

TUTOR MANUAL

MARICOPA CENTER FOR LEARNING AND INSTRUCTION

UBUYACAR

PROBLEM-BASED LEARNING MANUAL

PROBLEM STATEMENT

You are interested in purchasing a new vehicle. What should your annual salary be to afford the car you want?

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THE TUTOR'S (TEACHER'S) ROLE IN A PROBLEM-BASED LEARNING CURRICULUM

One of the many exciting features of Problem-Based Learning (PBL) is the empowerment of teacher to become active designers of curriculum and facilitators of learning. As curriculum designer, the typical teacher's role changes from implementing externally made curriculum decisions to being an active decision maker in the curriculum planning process. As a PBL tutor, the teacher's role changes from that of a disseminator of information to a facilitator of learning.

The facilitatory skills of the teacher are central to the success of PBL. The teacher serves as a coach or guide for student learning. As a facilitator, the teacher challenges, questions, and stimulates the students in their thinking, problem solving and self-directed study. After a while, the students will similarly challenge each other and themselves as they work, think, and learn. In this process, students assume responsibility for their learning and move from teacher-centered to student-centered education. The student becomes an active as opposed to passive learner.

As a designer of curriculum, the teacher's challenge is to select and structure problems so that they address both the important content objectives of the curriculum and important real-world issues. This process results in a reaffirmation of the importance of some objectives, the clarification of some and the elimination of others as lacking relevance or importance.

PBL problems have been designed to stimulate both the teaching and the curriculum design roles of the teacher, to stimulate, not to stifle. For the teacher using facilitatory skills (tutor) these problems serve to support facilitation of the PBL process and focus the direction of the problem. For the curriculum designer, they serve mainly as a prime (or model) for the creative pump.

— SIU Medical School, Barrows, Kelsner

PROBLEM SOLVING PROCESS

1. Understand the problem

Identify the problem — unknown
What are you asked to find/solve?

Known

Define terms
Assumptions
Other previous knowledge
Relevant / irrelevant information

Unknown

Gather further information

2. Devise a plan

Sketch a picture or a diagram
Determine operations
Take a risk — Behold the turtle for he does not move
forward without sticking out his neck.

3. Carry out the plan

Write out steps
Perform operations

4. Evaluate

Is the problem solved?
Is it reasonable?

HOW DO PEOPLE SOLVE PROBLEMS?

This is how Mary O'Meara, creative director at Young & Rubicam in the sixties, answered that question from a high school student.

There is the *sponge* part: when you soak up all the information you can discover (and a lot of misinformation).

There is the *shake* part: when you shake out the facts and question the problem itself and start to imagine all sorts of things.

There is the *squeeze* part: when you wring out the sponge and scribble down the most promising splashes and dribbles.

There is the *bounce* part: when you and another concerned with the problem toss embryonic ideas back and forth until only the fittest survive.

There is the *scratch* part: like the above, but now you scratch brain against brain hoping to spark a new notion.

There is the *once-again-please* part: when you examine the survivors in the cold light of reason, abandon most, and incubate a few in the warm darkness of imagination.

There is the *dry* part: when you quit thinking about the damned problem and turn your mind to pleasure or routine. (You only think you've stopped thinking.)

There is the *yahoo* part: when things connect and an idea pops into your head that turns out to be the key to the solution. Often this happens when you least expect it and aren't even thinking about the big problem.

There is the *do* part: when you use your particular talents and learned skills and those of others concerned to shape and form the raw idea into a proper solution.

Then there is the *itch* part: which maybe should come first instead of last. The drive to solve problems creatively -- with a new and original solution -- stems from some chronic itch; dissatisfaction with all existing solutions. Even when the latest may be your own.

PBL PROBLEM TEMPLATE

PROBLEM NAME U BUY A CAR

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PROBLEM STATEMENT You are interested in purchasing a new vehicle. What should your annual salary be to afford the car you want?

PERFORMANCE/PRODUCTS Assessment will be based on:

1. performance
 - use of problem-solving process as a template for solution design/decision making
 - work as an effective team member

2. product
 - justified decisions based on mathematical support, cited sources, and logical/critical thinking
 - well-organized materials presented with proper notation
 - accurate and relevant information and computation

SUGGESTIONS TO THE TUTOR (TEACHER)

PRESENTATION

(associated materials, simulations, student roles, bringing the problem home, etc.)

Student Role: Consumer

Guide the students with such questions as:

- What do you know about buying a car?
- What does “being able to afford a car” mean?
- What are the implications of buying a new vehicle?

INQUIRY MATERIALS

Debt to income ratio
Car costs
Loan payments

LEARNING RESOURCES

World Wide Web (WWW)

<http://edmunds.com>

pricing reports; reviews; safety information; buying and leasing information

<http://www.kbb.com>

New-vehicle pricing reports; information on other blue book publications

Periodicals

Car and Driver
Consumer Reports
Motor Trend
Road and Track

Pamphlets

Everybody’s Money (Desert Schools Credit Union)

Texts

ANTICIPATED LEARNING ISSUES

(subjects, domains, learning issues stimulated)

- How are debt to income ratios determined?
- What costs are involved in purchasing a car and how are they determined?
- What resources can be used to compute loan payments?

OTHER ADVICE TO THE TUTOR

TUTOR QUESTIONS

Your students will have many questions, especially at the beginning of the project. Questions such as, “How do we do this?” or “What’s the answer?” should be politely ignored or turned back to the student, but questions such as, “Do I have a trade-in?” or “Am I leasing or buying” should definitely be answered.

In this section, we have included possible questions that students may have and responses to those questions which are in the flavor of PBL. The idea is to give the students necessary information without giving them the answer.

QUESTION LIST

1. How much does my vehicle cost?
2. What options can I get?
3. What's my budget? (or any other question about budget)
4. Do I have a down payment?
5. Is the car I am getting new or used?
6. Do I determine my salary before or after taxes?
7. Am I leasing or buying?
8. Any math-type question covering material in the text book.
9. How do I qualify for a loan?
10. What are the maintenance costs for my vehicle?
11. What is the sales tax on my purchase?
12. Do I have a trade-in and how much is it worth?

QUESTIONS

1. **How much does my vehicle cost?**
This and all information concerning options, dealer cost, additional cost, etc., can be found at the Web Sites listed in the resources section.
2. **What options can I get?**
You may get any options you can afford. Information on options can be found at the Web sites listed in the resources section.
3. **What's my budget?**
The goal with this project is to personalize the information as much as possible without forcing people to reveal any private information. Students should use as much of their own budget as they feel comfortable and can feel free to substitute in reasonable numerical values in place of their own.
4. **Do I have a down payment?**
For the basis of this project, the students may use up to \$5000 as a down payment.
5. **Is the car I am getting new or used?**
NEW car of their choice.
6. **Do I determine my salary before or after taxes?**
Determine gross pay.
7. **Am I leasing or buying?**
This project is based on buying a car, but students who wish to investigate leasing and compare it to actually buying may do so.
8. **Any math-type question covering material in the textbook.**
These questions will be learning issues for them and they should refer to their textbook or an appropriate resource.
9. **How do I qualify for a loan?**
There are many steps involved in this process. Refer to the "Everybody's Money" pamphlet listed on the resource page. Also refer to the debt-to-income ratio information in the information section.
10. **What are the maintenance costs for my vehicle?**
This information can be found at one of the Web sites listed in the resources section.
11. **What is the sales tax for my purchase?**
This will vary from state-to-state. For Arizona, assume 6.5% tax.
12. **Do I have a trade-in and how much is it worth?**
Students will use their car (or their parents) as a trade-in. Trade-in values can be determined using resources on the Web.

WHAT IT MEANS TO “AFFORD” A CAR . . .

It may seem simple at first to answer this question. However, “having enough money” and “affording” a vehicle can be two different things. Lending institutions have a definition of “afford” that is based on something called “debt-to-income ratio.” The formula for this ratio is:

DEBT TO INCOME \leq 28% OF YOUR INCOME
(this % varies, but is acceptable for this assignment)

INCOME = GROSS ANNUAL INCOME
(i.e. before taxes)

DEBT = REVOLVING CHARGES AND LOANS

So, your students should verify that they can afford the car they want by showing that their debt-to-income ratio is at an acceptable level.

RESOURCES

WORLD WIDE WEB (WWW)

<http://www.webfoot.com/cgi-bin/loan.pl>
loan payment calculator

<http://edmunds.com>
pricing reports; reviews; safety information;
buying and leasing information

<http://www.kbb.com>
new-vehicle pricing reports; information on other
blue book publications

<http://www.dwx.com:8181/~iabanker/car.html>

PERIODICALS

Car and Driver (<http://www.caranddriver.com/>)
Consumer Reports
Motor Trend (<http://www.motortrend.com/>)
Road and Track

BOOKS

Pre-Algebra by Wright (your text book)

PAMPHLETS

Everybody's Money (Desert Schools Credit Union)

OTHER