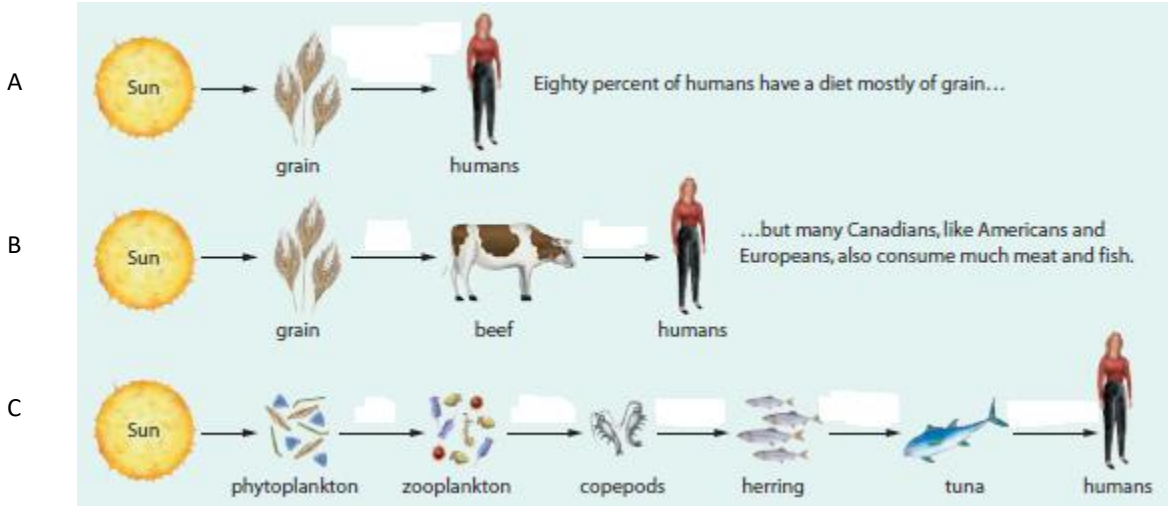


Recall that only a very small fraction of the Sun’s radiant energy is absorbed by and incorporated into plant material. For ease of calculation, assume that the amount of energy captured by plants and contained in their tissues is **2 percent of the total energy available from sunlight**. Also assume that **10 percent of the energy at one trophic level is transferred to the next level**. (Remember, though, that the 10 percent value is an oversimplification.)



1. The three food chains shown here represent typical food chains for people with different diets. Study the food chains and determine the amount of energy available to each trophic level if incoming **sunlight is 1,000,000 kJ** by drawing three different pyramids of energy.

2. About 80 percent of the world’s population eat mostly grain-based foods. Why do you think this is the case?

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3. How might diet influence the number of humans that Earth can ultimately support?

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4. One square metre of land that is planted with rice produces about 5200 kJ of energy per year. A chicken farm produces about 800 kJ/m<sup>2</sup> of potential food energy per year. Assume that a human must consume 2400 kJ per day to survive. Although it is an oversimplification to imply that a person could survive by eating only one type of food, calculate the total area of land needed to support the student population of your school (1100) for one year on a diet of...

Rice	Chicken
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**Example calculation:**

If a cattle farm produces 500 kJ/m<sup>2</sup> and you need to feed 200 people

2400 kJ x 365 = 876000 kJ per person

876000 x 200 = 175200000 kJ for 200 people

175200000 kJ / 500 kJ = 350,500 m<sup>2</sup> of area to feed 200 people for a year.

5. Which type of food is more efficient at producing energy for human consumption?  
 \_\_\_\_\_ How many times more efficient? \_\_\_\_\_ (Hint: Divide big by small)

6. What do you think the farming industry will look like 100 years from now?

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