

DRAFT* The Accounting Equation *DRAFT

In this lesson I am going to explain why the accounting equation is the single most important accounting concept. To do that effectively, I am going to simultaneously explain why it is critical in every three-statement model that you build.

Even if you never build a financial model, I find that understanding it in this context is one of the most powerful ways to cement an understanding of the accounting equation and how the three primary financial statements are linked.

I studied some accounting in college, but it wasn't until I built my first three-statement model as an investment banker that I felt I truly understood the concepts, which is why I choose to teach it this way on ASM.

Over the years I have received similar feedback from many of the thousands of students that have worked through ASM's content as well. Per the testimonial below, it may feel like a lot of information initially, but I promise it will come together by the conclusion of this series.

Testimonial: "Having had several accounting courses, initially it seemed odd viewing an entire model in one Excel spreadsheet. It seemed like too much information in one place or on one page and it made me a little uncomfortable, but by the end of the 2nd section I found this to be the most efficient manner that I've ever been taught Accounting."

A Closed System

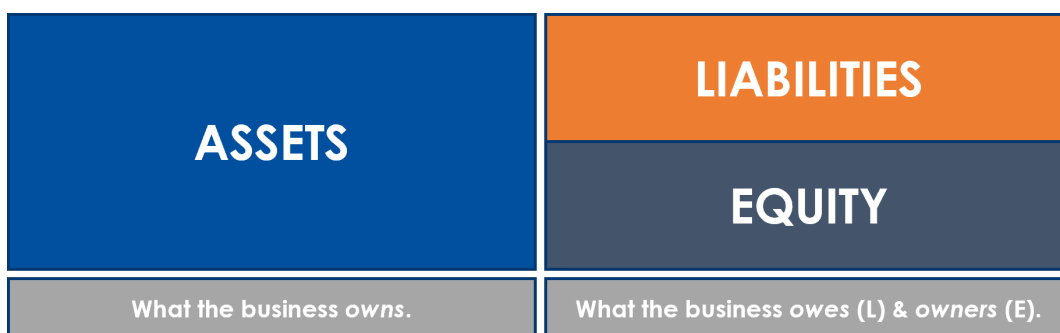
The beautiful thing about accounting and the three-statement models it helps inform is that they create a closed system. What affects the income statement also affects the balance sheet, and any change on the balance sheet must be captured by the cash flow statement. If you understand these relationships, then you will also understand how cash moves through a business. **Ultimately, and certainly as an investor, that is the goal.**

The accounting equation is the first concept you need to master to build on this skill set. Per the image below, the accounting equation states that the value of a company's assets is equal to the sum of the company's liabilities and equity.



More precisely, a company uses assets to generate revenue; this is everything that the company owns. Liabilities and equity represent the means of acquiring and owning the assets. So, on the left-hand side of the equation (assets) you have everything the business owns and on the right-hand side of the equation you have everything the company owes.

I find visuals help with abstract concepts, and in that regard repositioning the colored rectangles such that the “Assets” rectangle is the size of both the “Liabilities” and “Equity” rectangles can help visual learners with the relationship between all three.



So how is this relationship ($A = L + E$) always maintained?

A lot of vocabulary surrounds the framework that maintains this equation. To help absorb the concepts I thought I would introduce a related concept for an entirely different field: physics.

Newton's Third Law: For every action, there is an equal and opposite reaction.

This is the basic premise behind the **dual aspect concept** in accounting. It requires that every transaction a business makes be recorded (at *least*) twice in equal but opposite values. This concept is the basis of **double-entry accounting** (or **double-entry bookkeeping**), and framework is the best way to produce reliable financial statements.

Double-Entry Accounting: Every financial transaction has equal and opposite effects in at least two different accounts.

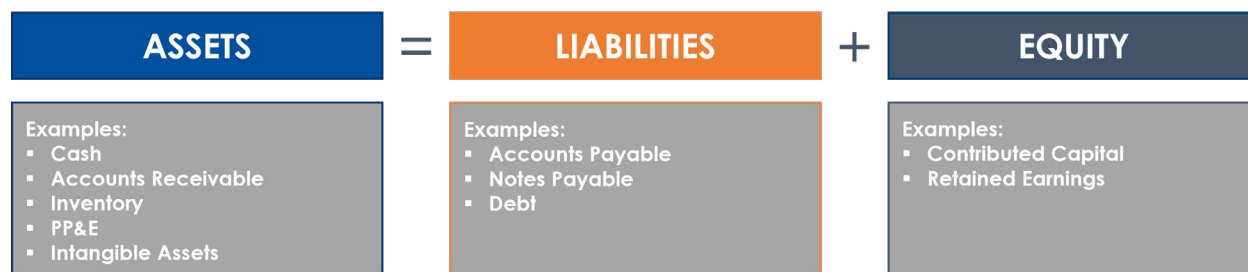
I want to return to a more detailed definition of double-entry accounting, but to help with the vocabulary that will be included in that section, we first need to explore examples of the three components of the accounting equation.

Definitions

Let's quickly walk through a few examples for each of the three categories: assets, liabilities and stockholders' equity (same as equity). The definitions themselves will also include vocabulary, while I would normally NEVER encourage this, please don't get too hung up on new words for *now*.

The challenging aspect of explaining a framework so intertwined is that you must pull vocabulary forward. When you are reading something new it benefits you enormously to pause and fully

appreciate each new definition (see ASM On Learning¹), the exception we are making here is that I am promising more detailed definitions in future lessons that will be easier to grasp once the concepts in this lesson have been absorbed. So, with that in mind, let's look at some examples.



Assets: All property owned by the company.

- Cash: The most liquid account. This includes all cash and cash equivalents.
- Accounts Receivable: The balance of revenue still on credit, net of any allowances for doubtful accounts. (In other words, this is what customers owe the company.)
- Inventory: This account includes raw materials, work-in-progress (WIP) and finished goods. When a sale is reported, the cost of the sale pulls from this account and is reported under cost of goods sold on the income statement.
- PP&E: Tangible fixed assets listed net of accumulated depreciation (e.g., land, buildings, equipment).
- Intangible Assets: Examples of identifiable intangible assets include patents and licenses. Examples of unidentifiable intangible assets include goodwill and the company's brand.

Liabilities: All debts the company currently has outstanding.

- Accounts Payable: Sums the company owes its vendors and suppliers for items and / or services purchased on credit.
- Notes Payable: The equivalent of debt. You can have both short- and long-term notes payable (short-term debt is due within one year's time).
- Debt: A loan from a bank, for example.

Stockholders' Equity: Ownership interest in the company after all debts or liabilities have been repaid.

- Contributed Capital: Value of the capital that shareholders have contributed (invested) in the company.
- Retained Earnings: The amount of net income that is retained by the business.

Double-Entry Bookkeeping System Example

To echo the previous introduction, most companies maintain the accounting equation using a double-entry bookkeeping system to record financial data. Under this system, a change in one

¹ LINK: <https://www.asimplemodel.com/resources/introduction/how-to-learn>

account must be matched in another account. **These changes are made by debits and credits and for every entry, the sum of debits must equal the sum of credits.**

It's important to note that here, debit and credit are not defined by their everyday usage. Here debit means left, and credit means right. Whether or not a debit or credit increases an account is indicated by these signs visible in the image below.



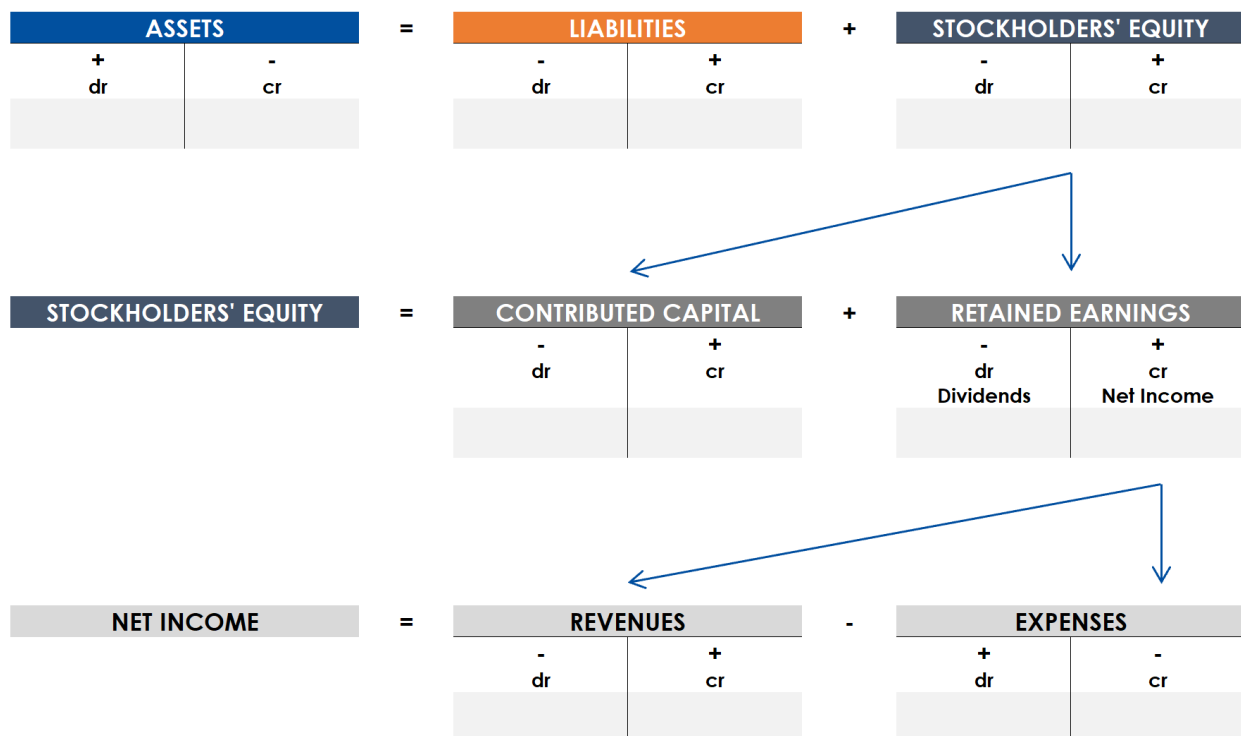
As you will see, on the left-hand side of the equation a debit increases an account, and on the right-hand side of the equation, a credit increases an account.

Let's walk through a quick example where a company intends to raise \$5 million by issuing debt. To record that transaction, you would credit liabilities in the amount of \$5 million. This reflects the assumption of debt on the balance sheet. You would then debit assets by \$5 million to reflect an increase in cash on the balance.



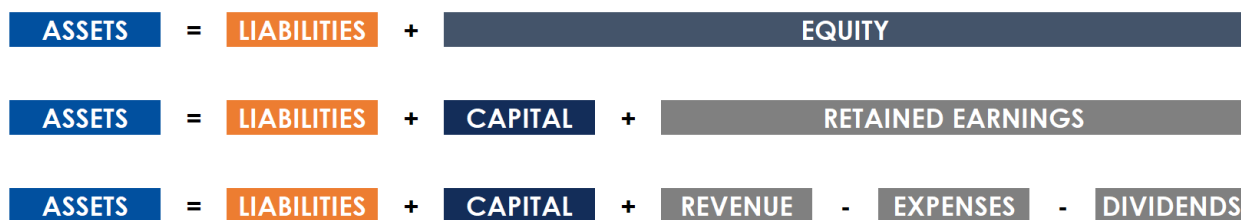
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This equation can be expanded to show that stockholders' equity is equal to contributed capital plus retained earnings, and that net income is equal to revenues less expenses.



We will revisit the expanded accounting equation in future lessons. For the time being one detail to note is that under expenses the impact of a debit and credit is reversed. This is a **common interview question**, which is why I wanted to point it out.

The expanded accounting equation can also be reformatted and expressed per the sequence visible below (again, just an additional visual to help with the learning process).



We will be revisiting this expanded equation throughout the lessons that follow. For now it's simply helpful to be aware of.

Author's Note: I had a hand-drawn image of the accounting equation (the version with debits and credits included) pinned to my cubicle for the entire time that I was an investment banking analyst. It helped me substantially on technical calls and as I thought through the three-statement model framework.

If you are ever having trouble remembering how debits and credits impact accounts, use the DEALER acronym to answer the question.

Example: Starting a Company

Let's build a company to further explore the accounting equation. Convinced that "there's always money in the banana stand" you decide to launch your very own banana stand business. In the sequence that follows, we are going to start by raising the funds required to purchase equipment and inventory and conclude with the company's first profitable sale of chocolate bananas.

As we work through each step, keep the accounting equation in mind and notice how the balance sheet remains balanced as we progress through the sequence.

- **Period 1:** You invest cash in the company. Cash and contributed capital both increase by the same amount.
- **Period 2:** The company raises debt. Cash and debt both increase by the same amount.
- **Period 3:** The company purchases a banana stand and equipment. Cash is reduced by the amount of the purchase and PP&E increases by the amount of the purchase.
- **Period 4:** The company purchases enough inventory for 100 chocolate bananas. Cash is reduced by the amount of inventory purchased and inventory grows by the same amount.
- **Period 5:** The company sells 100 chocolate bananas at a 50% profit. Cash increases by the amount of the sale, and because the inventory (chocolate bananas) have been sold, inventory is reduced to zero. The difference between the sale and cost of inventory (i.e., the profit made on the sale) is recorded under retained earnings.

The Banana Stand

BALANCE SHEET	Period 1	Period 2	Period 3	Period 4	Period 5
Transaction Description	Invest Cash	Raise Debt	Banana Stand	Inventory (100)	Sale (100)
Value	\$ 500	\$ 500	\$ 600	\$ 100	\$ 200
ASSETS					
Current Assets					
Cash	500	1,000	400	300	500
Accounts Receivable	-	-	-	-	-
Inventory	-	-	-	100	-
Total Current Assets	500	1,000	400	400	500
Fixed Assets					
PP&E (No Depreciation for Now)	-	-	600	600	600
TOTAL ASSETS	500	1,000	1,000	1,000	1,100
LIABILITIES					
Current Liabilities					
Accounts Payable	-	-	-	-	-
Notes Payable	-	-	-	-	-
Total Current Liabilities	-	-	-	-	-
Long Term Liabilities					
Debt	-	500	500	500	500
TOTAL LIABILITIES	-	500	500	500	500
EQUITY					
Contributed Capital	500	500	500	500	500
Retained Earnings	-	-	-	-	100
TOTAL EQUITY	500	500	500	500	600
TOTAL LIABILITIES & EQUITY	500	1,000	1,000	1,000	1,100
Check	-	-	-	-	-

Example: Buying a Company

Let's walk through an example where you decide to acquire a business that generates cash flow of \$10 million each year for \$100 million. To do this, you raise \$50 million of equity and \$50 million of debt.

In this example, we will assume that the debt raised must be paid off in five years. To keep things simple, we will keep the business valued at \$100 million over this period and assume that the debt raised is the only liability on the company's balance sheet. Finally, we are going to assume that the company generates precisely the amount of cash required to pay down debt in each period.

So, what does the accounting equation look like as you pay down debt? Starting out, you have assets equal to \$100 million, liabilities equal to \$50 million and stockholders' equity also equal to \$50 million. But notice how stockholders' equity increases as the company pays down debt.

Business Acquisition Example

(figures in millions)

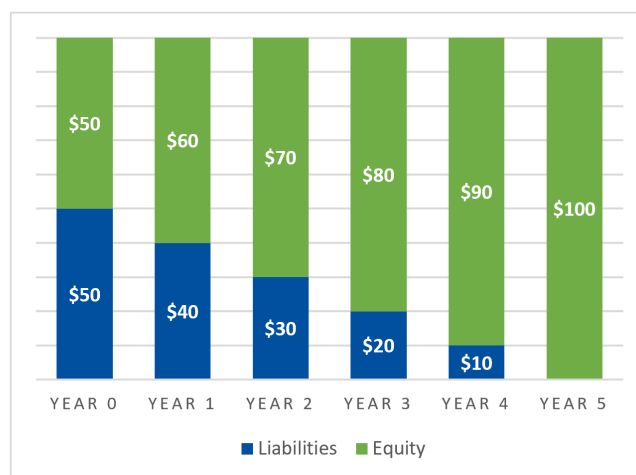
Acquisition	\$	100
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Sources of Funding

Equity	\$	50
Debt	\$	50

Total	\$	100
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Period	Assets	=	Liabilities	+	Equity
Year 0	\$100	=	\$50	+	\$50
Year 1	\$100	=	\$40	+	\$60
Year 2	\$100	=	\$30	+	\$70
Year 3	\$100	=	\$20	+	\$80
Year 4	\$100	=	\$10	+	\$90
Year 5	\$100	=	\$0	+	\$100



At a most basic level, this is how an LBO model works. Recall that stockholders' equity represents ownership interests after all liabilities have been repaid. Which is why, in the final period stockholders' equity is equal to the value of the company's assets.

Three-Statement Model (Please See Video)

At this point we can move on from the accounting equation, but I want revisit this framework in the context of a financial model before concluding the lesson. ***For the time being, don't worry about the model itself or any of the vocabulary you might see in the model. I am going to be referencing the financial statements, but it's not yet important to understand them.*** What I want to demonstrate is that a properly built financial model will automatically reflect the changes required in response to any transaction.

By way of example, let's revisit the \$5 million debt raise. In the image below you will see that the company has a cash balance of \$8.2 million in the third projected period.

BALANCE SHEET	20X1	20X2	20X3	20X4	20X5	20X6	20X7
Current Assets							
Cash	1,273	2,000	3,048	5,529	8,190	11,098	14,329
Accounts Receivable	7,750	8,050	8,640	10,611	11,875	12,842	14,127
Inventory	4,800	5,700	6,095	6,705	7,375	8,113	8,924
Prepaid Expenses	456	1,849	1,849	1,849	1,849	1,849	1,849
Total Current Assets	14,279	18,401	20,641	24,696	29,089	33,902	39,229
Fixed Assets							
PP&E, Net of Accum. Depreciation	10,913	10,932	11,159	11,559	12,099	12,743	13,451
TOTAL ASSETS	25,192	29,333	31,800	36,256	41,188	46,645	52,680

To update the model for an additional \$5 million dollars of debt raised, we need to update the debt schedule. In this example we will increase debt by \$5 million in the third period.

CASH FLOW FROM INVESTING ACTIVITIES							
Capital Expenditures - Purchase of PP&E			(3,500)	(4,000)	(4,500)	(5,000)	(5,500)
Net Cash Used in Investing Activities			(3,500)	(4,000)	(4,500)	(5,000)	(5,500)
CASH FLOW FROM FINANCING ACTIVITIES							
Revolving Credit Facility (Line of Credit)			(1,375)	0	0	0	0
Long Term Debt			0	0	5,000	0	0
Net Cash Provided by (Used in) Fnce Activities			(1,375)	0	5,000	0	0
Net Cash Flow			1,048	2,481	7,503	2,592	2,915
Beginning Cash Balance			2,000	3,048	5,529	13,032	15,624
Ending Cash Balance			3,048	5,529	13,032	15,624	18,539

Supporting Schedules

Company Name

(000s)

DEBT SCHEDULE	20X1	20X2	20X3	20X4	20X5	20X6	20X7
Cash Balance @ Beg of Year (End of Last Year)			2,000	3,048	5,529	13,032	15,624
Plus: Free Cash Flow from Operations and Investing			2,423	2,481	2,503	2,592	2,915
Plus: Free Cash Flow from Financing (BEFORE L.O.C.)			0	0	5,000	0	0
Less: Minimum Cash Balance			2,000	2,000	2,000	2,000	2,000
Total Cash Available or (Required) from L.O.C.			2,423	3,529	11,032	13,624	16,539
Line of Credit	792	1,375	0	0	0	0	0
Debt							
Long Term Debt, Net of Current Maturities	5,000	5,000	5,000	5,000	10,000	10,000	10,000
Current Portion of Long Term Debt	0	0	0	0	0	0	0
Interest Expense							
Interest Rate on Long Term Debt			8.0%	8.0%	8.0%	8.0%	8.0%
Interest Rate on Line of Credit			5.0%	5.0%	5.0%	5.0%	5.0%
Interest Expense on Long Term Debt			400	400	600	800	800
Interest Expense on Line of Credit			34	0	0	0	0

Notice that with this update, \$5 million shows up on your cash flow statement as a cash inflow. But, if you scroll up to cash on your balance sheet, you will notice that cash has increased from \$8.2 million to roughly \$13 million. **Immediately you might be asking yourself why the increase doesn't reflect precisely \$5 million. What's going on?**

BALANCE SHEET	20X1	20X2	20X3	20X4	20X5	20X6	20X7
Current Assets							
Cash	1,273	2,000	3,048	5,529	13,032	15,624	18,539
Accounts Receivable	7,750	8,050	8,640	10,611	11,875	12,842	14,127
Inventory	4,800	5,700	6,095	6,705	7,375	8,113	8,924
Prepaid Expenses	456	1,849	1,849	1,849	1,849	1,849	1,849
Total Current Assets	14,279	18,401	20,641	24,696	33,931	38,428	43,439
Fixed Assets							
PP&E, Net of Accum. Depreciation	10,913	10,932	11,159	11,559	12,099	12,743	13,451
TOTAL ASSETS	25,192	29,333	31,800	36,256	46,030	51,171	56,890

Let's track down the source. On the cash flow statement, we saw a cash inflow of \$5 million, so that shouldn't be the source of the discrepancy. The cash flow statement starts with net income, which pulls from the income statement, so we can explore the income statement next.

We can identify the difference with a clever trick: select the appropriate period and paste the values to the right of the income statement. Next, go back to the debt schedule and reverse the increase (i.e., eliminate the \$5 million of debt we just added to the debt schedule).

Next, scroll back up to the income statement, and we will identify what is different by looking at each line item from top to bottom. Everything looks the same until you get to interest expense, which shows a \$200,000 difference. This flows through to net income, which means that the calculation of cash flow, which starts with net income, is also reduced by \$200,000. This cash calculation links to the balance sheet and explains why the increase in the cash balance doesn't reflect the full \$5 million sum.

	Historical 20X1	Historical 20X2	Projected 20X3	Projected 20X4	Projected 20X5	Projected 20X6	Projected 20X7	Projected 20X5
INCOME STATEMENT								
Revenue	74,452	83,492	91,841	101,025	111,128	122,241	134,465	111,128
Growth (%)	NA	12.1%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Cost of Goods Sold	64,440	72,524	79,634	87,597	96,357	105,992	116,592	96,357
% of Sales	86.6%	86.9%	86.7%	86.7%	86.7%	86.7%	86.7%	86.7%
Gross Profit	10,012	10,968	12,208	13,428	14,771	16,248	17,873	14,771
% of Sales	13.4%	13.1%	13.3%	13.3%	13.3%	13.3%	13.3%	13.3%
Operating Expenses (SG&A)	6,389	6,545	7,540	8,294	9,124	10,036	11,040	9,124
% of Sales	8.6%	7.8%	8.2%	8.2%	8.2%	8.2%	8.2%	8.2%
Operating Income (EBIT)	3,623	4,423	4,667	5,134	5,654	6,212	6,833	5,654
Interest Expense	518	474	434	400	400	400	400	600
Income Tax Expense	1,087	1,382	889	994	1,102	1,221	1,351	1,060
Tax Rate	NM	NM	21.0%	21.0%	21.0%	21.0%	21.0%	21.0%
Net Income	2,018	2,567	3,344	3,740	4,145	4,592	5,082	3,987

More precisely, the \$200,000 difference is due to the additional interest expense due. When you raise additional debt, the associated interest expense consumes cash. Since this model is built in annual periods, a full year of interest expense runs through the income statement, reducing the amount of cash on hand.

Financial Statements

	20X1	20X2	20X3	20X4
INCOME STATEMENT				
Revenue	1,331	1,464	1,611	1,772
Cost of Goods Sold	799	878	966	1,063
Gross Profit	532	586	644	709
Operating Expenses (SG&A)	200	220	242	266
Operating Income (EBIT)	333	366	403	443
Interest Expense	43	38	33	28
Pretax Income	290	329	370	415
Income Tax Expense	102	115	130	145
Net Income	189	214	241	270
BALANCE SHEET				
Cash	478	627	809	1,026
Accounts Receivable	109	129	156	196
Inventory	131	144	159	175
Total Current Assets	718	892	1,100	1,346
Property Plant & Equipment (PP&E)	840	837	827	808
TOTAL ASSETS	1,559	1,729	1,927	2,156
Accounts Payable	66	72	79	87
Current Portion on Long Term Debt	50	50	50	50
Total Current Liabilities	116	122	129	137
Long Term Debt	400	350	300	250
TOTAL LIABILITIES	516	472	429	387
Common Stock	100	100	100	100
Retained Earnings	943	1,157	1,397	1,667
TOTAL EQUITY	1,043	1,257	1,497	1,767
TOTAL LIABILITIES & EQUITY	1,559	1,729	1,927	2,156
Check	0.0	0.0	0.0	0.0
CASH FLOW STATEMENT				
CASH FLOW FROM OPERATING ACTIVITIES				
Net Income		214	241	270
Add Back Non-Cash Items				
Depreciation		73	81	89
Amortization		0	0	0
Changes in Working Capital				
Accounts Receivable		(11)	(12)	(13)
Inventory		(13)	(14)	(16)
Accounts Payable		7	7	8
Net Cash Provided by Operating Activities		269	302	337
CASH FLOW FROM INVESTING ACTIVITIES				
Capital Expenditures - Purchase of PP&E		(70)	(70)	(70)
Net Cash Used in Investing Activities		(70)	(70)	(70)
CASH FLOW FROM FINANCING ACTIVITIES				
Revolving Credit Facility		0	0	0
Long Term Debt (Current Portion)		(50)	(50)	(50)
Net Cash Provided by (Used in) Financing Activities		(50)	(50)	(50)
Net Cash Flow		149	182	217

Supporting Schedules

	20X1	20X2	20X3	20X4
DEBT SCHEDULE				
Cash Balance @ Beg of Year (End of Last Year)		478	627	809
Plus: Free Cash Flow from Operations and Investing		199	232	267
Less: Minimum Cash Balance		0	0	0
Total Cash Available or (Required) for Debt Service		677	859	1,076
Debt				
Current Portion of LT Debt			50	50
Long Term Debt			350	300
Total Cash Surplus			627	809
Line of Credit			0	0
INTEREST EXPENSE				
Interest Rate on Long Term Debt			10%	10%
Interest Rate on Line of Credit			8%	8%
Interest Expense on Long Term Debt			37.5	32.5
Interest Expense on Line of Credit			0	0
Total Interest Expense			38	33
PP&E SCHEDULE				
Beg. PP&E, Net of Accum. Depreciation		840	837	827
Plus: Capital Expenditures		70	70	70
Less: Depreciation		73	81	89
End. PP&E, Net of Accum. Depreciation		837	827	808

This is what I really like about financial models: In a properly built financial model, you can take an abstract concept and visualize it.

Much like the example we just walked through, building financial models will cause you to think through important transactions and how they impact cash. **In my opinion, for an aspiring financial analyst or investor, understanding how cash moves through a company is perhaps the most valuable technical skill you can have.**

Closing Thoughts and Recap

This lesson contained a lot of information, which is going to provide terrific context moving forward. We will be building on the exercises and vocabulary provided throughout the lessons that follow. From this lesson the two biggest takeaways are the accounting equation itself and the fact that the balance sheet is a formal presentation of the accounting equation.