UNIT 3
SEARCH FOR SOLUTIONS TO SOLVE PROBLEMS

Practical Problem:

How do I solve practical problems related to individual and family health in an ethical, respectful and responsible way?

Missouri Family and Consumer Sciences Competencies:

(PS/C-1) Demonstrate practical problem-solving skills.

(PS/C-2) Evaluate consequences of possible solutions for self and others.

(PS/C-3) Compare and contrast practical problem-solving techniques to other problem-solving strategies.

(PS/C-4) Propose ethical solutions to practical problems.

Enabling Objectives for Competency Mastery:

1. Define a practical problem.
2. Define ethics and apply to solving practical problems.
3. Develop solutions for practical problems which demonstrate concern for self and others.

Teacher Background Information

Rationale

Making decisions about nutrition and wellness requires the use of practical, problem-solving skills. Realizing there are consequences for the actions taken helps teenagers, as well as adults, to take responsibility for choices being made.

In *Discovering and Exploring Habits of Mind*, Costa and Kallick (2000) identified 16 types of behavior that contribute to building strong problem-solving skills. The authors suggest that students must practice each of these skills and become proficient at selecting which habit to draw on when solving a problem. All habits or skills are needed, but at different times. The 16 habits of mind are:

1. Persisting
2. Managing impulsivity
3. Listening with understanding and empathy
4. Thinking flexibly
5. Thinking about thinking (metacognition)
6. Striving for accuracy
7. Questioning and posing problems
8. Applying past knowledge to new situations
9. Thinking and communicating with clarity and precision
10. Gathering data through all senses
11. Creating, imagining, innovating
12. Responding with wonderment and awe
13. Taking responsible risks
14. Finding humor
15. Thinking interdependently
16. Remaining open to continuous learning

Costa and Kallick (2000) advise teachers that these 16 behaviors must be taught, assessed, and reinforced throughout the curriculum. The authors suggest that, "...new behaviors must be labeled and discussed." When those behaviors are repeated they should be recognized and rewarded.

Students must be taught what the problem-solving behaviors are, when and how to use the skills, and how to apply the skills to other, similar situations when they occur. Gick and Holyoak (1980) conducted a study of students' problem-solving skills using analogy to transfer problem-solving strategies from situation to another similar situation. A control group was given one problem to solve with no guidance or preparation. Another group of students solved one problem and then were given a second problem similar to the first one. The third group of students solved one problem and then was given a second similar problem. They were told that the solution to the first problem would help them solve the new problem.

In the first group that received no guidance, 8% of the students were able to solve the problem. Thirty percent of the second group, which received coaching on one problem and then was given a second, similar problem, was able to solve the second problem. An astonishing 92% of the members of the third group which received a practice problem and a hint were able to accurately solve the problem.

This is overwhelming evidence that merely imbedding a problem-solving skill in a lesson does not help a student internalize the skill for future use. Teachers must describe the problem-solving process, link the process to practical problems that students face, and reintroduce the process in analogous (similar) examples.

Students must learn that often there will be more than one right answer for some types of problems. Depending on the situation, their own belief system, and the circumstances at the time, the "right" choice may be different for them than someone else in their family or another person down the street. When students begin to think through a situation they will make a better decision based on information gathered rather than a spur-of-the-moment decision or a decision made under pressure from others.

Problems can be divided into two groups:

1. Well-defined problems are based on the information already known and a set of procedures already known, the single correct solution can be determined. For example, you have $17 and you want to buy something that costs $26, how much more money will you need? There is only one correct solution to this problem.

2. Ill-defined problems include uncertainty. Some important information may be missing, or more than one solution may be possible. For example, what career will I pursue?

How students go about solving a problem depends in part on what type of problem they are facing. To solve a scientific problem, students must first define the problem and form an hypothesis. They next test the hypothesis; observe and record data; then draw conclusions based on the information you discover. A "right" answer exists that will always solve this problem. For example, when you turn the key in the ignition, the car does not start. There is a specific problem that must be discovered and corrected.

Theoretical problems are solved first by stating the problem, then selecting ideas, facts, and other information. Evaluate the pros and cons of all opposing arguments, then choose the alternative that has the strongest support. "Right answers" generally do not exist, individuals must develop an opinion about the appropriate solution based on their beliefs.

To solve a practical problem students recognize the base problem. They must evaluate the quality of information and the relevance of information; then analyze alternatives and consequences of every option. Select the best choice from among all possible choices and take action. Finally, students will evaluate the outcome of the action in solving the problem.

Decisions are made every day regarding nutrition, health and personal wellness issues. From the time a student is awake until fast asleep at the end of the day, decisions are made as to food selections, when or where to eat, physical activity and exercise, social decisions, as well as emotional choices. There may be community issues and career choices that affect health. Using the practical problem-solving approach involves value questions that require core beliefs and rational judgments. This approach helps students to assess information more accurately and to realize there may be many possible answers. The one right answer for an individual is the one that fits into their own belief system. The student must understand the consequences of the "best" choices and seek the choice that does not hurt themselves or anyone else.

References:

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Glick, M. L. & Holyoak, K. J. (1980, July). Analogical problem-solving. *Cognitive
    Psychology,* 12(3), 306-355.

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The Ohio State University. (1995). *Parenting Resource Guide: A Resource for Teaching
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    OH: The Ohio State University.

Instructional Strategies

1. Define a practical problem. (Competencies PS/C-1, PS/C-3)

a. Refer to Activity Sheet #1: **SEARCH for Solutions** in this unit. Discuss each step in the problem-solving process. As a class, write a definition for a practical problem. Discuss each word to determine what it means in the overall definition. Practical problems are usually ill-defined, involve judgments, and often have multiple "right" answers.

b. Create a chart listing issues that could be considered everyday, practical problems. Place a star beside each problem that could involve ethical decisions. Refer to Fact Sheet #1: **Ethical Decisions vs. Core Beliefs** and place the number(s) of the core beliefs beside the star each may relate to.

> *Questions for Discussion/Formative Assessment*
> - *Which core values are more frequently challenged in seeking to maintain a healthy lifestyle?*
> - *What can be done to face these challenges?*
> - *Identify some possible resources that can offer information and alternatives when the various types of problems occur.*

c. Consider this practical problem:

Alyssa gets up at 6:30 every morning for school. She has a 40-minute bus ride to school, so she leaves home by 7:15 a.m. each day. She isn't really hungry for breakfast that early in the morning, and there isn't much time to prepare a meal and still get dressed. When she gets to her first class she is usually hungry and unable to concentrate on the subject.

> *Questions for Discussion/Formative Assessment*
> - *What is the practical problem?*
> - *Which core values are questioned by this problem?*
> - *Will any other individuals be affected by actions taken to solve this problem?*
> - *List all the possible solutions for this problem.*

d. Use Activity Sheet #2: **Developing and Using Habits of Mind to Solve Practical Problems** to explore habits that improve practical problem-solving skills. Share with the class one habit used often and one habit for improvement. Discuss some ideas for how to improve a habit (or create a habit).

e. Compare and contrast Well-defined Problems and Ill-defined Problems using a graphic organizer such as a Venn diagram. Use Activity Sheet #3: **Thinking It Over** to illustrate one type of problem-solving. Is this a Well-defined Problem or an Ill-defined Problem? Why?

Teacher Note: Solution to the Nine Dot Problem follows. This is a well-defined problem because there is only one standard response that solves this problem.

Use no more than 4 lines to connect all nine dots, and do not lift your pencil from the paper once you begin.
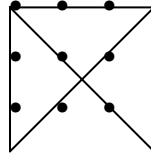
2. Define ethics and apply to solving practical problems. (Competencies PS/C-3, PS/C-4)

a. List as many terms or phrases that use the word ethics (i.e. medical ethics, code of ethics, ethical behavior). View the video: *Business Ethics in the 21st Century.* The video is available from Resources@MCCE, item #BE video 10.

> *Questions for Discussion/Formative Assessment*
> - *What do these terms have in common?*
> - *How would someone's values (beliefs) affect their ethical actions? (e.g., it's not wrong unless you get caught, or someone who makes an anonymous donation to a charity)*

b. Break into small groups and have each group develop a definition of ethics using a poster board for their thoughts. Each group can write, draw or decorate. The only requirement is that the poster must include a definition for ethics somewhere on it. Present the poster to the rest of the class.

c. Consider this problem:

Nick and Darren are good friends. They sometimes study together or play basketball at each other's house. Nick is supposed to be home by 10:00 p.m. on school nights. On Thursday night, Nick went out with some friends and did not get home until 11:30 p.m. He told his parents he was studying at Darren's house and lost track of time while working on a project. The next day Nick told Darren that if his parents should call to ask, Darren should say that Nick was at his house. Darren doesn't want to lie. He also doesn't want his friend to get into trouble. What do you think Darren should say if Nick's parents call?

> *Questions for Discussion/Formative Assessment*
> - *Are there any ethics being challenged here? If so, which ones? (Honesty, accountability, fairness, loyalty, integrity, pursuit of excellence, respect for others, promise keeping and responsible citizenship)*
> - *Which boy is compromising ethics? Why?*
> - *Which ethics would be less important than others in this problem?*

3. **Develop solutions for practical problems which demonstrate concern for self and others. (Competencies PS/C-1, PS/C-4)**

   a. Use the *Ethical Decisions vs. Core Values* Fact Sheet to discuss how core beliefs can create an ethical dilemma in real life. For example, it is important to be loyal to a friend. Normally it is not difficult to be a loyal friend. What kinds of situations can come up that might cause a friend to not be loyal?

   b. Keep a journal for three days describing any practical problems that you faced during this time. Write by each item the method used to solve the problem.

   c. Work as a class on Instructional Strategy 2 (c) to complete Activity Sheet #1: **SEARCH for Solutions**. Remember to use your own values and core beliefs in a caring and respectful manner.

Teacher Note: To ensure students' understanding, have them list the methods people may use to make important decisions. Some examples may include:

Avoidance-ignoring a problem and hoping it will go away.

Experience-what turned out well before should do the same again.

Habit-Making the same decision under the same circumstances without considering if it is the best decision.

Denial-pretending there is no problem.

Impulse-acting on the first idea that comes to mind.

Analysis paralysis-to research, ponder and agonize until it's too late to matter.

Cinderella Syndrome-believing the Fairy Godmother will magically solve the problem if you wait and wish.

Delegation-to let someone else solve the problem.

Rational review (practical problem-solving)-to consider all alternatives, consequences and effects on oneself and others before making a decision.

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   d. Use Instructional Strategy 2(c) as a discussion starter. In small groups, use Activity Sheet #1: **SEARCH for Solutions** to identify and propose a solution to other types of ethical dilemmas teens face. Each group presents its ethical dilemma and steps to solve this problem.

Summative Assessments
(Teachers may insert their own assessments)

Paper and Pencil

Classroom Experiences

Application to Real-Life Settings

Fact Sheet #1

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Ethical Decisions vs. Core Beliefs

Although individuals value wants and needs differently, core beliefs are shared by everyone in a group or community. Ethical decisions that place you in a difficult position typically challenge one or more of the following ten core beliefs:

1.   Caring - treating people with concern and respect

2.   Honesty - being truthful and not deceiving or distorting information

3.   Accountability - accepting responsibility for decisions and consequences for actions

4.   Fairness - being open-minded and unbiased

5.   Loyalty - being faithful and honest in dealings with others

6.   Integrity - using independent judgment and avoiding conflicts of interest

7.   Pursuit of Excellence - striving to achieve potential

8.   Respect for Others - recognizing the rights of others to privacy; includes being courteous, prompt and decent

9.   Promise Keeping - being reliable and following through to maintain expectations of performance

10.   Responsible Citizenship - actions should be in accordance with society's values

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Competencies PS/C-1, C-3 and C-4
Activity Sheet #1

Name _____

State the Practical Problem	A practical problem often is: • Poorly structured (it is not a neat, clean, clear problem) • Involves conflicting values • Involves taking action that will affect others • Lacks vital information on first encounter • Subject to change with elaboration • Gray or may have no "right" answer	What is the problem? What are the various aspects of the problem that make the solution difficult to determine? Who is involved in the problem? Who is affected by any solution? What is likely to happen if I do nothing? What do I want the outcome to be?
Examine the facts, values & people involved	This can be considered the research phase where all facts are determined and the need for additional information is itemized. Individuals will differ on their responses at this step. Understanding the role values play in decision making is important at this point.	What facts do I need? Where is the information available? Who can I turn to for guidance? What values are in conflict?
Analyze the options	This is like standing at a crossroads with several paths to be considered. Long-term and short-term consequences are important, as well as the impact on self and others. Determine the trade-off for each option.	What are my options? What are short-term results for each? What are the long-term consequences for each action? How will each outcome affect me? How will each outcome affect others I care about?
Review the options & select the best choice	The steps above are thinking steps. This is the first action step. Every option is an action—even doing nothing has a consequence and is a possible response. This is the stage where every option is placed on a balance with its likely consequences.	Which option best reflects my values and solves the problem? Which option(s) am I unable to live with? Which option do I choose? What skills do I need for the action?
Chart & start an action plan	With all of the facts stated, rated and weighted, all that remains is to take action. A solution must be planned and implemented. You've decided what you are going to do and how you will do it.	What resources do I have? What resources do I need? What barriers might prevent me from taking this action? How do I organize my actions?
Highlight the outcome	The evaluation process is critical in determining if you did the right thing after all. It also helps to review what you learned from the experience and how this knowledge can be applied to similar problems in the future.	Did this choice solve the problem? Did this choice create additional problems? Would you apply this choice again? What did you learn from this?

Competencies PS/C-1, C-3 and C-4
Activity Sheet #1 continued   Name _____

S E A R C H for Solutions

The SEARCH for Solutions takes you step-by-step through the problem-solving process. Complete the steps below as you solve practical problems. You may go through the steps in a different order, but it is important to complete every step.

<u>S</u>tate the problem to be solved.

<u>E</u>xamine information needed to solve the problem.

GOALS & VALUES:	FACTS:	CONSIDERATIONS:
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

<u>A</u>nalyze options or alternatives.

POSSIBLE SOLUTIONS:	POSSIBLE CONSEQUENCES:	EXPECTED OUTCOME:
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

<u>R</u>eview the options and select the best choice. Place a check beside your solution listed above. Provide logical reasons for your choice.
Defend your solutions: *Relevance to the problem*
                    Ethical base (positive long-term effects on all involved)
                    Ability to resolve the problem
                    Strength based on facts

<u>C</u>hart and start a plan for action. Identify the actions you need to take, when they will be done, and who will do them.

<u>H</u>ighlight the outcome of your actions. Evaluate whether or not your choice was best. Identify what you have learned from solving this problem. Did you discover another solution you could have tried?

Developing and Using Habits of Mind
to Solve Practical Problems

A habit is a learned and practiced behavior. You do many things by habit without consciously thinking about it. The 16 habits of mind listed below will help you solve everyday, practical problems. You may use each habit for a different problem, or at a different time.

Review the list below and circle the number of the habits you already use a lot. Give an example of how you have used this habit to solve a problem.

1.   Persisting

2.   Managing impulsivity

3.   Listening with understanding and empathy

4.   Thinking flexibly

5.   Thinking about thinking (metacognition)

6.   Striving for accuracy

7.   Questioning and posing problems

Competencies PS/C-1, C-3
Activity Sheet #2 continued $\qquad$ **Name** _____

8. Applying past knowledge to new situations

9. Thinking and communicating with clarity and precision

10. Gathering data through all senses

11. Creating, imagining, innovating

12. Responding with wonderment and awe

13. Taking responsible risks

14. Finding humor

15. Thinking interdependently

16. Remaining open to continuous learning

Costa, Arthur L, and Bena Kallick. *Discovering and Exploring Habits of Mind.* Association for Supervision and Curriculum Development. Washington, DC: 2000.

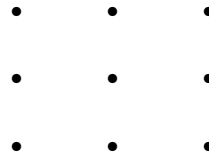**Competencies PS/C-1, C-3**
Activity Sheet #3

Name _____

Thinking It Over

The Facts Say…

The Nine Dot Problem

Without lifting your pencil from the paper, connect all nine dots using no more than four lines.

•   •   •

•   •   •

•   •   •

After Thinking It Over, I say…

Is this an example of a Well-defined Problem or an Ill-defined Problem. Why?

_____

_____

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_____

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_____