

PBL Unit Title: Good Diet, Fad Diet

Primary Subject Area: Biology

Interdisciplinary Areas also Covered: Health, Psychology, English (Research Skills)

Grade/Age Level: 9th-10th Grade

Description of students' role and problem situation: Students play a role of a registered dietician. Mary Parker, 16-year-old patient, has been referred to them because she is on a low carbohydrate diet and Metabolife. Her mother suspects an eating disorder may also be present. The students must research her current weight loss plan and other diets to create a healthy and effective weight loss plan for Mary.

Educational Objectives: (Indicate if unit is interdisciplinary, but only list the objectives from primary subject area)

- ◆ To examine low carbohydrate diets and diets currently on the market and compare them to a balanced diet.
- ◆ To learn the function of macronutrients, vitamins, and minerals in the body and their recommended daily values.
- ◆ To research the warning signs and health consequences of eating disorders.
- ◆ To examine the effects of depression, self-esteem, and family dynamics on weight problems.

Name: Michelle D. Patrick

E-mail Address: mpatrick75@aol.com

School Name: Cardinal Gibbons High School

School Location: Raleigh, North Carolina

Wilmington Family Practice

211 Oleander Drive, Suite 203

Wilmington, NC 28403

(910) 392-2615 Phone

(910) 392-4486 Fax

Gregory Benson, MD
Scott Dudley, MD, MPH
Elizabeth Grace, MD
Virginia Greenberg, MD

Alexander Jones, MD
Jonathan Nelson, MD
Laura Palmer, MD, PhD
Michael Stenner, MD

Date: 3 May, 2002

To: Judy Thomas, RD

From: Michael Stenner, MD

Subject: Referral of Mary Parker

I examined this patient on 25 April and have enclosed general information and my examination notes. The patient's mother expressed concerned about the patient's new diet geared toward weight loss and also suspects an eating disorder may be present. The patient's physical examination revealed no abnormalities. At my suggestion, the mother has set an appointment with you next Thursday, 9 May. At that time, the mother would like to discuss and seek advice on the patient's current weight loss plan, which consists of a low-carbohydrate diet and Metabolife. Particularly, the mother wants to know if the patient should continue the diet—it has been successful, but are there negative consequences? She would also like more information on the warning signs and health consequences of eating disorders, specifically anorexia nervosa and bulimia nervosa. I have enclosed the patient's blood work so that you may make a diagnosis. Finally, she would like a healthy, effective, and detailed strategy for weight loss for the patient, whether that means continuing the current diet or implementing a new plan.

Patient Information

Patient's Full Name: Mary Ann Parker
Age: 16 Sex: F

SECTION I (Only fill out this section if you are a new patient or if information has changed since last visit)

Date of Birth: 7/22/85 Place of Birth: Wilmington, NC
Home Address: 704 King Street
Wilmington, NC 28403
Home Phone: (910) 465-2371 Work Phone: N/A
Work Address: N/A

Occupation: Student - Junior Cape Fear Academy

If patient is a minor (under age 18)

Mother's Name: Nancy Parker Father's Name: William Parker III
Occupation: stay at home mom Occupation: Attorney
Home Phone: (910) 465-2371 Home Phone: (910) 465-2371
Work Phone: N/A Work Phone: (910) 392-4932

SECTION II

Date: 4/25/02
What is the reason for your appointment today? lost 16lbs in
1 month

What concerns would you like to discuss with the doctor? Diet pills,
Low-carb diet, eating disorders

Current medications/supplements? Zoloft (sertraline)
Multivitamin, Metabolife
Allergies? None

I certify that the above information is accurate to the best of my ability. I understand that it will be kept confidential and will only be share with my permission.

Nancy Parker 4/25/02
Patient's signature (or guardian's if under 18) Date

Patient Information

Patient's Full Name: _____

Age: _____ Sex: _____

SECTION I (Only fill out this section if you are a new patient or if information has changed since last visit)

Date of Birth: _____ Place of Birth: _____

Home Address: _____

Home Phone: _____ Work Phone: _____

Work Address: _____

Occupation: _____

If patient is a minor (under age 18)

Mother's Name: _____ Father's Name: _____

Occupation: _____ Occupation: _____

Home Phone: _____ Home Phone: _____

Work Phone: _____ Work Phone: _____

SECTION II

Date: _____

What is the reason for your appointment today? _____

What concerns would you like to discuss with the doctor? _____

Current medications/supplements? _____

Allergies? _____

I certify that the above information is accurate to the best of my ability. I understand that it will be kept confidential and will only be share with my permission.

Patient's signature (or guardian's if under 18)

Date

Patient Examination

Patient's Full Name: _____

Height: _____

Weight: _____

Temperature: _____

BP: _____

Pulse: _____

Lab Work

Total Cholesterol: _____

Platelets: _____

HDL: _____

Hemoglobin: _____

LDL: _____

Hematocrit: _____

Triglycerides: _____

Electrolytes: Na _____

Blood Glucose: _____

K _____

Iron: _____

Cl _____

Erythrocytes: _____

Ca _____

Leukocytes: _____

Mg _____

CO₂ _____

Examination

Patient Examination

Patient's Full Name: Mary Parker

Height: 65 in. Weight: 159
Temperature: 97.6 BP: 110/72
Pulse: 75

Lab Work

Total Cholesterol:	<u>198 mg/dL</u>	Platelets:	<u>230,000/mL</u>
HDL:	<u>61 mg/dL</u>	Hemoglobin:	<u>13 g/dL</u>
LDL:	<u>137 mg/dL</u>	Hematocrit:	<u>36 %</u>
Triglycerides:	<u>116 mg/dL</u>	Electrolytes: Na	<u>137 mEq/L</u>
Blood Glucose:	<u>72 mg/dL</u>	K	<u>3.5 mEq/L</u>
Iron:	<u>121 µg/dL</u>	Cl	<u>97 mEq/L</u>
Erythrocytes:	<u>4.2 mil/μL/cmm</u>	Ca	<u>8.7 mg/dL</u>
Leukocytes:	<u>12.00 cels/μL/cmm</u>	Mg	<u>1.6 mEq/dL</u>
		CO ₂	<u>32 mEq/L</u>

Examination

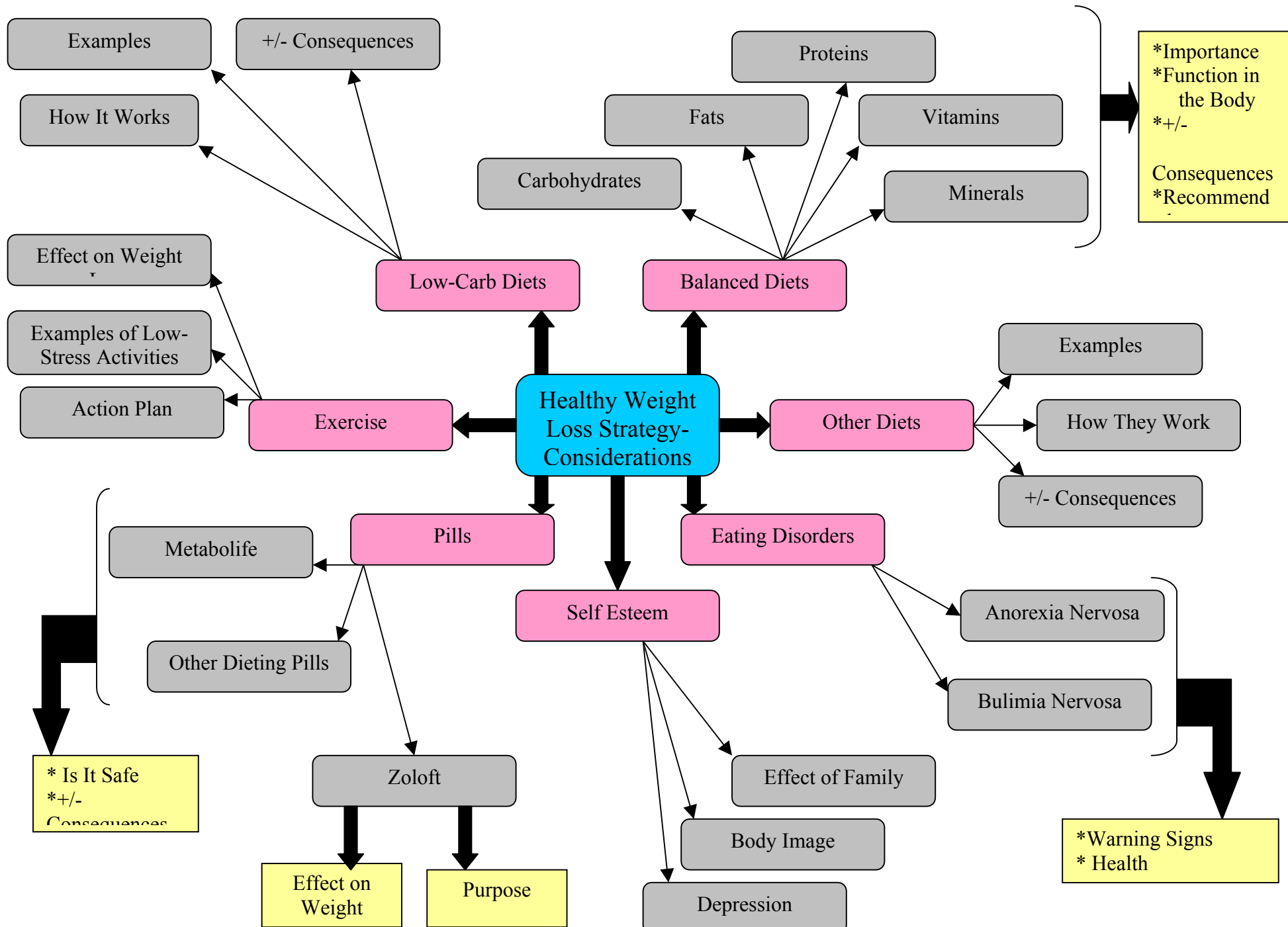
History - Pt gained 20 lbs last yr
Lost 16 lbs last month w/ new diet's pills

low-carb diet - began 3/15/02
high fat/protein
less than 30g carbs/day
no fruit/veggies, occasional salad
daily multivitamin
weight loss decreased in 4/1/02
Metabolife - diet pill - began 4/5/02
in addition to low-carb diet
no exercise

lost 7 lbs
first week
mom states ate more ("too much")

Family - Mom - on weight watchers; inquired if diet (low carb) is healthy; should she switch over
Dad - no weight problems, successful attorney, avid biker & runner
Sister - in college - Harvard, no weight problems

Physical exam - normal



Good Diet, Fad Diet

Know and Need to Know Lists

Know

- Exam by family doctor on 4/25/02, 8 days ago
- On a new weight loss plan which includes
- A low-carb diet, started 3/15/02-high protein and fat, less than 30 g of carbs/day, no fruit/veggies, occasional salad
- Metabolife, started 4/5/02 when weight loss decreased
- No exercise
- Lost 16 lbs. on this diet in last month
- Gained 20 lbs. in last year
- On Zoloft (sertraline)
- On multivitamin
- 16 year old female, junior in high school
- 65 inches tall, 159 lbs. (after the 16 lb. weight loss)
- Mom suspects eating disorder
- Have bloodwork
- Have examination results-no abnormalities
- Mom stays at home and is on Weight Watchers
- Dad is an attorney and does not have weight problems
- Set appointment with registered dietician for 5/9/02, in 6 days
- Mom wants information on current weight loss plan (especially negative consequences), on eating disorders (especially anorexia nervosa and bulimia nervosa), and on an effective strategy for weight loss.

Need to Know

- What is a low-carb diet? Examples? What is the premise behind it?
- What are the positive and negative consequences of a low-carb diet?
- Why are fats, proteins, and carbohydrates important? How are they processed in the body? What are they used for in the body? What are their recommended intakes?
- How does a deficiency in one of these nutrients get compensated for?
- How do you read food labels?
- Are certain minerals and vitamins lacking in a low-carb diet? Can they be received in the form a pill?
- How does exercise help contribute to weight loss?
- What is Metabolife? Is it safe? What are the positive and negative consequences of taking it?
- What is an acceptable amount of weight loss? What caused her to lose 16 lbs. in one month?
- What is an acceptable amount of weight gain? What caused her to gain 20 lbs. in one year?
- What is Zoloft and why would she be on it? Would it affect her weight?

- What are the pressures on a 16 year-old? Self-esteem issues?
- Is 159 lbs. and 65 inches normal? Is she overweight? Is she obese?
- What are eating disorders? What are the warning signs and health consequences of anorexia nervosa and bulimia nervosa?
- Is her blood work normal? Or does it indicate her diet is unhealthy or that an eating disorder may be present?
- What signs would be seen by the doctor in the physical exam if she has an eating disorder?
- In what ways could her mom and dad be contributing to her weight problem?
- Is her current method an effective and healthy way to lose weight?
- What are healthy and effective ways to lose weight?

Good Diet, Fad Diet Curriculum Alignment

Major Area

Biology

- List the four types of organic compounds (carbohydrates, lipids, proteins, and nucleic acids) along with their characteristics and importances in living things.
- Tell the functions of each body system: skeletal, muscular, nervous, reproductive, digestive, urinary, endocrine, respiratory, circulatory.
- Identify the names of the major bones and muscles, and the major or prominent organs of each body system

Honors Biology

- Name the four classes of organic molecules in cells & explain why they are macromolecules polymers
- Differentiate between saturated and unsaturated fats
- List the organs of the digestive tract and state the contribution of each to the digestive process
- Discuss the digestion of starch, protein, and fat, listing all the steps that occur to bring about digestion of each of these
- Give the chief contribution of carbohydrates, proteins, fats, fruits and vegetables to the diet
- Explain why the amount of saturated fat be curtailed in the diet
- Name and discuss three eating disorders
- Draw and label the structures of the digestive system
- Trace the pathway of food from the point of ingestion to the point of egestion

Anatomy

- Student will discuss the basics of protein, fat, and carbohydrate digestion and give the end products of each process
- Student will describe the metabolic roles of carbohydrates, fats, proteins, vitamins, and minerals
- Student will define basal metabolic rate and list some factors that affect it
- Student will discuss the nature and importance of electrolytes in body fluids
- Student will give examples of common fluid imbalances

Physical Science

- Student will be able to convert from one metric unit to another.

Interdisciplinary

Media Studies

- Students will review their understanding of Media Center programs, resources, philosophy, policies and layout of the Media Center.
- Students will locate specific books based on subject, author or title.
- Students will locate specific audio-visual materials.

- Students will locate specific information by determining which source would be best: general books, reference books, magazines, SIRS, the Internet.
- Students will actually answer specific questions in which they must decide which source would be best.
- Students will be able to locate specific information using all types of sources on a specific topic.

Psychology

- Define the nature of parental-child interactions and conflicts
- Distinguish between the concepts of normalcy and abnormality

Health

- Students will be able to relate fitness to other aspects of health.
- Students will recognize the basic components of fitness.
- Students will demonstrate knowledge of how to acquire increased cardiovascular and muscular endurance, strength, and flexibility.
- Students will be able to identify the classes of nutrients.
- Students will be able to design a properly balanced meal.
- Students will demonstrate a knowledge of different starches, fibers and sugars.
- Students will be able to discuss differences between essential and non-essential amino acids.
- Students will be able to demonstrate an understanding of essential minerals, their functions, and food sources.
- Students will be able to discuss the difference between fat-soluble and water-soluble vitamins.
- Students will be able to identify and define the following nutrition related terms:
Glucose, Fatty Acids, Amino Acids, Calories, Glycogen, Cholesterol, Trace Minerals, Electrolytes
- Students will be able to discuss body composition measurement and assessments.
- Students will be able to identify unsound weight loss practices and gimmick programs.
- Students will demonstrate knowledge of problems associated with body fat percentages that are too high as well as those that are too low.
- Students will be able to design plans for safe weight loss and maintenance programs.
- Students will be able to identify and define the following weight control related terms
Obesity, Skin Caliper, Hydrostatic Weighing, Anorexia Nervosa, Bulimia, Diuretics
- Students will be able to identify the risk factors for cardiovascular diseases.
- Students will be able to explain risk-reducing behaviors for cardiovascular disease

English

- Students will be able to condense large sections of reading into concise summaries.
- Students will be able to structure substantive and organized writing under timed pressure.
- Students will understand strategies for reading critically
- Students will be able to research a topic; paraphrase, summarize, and quote from a source; document sources using the new MLA style of parenthetical documentation
- Students will be familiar with the form and structure of an argument

- Students will be able to skim and read their sources

Keyboarding/Computer Skills

- Students will show ability to format memos properly from arranged and semiarranged copy.
- Students will demonstrate ability to process personal-business letters in block format from arranged and semiarranged copy.
- Students will demonstrate knowledge of how to format large and small envelopes.
- Students will demonstrate mastery of accessing the Internet using the Network.
- Students will demonstrate knowledge of ways to find specific information on the Internet when given a topic.
- Students will relate their knowledge of Internet use to ethical issues of copyrights and personal use.
- Students will realize how they can use the Internet in their personal lives as well as school.
- Students will use Works to create new word processing documents, key text, and save a document.

Good Diet, Fad Diet Student Characteristics

1. My students are motivated.
2. My students like to learn new things.
3. My students are procrastinators. They usually do what is required, but save it for the last minute.
4. My students want to know the “right” answer.
5. My students are easily influenced by their peers.
6. My students want acceptance from both teachers and other students.
7. My students are grade conscious.
8. My students want to be independent and do things for themselves, yet are still needy at times.
9. My students like working with others.
10. My students tend to police themselves in group situations, particularly when it comes to behavior.
11. My students are concrete, not abstract thinkers.
12. My students are eager to please both teachers and parents.
13. My students are activists and are willing to take action for a cause they support.
14. My students are over-committed with sports, church, and family obligations.
15. My students are mostly white and upper-middle class.

Good Diet, Fad Diet Problem Statement

How can we as dieticians, decide on a strategy for weight loss for Mary in such a way that the strategy

- consists of all the macronutrients, vitamins, and minerals and is balanced
- includes exercise
- is easy to maintain
- is financially reasonable
- addresses eating disorders
- and is presentable in 6 days in a detailed, written form.

Good Diet, Fad Diet Resources

Books

Abraham, S. (1992). *Eating Disorders: The Facts*. Oxford: Oxford University Press.

Bender, D. A. (1997). *Nutrition: A Reference Handbook*. Oxford: Oxford University Press.

Bricklin, M. (1992). *Prevention Magazine's Complete Nutrition Reference Handbook*. Emmaus, PA: Rodale Press.

Newstrom, H. (1993). *Nutrients Catalog*. Jefferson, NC: McFarland & Company.

Wardlaw, G. M., & Insel, P. M. (1996). *Perspectives in Nutrition*. Boston: WCB McGraw-Hill.

Webb, F. S. (1994). *Hamilton/Whitney's Nutrition: Concepts and Controversies*. Minneapolis: West Publishing Company.

Journals

Adkins Diet: What's Wrong with It? (2002). *Consumer Reports*, 67(6), 30-32.

Berkoff, F. (2002). High-Protein Diets Gets Low Marks. *Canadian Living*, 27(5), 63.

Burn Fat with Metabolife 356? (2002). *Consumer Reports on Health*, 12(2), 2.

Cowley, G., Reno, J., & Underwood, A. (1999). Mad about Metabolife. *Newsweek*, 134(14), 52-54.

Dowd, K. (2002). The (Almost) Perfect Exercise Plan. *Current Health*, 25(6), 26-29.

FYI: Eating Disorders. (2002). *Scholastic Choices*, 17(7), 10.

Gabel, K. A., & Lund, J. A. (2002). Weight Loss at a Cost: Implications of High-Protein, Low-Carbohydrate Diets. *The Journal of Physical Education, Recreation, & Dance*, 73(2), 18-22.

Hammock, D. (2002). Slim Down (A Lot) For Summer. *Good Housekeeping*, 234(5), 155-159.

Perfect Body in a Bottle, Pill, Bar or Powder. (2000). *Drug Store News*, 22(16), 37.

Schlosberg, S. (2002). The Last Word on Low-Carb Diets. *Shape*, 21(5), 64-66.

Shaw, E. M. (2002). The Dangers of Eating Disorders. *American Fitness*, 20(1), 54-62.

Walsh, J. & Doheny, K. (2001). Exercise and Zoloft Tie as Antidepressants. *Shape*, 20(8), 104.

Wrightson, C. (2001). Low-Carbohydrate Diet; High-Protein Diet. *Health*, 15(1), 90-98.

Films/Videos

Angel, C., & Weber, A. S. (Executive Producers), & Friedman, G. (Producer). (2000). *Eating Disorders: The Inner Voice* [Videorecording]. Charleston, WV: Cambridge Educational.

Websites

How to Review Your Blood Test Results

<http://www.amarillomed.com/howto.htm>

What Does My Blood Test Mean?

<http://www.bloodbook.com/test-result.html>

National Eating Disorders Association

http://www.nationaleatingdisorders.org/custom/customPages/viewPage.asp?WebPage_ID=337

Metabolife Home Page

<http://www.metabolife.com>

Zoloft

<http://www.nami.org/helpline/zoloft.htm>

Recommended Dietary Allowances

<http://www.dietitian.com/rda.html>

Good Diet, Fad Diet Capstone

The capstone is authentic to the problem since the students are taking on the role of a registered dietician, and researching a healthy, effective, and detailed plan for weight loss. Many of them will be learning new content knowledge in this unit, though many of them should already be familiar with how to go about researching (assuming I am going to cover during the second half of the year).

The capstone performance relates to my objectives. (Major ones are listed below, however the curricular alignment is attached.)

- Students will have to research fats, proteins, carbohydrates, vitamins, and minerals, and know the function of each, the recommended intakes, consequences of too much or too little, and how to read food labels.
- Students will need to know general information on how the digestive system functions and how fats, proteins, and carbohydrates are metabolized.
- Students will have to research eating disorders and know the warning signs and health consequences.
- Students will be able to identify unsound weight loss practices.
- Students will understand the basic components of fitness.
- Students will learn how to do library research and be able to identify appropriate resources.

The students will be responsible for 3 components.

- **Written Plan of Action:** Each group is responsible for a written plan of action for a healthy, effective weight loss strategy to be given to Mary. The plan of action will be turned in and evaluated by the teacher and registered dietician.
- **Skit:** Each group is responsible for creating a 5-10 minute skit (live or recorded). The roles that must be represented in the skit are that of Mary, her mother, and the registered dietician. An optional fourth role may be included if desired. Using the skit, the characters will discuss Mary's current weight loss plan, the positive and/or negative consequences, and whether it should be continued. The characters should also detail the warning signs and health consequences of eating disorders and present a plan of action for healthy weight loss (while discounting those other diets considered "unhealthy"). The skit will be presented to and evaluated by a registered dietician in the field, the teacher, and fellow students.
- **Self-Evaluation:** Each individual is responsible for answering the following questions after the skits that will be evaluated by the teacher.
 - What were the most interesting/surprising things you learned in this investigation? Did any of the new information make you change your mind about something you previously believed?
 - How does this problem relate to you personally?

- What new skills did you learn as you researched? Did you consider researching to be a difficult task?
- How well did your group function? Are you satisfied with the role you played in the group? What improvements could be made for next time?
- How can you apply the knowledge and skills gained in this problem in the future?
- After seeing other groups' skits, compare your solution to others you heard. What strengths and weaknesses do you see with your solution? How about the strengths and weaknesses of other groups' solutions?

**Good Diet, Fad Diet
Assessment Rubric**

Criteria	"Excellent Performance"	"Mediocre Performance"
Introduction <i>10 points</i>	<ul style="list-style-type: none"> • Introduce the situation and bring the audience up to speed • Capture the audience with introduction <p style="text-align: right;">10</p>	<ul style="list-style-type: none"> • Introduce the situation but do it in such a manner that the audience is not enticed OR • Capture the attention of the audience, but do not give enough background information to properly acquaint audience with situation <p style="text-align: right;">8</p>
Content <i>15 points</i>	<ul style="list-style-type: none"> • Cover the following information in skit: explanation about blood work, current weight loss plan (low-carb diet and Metabolife), eating disorders, other dieting methods, and a healthy plan of action for losing weight <p style="text-align: right;">15</p>	<ul style="list-style-type: none"> • Fail to cover one of the topics: explanation about blood work, current weight loss plan (low-carb diet and Metabolife), eating disorders, other dieting methods, or a healthy plan of action for losing weight <p style="text-align: right;">12</p>
Support <i>10 points</i>	<ul style="list-style-type: none"> • Problem is well-researched • Provide examples and verifying information on all topics covered (ex. who says Metabolife is/isn't harmful, who says low-carb diets are/aren't harmful) <p style="text-align: right;">10</p>	<ul style="list-style-type: none"> • Do not provide examples or verifying information on all topics covered • Audience is left wanting more information, or wondering where group got the information <p style="text-align: right;">8</p>
Solution <i>10 points</i>	<ul style="list-style-type: none"> • Solution is reasonable and workable • Solution is detailed • Solution is supported by evidence <p style="text-align: right;">10</p>	<ul style="list-style-type: none"> • Solution is detailed and supported by evidence but not very feasible OR • Solution is reasonable but audience is not given enough detail or solution is not supported with enough evidence <p style="text-align: right;">8</p>
Organization <i>5 points</i>	<ul style="list-style-type: none"> • Background information is given and the problem is introduced before the solution <p style="text-align: right;">5</p>	<ul style="list-style-type: none"> • Solution is given before the audience has a thorough grasp of the problem and background information <p style="text-align: right;">4</p>
Importance <i>10 points</i>	<ul style="list-style-type: none"> • Main points and examples/verifying evidence are emphasized <p style="text-align: right;">10</p>	<ul style="list-style-type: none"> • Main points are generally emphasized but the group presents irrelevant information or goes off on a tangent <p style="text-align: right;">8</p>

<p>Familiarity/ Comprehension</p> <p><i>10 points</i></p>	<ul style="list-style-type: none"> • Appears as if skit has been practiced • Appear comfortable with content and their understanding of the problem • Know problem well enough to give quality answers to questions from audience 10 	<ul style="list-style-type: none"> • Group is familiar with problem and content, but skit appears to be thrown together without much thought or practice OR • Skit is well-rehearsed but group does not seem to have complete grasp of the problem, the content, or the solution 8
<p>Enthusiasm/ Believability</p> <p><i>5 points</i></p>	<ul style="list-style-type: none"> • Maintain roles throughout entire skit • Show enthusiasm during performance and convey that to audience 5 	<ul style="list-style-type: none"> • Maintain roles throughout skit, but audience is bored because of lack of enthusiasm shown by the group OR • Show enthusiasm, however students do not maintain their roles throughout skit 4
<p>Speech</p> <p><i>5 points</i></p>	<ul style="list-style-type: none"> • Speak clearly with appropriate volume and inflection 5 	<ul style="list-style-type: none"> • Difficult to hear all students because they are not loud enough or they are mumbling 4
<p>Eye Contact</p> <p><i>5 points</i></p>	<ul style="list-style-type: none"> • Maintain consistent eye contact with other members of the group during the skit, and with the audience during the question/answer period 5 	<ul style="list-style-type: none"> • Show some evidence of eye contact during the skit and question/answer period, but not consistently 4
<p>Time</p> <p><i>5 points</i></p>	<ul style="list-style-type: none"> • Skit falls between 5 and 10 minutes • Pace is appropriate 5 	<ul style="list-style-type: none"> • Skit is less than 5 minutes or more than 10 minutes (but is only 1 minute off) • Feels like students are rushing or it is dragging on 4
<p>Teamwork</p> <p><i>10 points</i></p>	<ul style="list-style-type: none"> • Teamwork is evident; group appears to communicate with one another well • Every student is participating in some fashion 10 	<ul style="list-style-type: none"> • Group has issues that are evident to the audience; they don't seem to work well together • One student in the group is not participating 10

Grade out of 100 points: _____

Good Diet, Fad Diet Coaching Questions

Meet the Problem

- C Why do you think Mary's mother suspects an eating disorder?
- M Can you summarize how all of the pieces of information you have received are related, i.e. the memo, the patient information document, and the patient examination document?
- EC Is this weight loss problem an authentic one? Do people really struggle with this?

Know/Need to Know Board

- C What else can you tell me about her current weight loss plan?
- M Why do you think it is important to know about Mary's blood work results?
- EC Why do you think will you meet obstacles when trying to learn about different weight loss plans?

Writing Problem Statements

- C When will you meet with Mary and her mother?
- M What must be considered in order to develop a healthy, weight loss plan?
- EC Why is having a balanced diet a central issue?

Information Gathering and Sharing

- C Where did you find those warning signs for bulimia?
- M Which resources have been most helpful for information on different weight loss plans?
- EC How can you be sure that information on Metabolife is true if it came off of the internet?

Generating Possible Solutions

- C Do you have enough facts to suggest that Mary is anorexic?
- M How did you arrive at the solution that Mary should stick with her current weight loss plan?
- EC Will this solution resolve all of Mary's problems? What will go left unsolved?

**Good Diet, Fad Diet
Alternative Solutions**

Possible Solution #1	Pros	Cons	Consequences
<p>Choose a balance diet that includes all the major food groups--grains, fruits, vegetables, dairy, and meat. Ensure that Mary is getting the RDA values for carbohydrates, proteins, fats, vitamins, and minerals. Ensure the diet is varied and that consumption of foods is in moderation. Present a 2-week sample menu to get Mary started. Include a low-impact physical activity (walking) 3 times a week for 30 minutes each time. Address eating disorders with information, even though it is likely that she doesn't have one. Discontinue the use of Metabolife. Encourage her family to follow the same plan of action, since it is a balanced diet.</p>	<ul style="list-style-type: none"> • Mary will eat foods from all the major food groups • Mary will have a sample menu for the first 2-weeks of her diet • Mary will be getting much needed exercise • Mary does not have to have a different menu from her family • Mary will not be at risk for any harmful effects from Metabolife • Mary and mom will get information on eating disorders 	<ul style="list-style-type: none"> • Mary needs more exercise to lose weight; that amount is only good for maintaining weight • No consultation with physician about blood work. Dietician is not qualified to interpret blood-work • No consultation with psychologist about depression or self-esteem issues • Does not address mom's own weight problems, which could be influencing Mary • No mention of how Mary should plan her diet after the 2 weeks are up • No investigation of why Mary is overweight or why she gained 20 pounds in the last year 	<ul style="list-style-type: none"> • Mary will have a healthy diet and receive all major nutrients, vitamins, and minerals • Mary may not lose any additional weight, or may lose weight at a slower rate • Mary will protect herself from other health problems like heart problems, high cholesterol, and cancer with her new diet and exercise program, however, she may still be overweight

Possible Solution #2	Pros	Cons	Consequences
<p>Continue the low-carb diet and multivitamin to ensure Mary is getting her vitamins and minerals. Continue the diet until weight goal is met and gradually increase carbohydrates over a month long period. Discontinue the use of Metabolife. Get Mary on an exercise plan, 5 times a week, possibly with a personal trainer. Select an enjoyable physical activity Mary could do once a week with other family members. Speak to mom privately about eating disorders, since Mary does not have one. Discuss mom's own weight loss problems and their effect on how she perceives Mary's current weight loss plan--possibly encourage Mom to begin the low-carb diet. Opt not to consult psychologist since this is not a body-image problem, Mary is indeed overweight.</p>	<ul style="list-style-type: none"> • Mary will be taking a multivitamin to get required vitamins and minerals • Allows for gradual increase of carbohydrates once goal is met so that change is not too quick • Mary will not be at risk for any harmful effects from Metabolife • Mom will get information on eating disorders • Family will get involved in physical activity together--will help with weight loss and overall self-esteem • Mom's weight loss struggle will be addressed along with its effects on Mary. 	<ul style="list-style-type: none"> • Mary will not be eating a balanced diet. She will not be eating enough grains, fruits, and vegetables • The human body absorbs vitamins better when they are received in food, not from a pill • Mary's dad (and possible mom) will not likely eat the same meals • If Mary does have an eating disorder, the RD will miss the opportunity to give her more information on them • Does not take into account that weight may be tied to depression or self-esteem issues • No investigation of why Mary is overweight or why she gained 20 pounds in the last year 	<ul style="list-style-type: none"> • Mary will not be getting enough carbohydrates and her body will begin to compensate for it in a negative way. • Mary can expect to experience more weight loss • Mary may be protecting herself from other health problems by exercising and losing weight, however a high-fat, high-protein diet will only be increasing her chances for future health problems

Preferred Solution and Rationale:

The preferred solution to this problem is the first one, the one that advocates a well-balanced diet. The human body requires all of the macronutrients--fats, proteins, AND carbohydrates--and will begin to compensate if those needs are not met. For example, there are short-term harmful effects of low-carbohydrate diets, such as muscle breakdown and ketosis. There are also long-term consequences of low-carbohydrate diets, such as increase susceptibility to heart problems, cancer, and other health problems. The preferred solution advocates a balanced diet to prevent some of those future problems. The other solution looks at it in a different manner and the belief is that being overweight is the reason for the increased susceptibility to future health problems. Therefore, the first step should be to get Mary back to a more acceptable weight. This is a good idea, but the end result (not being overweight) is meaningless if the process is harmful. Therefore, a balanced diet, one that includes appropriate amounts of each macronutrient, vitamin, and mineral is the preferred solution. Because such a diet is varied, there is less of a risk of "falling of the wagon" and participating in a binge. Also, Mary would not need to be on a special diet and her family could eat the same foods. In addition, much of the initial weight loss associated with low-carbohydrate diets is due to water loss, so the likelihood of gaining the weight back is high. Both solutions advocate an exercise program, and because Mary does not typically do physical activity, it may be best for her to start at three times a week. Both solutions also recommend that Mary discontinue the use of Metabolife, a substance that can have harmful effects. In the preferred solution, Mary and her mom are given information of eating disorders, rather than just her mom getting the information. Even though it is likely that Mary does not have an eating disorder, being knowledgeable cannot hurt and Mary could possibly see warning signs in one of her friends in the future.

Good Diet, Fad Diet Debriefing

Each group of four will present their solution to the class in a live or recorded skit. The characters will discuss Mary's current weight loss plan, the positive and/or consequences, and whether it should be continued. They will also detail the warning signs and health consequences of anorexia and bulimia and present a plan of action for healthy weight loss (while discounting other diets considered "unhealthy"). All of the students in the class, along with the teacher and a registered dietician, will see all of the skits. Students may also review the written plan of action to become more familiar with the solution.

After every skit, students must do two things. As individuals, they will be required to score the group that just performed with the assessment rubric. After completing this task, they will meet back with their group to discuss the solution they heard presented in the skit. The students will be responsible for creating a chart of the advantages and disadvantages of the solution (pros/cons) and of the consequences of the solution. They will follow this procedure after each group has performed their skit. This group work will begin to get them thinking about how the solutions they are hearing can be compared with one another and even their own solutions. This group work is also a good opportunity for students to see if they had a different understanding of a particular concept, or interpreted something differently. After all of the groups have performed their skit, each group should be left with a pros, cons, and consequences list for each of the different solutions presented by each of the different groups.

Next, a class list of pros, cons, and consequences of each solution will be created on the board (or large sheets of paper). Students will volunteer or be selected to lead this process of gathering the information to add to the class lists. Many of the items on the class list will have already been discussed by students in their groups, but the advantage of this type of work is that some groups will come up with something that none of the groups had previously considered.

After a class list is generated, a class discussion will take place. Each solution--its pros, cons, and consequences--will be discussed one at a time. If students are unfamiliar with the PBL process, the teacher will likely have to coach the discussion (see next to last paragraph). As students become more familiar with the process, hopefully someone in the class will feel comfortable leading the discussion. When the class discussion of each solution is completed, the students will individually select (by voting) the "best" solution from the ones presented (as is, with no modifications). Good solutions will have far many more advantages than disadvantages.

After the "best" solution is picked, another class discussion is needed to determine whether minor changes need to be made in order to make the solution better. It is possible that the students will wish to remove a part of what they considered to be the "best" solution. For example, students may agree that Mary needs to be on a balanced diet, but may also believe that she may be more successful if she reduced her fat take

even further than originally suggested. On the other hand, students may feel that the "best" solution is lacking a vital component. For instance, they may believe Mary needs to be on a regular diet, but may feel that Mary needs to exercise more than three times a week. Regardless, after they have chosen the best solution, adding to the solution or removing part of the solution can be done by taking a class vote after the discussion.

The potential for new issues to arise during this part of the process is also possible. For example, what if during the course of discussing the solution, students decide Mary will have more success if she takes ownership of her weight loss and develops her own menu of food choices? Students may be required to go back and research how she could do this. Are there books she could use as guides? Are there nutritional software programs? Students may already be able to answer these questions depending on what kind of research they originally did to come up with a solution, but in many cases, they will need to go back and do a little more research.

Initially, a great deal of coaching from the teacher will be necessary during the class discussions. Students will find it easy to generate a class list of pros, cons, and consequences, since all that really entails is reading off of the list creating during their group work. However, systematically looking at the pros, cons, and consequences and deciding on the "best solution will not feel as natural to them. Teachers may have to ask questions such as:

"Why exactly is that a disadvantage?"

"There seem to be a number of cons to that solution, so why do you think they chose it?"

"What lead you to believe that a balanced-diet was the best solution?"

"Where did your research come from to support that statement?"

"Are there any other consequences that haven't been mentioned?"

"If you believe that is an important issue that needs to be added, why do you think they left it out?"

"How does this solution compare with your group's?"

"Why do you think they interpreted that piece of information differently?"

"Why was that issue overlooked?"

"Where would we need to go to look that up?"

"How do you know that is true?"

It is possible that students may completely neglect to research issues the teacher felt were important to cover in the PBL unit. For example, what if none of the groups research the effects of Zoloft and depression in general on weight? In that case, the teacher will have to guide them so that they will be exposed to the content. Here again, the students may be able to answer questions once asked just by what they have learned through their extensive research. However, if that is not the case, students will be responsible for looking up the issue or the teacher can instruct his/her students on the issue. If the issue is an important one, it would be better to have the students complete the research on their own.

