

Name _____

Mouse Math

You know those math problems that you do and then say, "When would I ever need to know this?" Well, in caring for laboratory animals, math is an important part of the job. Understanding how to do certain types of math problems helps to ensure that the animals are healthy, the environment is safe, and employees are protected.

For example, imagine you are a laboratory animal caregiver working at a company that develops new medicines to treat cancer. You are assigned to care for several rooms of mice in a study of a new drug to treat leukemia (a cancer of blood cells, common in children and certain families of mice). Your daily responsibilities may include:

- Providing daily care for animals in a safe and sanitary manner (feeding, watering, changing bedding, providing clean cages and nesting material, grooming animals, playing with animals).
- Observing and reporting anything that appears abnormal in the animals (eating habits, appearance, unusual behaviors, waste and urine, poor grooming).
- Observing and reporting changes in the animal room environment (temperature, fresh air flow, room lighting, humidity, noise level).
- Handling, gently restraining the animals for examination, telling the difference between the sexes.
- Assisting with animal identification and record keeping.
- Separating animals by sex once they are old enough to wean.
- Using various equipment and machinery following established procedures (such as light meters, sanitizing equipment, and computers).
- Conducting sanitation and sterilization procedures on rooms and equipment.
- Providing assistance to a supervisor, researcher, or veterinarian.
- Providing treatments to animals as instructed.

Math will play an important role in your daily job duties. Can you complete the following math problems you might come across during a normal day at work?

- _____ You are required by law to provide a certain amount of space in the cage for each mouse, depending on the size of the mouse. According to a government document called the *Guide for the Care and Use of Laboratory Animals*, mice that weigh up to 25 grams (g) are each supposed to have 12 in² of floor area in their cage. Your mice all weigh between 15 g and 20 g. What is the maximum number of mice you can put into a cage that measures 9 inches wide x 12 inches long?
- _____ Based on the requirements listed above in no. 1, how many 20 g mice can be housed in a cage that is 7.5" wide x 11.5" long x 5" high?
- _____ According to the *Guide for the Care and Use of Laboratory Animals*, the temperature of your animal room is required to be maintained at 22°C. The thermometer in your room reads 75°F. Should you call the building engineer to report the room is at the wrong temperature? Yes or No?
- _____ A 50 lb. bag of rodent chow (mouse and rat food) costs \$35. What is its price per pound?
- Each of your mice eats approximately 4 g of food per day.
 - _____ a. Approximately how many grams of food does one mouse eat in a month (30 days)?
 - _____ b. How much food (in grams) would be required to feed all 250 mice in one of your rooms for one month?
 - _____ c. How much is your answer to "b" (above) equal to in kilograms (kg)?
 - _____ d. What is the answer to "c" (above) equal to in pounds?
- In another mouse room, you use a 50 lb bag of feed each month to feed the mice.
 - _____ a. How many 50 lb bags of feed would you need for that room for 6 months?
 - _____ b. For one year?
- _____ You have been trained to use a special machine that works like a giant automatic dishwasher, to clean and sanitize the empty mouse cages. According to guidelines, the rinse water must reach a minimum of 180°F in order to kill most of the bacteria that might spread infection. Your mice are very important animals that can pick up infections easily, so you must be sure the cages are properly sanitized before you put your mice in them. The display on the machine indicates the rinse water is at 84°C. Is the water hot enough to sanitize the cages? Yes or No?
- _____ You care for a room that holds 30 mouse cages. It requires a total of 10 lbs of clean bedding each time all 30 cages are changed. You are required to change their bedding 2 times per week. How long would a 50 lb. bag of bedding last?
- _____ A mouse's normal body temperature is 35.8°C to 37.4°C. If a mouse has a body temperature of 98°F, is that below normal, within the normal range, or above normal?
- _____ You are now making \$24,000 per year. Because you are doing so well at your job, you receive a "performance" merit raise of 5% per year. What will your new annual salary be?

