

Cost/Benefit Analysis

Lesson Plan

Objective

Introduce methodologies for determining if a course of action is worth taking; determine the value of items and actions and define opinions regarding subjective issues.

Students will be able to:

- CCRA.L.6 – Acquire and use accurately a range of general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when encountering an unknown term important to comprehension or expression.
- HSA-CED.A – Create equations that describe numbers or relationships.
- HSA-SSE.B – Write expressions in equivalent forms to solve problems.
- HSN-Q.A – Reason quantitatively and use units to solve problems.
- HSS-MD.A – Calculate expected values and use them to solve problems.

Teaching Materials

- Student document/handout
- Computer for each student/single computer projected on a screen
- Mortgage loan calculator (from the web – BankRate.com)
- Calculator

Lesson Activity

1. Start a discussion to determine pre-existing knowledge and opinions.
 - Ask students: When you are shopping, how do you determine if an item is worth the price?
2. Introduce the student document/handout.
 - Ask students to read up to the first discussion point.
 - Ask: Would you buy the steak for \$15.45? Why or why not?
 - Allow students to express their thoughts and draw attention to the subjective differences in their opinions and how they allocate value.
3. Tell students to continue reading up to second discussion point.

- Ask: Is saving \$1.00 per 12-pack good enough reason to make a special trip into the drugstore?
 - Although some students may say they would not buy four 12-packs, tell them to think about the problem hypothetically.
 - Point out that a single 12-pack at the grocery store would be more expensive than one at the drugstore.
 - Note that this increases the savings for purchasing *x-amount* of 12-packs at the drugstore.
4. Tell students to continue reading up to the third discussion point.
 5. Before moving forward, stop and be sure the students understand all four steps defined in Cost/Benefit Analysis (CBA) procedure.
 6. Engage students to discuss the question: Would a much smaller savings prompt you to change your mind about a special trip into the drugstore? Explain your reasoning.
 7. Ask students to read up to the fourth discussion point.
 - Question: How might you place a monetary value on a human life?
 8. Tell students to continue reading up to the fifth discussion point.
 9. Discuss opportunity costs.
 - Ask students if they would prefer to dine out or go to the movies.
 - Ask for other examples of choices that create opportunity costs in their lives.
 - Be sure they understand that the **cost** of choosing one option is the **benefit** of the choice not made.
 10. Inform students to read up to the sixth discussion point.
 - Ask: How do you feel about the choice between the traffic light or the park upgrade?
 - There may very well be differing subjective views in this discussion. Again, draw attention to the variety of opinions.
 11. Discuss Future Value/Future Value Formula
 - Ask for a volunteer to complete the example given on the board.
 - Be sure each student can use a calculator properly to verify the result.
 12. Present students with the following information to practice the strategy:
 - Calculate future value of \$2,700 invested at 2.5% for 10 years.

- Remind students to use Future Value Formula (found in their lesson document, Discussion #6).
- After students work through the problem, read the answer aloud: **\$3,456.23**

13. Introduce the CBA activity and tell students to read up to the seventh discussion point.

- Students may require an explanation of an escrow account.
- Define escrow account for students.
 - Escrow account: separate money collected for paying taxes and insurance.
 - An escrow payment is paid in addition to principal and interest.
 - This additional payment can greatly increase a monthly payment amount but is not part of the mortgage itself.
- Prior to asking the following questions, students may require clarification of the **Amortization Table**.
 - Ask: If I borrowed \$1,000 at 5% interest, how much interest would I owe?
 - **Answer: \$50**
 - Ask: If I borrowed \$800 at 5% interest, how much interest would I owe?
 - **Answer: \$40**
 - Ask: If I borrowed \$300 at 5% interest, how much interest would I owe?
 - **Answer: \$15**
- Remind students that because the interest rate is constant (at 5%), the less money an individual owes, the less interest he/she pays.
- Inform students that every month part of the mortgage payment reduces the amount the borrower owes; so, next month, he/she will not owe as much interest either.
- Explain to the students that every month's payment represents a different amount of interest and amount applied to pay off the loan, thus providing the reason why each payment is in a table.

14. Instruct students to begin the exercise by using the mortgage loan calculator and their hand-held calculators to determine the values in the blank ovals (use the BankRate.com mortgage loan calculator: <http://www.bankrate.com/calculators/mortgages/mortgage-calculator.aspx?MSA=8960&MSA=8960&MSA=8960&MSA=8960&MSA=8960&MSA=8960>).

15. The following table shows the answers to the fill-in questions on the student document/handout:

What is the Conleys' current monthly mortgage payment?	\$1,555.58
If the Conleys keep their existing mortgage, how much total interest will they end up paying after 30 years?	\$360,008.61
It has been exactly 10 years since the mortgage was taken out (120 months). How much do the Conleys still owe on their loan?	\$177,628.08
How much interest have they paid so far over the 10 years?	\$164,297.62
How much interest is yet to be paid if they keep this existing loan?	\$195,710.99
Loan origination fee 1.5% of loan amount	\$2,664.42
Points 2 points	\$3,552.56
Total cost of the refinance	\$8,816.98
How much do the Conleys owe on their existing loan? (You answered this question earlier. This will be the new loan amount.)	\$177,628.08
What will be the Conleys' new monthly mortgage payment?	\$926.59
If the Conleys keep their new mortgage, how much total interest will they end up paying after 30 years?	\$155,945.09
What is the Conleys' current monthly mortgage payment?	\$1,555.58
What will be the Conleys' new monthly mortgage payment?	\$926.59
Subtract the new monthly mortgage from the current monthly mortgage. (If positive, this will be the Conleys' monthly savings.)	\$628.99
How many months of savings will it take before the Conleys recover the cost of refinancing the loan? (This is the break-even period.)	14 months

This is the amount of interest they will save over the long term. Is it substantial?	\$39,765.90
Please calculate the future value of investing the Total Costs figure from the table above in a safe investment yielding 2.5% interest for 30 years.	\$18,494.21

16. Ask students to discuss life situations they correlate to the Cost/Benefit Analysis methodology.

17. Conclusions:

- Following a particular course of action can sometimes simply feel right.
- Subjective opinions can be difficult to quantify; therefore, this makes it difficult to prove that feeling like the right thing to do *is* the right thing to do.

Extension Activities

1. Can you think of a situation where you just know what the right course of action is, but cannot prove that it is merely by reducing the action to dollars and cents?
2. Can you think of a situation where what seems to be the right thing to do turns out to be the wrong thing to do?