Albert Einstein was named an honorary member of the Plumbers and Steamfitters Union after publicly stating that he would become a plumber if he had to do it all over again.
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The Romans

Water Supply

• Aqueducts transported water from sources
  – Highest quality supplied drinking fountains
  – Lower quality supplied public baths and latrines
• Lead pipes transferred water to limited users
The Romans

Wastewater System

• Chamber pots in residences
  – Dumped out windows

• Toilets (luxury)
  – Hole in the floor drained to cesspool below

• Public latrines
  – Wastewater flowed through central channel into main sewage system and into nearby rivers and streams

• Few private wastewater system connections
Plumbing System

- Water supply pipes
- Fixture – A device that uses water (sink, toilet, dishwasher, etc.)
- Soil, waste, and vent pipes
- Drain and sewer
- Gas pipes
- Storm water drainage
Water Supply System

Network of pipes that transport hot and cold potable water under pressure

• **Fixture** – A device that uses water (sink, toilet, dishwasher, etc.)

• **Water Heater** – Large insulated tanks that heat cold water to be distributed in the hot water supply lines

• **Trunk Lines** – Hot or cold water pipes that serve many fixtures

• **Branch Lines** – Hot or cold water pipes that serve only one or two fixtures
Water Supply System

- **Water Main** – Supply pipe installed and maintained by a public entity and on public property
- **Water Service** – Pipe from the water main to the building supply pipes
- **Meter** – Measures the amount of water transported through water service
- **Valve** – A fitting used to control water flow (located next to the meter)
Drain-Waste-Vent System

Network of pipes that transport wastewater and sewer gases from the building

- **Drain Pipe** – A pipe that carries wastewater in a building
- **Vent Pipe** – A vertical pipe that provides circulation of air to and from the drainage system
- **Trap** – A fitting (usually U-shaped) that provides a seal to prevent the flow of sewer gases
- **Stack** – A vertical pipe (waste or vent) that extends through at least one story
- **Cleanout** – An access opening to allow cleanout of the pipe
Drain-Waste-Vent System

- **Sewage** – Any liquid waste containing animal or vegetable matter, including liquids containing chemicals
- **Sanitary Sewer** – A sewer pipe that carries only sewage
- **Storm Sewer** – A sewer pipe that carries storm water or other drainage (but not sewage)
- **Building Sewer or Sewer Lateral** – Part of the drainage system from the building to the public, private, or individual sewer disposal system
- **Sewer Main** – A sewer pipe installed and maintained by a public entity and on public property
Plumbing Codes

- Protect health and safety of community
- Reduce potential for widespread disease
- Provide rules and regulations for installing drinking water or sewer facilities
- Identify required methods for installing plumbing systems
- Provide permits and inspections

The International Residential Code includes requirements for residential plumbing systems. The International Plumbing Code is a model code that has been widely adopted throughout the United States for non-residential facilities.
Plumbing Codes

- **Supply pipe size dependent upon**
  - Amount of water
  - Water pressure
  - Pipe length
  - Number of stories
  - Flow pressure necessary at farthest point in system

- **Drainage and vent pipe size dependent upon**
  - Plumbing Fixture Units
    - Type of fixture
    - Estimated amount of waste
Plumbing Codes

For non-residential facilities

IBC Chapter 29 – Plumbing Systems

• Minimum number of plumbing facilities
  • Water closets
  • Lavatories
  • Bathtubs/showers
  • Drinking fountains
  • Other fixtures

• Location of toilet facilities

• Toilet room requirements
Plumbing Plan

**LEGEND**

- **HOT WATER**
- **COLD WATER**
- **DRAIN**
- **VENT**
Plumbing Plans – Isometric

Waste T
Vent T
Y fitting
Elbow, 90 degrees
Energy Conservation

• Locate hot water heater in conditioned space
• Insulate hot water heater
• Insulate exposed hot water pipes
• Insulate cold water pipes with freezing potential
• Place water pipes in interior walls, if possible
• Use low-flow fixtures
• Seal all wall fenestrations
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