Introduction to Animal Feeds and Feeding Name: _____

We feed livestock all kinds of material. Beet pulp, distiller's grain, alfalfa hay, mineral/salt blocks, and hundreds of other weird and wonderful feeds. You as a human eat all kinds of material also. Some of the best include pizza, greasy burgers, and coca cola. The stuff livestock and humans eat can be analyzed and expressed in many forms. In ag math we are going to learn first about how feed nutrient and energy values are expressed.

Energy and/or nutrient content of a feed may be expressed as A. Percentage, B. Quantity per unit (like the coke has 25 grams of sugar per bottle). The following are all bases and terminology used when expressing bases:

a. Dry matter basis – dry out the feed, what is in it with no water
b. As-fed basis – it has water. How you eat it
c. Air-dry basis – assume 90% dry matter 10% water

It is sometimes hard to compare different feeds and their nutrient compositions if one is wet and one is not. Say you drank a gallon of water with a flintstone vitamin in it or you just ate the vitamin with no water. In one situation you had over 8 pounds of liquid. That's a lot in your stomach. The other you had almost nothing. However, you got the same vitamin. Thus, many times when we compare feeds (water-vitamin vs plain vitamin) we look at just the dry matter and what is in them. Everything is going to get converted to dry matter so we can compare apples to apples (dry matter to dry matter) and not apples to an opera (dry matter to as-fed basis).

To convert as-fed to dry matter we are going to use a proportion. Proportions are easy. Everyone in this class can do them. We just have to now apply them to feeding livestock (or humans).

Example Proportion: I have 100 dollars. I want to give half of it to my friend Morty. How much do I give Morty?

Ex 1 $\frac{1}{2} = \frac{x}{\$100}$

A. cross multiply
B. solve for x
C. Units - top units = top units
bottom units = bottom units

so. $\frac{1}{2} \times \frac{x}{100}$

$2x = 100$

$x = 50$ dollars

Example: I have 90 dollars. Chance takes 33 dollars. What percent do I have left? Note: percent's are always over 100

Ex 2. $90 - 33 = \$57$ left

$\frac{\$57}{\$90} = \frac{x}{100\%}$

A. Total is 100% → set up
B. Cross multiply
C. Solve for x

$90x = 5700$

$x = 63\frac{1}{3}\%$

Feed Proportion

$$\frac{\text{As-Fed}\ \%\ \text{nutrient as fed basis}}{\%\ \text{of Feed dry matter}} = \frac{\text{Dry matter}\ \%\ \text{nutrient dry matter basis}}{100\%\ \text{dry matter}}$$

Some practice problems:

1. Silage is at 8% crude protein on an as-fed basis and contains 45% dry matter. What percent crude protein would the alfalfa silage contain on a dry matter basis?

As Fed ↓

$$\frac{8\%\ CP}{45\%\ DM} = \frac{\%\ CP}{100\%\ DM}$$

2. Some grass hay contains 12% protein on an as-fed basis and contains 85% dry matter. What percent crude protein would the alfalfa silage contain on a dry matter basis?

3. You are going to mix a new ration for your cattle. You are looking at some charts and see beet pulp contains 10 percent protein on a dry matter basis. If the beet pulp is at 11% dry matter on an as-fed basis, what is its percent protein on the as-fed basis?

10% P on 100% DM
? % on 11% DM

1.1% P

$$\frac{x\ \%P}{11\%\ DM} = \frac{10\%P}{100\%\ DM}$$

4. You are going to mix a new ration for your cattle. You are looking at some charts and see animal blood (dehydrated) contains 21 percent protein on a dry matter basis. If the animal blood you get is at 92% dry matter on an as-fed basis, what is its percent protein on the as-fed basis?

5. Three samples of hay contain the following energy (kcal digestible) on a **dry matter basis**

A	1000 kcal/pound	30% dry matter
B	1200 kcal/pound	35% dry matter
C	1175 kcal/pound	39% dry matter

What is the energy for all on an as fed basis?

per pound.

$$\frac{1000\ kcal/1\ lb}{100\%\ DM} = \frac{x\ kcal/1\ lb}{30\%\ DM}$$

As fed / DM TDN / Use Proportions when

1. Dealing with Percentages top & bottom & same labels

2. Using a percentage and a unit given per specified amount of unit

   ie $\frac{\text{Kcal}}{1 \text{ pound}} \equiv \%$ top or bottom

3. Neither

As Fed - water

% Dry Matter - 100%

% water

$\frac{4oz\ Fat}{16\ oz\ taco}$ → Dry → $\frac{4oz\ Fat}{8oz\ taco}$

↓ 8oz water

A. What % of taco was H_2O?

B. What is the % fat on
   i. DM Basis
   ii As Fed Basis

C. what % of taco on as-fed basis was DM.

D. Assuming same taco %
   i How much fat is in 18 lbs of taco as fed?

   ii How much fat is in 31 kg of taco DM.

New formula: Parts dry matter feed = Parts as-fed * % dry mater in feed (pounds, grams, weight, etc)

6. How much dry matter did you feed your pigs if they were given the following:

Feed	Weight As-fed	% Dry Matter
Soybean Meal	4 pounds	44%
Corn Silage	11 pounds	90%

4 • .44 = 1.76 lbs DM

7. Rewrite the formula from number six. We are now going to convert pounds of dry matter into as feed basis:

Feed	Weight Dry	% Dry Matter
Corn	3 lbs	88 %
Silage	10 lbs	90 %
Rolled Oats	0.5 lbs	95 %

Parts DM = Parts AF • %DM

3 / .88 = 3.409

Remember the following:

1. When going from as-fed to dry matter
    a. Weight decreases
    b. Nutrient concentration increases

2. When going from dry matter to as-fed
    a. Weight increases
    b. Nutrient concentration decreases

1. $\frac{8\%\ CP}{45\%\ DM} = \frac{x}{100\%\ DM}$

$45x = 800$

17.78 % CP

Proportions
units

1. line up units
2. All cancel

2. $\frac{12\%\ P}{85\%\ DM} = \frac{x}{100\%\ DM}$

$85x = 1200$

$x =$ 14.12 % Protein

3. $\frac{x}{11\%\ DM} \times \frac{10\%\ Protein}{100\%\ DM}$

$100x = 110$

$x =$ 1.1 % Protein

4. $\frac{x}{92\%\ DM} = \frac{21\%\ protein}{100\%\ DM}$

$1932 = 100x$

19.32 % Protein

5. $\frac{1000\ Kal}{100\%\ Dm} = \frac{x\ Kcal}{30\%\ DM}$ $100x = 30000$ **$x = 300$ Kcal**

$\frac{1200\ Kcal}{100\%\ Dm} = \frac{x\ Kcal}{35\%\ Dm}$ $100x = 42000$ **$x = 420$ Kcal**

$\frac{1175\ Kal}{100\%\ Dm} = \frac{x\ Kal}{39\%\ DM}$ $100x = 45825$ **$x = 458.25$ Kcal**

Total = 1178.25 Kcal

6. SBM $4 \text{ lbs} \times 44\% = 1.76 \text{ lbs}$

$44\% \downarrow 0.44$

7. $\frac{\text{WA}}{\text{DM\%}} = \text{As-fed}$

Corn $\frac{3 \text{ lbs}}{88\% \text{ or } .88} = 3.41 \text{ lbs as fed}$

S. Lage $\frac{10 \text{ lbs}}{90\% \text{ or } .9} = 11.11 \text{ lbs As fed}$

Rolled Oats $\frac{0.5 \text{ lbs}}{.95} = 0.53 \text{ lbs as fed}$