Chocolate

Spring 2020
Introduction

• Chocolate is the most delicious food in the universe
  ▪ 2017 stats:
    - 15 billion pounds of chocolate eaten per year, worldwide
    - Average US consumption 9.7 lbs per person per year
      - (Compare to 19.4 lbs per person per year in Switzerland!)
    - At least $83 billion in sales worldwide per year

• But where does this wondrous food come from?
  ▪ And how does it work?
Theobroma Cacao

- **Food of the Gods**
  - Literal translation of scientific name

- Cacao trees grow in tropical regions
  - 70% grown in West Africa
  - There are real ethical issues to cacao farming (search the web)

- Farmers sell cacao beans
  - Cacao pods contain beans in a goopy white pulp
  - Beans + pulp fermented for a few days
  - Beans are then dried and shipped
Cacao Beans to Chocolate Liquor

1. Beans cleaned/pasteurized (steam+pressure)
2. Beans roasted (like coffee) to reach desired flavor
3. Shells removed, leaving behind cocoa nibs (below)
4. Nibs ground to a paste
   • Result: chocolate liquor
     - Not alcoholic!
     - A fluid with solids and fat
   • Two options next
     - Separate out the cocoa butter
       - Use cocoa butter in cosmetics and to make other chocolate richer
     - Make chocolate!
   • (Chocolate usually made from beans of different origins, mixed to get the right flavor)
Bitter Chocolates

• Chocolate liquor mixed with other ingredients
  ▪ Almost always, with extra cocoa butter to make richer
    - Less desirable beans used for cocoa butter
    - Cocoa butter is deodorized before being used elsewhere
  ▪ Note: chocolate chips have less cocoa butter so they keep their shape in cookies

• Pure chocolate liquor = unsweetened chocolate
  ▪ Tastes quite bitter, not very fun to eat
  ▪ Sometimes called “baking chocolate”

• Bittersweet chocolate = ~70% cacao, 30% sugar
  ▪ Often has vanilla, lecithin added as well

• Semisweet chocolate = ~55% cacao, 45% sugar
  ▪ (Also has vanilla, lecithin)
Milk Chocolate

- Problem with adding milk to chocolate:
  - Chocolate is a very dry food
  - If you add water to something dry and powdery, it clumps!
  - If you add a little bit of milk to chocolate, it seizes
    - Becomes a sticky, clumpy mess
    - Only thing you can do is add a lot more liquid to it and make an emulsion

- 1867: Henri Nestlé develops powdered milk for infant formula!

- 1876: Daniel Peter adds Nestlé’s powdered milk to chocolate to get the first milk chocolate

- (Good) Milk chocolate = ~38% cacao, plus powdered milk, sugar, vanilla, lecithin
White Chocolate

• No cacao solids!
  ▪ That’s why it’s not brown

• Ingredients: Cocoa butter, powdered milk, sugar, etc.

• Look for a high cacao % amount (i.e., a lot of cocoa butter)

• Without the bitter cacao solids, white chocolate is quite sweet…
Three Chocolates

Left to right: 70% bittersweet, 38% milk, 31% white
Chocolate Crystalization

• Cocoa butter can *crystallize* into a solid in many different ways
  - Commonly referred to as I, II, III, IV, V, VI
• There’s a problem in terms of taste:
  - Form I is unstable and changes to form II
  - Form II changes (more slowly) into forms III and IV
  - Forms III and IV are firm, but
    - Little “snap” when you bite into them
    - Both will “bloom” over time — (whitish) fat separates from solids
  - Form VI is good, but takes a long time to form
• ⇒ When solidifying melted chocolate, need to make form V crystals
**Tempering Chocolate**

- First, heat chocolate so all crystals melted
  - 108°F for bittersweet usually works
  - Be sure not to burn the chocolate (don’t go above 115°F)

- Then, to solidify it:
  - Method 1 (“Tabling”): Pour 2/3 of the chocolate onto a room temperature marble slab; fold chocolate over itself using a scraper or palette knife until it becomes thick, around 84°F; put back in the bowl and mix, aiming for 91°F or less
    - Idea: Form lots of crystals (folding), then melt away the bad ones (by adding back to the 1/3 chocolate)
  - Method 2 (“Microwave”): When melting chocolate, use a microwave, and heat so only 2/3 is melted; then remove and stir until all melted
    - Idea: The 1/3 unmelted chocolate is seed for the crystal form
  - Method 3: Buy a chocolate tempering machine!
Chocolate Truffles

• Ingredients
  ■ 4.5oz bittersweet chocolate
  ■ 4oz heavy cream
  ■ 1/2 ounce corn syrup
  ■ 1/2 ounce softened (not melted) butter
  ■ Pinch of salt

• Melt chocolate and cream in microwave gently

• Let cool to 85-95°F and add remaining ingredients
  ■ Now you have a ganache

• Let cool until you can roll it by hand into balls

• Dip in tempered chocolate or coat with cocoa powder or powdered sugar
Molded Chocolates

- Directions
  - Pour tempered chocolate into molds, then pour out, leaving a shell to set
    - Optional: decorate molds with colored cocoa butter first
  - Fill shell with ganache, leaving 1/8-inch at top
  - Fill remaining shell with tempered chocolate to form bottom
Hand-Dipped Chocolates

• Directions
  - Pour ganache into square pan lined with plastic wrap
  - Cool in refrigerator (2 hours) or freezer (30 mins)
  - Remove, coat one side with melted chocolate to form “foot”
  - Cut into squares
  - Dip squares in tempered chocolate
    - Optional: Decorate with transfer sheets
For More Information
