Brief Overview
Peanuts are grown on farms, sent to shelling plants, then shipped to manufacturers to make peanut butter.
1. Farm (planted, harvested, dried, shipped to shelling plant)
2. Shelling plant (cleaned, shelled, sorted, shipped to manufacturer)
3. Manufacturer (roasted, blanched, ground, mixed, jarred, shipped to stores)

Brief History
Beginning as a source of protein for toothless patients, peanut butter today is manufactured by the thousands with assembly-line machinery.

1. Farm
Peanuts are planted and harvested on farms each year, then dried and inspected by the State or Federal Inspection Bureaus, then packed and sold to shelling plants.

Runner peanuts (Fig. 1) are used in this process because of their kernels’ uniform size and therefore optimal roasting capability. Each peanut has a shell and two kernels that each has reddish skin and a small middle piece called a heart.

2. Shelling Plant
After being separated from debris, the peanuts are sorted by size and sent through a shelling machine. This is where the peanuts are placed in large slotted cylindrical drums that rotate, rubbing the peanuts against each other until the shells are opened and the kernels fall through the slots. Then an electronic color sorter spots any burnt or spoiled peanuts and disposes of them. Then the peanuts are packed and shipped to the peanut butter manufacturers.
3. Peanut Butter Manufacturer
   
a) Roasting
   The peanuts are placed into the *shelled peanut reservoir* (Fig. 2), where they wait until they are sent through the 240 degrees Celsius *hot air roaster*, which shakes to ensure evenly roasted peanuts. The peanuts turn from white to light brown.

b) Cooling
   The peanuts are then sent on a *shaking conveyor belt* to where they are cooled at a fast pace at room temperature by *suction fans*, ensuring that the natural oils will remain in the peanuts while also making sure the peanuts do not continue to cook.

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**Figure 2:**
Roasting & Cooling

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c) Blanching
   In the *blancher* (Fig 3), the peanuts are lightly rubbed between two *belts*, which removes their outer skins. The Skins are dropped into barrels beneath the machine to be used as pig feed.

d) Splitting
   The skinless peanuts move on the *splitter*, where each peanut is split so that the bitter middle, the *heart*, can be removed. The hearts fall into barrels to be used as bird feed.

e) Grinding
   The split peanuts are sent to the *grinder*, where the peanuts are ground at a medium pace into a smooth peanut paste. This peanut paste is sent to the *mixer*.

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**Figure 3:**
Blanching, Splitting, & Grinding
f) Mixing
(Fig 4) A container with three sections (one for salt, one for sugar, and one for hydrogenated vegetable oil, which is the stabilizer that stops peanut oil from separating from the peanut butter) releases these three emulsifiers into the mixer, where mixing rods rotate the peanut paste to mix in the emulsifiers. If the batch of peanuts is to be made as chunky peanut butter, small bits of peanuts are added to the smooth peanut butter at this stage. This mixing process heats the peanut butter to about 60 degrees Celsius.

g) Jarring
The peanut butter is cooled down again to 38 degrees Celsius, and empty jars are sent on a conveyor belt to be filled underneath the two spouts of the mixer. The spout releases enough peanut butter to fill the jar, and then the jar is moved to the capping machine. The caps are created with aluminum seals on the inside that fall onto the jar and seal there when the capped jars are sent through a heater. Then the full jars go through a labeling process, where the expiration dates and the company’s label are placed on the jar. Each jar has a shelf life of at least one year. The jars are packaged and shipped to retailers.
Working on this project, I gathered a lot of information on the process of making peanut butter. I found it helpful to watch videos and use written resources to learn about each part of the process. The assembly line machinery was the most complex part of the process even on a factory scale.


"Peanut Butter, Roasting & Deskinner Making Machine." Zhauns – Business Opportunity Machinery. Web. 29 Oct. 2010. <http://www.zhauns.com/peanut.php>. This is where I gathered information about the general process of making peanut butter and the smaller machinery that can accomplish the task. The video on this webpage showed me the basic steps of making peanut butter, which helped to simplify the larger-scale manufacturing process so that I could understand it better.

"Peanut Grading, Shelling, and Blanching." American Peanut Council. Web. 31 Oct. 2010. <http://www.peanutsusa.org.uk/Europe/index.cfm?fuseaction= home.page&pid=58> This is where I gathered information about the history of peanut butter as well as the shelling, inspecting, and blanching processes. This is also where I learned about the parts of a peanut.