

Chapter 2: Food Safety

SAFE PRACTICES

Did you know good food safety habits are important in our every day lives?

From farmer to consumer, it is important to ensure food is safe. Foodborne microbes are one of the leading causes of illness in the United States. It has been estimated that 15% of US citizens each year are affected by **foodborne illness**.

The key is to prevent foodborne illness, not to treat. The United States government promotes food safety to its citizens. The Federal Drug Administration (FDA) and the United States Department of Agriculture (USDA) regulate and inspect foodservice facilities to ensure safety. Along with the FDA and USDA, the Environmental Protection Agency (EPA) and the Centers for Disease Control (CDC) require safe handling of raw and partially cooked meats. Raw and partially cooked meats are the most common causes of foodborne illness.

One of the top causes of foodborne illness is meat that has not been cooked to the proper temperature. Higher temperatures kill the microorganisms that can cause foodborne illness. When preparing meat, we should use thermometers to make sure the center of the



meat has been cooked to its proper temperature. Each type of meat requires a different cooking temperature. To properly determine the temperature, the thermometer must first be calibrated.

Calibration ensures the thermometer reads the correct temperatures. This can be done by placing it in ice-cold water (32° Fahrenheit) or

boiling water (212° Fahrenheit). Water molecules increase in motion as they move through these states (solid, liquid, gas). When energy changes state, it undergoes a phase change such as **melting**, **freezing**, **evaporation**, or **vaporization**. You will observe these types of state changes in *Food Explorations Lab I* of this chapter.

Melting occurs when a solid becomes a liquid by absorbing heat. In this phase change, molecular bonds are broken to allow melting to occur. Freezing is the opposite of melting. It is when a liquid becomes a solid. During freezing, heat leaves the liquid to allow tight molecular bonds to form. Evaporation and vaporization are when a liquid becomes a gas because heat moves into the liquid and allows the molecules to move more freely.

There are also other reasons foodborne illness may occur. For example, food can be contaminated with harmful bacteria during food preparation. Washing your hands for 20 seconds, or as long as it takes to sing Happy Birthday to yourself twice, at the proper temperature and using cleansing agents are essential in preventing illness. Washing our hands before eating can help keep us safe. The bacteria on our hands can easily transfer to the food we're eating. You will observe why hand washing is an important practice in *Food Explorations Lab II* of this chapter.

Preventing microbial growth in food can be a little harder. Many factors affect microbial growth on food (e.g. pH, moisture). It is important to keep foods at the right temperature to prevent growth (less than 40°F or greater than 140°F). Food can't be kept for too long at room temperature before it is considered unsafe for consumption. Storing raw foods (meat and dairy products) properly and washing foods, like fruits and vegetables, are also methods that keep food safe.



Given enough time, mold can grow in cold or hot temperatures.

Even when proper prevention techniques are in place, age effects occur. When foods age, they produce certain microorganisms like mold, yeast, and bacteria.

Molds are multicellular organisms with a cotton-like appearance. They grow on the surface of dry foods, like bread, at room temperature. If given enough time, they can grow in cold or hot temperatures. You will learn more about mold growth on food in *Food Explorations Lab III* of this chapter.

Yeast is a single celled microorganism. It can grow on foods like citrus fruits because they provide the best environment for yeast to reproduce. The conditions for this environment include sugar, acidity (pH 4.0 to 4.5), and oxygen.

Bacteria are tiny single cellular microorganisms smaller than molds and yeasts. They reproduce in high moisture and neutral pH conditions (pH 7), where sugar and salt are not present. Depending on the bacteria, different environmental conditions are needed. Some bacteria love the cold, some love the heat, and some love room temperature. It is important to remember, however, that not all bacteria are bad for your health!

From the farm to the kitchen, everyone should be aware of the methods to prevent foodborne illness. Let's find out what we can do to keep our food safe!

Think About It

Food Explorations Lab I

1. Thermometers should be calibrated to ensure that food is cooked to the correct temperature.
2. The state change from a liquid to a gas is called evaporation.
3. The water molecules in the frozen state of matter move the slowest.

Food Explorations Lab II

1. Which part of our body is most likely to contaminate food during preparation? hands
2. The correct storage temperature can prevent microbial growth on food.
3. Washing hands before eating can help keep you safe.

Food Explorations Lab III

1. Multi-cellular organisms that grow on dry food are called mold.
2. A single cellular microorganism that grows on citrus fruit is called yeast.
3. The smallest microorganisms that grow on food are bacteria.