Build Strength with Protein

Discussion
1. Discuss the role of protein in the body.
Protein is the body’s building block. Protein helps you grow big and strong. Protein supports and maintains body components, including:
   • blood,
   • organs,
   • muscles,
   • hair,
   • skin, and
   • nails.

2. What are some functions of protein?
   • Helps body tissues grow.
   • Helps repair body tissues.
   • Aids proper function of red blood cells.
   • Helps prevent infections.
   • Regulates hormones and enzymes.

3. Talk about the amount of meat needed each day.

<table>
<thead>
<tr>
<th>Group</th>
<th>Age</th>
<th>Daily Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children</td>
<td>2 to 3 years old</td>
<td>2 ounces</td>
</tr>
<tr>
<td></td>
<td>4 to 8 years old</td>
<td>3 to 4 ounces</td>
</tr>
<tr>
<td>Girls</td>
<td>9 to 13 years old</td>
<td>5 ounces</td>
</tr>
<tr>
<td></td>
<td>14 to 18 years old</td>
<td>5 ounces</td>
</tr>
<tr>
<td>Boys</td>
<td>9 to 13 years old</td>
<td>5 ounces</td>
</tr>
<tr>
<td></td>
<td>14 to 18 years old</td>
<td>6 ounces</td>
</tr>
<tr>
<td>Women</td>
<td>19 to 30 years old</td>
<td>5½ ounces</td>
</tr>
<tr>
<td></td>
<td>31 to 50 years old</td>
<td>5 ounces</td>
</tr>
<tr>
<td></td>
<td>51+ years old</td>
<td>5 ounces</td>
</tr>
<tr>
<td>Men</td>
<td>19 to 30 years old</td>
<td>6½ ounces</td>
</tr>
<tr>
<td></td>
<td>31 to 50 years old</td>
<td>6 ounces</td>
</tr>
<tr>
<td></td>
<td>51+ years old</td>
<td>5½ ounces</td>
</tr>
</tbody>
</table>

4. Compare 1 ounce equivalents.
   • 1 ounce of meat, poultry, or fish
   • ¼ cup cooked dry beans or peas
   • 1 egg
   • 1 tablespoon of peanut butter
   • ½ ounce of nuts/seed
   • 1 deck of cards is about the size of 3 ounces of meat

Learner Objectives
Participants will be able to:
• discuss protein functions;
• identify plant and animal sources of protein;
• distinguish between involuntary and voluntary muscle movement; and
• identify one goal or action related to lean protein and/or physical activity.

Materials
• Hula hoops
• Jump rope
• Muscle man diagram
5. Discuss lean protein sources.
Remind students to choose lean meats because they are lower in fat. Encourage students to look for meat sources that are grilled or baked, rather than fried or breaded. Have the students decide which of the two choices in the pairs below is the leaner protein choice.
• chicken nuggets or baked chicken
• tuna or fried catfish
• pork chop or tilapia
• turkey or steak

6. Compare protein sources.

<table>
<thead>
<tr>
<th>Grilled vs. Fried</th>
<th>Calories</th>
<th>Protein</th>
<th>Carbs</th>
<th>Fat grams</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fried chicken, 4 ounces</td>
<td>296</td>
<td>28 grams</td>
<td>11 grams</td>
<td>15 grams</td>
</tr>
<tr>
<td>Grilled chicken, 4 ounces</td>
<td>110</td>
<td>20 grams</td>
<td>0 grams</td>
<td>1 gram</td>
</tr>
<tr>
<td>Fried fish sticks, 4 ounces</td>
<td>231</td>
<td>20 grams</td>
<td>8 grams</td>
<td>13 grams</td>
</tr>
<tr>
<td>Grilled fish (1 fillet)</td>
<td>80</td>
<td>14 grams</td>
<td>1 gram</td>
<td>3 grams</td>
</tr>
<tr>
<td>Chicken fried steak, 4 ounces</td>
<td>325</td>
<td>11 grams</td>
<td>34 grams</td>
<td>47 grams</td>
</tr>
<tr>
<td>Grilled lean hamburger, 4 ounces</td>
<td>136</td>
<td>24 grams</td>
<td>0 grams</td>
<td>4.5 grams</td>
</tr>
</tbody>
</table>

7. Brainstorm different sources of protein. (Meat is not the only source of protein.)
• almonds
• cashews
• eggs
• crabmeat
• flounder fish
• liver
• soybeans
• tofu
• lima beans
• peanuts
• trout
• tuna
• walnuts
• dairy products
8. Discuss the importance of physical activity and muscles.
   • Physical activity makes muscles stronger (and larger).
   • When muscles get stronger, you can exercise for a longer time.
   • Examples: biking, running, walking.
   • Strong muscles prevent injuries.

9. Brainstorm simple exercises for:
   • Upper body
     • push-ups, pull-ups, tug-o-war
   • Lower body
     • jumping, running, biking
   • Core
     • sit-ups, hula hooping

Activity
Shake and Move: Have youth participate in exercise challenges. Don’t compare them to each other. Instead, have them do the challenge several times, trying to improve their score each time.
   • Push-ups: Have youth see how many push-ups they can do in 1 minute.
   • Jump rope: Have youth see how many times they can jump rope in 1 minute.
   • Sit-ups: Have youth see how many sit-ups they can do in 1 minute.
   • Hula-hoop: Have youth see how many times they can hula-hoop in 1 minute.
**Name that Muscle (Front)**

Play “Name that Muscle” to help youth learn major muscles of the body.

- **Deltoid: Shoulder**
  - Lifts the arm up.

- **Pectoralis [pek-toh-ray-lis] Major: Chest**
  - Pulls the arm down and in towards the body.

- **Biceps: Front of arm**
  - Bends the elbow.

- **Abdominal muscles: Stomach**
  - Keeps the body upright.

- **Rectus femoris: Front upper leg**
  - Assists in flexion and hip extension.

- **Sartorius [sahr-tor-ee-uhs]: Runs across the upper and inner part of the thigh**
  - Assists in flexion, rotation of hip, and flexion of knee.
Name that Muscle (Back)

Play “Name that Muscle” to help youth learn major muscles of the body.

Trapezius [trah-pee-zee-uhs]: Upper back
  • Used to rotate and move the shoulder blade up and down.
  • It also assists in breathing.

Triceps: Back of arm
  • Extends the elbow.

Latissimus [lah-tis-i-muhs] dorsi [dor-see]: Back
  • Pulls the arm down and in towards the body.

Gluteus [gloo-tee-uhs] maximus: Buttocks
  • Is a major muscle in allowing humans to walk upright.

Biceps femoris [fem-or-is]: Back upper leg
  • Assists in flexion of the upper leg.

Gastrocnemius [gas-troh-nee-mee-uhs]: Calf
  • Helps you point your toe by pulling on your heel.
Types of Muscle

- **Skeletal (or voluntary) muscle** is the type of muscle you can see and feel. When you work out with weights, you are exercising skeletal muscle. Skeletal muscles attach to the skeleton and come in pairs because one muscle moves the bone in one direction and the other moves it back the other way. These muscles contract voluntarily—you think about contracting them, your brain sends the signal, and the muscles contract.

- **Smooth (or involuntary) muscle** can stretch and maintain tension for long periods of time. It is found in your digestive system, blood vessels, bladder, and airways. Your nervous system controls it without you having to think about it, so it contracts involuntarily. For example, your stomach and intestines work all day, but most of the time you’re not aware of it.

- **Cardiac muscle** is found only in your heart, and is a twitch muscle that contracts involuntarily. Its big features are endurance and consistency. It can stretch in a limited way, like smooth muscle, and contract with the force of a skeletal muscle.
What is the role of protein?
_______________________________________________
_______________________________________________
_______________________________________________

Protein provides 4 calories per gram. If 1 cup of milk has 8 grams of protein, how many calories is the protein providing?
_______________________________________________
_______________________________________________
_______________________________________________

What are the three types of muscle?
_______________________________________________
_______________________________________________
_______________________________________________

What does it mean if a muscle is involuntary?
What is an example?
_______________________________________________
_______________________________________________
_______________________________________________

What is the name of the muscle of the chest?
_______________________________________________

Name two muscles in the upper arm.
_______________________________________________
_______________________________________________

What is one thing I can do today to increase the amount of lean protein I eat?
_______________________________________________
_______________________________________________
_______________________________________________
### Kansas School Wellness Policy Model Guideline — Nutrition Education

#### Classroom: Middle–High School

<table>
<thead>
<tr>
<th>Requirements achieved in this lesson:</th>
<th>Basic</th>
<th>Advanced</th>
<th>Exemplary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic, Advanced and Exemplary</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Basic
- At least 25 percent of nutrition education involves hands-on activities that engage students in enjoyable, developmentally appropriate, culturally relevant, participatory activities.

#### Advanced
- At least 50 percent of nutrition education instruction involves hands-on activities that engage students in enjoyable, developmentally appropriate, culturally relevant, participatory activities.

#### Exemplary
- Topic
  - Basic nutrient requirements for protein.
  - Dietary guidelines and personal eating plans.

### References

- Details on Protein Function, Your Daily Protein Requirement and Vegetarian Protein Need: [http://www.fatfreekitchen.com/nutrition/protein.html](http://www.fatfreekitchen.com/nutrition/protein.html)
- Your Muscles: [http://www.kidshealth.org/kid/body/muscles_noSW.html](http://www.kidshealth.org/kid/body/muscles_noSW.html)
- Choose My Plate: [http://www.choosemyplate.gov/](http://www.choosemyplate.gov/)

### Answer Key

1. Helps with growth and repair of body tissues, aids proper function of red blood cells, helps prevent infection, and regulates hormones and enzymes.
2. $8 \times 4 = 32$, 32 calories provided just from the protein.
3. Skeletal, smooth, cardiac
4. You do not have to think about contracting it. An example would be intestinal muscles.
5. Pectoralis
6. Deltoid, biceps
7. Answers vary

The author gratefully acknowledges the contributions of Catherine Metzgar (senior in dietetics, graduated May 2010); Kyleen Krehbiel (senior in dietetics, graduated May 2011); reviewed by Lisa Friesen, R.D., Virginia Barnard, MPH; additional review and editing by Erika Bono, MPH, R.D., and Yijing Li, M.S.

Brand names appearing in this publication are for product identification purposes only.
No endorsement is intended, nor is criticism implied of similar products not mentioned.

Publications from Kansas State University are available at: [www.ksre.ksu.edu](http://www.ksre.ksu.edu)

Publications are reviewed or revised annually by appropriate faculty to reflect current research and practice.

Date shown is that of publication or last revision.

Contents of this publication may be freely reproduced for educational purposes. All other rights reserved.

In each case, credit Tandalayo Kidd, Ph.D., R.D., LPN, associate professor, human nutrition, *Build Strength With Protein*, Kansas State University, November 2013.

---

**MF3008**

K-State Research and Extension is an equal opportunity provider and employer. Issued in furtherance of Cooperative Extension Work, Acts of May 8 and June 30, 1914, as amended. Kansas State University, County Extension Councils, Extension Districts, and United States Department of Agriculture Cooperaing, John D. Floros, Director.