

1. **Absolute Real Economic Growth** – an increase in the Real GDP from one period to the next
2. **Per Capita Real Economic Growth** – an increase from one period to the next in per capita Real GDP, which is Real GDP divided by population
3. **Economic Growth from an inefficient level of production** – we move from one point inside the PPF to closer to the PPF
4. **Economic Growth from an efficient level of production** – a shift in the PPF to the right, usually involving new technology or some other new development
5. More Natural Resources, Labor, capital, and technological advances all can cause economic growth
6. Free trade can be considered a technology, since it promotes growth
7. **Industrial Policy** – a deliberate policy by which government waters the green sports, or aids those industries that are most likely to be successful in the world marketplace
8. However, too much growth can be bad, causing inflation, more pollution, more factories, more crowded cities, more emphasis on material goods and getting ahead, more rushing around, etc.

Added 10/2002

1. **Labor with Capital and Technology**
 - a. Economic growth function – $Y(L, K, T)$
 - b. L is for labor, K is for capital, T is for technology
2. **Technology** – knowledge or anything else that increases the output with a given amount of capital and labor
3. **Technological Change** – improvement in technology over time
4. **Invention** – a discovery of a new knowledge
5. **Innovation** – applications of new knowledge in a way that creates new products or significantly changes old ones
6. **Diffusion** – the spreading of an innovation throughout the economy
7. **Organization and Specialization** – tech can also include the way firms are organized. A new filing system that makes it easier for employees to find files can be considered technology
8. **Capital Saving and labor saving** – same job w/ less capital/labor
9. **Adam Smith** – *Wealth of Nations* – emphasized division of labor to improve production
 - a. **NOTE:** You want to know who this guy is. You'll hear of him a lot if you study economics
10. **Learning by doing** – workers become more proficient by doing a particular task many times
11. **Human capital** – a person's accumulated knowledge and skills. Education, for example, increases human capital
12. **Edison's Invention Factory** – the production of technology, which are then patented
 - a. The discovery of technology is limited by the cost of producing it
13. Tech can also be produced through the luck of a single man doing research or simple trial/error
14. **Nonrivalry** – one person's use of tech doesn't decrease the amount that another person can use
 - a. This is not true for consumer products. If you drink a Coke, someone else cannot drink that Coke
15. **Nonexcludability** – inventor or owner of the tech cannot exclude other people from using it. They can prevent exact copying, but cannot stop others from using the idea.
 - a. Apple computers invented the point and click computer interface with the Macintosh
 - b. Microsoft "copies" it and releases Windows, which then goes on to outsell the Mac 100 – 1
16. **Intellectual Property Laws** – patent and copyright laws that prevent others from using inventions w/o compensation. Too bad they don't provide much protection
17. **Growth Accounting Formula** – an equation that states that the growth rate of productivity equals capital's share of income times the growth rate of capital per hour of work plus the growth rate of technology
 - a. Growth Rate of productivity = $1/3 * \text{Growth rate of capital/hour of work} + \text{growth rate of technology}$
 - b. $1/3$ because capital only accounts for about $1/3$ of the productivity function (L, K, T)
18. **Growth Rate of Technology – rearrange accounting formula**
 - a. Growth rate/tech = growth rate/productivity – $1/3 * \text{growth rate of capital/hour of work}$
19. The productivity growth slowdown in the US in the 70's was due to a slowdown in both tech and capital growth
20. Tech played a larger role than capital in the 90's for the productivity rebound
21. Government encourages investment in human capital (education) and research/innovation to increase gdp
22. Spillovers (inventions that are not specific to one industry) are good since they can help multiple industries at once
23. Many technologies also requires new capital. For example, in order to use a computer, you have to buy one first