Simple Machines
- change direction
- multiply force
- change speed
- transfer force

Machines from the Past
- Aqueduct
- Sakia
- Archimedes Screw

Complex Machines
- System
- Subsystems
- Gears
  - Multiplying
  - Reducing
  - Parallel

Mechanical Advantage
\[ MA = \frac{\text{Output force}}{\text{Input force}} \]

Speed Ratio
\[ SR = \frac{\text{Input distance}}{\text{Output distance}} \]

Efficiency
\[ Efficiency = \frac{\text{Work}_{\text{output}}}{\text{Work}_{\text{input}}} \times 100 \]

Pascal's Law
"Pressure is transmitted equally in all directions throughout an enclosed fluid."

Pressure
\[ \text{Pressure} = \frac{\text{Force}}{\text{Area}} \]

Hydraulics
Pneumatics

Force of the small piston = Force of the large piston
Area of the small piston = Area of the large piston

Evaluation Criteria
- Efficiency
- Effectiveness
- Function
- Design
- Safety
- Convenience
- Esthetics
- Packaging
- Cost
- Improvement
- Environmental Impact

Societal and Technological Impact of Machines
- Block and Tackle
- Steam Engine
- Bicycles
- Egg Beater
- Pop Can Tab
- MagLev Trains
- Robots