Calorie	Amount of energy required to raise 1gm H2O by 1 degree C	**(6)Structural Carbohydrates**
Bomb Calorimeter	Measures the complete transduction of chemical energy to heat	Includes Cellulose and Hemicellulose
Gross energy	Total energy feedstuff can provide	Needs fermentation to be digested
Fats	9.4 kcal/g Provides most amount of energy	Beta Bonds
Carbohydrates	4.1 kcal/g	Outside the cells
Proteins	5.7 kcal/g	Requires more energy to be broken down
(5) Non Structural Carbohydrates	Includes Sugars and Starches	Straw
Within the cell	Corn	**2 types of Carbohydrates**
Alpha bonds	Broken through enzymatic digestion	Structural and Non-Structural
(2)Digestible Energy	What is actually used by the animal	**DE =**

IE - FE	Determines amount of energy available or digested by the animal	**TDN (3)**
Total Digestible Nutrients	A general measure of the nutritive value	= DCP + DNFE + DCF + 2.25(DEE)
DCP	Digestible Crude Proteins	**(2) DNFE**
DCF	Digestible Crude Fiber	Digestible Nitrogen Free Extract
DEE	Digestible Ether Extract	Measure of non-structural carbohydrates (SUGAR AND STARCH)
Problems w/ TDN (4)	Does not take into account losses in urine gas production and heat loss	These losses are greater in roughages than concentrates
Non ruminants don't utilize fiber as well as ruminants	Therefore more precise methods for describing and evaluating energy in feed ingredients are used	**Metabolizable Energy (2)**
Net Energy (5)	frequently used to describe energy for poultry	Digestible energy minus -Energy lost in urine 3% (3% of GE) -Energy lost in gas (methane 7-8 % GE)
Metabolized but takes into account heat increment	Heat production during digestion	Heat produces as a result of fermentation
widely used to describe energy for ruminants because of fermentation	Includes Heat increment	**Heat Increment (3)**
Greater heat loss with roughages than concentrates	Less heat production when fasting than fed	Heat produced during digestion and absorption

Measured Calorimetry	Housing an animal in a special chamber that will record temperature changes	**Indirect Calorimetry**
NEm (4)	Net energy Maintenance	measuring the amount of O2 and CO2 consumed and produced to calculate the energy of an ingredient
fraction of net energy to animal in equilibrium - no gain or loss	• Basal metabolism • Involuntary activity • Energy to warm • Energy to cool	**Maintenance**
Net energy for production	fraction of net energy used for growth, milk production	nutrition required to exist outside of growth, reproduction and lactation
NEg	Net energy growth	**NEl**
Importance of Net energy system (3)	Different feeds have different fuel values based on if they are being used for maintenance or gain	Net energy lactation
A feed may have a higher value in maintenance diet vs a finishing diet	economically important	**Poultry Energy System (2)**
Pigs Energy System (2)	Is classified as Metabolizable Energy	= ME + NE
Is classified as Metabolizable Energy	= DE + ME (+NE)	**Cattle Energy System (2)**
	Is classified as Net energy (also goats and ruminants)	= NE + TDN