weight | 3.2 % of body weight |
| Daily rate of gain | 2.2 lbs. | 2 lbs. |
| Selling weight | 940 lbs. | 700 lbs. |
| Selling price | $0.68/lb. | $0.68/lb. |

*Source: Center for Integrated Agricultural Systems, UW-Madison. 1999. Stocker cattle convert pasture to profits. Site: http://www.cias.wisc.edu*