**STANDARD 4—Proteins and Fats (Lipids)**

[http://watchlearnlive.heart.org](http://watchlearnlive.heart.org/) by the American Heart Association is a good link explaining cholesterol and how it affects the bloodstream.

<http://science.howstuffworks.com> the American Institute for Preventive Medicine.  "How Nutrition Works"  20 November 2006.  HowStuffWorks.com. See also

<http://health.howstuffworks.com/wellness/food-nutrition/facts/how-nutrition-works.htm>  04 February 2015. –This website has a number of rather long articles, but it is good background information. In order to avoid the ads, click on “Print” and read it on a cleaner screen.

<http://www.nlm.nih.gov/medlineplus/dietaryproteins.html> This is the official government website to give information on all sorts of dietary information. This particular write-up is on dietary proteins.

[DNA and RNA](http://www.nobelprize.org/educational/medicine/dna/intro.html) Excellent presentation on DNA and RNA—lots of illustrations and easy-to-understand information from the Nobel Prize website. Learning is scaffolded so the level of understanding can be chosen.

Objectives 1b and c— [Complete and Incomplete Proteins](http://www.cdc.gov/nutrition/everyone/basics/protein.html#What%20is%20protein) The combination of amino acids in a food source determine if a protein is considered complete or incomplete. Nine "essential amino acids" cannot be made by the body and must be consumed in food. A protein is considered "complete" if it contains all nine in the correct ratio, or "incomplete" if it is lacking or low in one or more of the nine. A "complementary" protein is two foods that together provide all nine in adequate amounts. Grain products are usually limited by their lysine content, while seeds and legumes are usually limited by sulfur-containing amino acids (e.g. methionine) or aromatic amino acids (e.g. tryptophan).

Whatever amino acid the plant is lowest in is called the “primary limiting amino acid.” An “essential amino acid” is a critical amino acid (protein) the body does not create within itself and must get from food—it is “essential” for good health.

Animal proteins (except for gelatin) contain adequate amounts of all nine essential amino acids, so they are complete proteins. Soy foods (tofu, tempeh, soy nuts, edamame, etc.) is the only complete plant protein. Quinoa has adequate amounts of the nine essential amino acids, but is not high enough in protein to be considered a “protein” food in MyPlate. All other plants proteins are incomplete and need to be paired with either a small amount of a complete protein, or another incomplete protein that is limited in a *different* essential amino acid in order to get all nine amino acids in the food. Pairing legumes with grains, nuts or seeds creates complete proteins.

<http://yumuniverse.com/plant-based-protein-information-chart/> This website has good, clear information on which amino acid is found in which plant, and how much protein is found in particular plants (remember plant protein is incomplete until paired with another type of incomplete protein, or a small amount of an animal complete protein). *Be careful, because the website wants to sell you their books and program. Not all of the information beyond the tables is documented, but is personal opinion.*

Objective 3c—raw milk vs. unpasteurized--[FDA Links on Raw vs. Pasteurized Milk](http://www.fda.gov/food/populartopics/ucm293042.htm)

There are links to articles, both scientific and popular, about the dangers of raw milk and the benefits of pasteurized.

Objective 4—Lipids

<http://youngwomenshealth.org/2012/12/10/dietary-fat-and-cholesterol/> This was a link in the MedPlus government website for fats and cholesterol. Unfortunately also includes Twitters on unrelated topics.

[Basic Chart to find Healthy Fats](http://cdn1.sph.harvard.edu/wp-content/uploads/sites/30/2012/10/finding-foods-with-healthy-fats.jpg) –a simple continuum chart (jpg) of healthy/unhealthy fats from Harvard School of Public Health.

<http://publications.nigms.nih.gov/chemhealth/eat.htm> “You Are What You Eat” discussion of lipids from the Chemistry standpoint.

<http://www.hsph.harvard.edu/nutritionsource/fats-full-story/> A complete layman’s explanation of lipids from the Harvard School of Public Health. It’s a long article, but great background for the teacher. Portions of the article could be useful to copy for the students. The explanations are clear, it’s just a long article.

Objective 4—Lipids—Question: Which is healthier—butter or margarine?

*This question was posed by one of the teachers to Martha Archuleta, USU’s Director of the Master of Dietetics Administration Program. This is her response:*

*“I’ve attached a link from a recent article from Diabetes Self-Management which is written by a dietitian and certified diabetes educator. One thing I like about it is that she addresses the debate and gives some succinct info about pros and cons of each and indicates that there is not a clear cut answer. I agree with this assessment. I know we want to give students the “right” information, but I think it’s also really important for people (including our students) to understand that nutrition is a constantly evolving science and things are not always clear cut, although there is usually still a common sense take-away (in my opinion). In this example, it’s not totally clear cut that margarine is better than butter, or vice versa. But the common sense take-away is still that both have lots of calories, so use either in moderation and use other oil based fats where possible.*

[*http://www.diabetesselfmanagement.com/blog/which-butter-or-spread-is-better/*](http://www.diabetesselfmanagement.com/blog/which-butter-or-spread-is-better/)

*--Martha Archuleta, April 22, 2015*