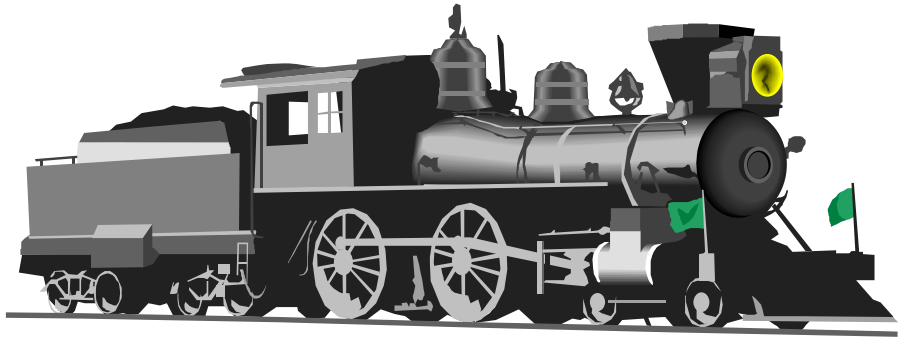
Slide No. 1

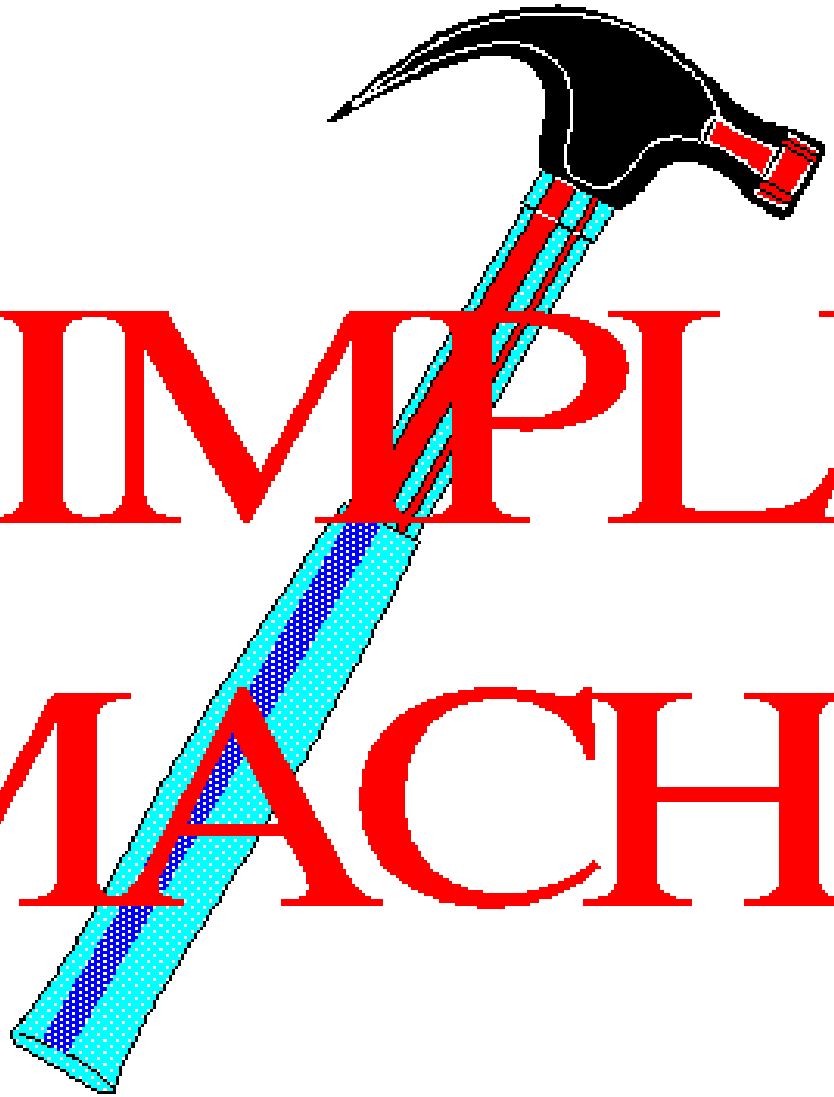
MAKING MACHINES WORK

CREATING ENERGY TO MAKE MACHINES DO EFFICIENT WORK

remember the four interactions

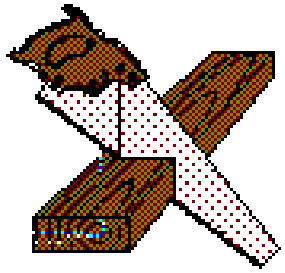


Slide No. 3



SIMPLE MACHINES

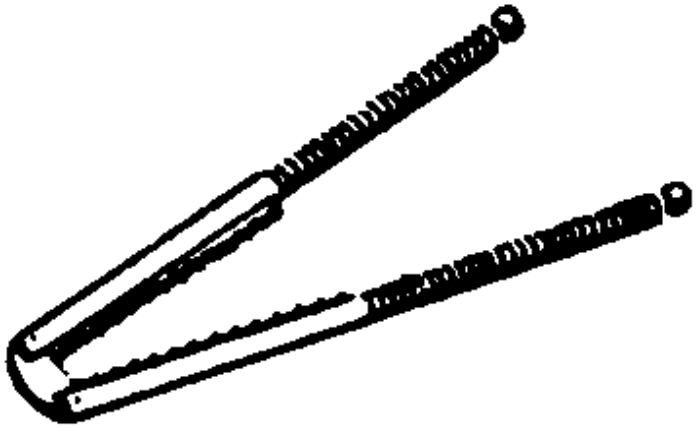
INCLINED PLANE



to transfer the movement of energy efficiently

engineering of waterways and railroads in early Europe and China

LEVER

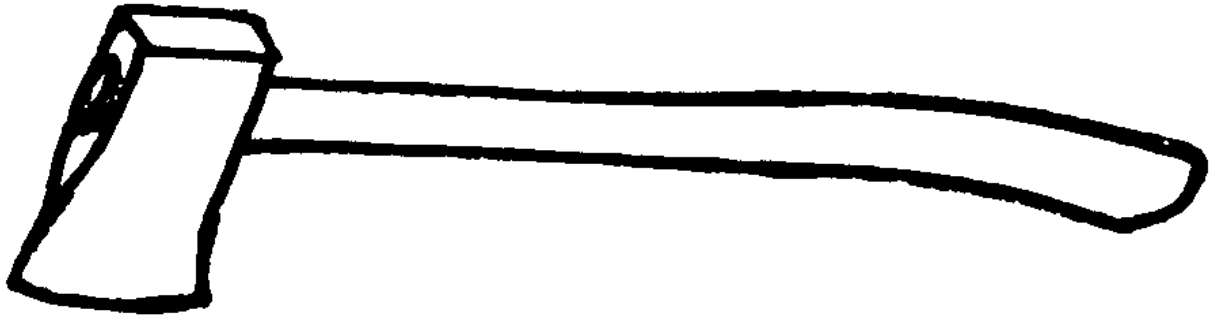


to make work easier,
(lifting, moving, or breaking)

a rigid body pivoted on a fixed fulcrum

" Give me a fulcrum on which to rest and I will move the Earth." Archimedes

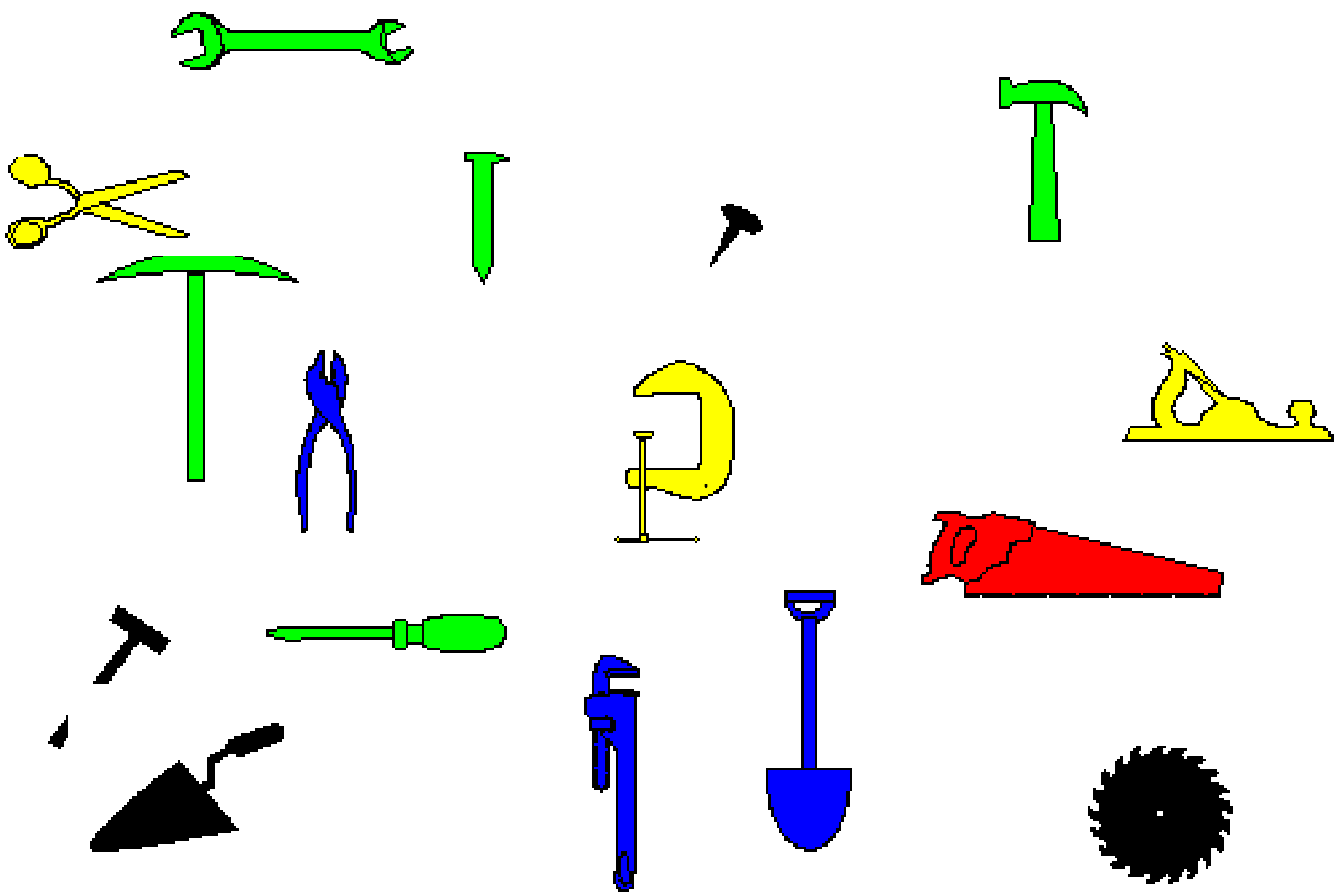
WEDGE



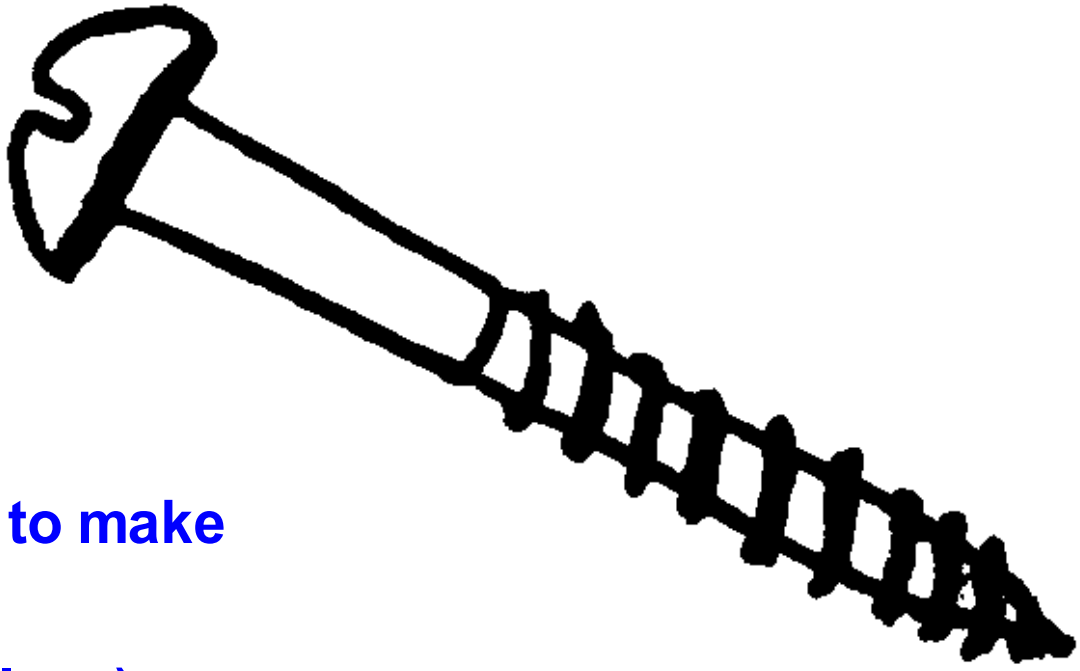
to help direct energy to be more efficient

Slide No. 7

Lever Wedge Inclined plane

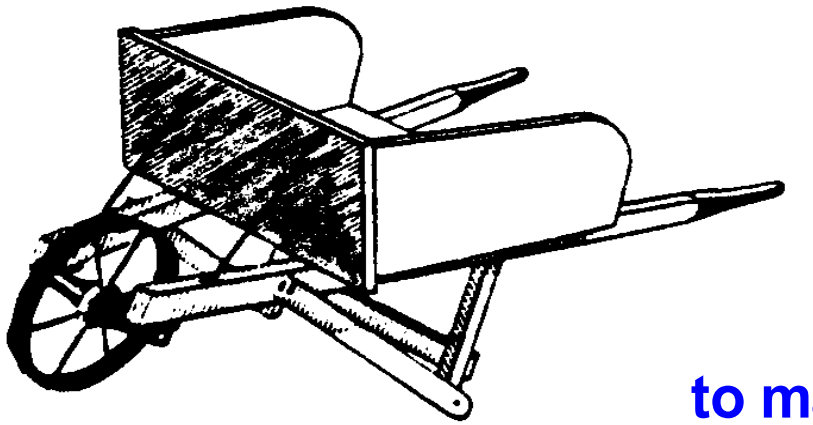


SCREW



force travels farther to make
the task easier
(modified inclined plane)

WHEEL AND AXLE



to make things move

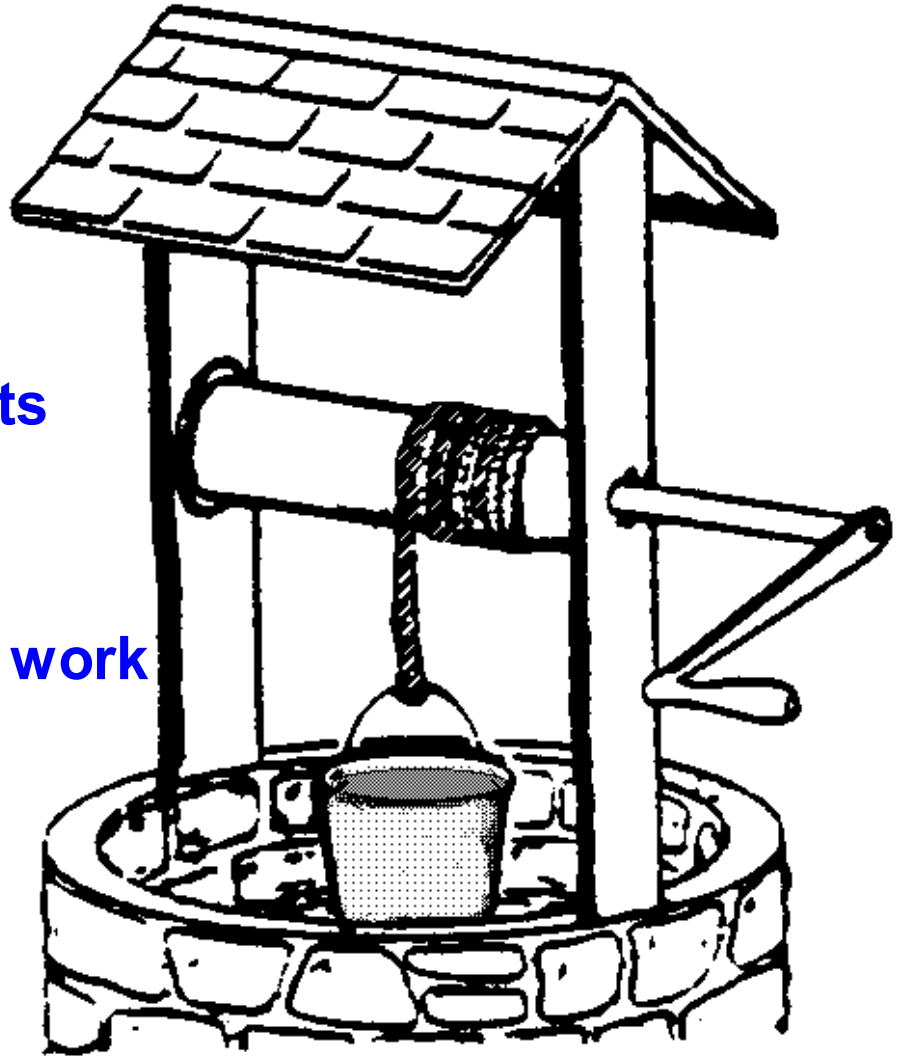
invention 4000 BC from potter's wheel in Mesopotamia, spoked wheel about 2000 BC

PULLEY

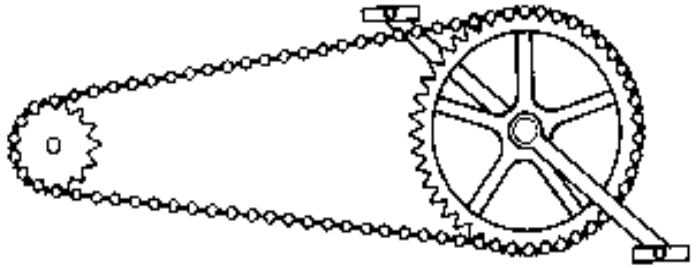
requires a belt

Helps to lift heavy objects easily

transfer of energy to create different types of work

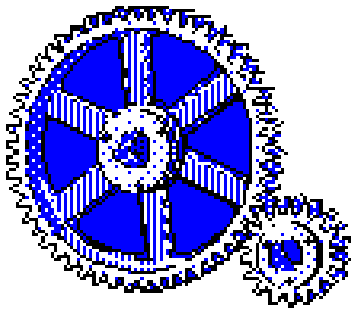


GEARS



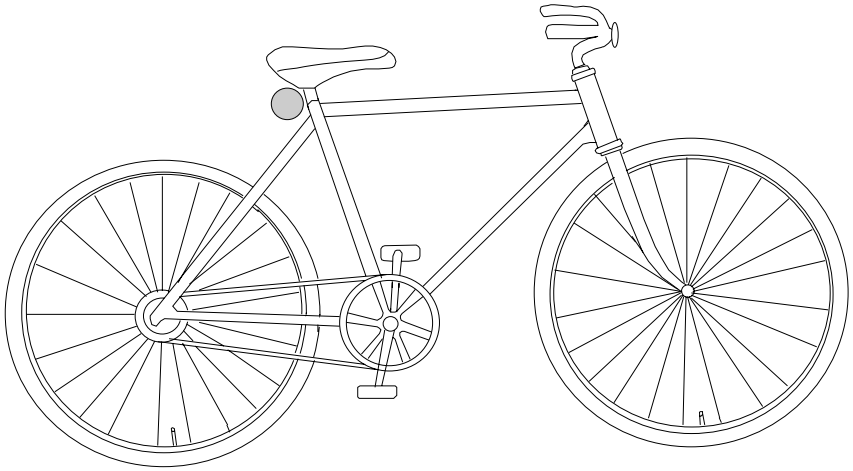
Transfers motion and force
from one rotating shaft to another, controls

grooves of gear = teeth
smaller gear = pinon; larger = gear



Gear Ratio

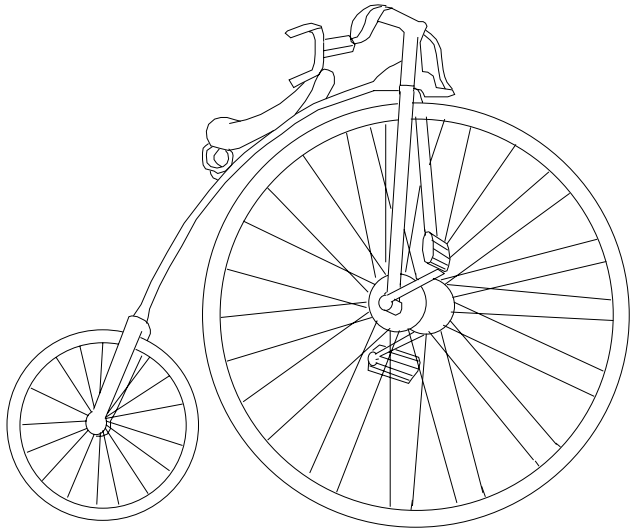
transfer of energy efficiently

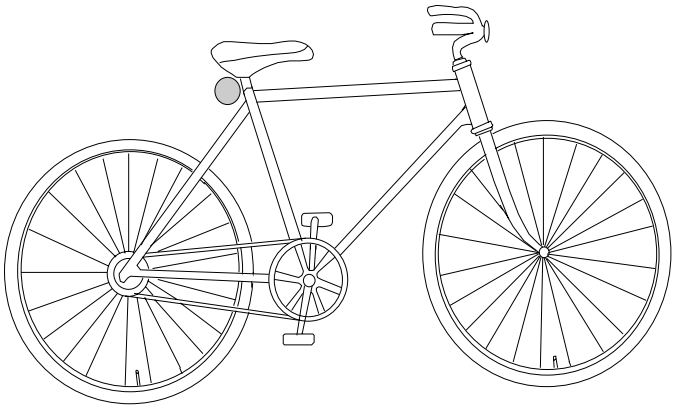


$$\frac{\text{teeth gear}}{\text{teeth pion}} = \text{gear ratio}$$

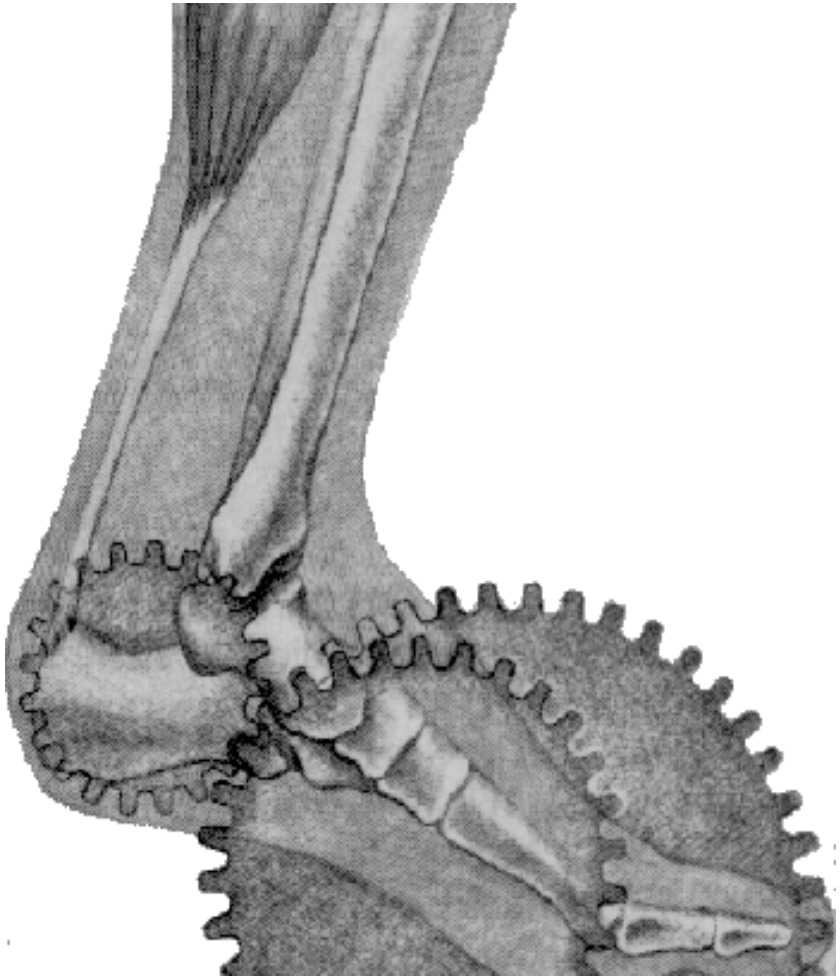
WHICH BIKE IS MORE EFFICIENT?

WHY?





The Human Machine

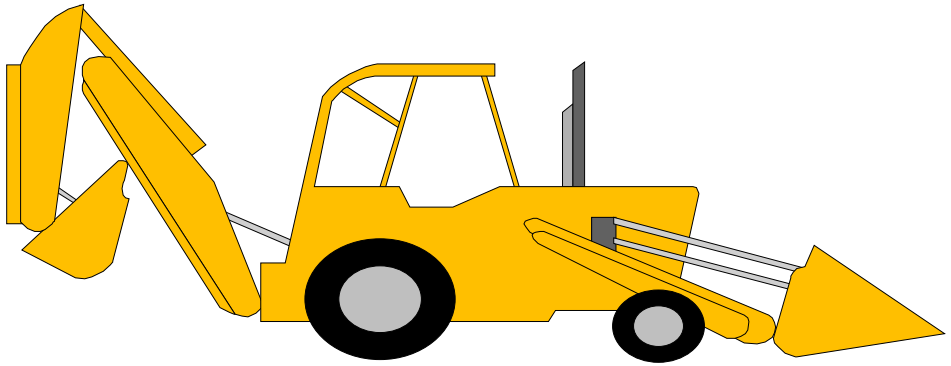


MECHANICS

STUDY OF MOTION OF OBJECTS

KINEMATICS ***(describe)***

DYNAMICS ***(forces related)***



in other words, the physics of understanding and designing machines that create work

VOCABULARY OF MACHINES

mass
potential
kinetic
efficiency
momentum
acceleration
distance
force

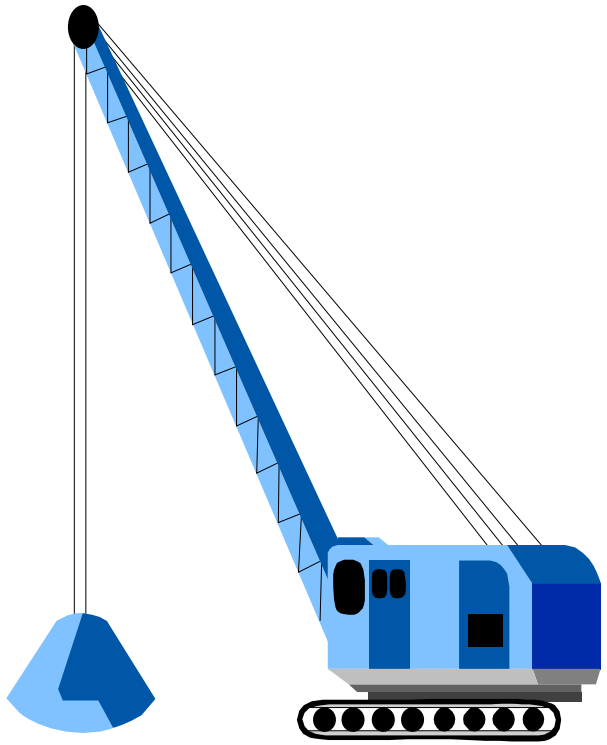




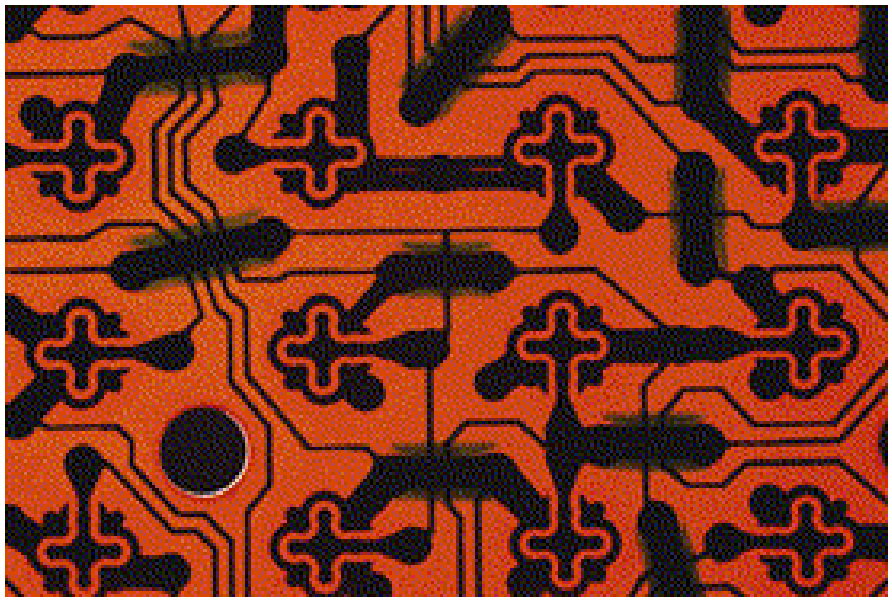

WORK IN = WORK OUT

W = FD

F = MA



Are machines being redefined?



after mechanics - atomic physics, quantum mechanics, thermodynamics, and who knows where physics will lead us