**Problem-Based Learning Activities**

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Prepared for: Kentucky High School Educators

Accounting Workshop

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**PBL Activity #1: Learning the Accounting Equation, Balance Sheet, Income Statement and Statement of Cash Flows**

1. Explain that this activity involves opening a new business on April 1st. The business is mowing lawns. We are starting from scratch and have no money. Have students discuss in groups and write down what events will take place. Prompt them with these questions:
	1. How can we get money?
	2. What do we need to get started?
	3. What happens in the business on a daily basis?

In order to arrive at these answers: Also have them # the answers below

* 1. Get a loan from the bank
	2. Purchase a lawn mower, gasoline, oil, etc.
	3. Pay for advertising to attract customers
	4. Mow lawns and collect fees
	5. Use some of our supplies of gas, oil, etc.
	6. May also have to pay for some necessary repairs

Have students # their answers to agree with the answers above.

1. Now explain that after a month we decide to expand the business. We need more money to do this so we go back to the bank to get a larger loan.
	1. What will the bank likely want to know before they will lend us more money? (Prompt students to arrive at these answers)
		1. What did you do with the cash from the first loan?
		2. What did you currently own and currently owe?
		3. Is your business profitable so far?
2. Provide instruction on the accounting equation and its elements.
3. Have students go back through the events above and identify which elements of the accounting equation are involved.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | **Assets** | **=** | **Liabilities** | **+** | **Contributed Capital** | **+** | **Revenue** | **-** | **Expenses** | **-** | **Dividends** |
| 1 | **X** |  | **X** |  |  |  |  |  |  |  |  |
| 2 | **X** |  |  |  |  |  |  |  |  |  |  |
| 3 | **X** |  |  |  |  |  |  |  | **X** |  |  |
| 4 | **X** |  |  |  |  |  | **X** |  |  |  |  |
| 5 | **X** |  |  |  |  |  |  |  | **X** |  |  |
| 6 | **X** |  |  |  |  |  |  |  | **X** |  |  |

1. Assume the following:
	1. We initially borrowed $1,000 from the bank
	2. The lawn mower cost $500
	3. Our supplies cost $300
	4. The advertising cost $100
	5. We mowed 15 lawns for a fee of $25 per lawn
	6. We used ½ of our supplies during April.
	7. We had to repair the lawn mower once and that cost $75
2. Have students record these events and amounts using the accounting equation.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|   | **Assets** | **=** | **Liabilities** | **+** | **Contributed Capital** | **+** | **Revenue** | **-** | **Expenses** | **-** | **Dividends** |
| 1 |  **1,000**  |  |  **1,000**  |  |  |  |  |  |  |  |  |
| 2 |  **500**  |  |  |  |  |  |  |  |  |  |  |
|  |  **300**  |  |  |  |  |  |  |  |  |  |  |
|   |  **-800**  |  |  |  |  |  |  |  |  |  |  |
| 3 |  **-100**  |  |  |  |  |  |  |  |  **100**  |  |  |
| 4 |  **375**  |  |  |  |  |  |  **375**  |  |  |  |  |
| 5 |  **-150**  |  |  |  |  |  |  |  |  **150**  |  |  |
| 6 |  **-75**  |  |  |  |  |  |  |  |  **75**  |  |  |
| **TOTALS** |  **1,050**  |  |  **1,000**  |  |  |  |  **375**  |  |  **325**  |  |  |

1. Provide instruction on the Balance Sheet (what we own and owe), Income Statement (profitability to date), and Statement of Cash Flows (what we did with the cash from the first loan)
2. Have students prepare each of these statements.

|  |
| --- |
| Awesome Lawn Service Company |
| Income Statement |
| For the month of April, 20xx |
|  |  |  |  |
| **Revenues:** |  |  |  |
|  | Fees from mowing lawns |  |  $ 375  |
|  |  |  |  |
| **Expenses:** |  |  |  |
|  | Advertising |  $ 100  |  |
|  | Supplies |  150  |  |
|  | Repairs |  75  |  |
|  | **Total Expenses** |  |  $ 325  |
|  |  |  |  |
| **Net Income** |  |  |  $ 50  |

|  |  |
| --- | --- |
| Awesome Lawn Service Company |  |
| Balance Sheet |  |
| As Of April 30, 20xx |  |
| **Assets:** |  |  |  |  |
|  | Cash |  $ 400  |  |  |
|  | Supplies |  150  |  |  |
|  | Lawn Mower |  500  |  |  |
| **TOTAL ASSETS** |  |  |  |  $ 1,050  |
|  |  |  |  |  |
| **Liabilities:** |  |  |  |  |
|  | Bank Loan |  $ 1,000  |  |  |
| **Total Liabilities** |  |  |  $ 1,000  |  |
| **Owners' Equity:** |  |  |  |  |
|  | Contributed Capital |  -  |  |  |
|  | Retained Earnings |  50  |  |  |
| **Total Owners' Equity** |  |  | 50 |  |
| **LIABILITIES AND OWNERS' EQUITY** |  |  |  |  $ 1,050  |

|  |
| --- |
| Awesome Lawn Service Company |
| Statement of Cash Flows |
| For the month of April, 20xx |
|  |  |  |  |  |
| **Cash from Operating Activities:** |  |  |  |
|  | Fees from mowing lawns |  | $375 |  |
|  | Advertising Paid |  | -100 |  |
|  | Repairs Paid |  | -75 |  |
|  | Total |  |  | $200 |
|  |  |  |  |  |
| **Cash from Investing Activities:** |  |  |  |
|  | Paid for lawn mower |  | -$500 |  |
|  | Paid for supplies |  | -300 |  |
|  | Total |  |  | -$800 |
|  |  |  |  |  |
| **Cash from Financing Activities:** |  |  |  |
|  | Borrowed from the bank |  |  | $1,000 |
|  |  |  |  |  |
| **Total from all activities** |  |  | $400 |
| Add: Beginning Cash Balance |  |  | 0 |
| **Ending Cash Balance** |  |  | $400 |

**PBL Activity #2: Understanding Inventory Costing Methods**

* Consider the following events and move your M&Ms as appropriate (place them in a **purchased** pile or a **sold** pile)
1. Purchase 10 orange
2. Purchase 8 red
3. Purchase 7 yellow
4. Sell 3 orange
5. Sell 6 red
6. Purchase 10 green
7. Purchase 15 red
8. Purchase 12 yellow
9. Sell 15 yellow
10. Sell 5 green
11. Purchase 9 orange
12. Sell 5 red
13. Purchase 6 green
14. Sell 8 orange
15. Purchase 5 yellow
* Assume your costs to purchase the items are as follows:
	+ Red = $1.00
	+ Orange = $1.50
	+ Yellow = $1.75
	+ Green = $2.00

**PART A:**

Calculate how much inventory (# of items and the total $ amount) there is left.

Calculate how much inventory (# of items and the total $ amount) was sold.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Part A:** |  |  |  |  |  |  |  |
|  | **Inventory Left** |  | **Inventory Sold** |
|  |  |  | **Total** |  |  |  | **Total** |
|  | **#** | **Cost** | **(# x Cost)** |  | **#** | **Cost** | **(# x Cost)** |
| **Red** | 12 | 1.00 |  $ 12.00  |  | 11 | 1.00 |  $ 11.00  |
| **Orange** | 8 | 1.50 |  $ 12.00  |  | 11 | 1.50 |  $ 16.50  |
| **Yellow**  | 9 | 1.75 |  $ 15.75  |  | 15 | 1.75 |  $ 26.25  |
| **Green** | 11 | 2.00 |  $ 22.00  |  | 5 | 2.00 |  $ 10.00  |
| **TOTALS** | 40 |   |  **$ 61.75**  |  | **42** |  |  **$ 63.75**  |

**PART B:** Now, assume new inventory purchases are placed on the shelves **behind** any existing items and when customers buy the items they MUST take the inventory in the front, *regardless of color* (go back to the beginning and everywhere it says “sell”, mark out the color).

Calculate how much inventory (# of items and the total $ amount) there is left.

Calculate how much inventory (# of items and the total $ amount) was sold.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Part B:** |  |  |  |  |  |  |  |
|  | **Inventory Left** |  | **Inventory Sold** |
|  |  |  | **Total** |  |  |  | **Total** |
|  | **#** | **Cost** | **(# x Cost)** |  | **#** | **Cost** | **(# x Cost)** |
| **Red** | 8 | 1.00 |  $ 8.00  |  | 15 | 1.00 |  $ 15.00  |
| **Orange** | 9 | 1.50 |  $ 13.50  |  | 10 | 1.50 |  $ 15.00  |
| **Yellow**  | 17 | 1.75 |  $ 29.75  |  | 7 | 1.75 |  $ 12.25  |
| **Green** | 6 | 2.00 |  $ 12.00  |  | 10 | 2.00 |  $ 20.00  |
| **TOTALS** | 40 |   |  **$ 63.25**  |  | **42** |  |  **$ 62.25**  |

**PART C:** Assume new inventory purchases are placed **in front of older items** on the shelves and when customers buy the items they MUST take the inventory from the front, *regardless of the color*.

Calculate how much inventory (# of items and the total $ amount) there is left.

Calculate how much inventory (# of items and the total $ amount) was sold.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Part C:** |  |  |  |  |  |  |  |
|  | **Inventory Left** |  | **Inventory Sold** |
|  |  |  | **Total** |  |  |  | **Total** |
|  | **#** | **Cost** | **(# x Cost)** |  | **#** | **Cost** | **(# x Cost)** |
| **Red** | 13 | 1.00 |  $ 13.00  |  | 10 | 1.00 |  $ 10.00  |
| **Orange** | 12 | 1.50 |  $ 18.00  |  | 7 | 1.50 |  $ 10.50  |
| **Yellow**  | 5 | 1.75 |  $ 8.75  |  | 19 | 1.75 |  $ 33.25  |
| **Green** | 10 | 2.00 |  $ 20.00  |  | 6 | 2.00 |  $ 12.00  |
| **TOTALS** | 40 |   |  **$ 59.75**  |  | **42** |  |  **$ 65.75**  |

Now teach the concepts of specific identification, FIFO and LIFO inventory costing methods. Point out to students the # of items sold and left in inventory is the same no matter what method was used, but the $ amounts will differ.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **PART B PROOF:** |  |  |  |  |  |
| **FIFO EI** |  | **FIFO COGS** |
|  |  | **Total** |  |  |  | **Total** |
| **#** | **Cost** | **(# x Cost)** |  | **#** | **Cost** | **(# x Cost)** |
| 5 | 1.75 |  $ 8.75  |  | 10 | 1.50 |  $ 15.00  |
| 6 | 2.00 |  $ 12.00  |  | 8 | 1.00 |  $ 8.00  |
| 9 | 1.50 |  $ 13.50  |  | 7 | 1.75 |  $ 12.25  |
| 12 | 1.75 |  $ 21.00  |  | 10 | 2.00 |  $ 20.00  |
| 8 | 1.00 |  $ 8.00  |  | 7 | 1.00 |  $ 7.00  |
| 40 |   |  $ 63.25  |  | 42 |   |  $ 62.25  |
| **PART C PROOF:** |  |  |  |  |  |  |  |
| **Trans. #** | **# Sold** | **Price** | **Total** |  | **LIFO ENDING INVENTORY** |  |
| 1 |  |  |  |  | 10 | 1.50 |  $ 15.00  |  |
| 2 |  |  |  |  | 8 | 1.00 |  $ 8.00  |  |
| 3 |  |  |  |  | 7 | 1.75 |  $ 12.25  |  |
| 4 | 3 | 1.75 |  $ 5.25  |  | 10 | 1.50 |  $ 15.00  |  |
|  |  |  |  |  | 8 | 1.00 |  $ 8.00  |  |
|  |  |  |  |  | 4 | 1.75 |  $ 7.00  |  |
| 5 | 4 | 1.75 |  $ 7.00  |  | 10 | 1.50 |  $ 15.00  |  |
|  | 2 | 1.00 |  $ 2.00  |  | 6 | 1.00 |  $ 6.00  |  |
| 6 |  |  |  |  | 10 | 2.00 |  $ 20.00  |  |
| 7 |  |  |  |  | 15 | 1.00 |  $ 15.00  |  |
| 8 |  |  |  |  | 12 | 1.75 |  $ 21.00  |  |
| 9 | 12 | 1.75 |  $ 21.00  |  | 10 | 1.50 |  $ 15.00  |  |
|  | 3 | 1.00 |  $ 3.00  |  | 6 | 1.00 |  $ 6.00  |  |
|  |  |  |  |  | 10 | 2.00 |  $ 20.00  |  |
|  |  |  |  |  | 12 | 1.00 |  $ 12.00  |  |
| 10 | 5 | 1.00 |  $ 5.00  |  | 10 | 1.50 |  $ 15.00  |  |
|  |  |  |  |  | 6 | 1.00 |  $ 6.00  |  |
|  |  |  |  |  | 10 | 2.00 |  $ 20.00  |  |
|  |  |  |  |  | 7 | 1.00 |  $ 7.00  |  |
| 11 |  |  |  |  | 9 | 1.50 |  $ 13.50  |  |
| 12 | 5 | 1.50 |  $ 7.50  |  | 10 | 1.50 |  $ 15.00  |  |
|  |  |  |  |  | 6 | 1.00 |  $ 6.00  |  |
|  |  |  |  |  | 10 | 2.00 |  $ 20.00  |  |
|  |  |  |  |  | 7 | 1.00 |  $ 7.00  |  |
|  |  |  |  |  | 4 | 1.50 |  $ 6.00  |  |
| 13 |  |  |  |  | 6 | 2.00 |  $ 12.00  |  |
| 14 | 6 | 2.00 |  $ 12.00  |  | 10 | 1.50 |  $ 15.00  |  |
|  | 2 | 1.50 |  $ 3.00  |  | 6 | 1.00 |  $ 6.00  |  |
|  |  |  |  |  | 10 | 2.00 |  $ 20.00  |  |
|  |  |  |  |  | 7 | 1.00 |  $ 7.00  |  |
|  |  |  |  |  | 2 | 1.50 |  $ 3.00  |  |
| 15 |  |  |   |  | 5 | 1.75 |  $ 8.75  |  **$ 59.75**  |
|  |  |  |  **$ 65.75**  |  |  |  |  |  |

**PBL Activity #3: Understanding Depreciation Methods**

Assume a company buys an asset that is expected to last 5 years.

Use your 100 M&Ms to show how much of the asset is used up in each of the 5 years if:

1. It is used up evenly
	* 20
2. It is used up ½ in the first year, ¼ in the second year, 1/8 in the third year, 1/16 in the fourth year
	* 50, 25, 13, 7, 4
3. It will be used up based on how much it is *actually* used to produce inventory. It will produce 120 units over its life. Units produced are as follows:
	* Year 1 = 15
	* Year 2 = 25
	* Year 3 = 20
	* Year 4 = 40
	* Year 5 = 20

Assume this asset cost $225,000 and complete the tables below for each of the 3 scenarios above.

1.

|  |  |  |  |
| --- | --- | --- | --- |
| **Year** | $ Amount Used Up **This Year** | Total $ Amount Used Up for **All Years to Date** | $ Amount **Left to be Used in Future Years** |
| **1** |  $ 45,000  |  $ 45,000  |  $ 180,000  |
| **2** |  $ 45,000  |  $ 90,000  |  $ 135,000  |
| **3** |  $ 45,000  |  $ 135,000  |  $ 90,000  |
| **4** |  $ 45,000  |  $ 180,000  |  $ 45,000  |
| **5** |  $ 45,000  |  $ 225,000  |  $ -  |

2.

|  |  |  |  |
| --- | --- | --- | --- |
| **Year** | $ Amount Used Up **This Year** | Total $ Amount Used Up for **All Years to Date** | $ Amount **Left to be Used in Future Years** |
| **1** |  $ 112,500  |  $ 112,500  |  $ 112,500  |
| **2** |  $ 56,250  |  $ 168,750  |  $ 56,250  |
| **3** |  $ 28,125  |  $ 196,875  |  $ 28,125  |
| **4** |  $ 14,063  |  $ 210,938  |  $ 14,063  |
| **5** |  $ 7,031  |  $ 217,969  |  $ 7,031  |

3.

|  |  |  |  |
| --- | --- | --- | --- |
| **Year** | $ Amount Used Up **This Year** | Total $ Amount Used Up for **All Years to Date** | $ Amount **Left to be Used in Future Years** |
| **1** |  $ 28,125  |  $ 28,125  |  $ 196,875  |
| **2** |  $ 46,875  |  $ 75,000  |  $ 150,000  |
| **3** |  $ 37,500  |  $ 112,500  |  $ 112,500  |
| **4** |  $ 75,000  |  $ 187,500  |  $ 37,500  |
| **5** |  $ 37,500  |  $ 225,000  |  $ -  |

Now teach the concepts of depreciation, accumulated depreciation and book value.

**PBL Activity #4: Time Value of Money**

1. Your favorite aunt gives you $100 for your birthday. You put it in a bank account that earns 5% interest annually.

Use the chart below to determine how much money you will have at the end of 5 years. Round your calculations to 2 decimal points.

|  |  |  |  |
| --- | --- | --- | --- |
|   | **Amount Invested** | **Annual Interest Earned** | **End of Year Balance** |
| **Beginning of Year 1** | 100.00 | 5.00 | 105.00 |
| **Beginning of Year 2** | 0.00 | 5.25 | 110.25 |
| **Beginning of Year 3** | 0.00 | 5.51 | 115.76 |
| **Beginning of Year 4** | 0.00 | 5.79 | 121.55 |
| **Beginning of Year 5** | 0.00 | 6.08 | 127.63 |

1. Now assume your favorite aunt gives you $100 on your birthday every year, for five years. Each year you deposit the new money into the same bank account that earns 5% interest annually.

Use the chart below to determine how much money you will have at the end of 5 years. Round your calculations to 2 decimal points.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Amount Invested** | **New Beginning Year Balance (see \* below)** | **Annual Interest Earned** | **End of Year Balance** |
| **Beginning of Year 1** | $100  | $100  | $5.00  | $105  |
| **Beginning of Year 2** | $100  | $205  | $10.25  | $215  |
| **Beginning of Year 3** | $100  | $315  | $15.76  | $331  |
| **Beginning of Year 4** | $100  | $431  | $21.55  | $453  |
| **Beginning of Year 5** | $100  | $553  | $27.63  | $580  |
|  |  |  |  |  |
|  |  |  |  |  |
| \*Last year's ending balance + amount invested at beginning of current year |

* Now teach the future value concept for lump sum investments and annuities.
	+ Show the calculations using FV tables and that your answers agree with the extended calculations above.
* Also demonstrate (through reversal) the present value concept for lump sum investments. Show the calculation using the PV table.