2008 SENIOR TEAM PROBLEM

You have a 180 lb. Shropshire ewe that is nursing twin ram lambs that are four weeks old. Balance a ration for her.

Here are her daily nutritional requirements in pounds of dry feed (DM).

Dry matter (DM) intake	Protein (CP)	Energy (TDN)	Ca	P
6.6	0.96	4.3	0.0246	0.0189

Here are the feeds you have available to feed her:

Feedstuff	% dry matter (DM)	% energy (TDN)	% protein (CP)	%Ca	%P
Hay	90	58	14	.80	0.24
Corn	90	88	9	.02	0.3
Soybean meal	90	84	49	0.38	0.71

To balance a ration for sheep, we should always start with forage. Let's feed this ewe 4 lbs. of hay per day.

1. Calculate how much energy and protein the 4 lbs. of hay provides the ewe.

Lbs. hay	X	% DM	X	% CP	=	Lbs. CP
4.0	X	0.90	X	0.14	=	0.504
Lbs. hay	X	% DM	X	% TDN	=	Lbs. TDN
4.0	X	0.90	X	0.58	=	2.088

2. Energy is the most limiting nutrient, so we should balance for it first. To do this, subtract the energy the hay provides from the energy that the ewe requires. This will tell us how much additional energy we need to feed in the form of a grain supplement.

TDN required	-	TDN supplied by hay	=	TDN Deficiency
4.3	-	2.09	=	2.21

Corn is the best source of energy. Determine how much corn you need to feed to meet the ewe's energy requirements.

TDN Deficiency	÷	%TDN corn	=	Lbs. corn (DM)
2.21	÷	0.88	=	2.51

3. Now we need to balance the ration for protein. Calculate how much additional protein the corn provides to the ration.

Lbs. corn	X	% CP corn	=	Lbs. CP in corn
2.51	X	0.09		0.226

Subtract the protein the hay and corn provide from the protein the ewe requires.

CP required	-	CP in hay	-	CP in corn	=	CP deficiency
0.96		0.504		0.226	=	0.23

If the ration is still deficient in protein, you'll need to mix soybean meal with the corn. Calculate what percent protein the grain ration (corn + soybean meal) needs to be to provide the additional protein.

CP required - CP in hay	÷	Lbs. grain	=	% CP required in grain ration
0.456	÷	2.51	=	18.2

4. Use the Pearson Square to balance the grain ration (for protein %) to meet the ewe's protein requirements.

% CP in Corn	% CP required	Parts corn	÷	Total parts	=	% Corn
		+				
% CP in SBM		Parts SBM	÷	Total parts	=	% SBM
		= total parts				100%

To get parts corn, subtract %CP in SBM from %CP required
To get parts SBM, subtract %CP in corn from % CP required.
Add parts of corn to parts of SBM
Divide parts of corn by total parts to get % corn in ration
Divide parts of SBM by total parts to get % SBM in ration
Multiple % corn and % SBM by the amount of grain you are feeding to determine how much corn and SBM should be in the ration.

9	18.2	30.8	÷	40.0	=	77% corn
		+				
49		9.2	÷	40.0	=	23% SBM
		40.0				100%

5. Give your ration in the table below. Don't forget to convert the pounds of corn and soybean meal from a dry matter basis to an as fed basis.

Feedstuff	Lbs. dry matter	Divide by	Lbs. as fed
Hay	3.6	0.90	4.0
Corn	2.51 x 77%	0.90	2.15
	1.93		
Soybean meal	2.51 x 23%	0.90	0.64
	0.58		