# Lewis & Clark GAMES MODEL

## REFERENCE GUIDE

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**Summary**

L&C Games is a fictitious console games distribution company located in Boston, Massachusetts. The L&C Games Model reflects information pertaining to a period of one year beginning on January 1 and ending on December 31. It is comprised of 17 separate sheets that are linked in order to produce analytical results. The sheets include: Inputs, Balance Sheet, Income Statement, Statement of Retained Earnings, Statement of Cash Flows, Financing Cash In, Financing Cash Out, Investing Cash In, Investing Cash Out, Operating Cash In, Operating Cash Out, Sales, R.E., Eqpt., Labor, CGS, Financial and Other.

This reference guide is designed to explain to the user the flow of information through the model. With this guide, the user should be able to change the underlying assumptions and/or add new information to the model so that the model remains intact and functional and accurately reflects the changes and/or additions the user wants to make.

Please note: the *Reviewing Toolbar* feature of Excel can also be useful for following the flow of information through a large spreadsheet. Using the features of the *Reviewing Toolbar* in conjunction with this guide will help to clarify the inner workings of the model. Please refer to Excel help files and/or manuals for information on how to use the *Reviewing Toolbar.*

### **Assumptions**

As creators of the L&C Games Model, we have made some simplifying assumptions in order to avoid overcomplexity. The assumptions are not always completely realistic, but they simplify the model significantly and have allowed us to complete the project within the time constraints imposed by the term schedule and our other commitments. They are as follows:

1. No inventory will be carried over from month to month; the company sells exactly what it purchases each month.
2. All employee fringe benefits are included in salaries.
3. Employees are hired as needed for one month at a time, and there are no taxes, severance packages, or other costs associated with letting an employee go at the end of a month.
4. The company does not lease nor own any equipment or real estate. It is all rented.
5. Each month, ten percent of net income is paid out as dividends.
6. The purchase price of games includes delivery.
7. The sales price of games includes delivery.
8. Positive cash balances in the company account do not earn any interest.
9. Income tax is calculated each month and losses are not carried forward for the purpose of calculating each month’s income tax expense.

### **Limitations**

Please note that, like many small businesses, our model will have ‘growing pains’ if growth exceeds expectations. In other words, if the total unit sales per month exceeds 20,000 in any given month, the model will crash. A failure of this kind can be rectified simply by adjusting the inputs and/or assumptions so that the total unit sales are less than 20,000 for all months.

**Color Coding**

### The model has been color coded for the user’s convenience.

### The color yellow has been used to denote the inputs. Yellow shaded cells on the Inputs sheet are cells which can be changed by the user. The color blue represents direct alpha-numeric inputs throughout the model. These hard inputs can also be changed. For example, the “PaymentsExpected” array on the Operating Cash In sheet can be changed to allow customers more or less time to pay for goods. The color red highlights array and cell names.

### **Inputs**

This sheet provides the driving mechanisms for the scenarios that L&C Games has decided to pursue. All information on this sheet is plugged in by the user to allow for versatility in exploring different scenarios. The ‘volume factors’ are explained in the User Guide, as is the procedure for adding an additional store chain as a third customer.

**Balance Sheet**

The Balance Sheet is provided in order to illustrate the financial position of the company at the end of each month. It consists of the company’s assets, liabilities, and stockholders’ equity. Under the heading of assets, there are subheadings: current and non-current. Current assets are assets which are convertible to cash within one year or one operating cycle. Non-Current assets are all other assets. Liabilities are subcategorized in a similar manner. Stockholders’ Equity is subcategorized into contributed capital and retained earnings.

### Cash balances are computed by adding the previous month’s cash balance to the bottom line of the Statement of Cash Flows for each month. Accounts Receivable balances are computed by adding the previous month’s AR balance to the current month’s sales and subtracting the current month’s operating cash inflows. Inventory, Land, and Equipment are direct numerical inputs and are set at 0, in accordance with assumptions 1 & 4.

Accounts payable balances are computed by summing the previous month’s balance with all of the current month’s expenses, subtracting all of the current month’s operating cash outflows, and then adding back in the dividend outflow (as it is not an expense). Notes Payable balances are a direct input.

Both Capital Stock and Additional Paid In Capital are direct inputs. Retained Earnings balances are equal to the bottom line of the Statement of Retained Earnings.

Note that, in accordance with the basic accounting equation, the total value of all assets equals the sum of the total value of all liabilities and the total value of stockholders’ equity.

### **Income Statement**

The Income Statement summarizes the revenues and expenses of the business for each month. The bottom line of the Income Statement is Net Income, which flows through to the Statement of Retained Earnings.

The sales line is equal to the bottom line of the Sales sheet. The CGS line is equal to the bottom line of the CGS sheet.

The Labor line is equal to the bottom line of the Labor sheet, the R.E. line is equal to the bottom line of the R.E. sheet, the Eqpt line is equal to the bottom line of the Eqpt sheet, and the Other line is equal to the bottom line of the Other sheet. The Interest line is equal to the bottom line of the Financial Expenses sheet.

The Income Tax Expense line is computed. If the Pre-Tax Income < 0, then the Income Tax Expense will be 0. Otherwise the Income Tax Expense equals the Pre-Tax Income multiplied by the Income Tax Rate which is an input on the Inputs sheet.

The various subtotals (Gross Margin, Operating Income, and Pre-Tax Income) and the bottom line (Net Income) are computed in accordance with the multi-step form of the income statement, as defined by the GAAP. Net Income flows through to the Statement of Retained Earnings.

The Income Tax Expense line is computed. If the Pre-Tax Income < 0, then the Income Tax Expense will be 0. Otherwise the Income Tax Expense equals the Pre-Tax Income multiplied by the Income Tax Rate which is an input on the Inputs sheet.

### **Statement of Retained Earnings**

The Statement of Retained Earnings shows, for each month, the beginning balance of retained earnings, the net income for the month, the dividends paid out each month, and the ending balance of retained earnings.

Net income, of course, is equal to the bottom line of the Income Statement sheet. The dividend payed out to shareholders each month is equal to 10% of Net Income each month. The ending balance of retained earnings equals the beginning balance plus net income minus dividends. The ending balance each month flows through to the retained earnings line on the Balance Sheet and also to the beginning balance of retained earnings for the subsequent month.

### **Statement of Cash Flows**

The Statement of Cash Flows is most important to potential investors. It summarizes the cash inflows and outflows for each month and categorizes them into three types flows: financing, investing, and operating.

The Financing Cash Inflows line equals the bottom line of the Financing Cash In sheet, the Financing Cash Outflows line equals the bottom line of the Financing Cash Out sheet, and so on.

### **Financing Cash In**

The Financing Cash In sheet shows the details of all cash inflows from financing activities, including both equity and debt events. These flows are direct inputs and, accordingly, are colored blue. New financing cash in events can be entered directly into the “FinancingCashInEvents” array on the blank lines. The events are summed to produce the “MonthlyFinancingCashIn” array which flows through to the Statement of Cash Flows.

### **Financing Cash Out**

The Financing Cash Out sheet shows the details of all cash outflows from financing activities, including both equity and debt events. These flows are direct inputs and, accordingly, are colored blue. New financing cash out events can be entered directly into the “FinancingCashOutEvents” array on the blank lines. The events are summed to produce the “MonthlyFinancingCashOut” array which flows through to the Statement of Cash Flows.

### **Investing Cash In**

The Investing Cash In sheet shows the details of all cash inflows from investing activities. These flows are direct inputs and, accordingly, are colored blue. New investing cash in events can be entered directly into the “InvestingCashInEvents” array on the blank lines. The events are summed to produce the “MonthlyInvestingCashIn” array which flows through to the Statement of Cash Flows.

**Investing Cash Out**

The Investing Cash Out sheet shows the details of all cash outflows from investing activities. These flows are direct inputs and, accordingly, are colored blue. New investing cash out events can be entered directly into the “InvestingCashOutEvents” array on the blank lines. The events are summed to produce the “MonthlyInvestingCashOut” array which flows through to the Statement of Cash Flows.

### **Operating Cash In**

The net effect of this sheet is to convert sales to cash inflows, based on assumptions about how fast the company’s customers pay their bills.

The “PaymentsExpected” array shows the percentage of the total dollar amount of invoices which are payed by each chain by number of months from mailing of invoices. The invoices are categorized by size. The array contains direct inputs and is colored blue accordingly.

The “InvoicesMailed” array shows the total dollar amount of invoices sent to each chain during each month. The invoices are categorized by size to correspond with the sizes in the “PaymentsExpected” array. These numbers come from the “SalesPerChain” array on the Sales sheet.

The “PaymentSchedule” array is the result of convolving the “PaymentsExpected” array with the “InvoicesMailed” array. Each column of the “PaymentSchedule” array is then summed to produce the “MonthlyOperatingCashIn” array which is the bottom line of this sheet and flows through to the Statement of Cash Flows.

### **Operating Cash Out**

The net effect of this sheet is to convert expenses to cash outflows, based on assumptions about how fast the company pays its bills.

The “ExpensesPaid” array shows the percentage of the total dollar amount of invoices which are paid by L&C Games by expense category and by number of months from mailing of invoices. The array contains direct inputs and is colored blue accordingly.

The “InvoicesReceived” array shows the total dollar amount of invoices received by L&C Games each month. The invoices are categorized to correspond with the categories in the “ExpensesPaid” array. The operating, financial, and income tax expense lines come from their respective lines on the Income Statement. The Cost of Goods Sold lines come from the CGS sheet.

The “DividendSchedule” is equal to the Dividends Paid line on the Statement of Retained Earnings. It is used in the computation of the “MonthlyOperatingCashOut” array on this sheet and also on the Balance Sheet in the calculation of Accounts Payable.

The “ExpenseSchedule” array is the result of convolving the “ExpensesPaid” array with the “InvoicesReceived” array. Each column of the “ExpenseSchedule” array is then summed and added to the corresponding column of the “DividendSchedule” array to produce the “MonthlyOperatingCashOut” array which is the bottom line of this sheet and flows through to the Statement of Cash Flows.

### **Sales**

The Sales sheet calculates the total dollar value of all sales that L&C Games makes in a month. The bottom line of the Sales sheet is an array called “MonthlySales” which flows through to the Balance Sheet, the Other sheet, and the Income Statement.

“UnitSalesPerStore” is an array which contains direct inputs estimating the number of games sold per store per month to each of the company’s customers. These are color coded blue and can be changed by the user to reflect different assumptions about monthly unit sales.

“UnitSalesPerChain” is an array which is calculated by multiplying the “UnitSalesPerStore” array by the “NumberOfStores” array. The “NumberOfStores” array is defined on the Inputs sheet and contains values which represent the number of stores of each chain to which L&C sells.

The “UnitsSold” array totals each column of the “UnitSalesPerChain” array, producing an array which contains the total units sold per month.

The “SalesPrice” array is an array which contains the sales price per game for games sold to each chain. It is calculated by dividing the “BaseSalesPrice” by (1+ (the “UnitSalesPerChain” times the “SalesVolumeFactor”)). This formula produces a result which gives customers better prices in months in which they order more games. The “SalesVolumeFactor” and the “BaseSalesPrice” are defined on the Inputs sheet.

The “SalesPerChain” array contains the total dollar value of game orders for each chain. These values are computed by multiplying the “UnitSalesPerChain” array by the “SalesPrice” array.

Finally, the “MonthlySales” array is computed by summing each column of the “SalesPerChain” array.

### **Real Estate (R.E.)**

This sheet shows the real estate rental expenses incurred by the business. The “MonthlySpaceExpense” array is the bottom line of this sheet. It shows the total real estate rental expenses (in dollars) incurred by the business each month and flows through to the Income Statement sheet.

The “SpaceRates” array holds the monthly rental rates for different types of property used by the business. The values are direct inputs and extra lines have been included to simplify the addition of other types of space. To add an additional kind of property, simply type the description of the property type in the first blank cell under ‘Type’ and type in the new rate in the corresponding cell under ‘Dollars Per Type Per Month”.

The “SpaceNeeded” array defines how much of each type of space will be needed per month, depending on the sales volume in that month. The formula used to do this is based on the “EmployeesNeeded” array on the labor sheet, which consists of direct inputs. Warehouse space is related to the number of warehouse workers. Office space is related to the number of office workers. This array must also be updated when a new type of space is added.

The “SpaceSchedule” array computes how much of each type of space is needed in each month, based on the “UnitsPurchased” and the “SpaceNeeded” arrays. Note that additional warehouse space is needed in months 6, 11, and 12 due to increased sales during those months.

The “SpaceExpenseSchedule” contains values representing the dollar amount of rental expense incurred each month. It is computed by multiplying the “SpaceSchedule” array by the “SpaceRates” array.

The “MonthlySpaceExpense” array contains the sum of each column of the “SpaceExpenseSchedule”.

### **Equipment (Eqpt.)**

The flow of information through the Equipment sheet is similar to the R.E. sheet, except for the calculations used to produce the “EqptNeeded” array.

The “EqptNeeded” array is based on the “EmployeesNeeded” array on the Labor sheet. The number of delivery trucks needed in a given month is the sum of the number of truck drivers (both full and part-time). The number of forklifts needed is the sum of the number of warehouse workers (both full and part time). The number of computers needed is the sum of the number of office workers needed (accountants, secretaries, and managers).

Like the R.E. sheet, three changes must be made to accommodate a new type of equipment. First the name of the item must be entered under ‘Item’ in the “EqptRates” table. Second, the monthly rental rate must be entered under ‘Dollars Per Item Per Month’. Third, the “EqptNeeded” array must be updated to accommodate the new type of equipment.

Like the R.E. sheet, the Eqpt sheet produces a bottom line, in the form of an array called “MonthlyEqptExpense”. This array flows through to the Income Statement.

### **Labor**

The flow of information through the Labor sheet is similar to the R.E. sheet, except for the “EmployeesNeeded” array. In this instance, the “EmployeesNeeded” array contains values that are direct inputs; it is not calculated. Like the R.E. sheet and the Eqpt sheet, the bottom line of the labor sheet is the “MonthlyLaborExpense” array, which flows through to the Income Statement.

### **Cost of Goods Sold (CGS)**

Consistent with assumption 1, the “UnitsPurchased” array is directly equal to the “UnitsSold” array on the Sales sheet. The result is that the company purchases exactly the number of games that it will sell in any given month. The “UnitsPurchased” array flows through to the R.E. sheet, the Labor sheet, the Eqpt sheet, and the Other sheet. It is also used to produce the “PurchasePrice” and the “MonthlyCGSExpense” on the CGS sheet.

The “PurchasePrice” array contains the unit cost of games and is calculated using the “BasePurchasePrice” from the Inputs sheet, the “PurchaseVolumeFactor” from the Inputs sheet, and the “UnitsPurchased” array on the CGS sheet. The formula used is comparable to the formula used for the “SalesPrice” array on the Sales sheet.

The “MonthlyCGSExpense” array contains the total dollar cost of video games each month. It is computed by multiplying the “UnitsPurchased” array by the “PurchasePrice” array, and it flows through to the OperatingCashOut sheet and the IncomeStatement sheet.

### **Financial**

This sheet produces a bottom line array called “MonthlyFinancialExpense” which contains the total dollar value of financial expenses each month.

The “FinancialRates” array contains the monthly rate for each item of financial expense. As the model is currently set up, the only financial expense is interest on the $20,000 loan. These values are direct inputs. A new financial expense can be added here by entering the description of the item under ‘Item’ and the monthly rate under ‘Dollars Per Item Per Month’. Note that the Financing Cash In and Financing Cash Out statements may also need to be changed to reflect a new financing event. For example, if a new loan is taken out, the interest payments on the loan are accounted for on the Financial sheet, as described above. The principal of the loan is accounted for on the FinanciangCashIn and FinancingCashOut sheets.

The “FinancialExpenseSchedule” array contains the month by month schedule of financial expenses and is based entirely on the “FinancialRates” array.

The “MonthlyFinancialExpense” array contains the sum of each column of the “FinancialExpenseSchedule” array. It flows through to the Income Statement sheet.

### **Other**

The Other sheet handles various other kinds of expenses. It flows very much like the R.E. sheet, but the calculations used to create the “OtherNeeded” array are different.

The Office Supplies line of the “OtherNeeded” array is computed using a formula that is based on the number of office workers including secretaries, accountants, and managers. The Eqpt Fuel line of the “OtherNeeded” array is computed using a formula which is based on the number of truck drivers working, including both full and part time. The Insurance line is computed based on sales volume. The Repairs line is computed using a formula based on the number of truck drivers. The Telephone line is a direct input.

### **Convolve Module**

The Convolve Module is a macro that was provided to our team by the class instructor in order to simplify large and complicated calculations of arrays.