Animals in our Diets Reading

We have learned that all organisms need a source of energy and of building blocks for the body. Animals, including humans, meet these needs by eating food. In turn, some animals are food for people. Animal products in our food are a source of protein and fat. In this activity, we will focus on the protein.

Let's talk about biosynthesis. The proteins in human cells are all made from 21 different amino acids. Where do they come from? They all come from protein in the food we eat. You know part of the story of how our bodies use protein in food: The protein we eat is broken down into individual amino acids during digestion. These are transported throughout our bodies by our blood and absorbed by cells. Our cells build the proteins they need by stringing together amino acids.

BUT here's a problem: What if the protein in our food doesn't have exactly the right amino acids? Suppose a cell needs lysine (an amino acid) to make its protein, but the protein the person ate was made of other amino acids? What's a cell to do?

It turns out that for 12 of the 21 amino acids, human cells have a solution. They can make these amino acids from other amino acids. Then there are 9 amino acids—the essential amino acids—that our cells can't make. We have to get these 9 amino acids from protein in the food we eat.

Animal proteins usually have all or most of these nine essential amino acids. By comparison, individual plant proteins are often not complete. We need to eat a mixture of plants (for example, grains such as rice or wheat and legumes such as peas or beans) to get a complete protein diet.

The downside of animal proteins is that we have to grow a lot of food to feed the animals that produce the protein we consume. In other words, it takes more agricultural land to support human diets with lots of animal protein than it does to support diets with plant protein.

You can figure out how much animal protein you are eating, and how much food for animals it takes to produce that protein. It's a two-step process. You can use the Animals in Our Diets Worksheet as you follow these steps.

Step 1: How much animal protein do you eat?

You can use Table 1 in the Animals in Our Diets Worksheet to figure out how much animal protein you are eating. Here's how to fill out each column:

- Column 1: Source of animal protein. List all the animal foods that you ate during the last 24 hours.
- Column 2: Amount consumed. Estimate the amount of that food that you ate.
- Column 3: Protein content. Here are two ways to figure out a food's protein content:
    - If you have the package that the food came in, the nutrition label will be right there.
    - If you don't have the package, you can find nutrition information for all kinds of foods at the USDA Food-a-pedia website: https://www.supertracker.usda.gov/foodapedia.aspx. You need to (a) type in your food, (b) choose your specific food from the menu, and (c) choose the

"Nutrient Info" tab on the label that pops up. You can also choose the amount of food.

- Column 4: Amount of food consumed by livestock. Use Table 2 below to find your animal and calculate the amount of food the animal ate to produce its protein. You will need to multiply the number in the last column of Table 2—Dry weight of food per gram of protein—by the number of grams you found in Column 3 of Table 1.

Table 2. Protein content and dry weight of feed needed to grow animal protein sources

Source of protein	Protein content	Dry weight of feed per pound of meat	Dry weight of feed per gram of protein
beef	90 g/ lb meat	15 lbs feed/ lb meat	0.17 lb/ g
pork	95 g/ lb meat	6 lbs feed/ lb pork	0.06 lb / g
chicken	100 g/ lb meat	3 lbs feed/ lb meat	0.03 lb/ g
catfish	100 g/ lb meat	2 lbs feed/ lb meat	0.02 lb/ g
egg	6 g/ egg	2 lbs feed/lb of egg 0.28 lbs feed/egg	0.05 lbs/ g
milk	7 g/ cup of milk	2 lbs feed/lb milk 16 lbs feed/gal milk	0.14 lbs / g
cheese	70 g/ lb	15 lbs of feed/ lb	0.21 lb / g

Step 2: Find your agricultural protein footprint

How much food did animals eat to produce the animal protein that you ate? You can figure that out, too. Just add up all the pounds of food in Column 4 of Table 1 on your worksheet.

You can also figure out how much plant food you would have to eat to get the same amount of protein. People have the option of getting their protein from plants or animals. Mixtures of beans are a good source of complete plant protein. They contain about 90 g of protein per pound of dried beans. Use your worksheet to calculate how many pounds of beans you would need to get all the protein you need from beans.

Digging deeper

The sources of animal protein that you listed in Table 2 were probably all mammals, birds, or fish. But they are not the only possible sources of animal protein. Here's another possibility: http://www.npr.org/sections/thesalt/2013/09/19/223728061/making-food-from-flies-its-not-that-icky.

Here's some more information on essential and non-essential amino acids: https://medlineplus.gov/ency/article/002222.htm.