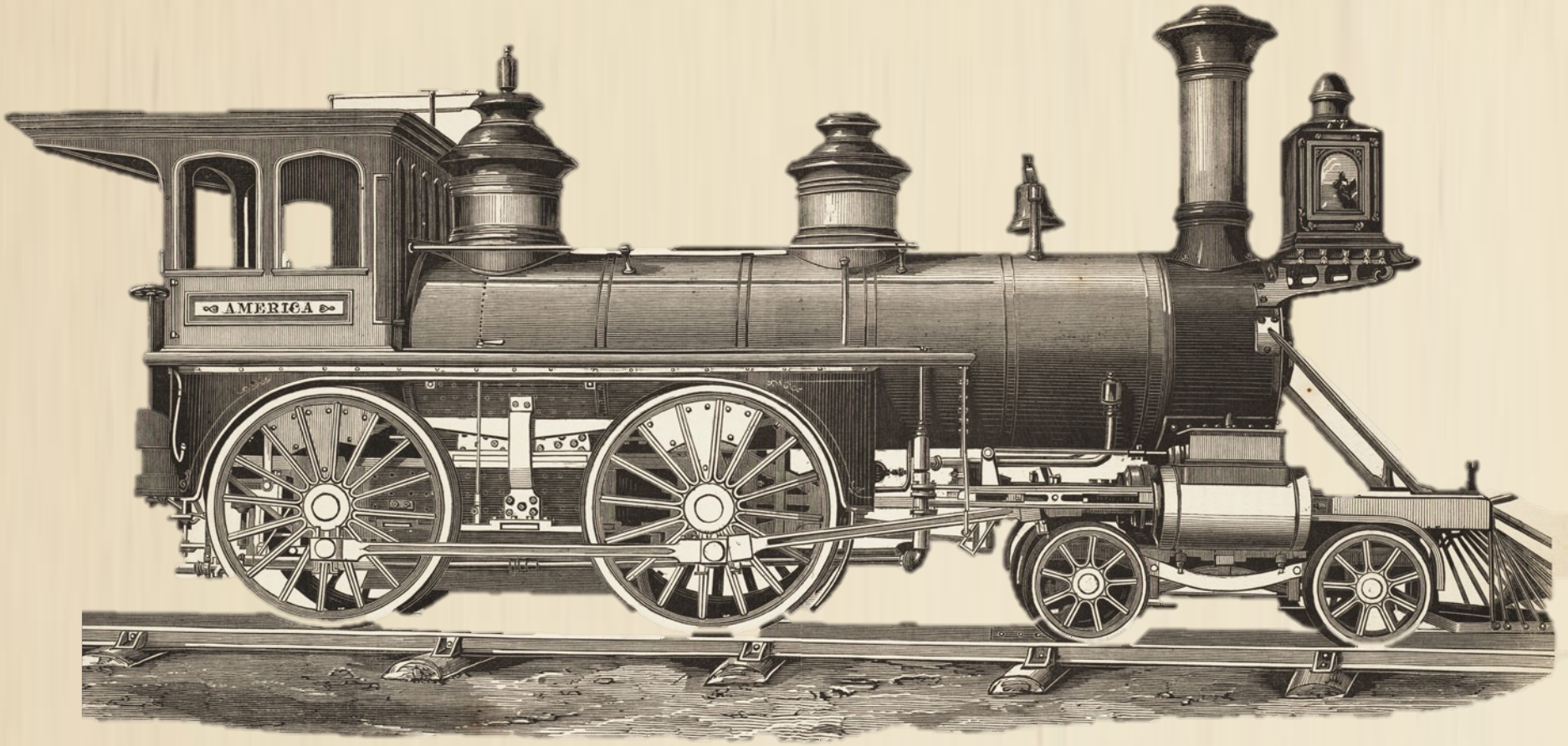
# INDUSTRIAL REVOLUTION: TECHNOLOGY

REVOLUTIONS c.1750-1900

c. 1750-1900



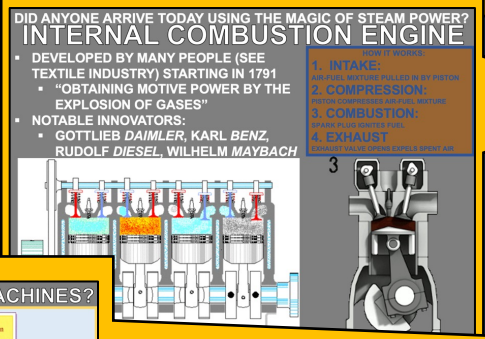
# HERE IS ALL THAT THE COLLEGE BOARD REQUIRES OF YOU FOR: INDUSTRIAL REVOLUTION TECHNOLOGY c. 1750-1900

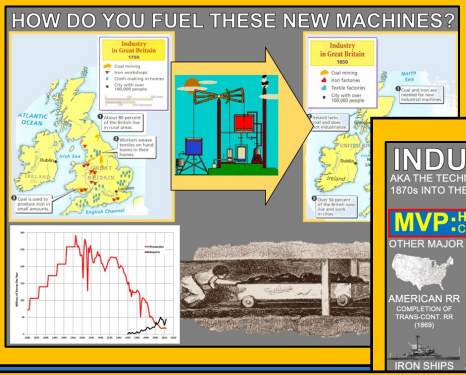
**THIS IS THE THEMATIC FOCUS. IT'S WHAT YOU SHOULD FOCUS ON FOR THIS SECTION**

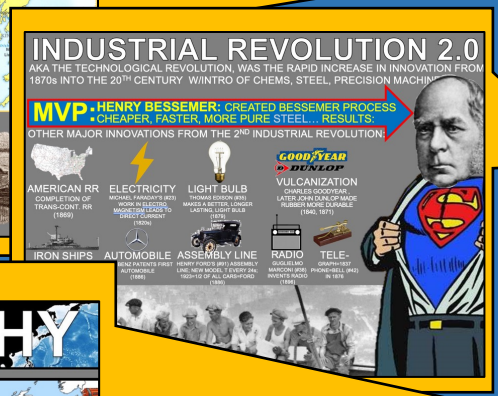
**THEMATIC FOCUS**

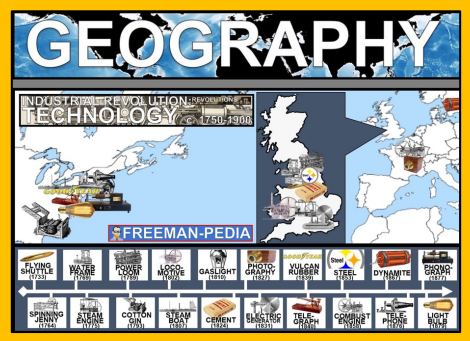
**Technology and Innovation** TEC

Human adaptation and innovation have resulted in increased efficiency, comfort, and security, and technological advances have shaped human development and interactions with both intended and unintended consequences.


## HISTORICAL DEVELOPMENTS

**KC-5.1.I.B**

The development of machines, including steam engines and the internal combustion engine, made it possible to take advantage of both existing and vast newly discovered resources of energy stored in fossil fuels, specifically coal and oil. The fossil fuels revolution greatly increased the energy available to human societies.

**KC-5.1.I.E**

The "second industrial revolution" led to new methods in the production of steel, chemicals, electricity, and precision machinery during the second half of the 19th century.

**KC-5.1.IV**

Railroads, steamships, and the telegraph made exploration, development, and communication possible in interior regions globally, which led to increased trade and migration.

# GEOGRAPHY

## INDUSTRIAL REVOLUTION: TECHNOLOGY c. 1750-1900

REVOLUTIONS 1750-1900



FREEMAN-PEDIA

FLYING SHUTTLE (1733)

WATER FRAME (1769)

POWER LOOM (1789)

LOCO-MOTIVE (1802)

GASLIGHT (1810)

PHOTO-GRAPHY (1827)


VULCAN RUBBER (1839)


STEEL (1853)


DYNAMITE (1867)

PHONO-GRAPH (1877)

SPINNING JENNY (1764)

STEAM ENGINE (1775)

COTTON GIN (1793)

STEAM BOAT (1807)


CEMENT (1824)

ELECTRIC GENERATOR (1831)

TELE-GRAPH (1840)

COMBUST ENGINE (1858)

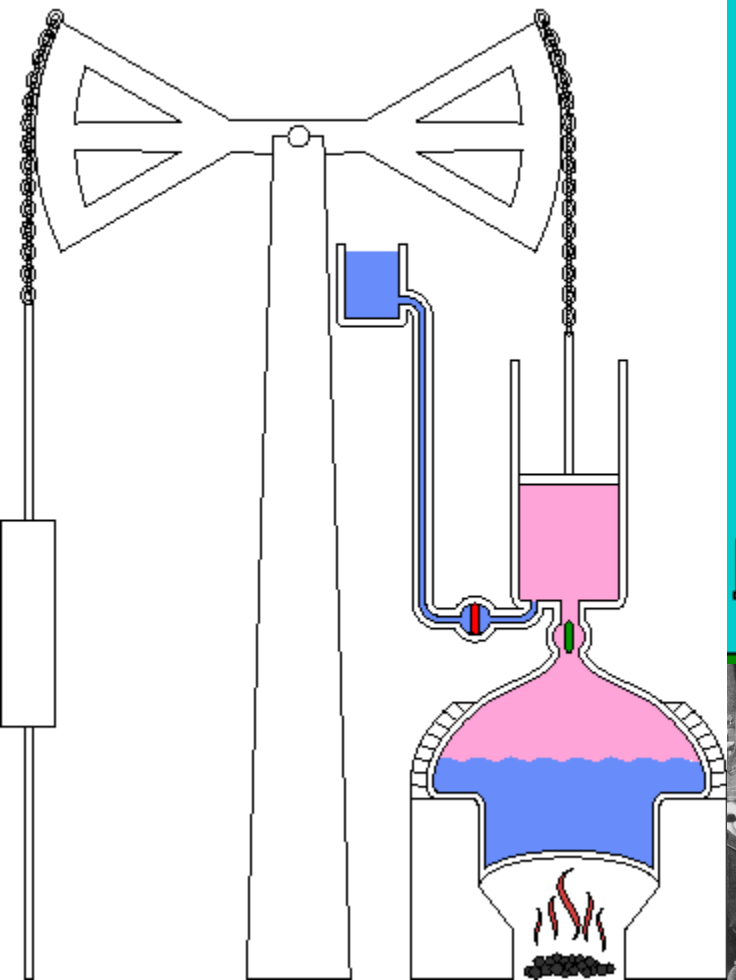
TELE-PHONE (1876)

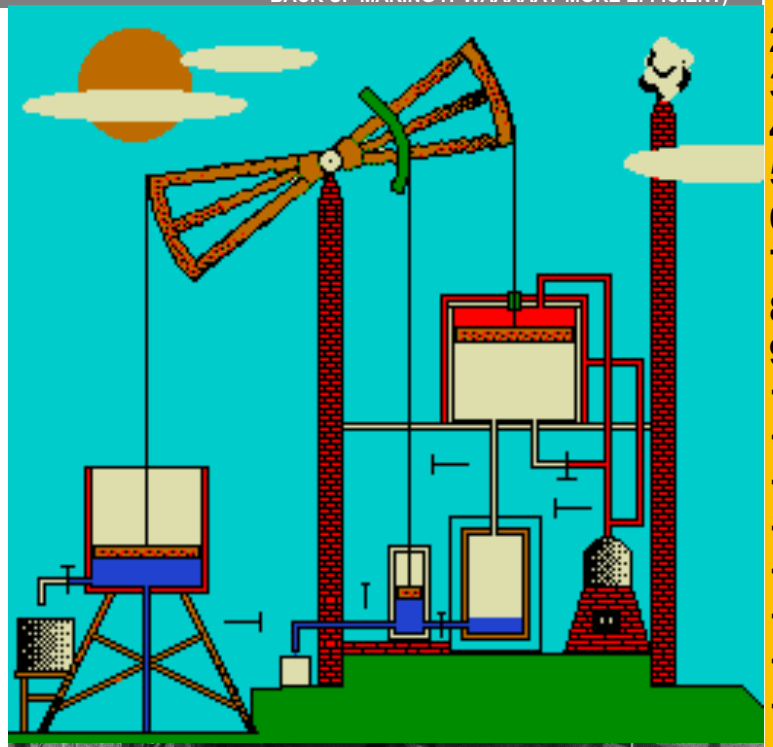
LIGHT BULB (1879)

FALLING WATER IS TOO WEAK AND NOT RELIABLE…

# STEAM ENGINE

- SCOTSMAN JAMES WATT
- WAS GIVEN A NEWCOMEN MODEL TO FIX/IMPROVE
- CAME UP WITH THIS MODEL BELOW (HIS IMPROVEMENT WAS USING TWO CONDENSERS SO YOU DIDN'T HAVE TO WAIT FOR IT TO HEAT BACK UP MAKING IT WAAAAAY MORE EFFICIENT)





## MOST INFLUENTIAL PEOPLE OF ALL TIME:

1. MUHAMMAD (PBUH)
2. NEWTON
3. JESUS
4. BUDDHA
5. CONFUCIUS
6. ST. PAUL
7. TS'AI LUN
8. GUTENBERG
9. COLUMBUS
10. EINSTEIN
11. PASTEUR
12. GALILEO
13. ARISTOTLE
14. EUCLID
15. MOSES
16. DARWIN
17. QIN SHIHUANGDI
18. AUGUSTUS C.
19. COPERNICUS
20. LAVOISIER
21. CONSTANTINE
22. JAMES WATT

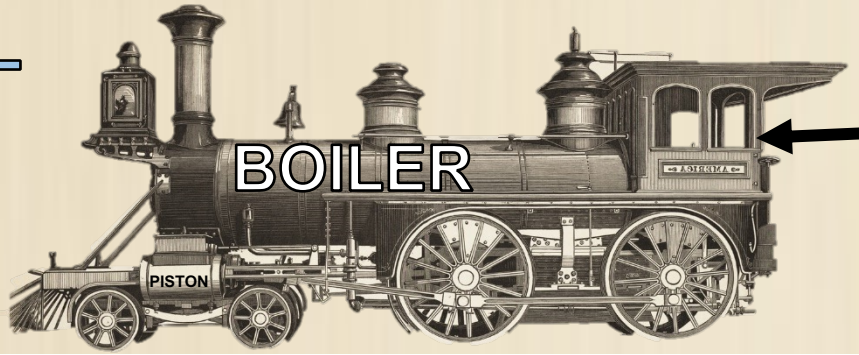
(MICHAEL K HART'S *THE 100*)

# HOW A STEAM LOCOMOTIVE WORKS:



BOILER=FULL OF WATER→

←PISTON→




FIREBOX

DID ANYONE ARRIVE TODAY USING THE MAGIC OF STEAM POWER?

# INTERNAL COMBUSTION ENGINE

- DEVELOPED BY MANY PEOPLE (SEE TEXTILE INDUSTRY) STARTING IN 1791
  - "OBTAINING MOTIVE POWER BY THE EXPLOSION OF GASES"
- NOTABLE INNOVATORS:
  - GOTTLIEB *DAIMLER*, KARL *BENZ*, RUDOLF *DIESEL*, WILHELM *MAYBACH*

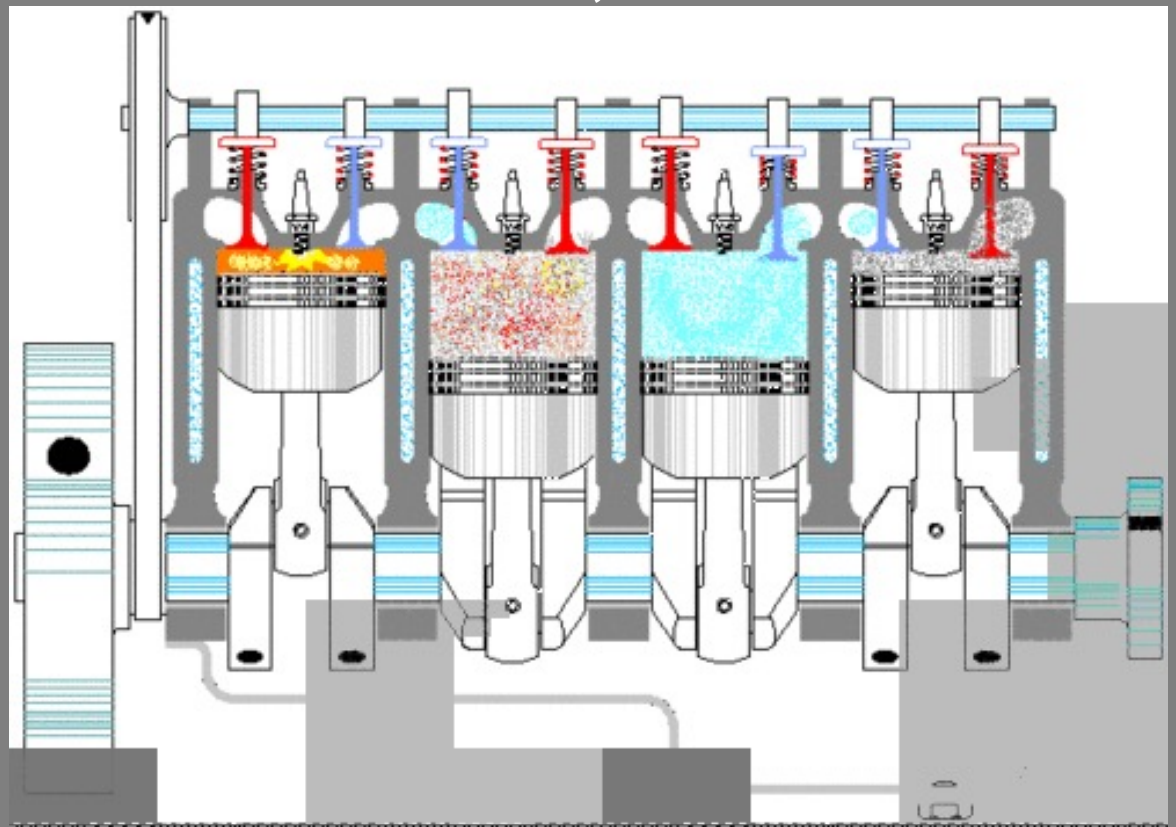
HOW IT WORKS:

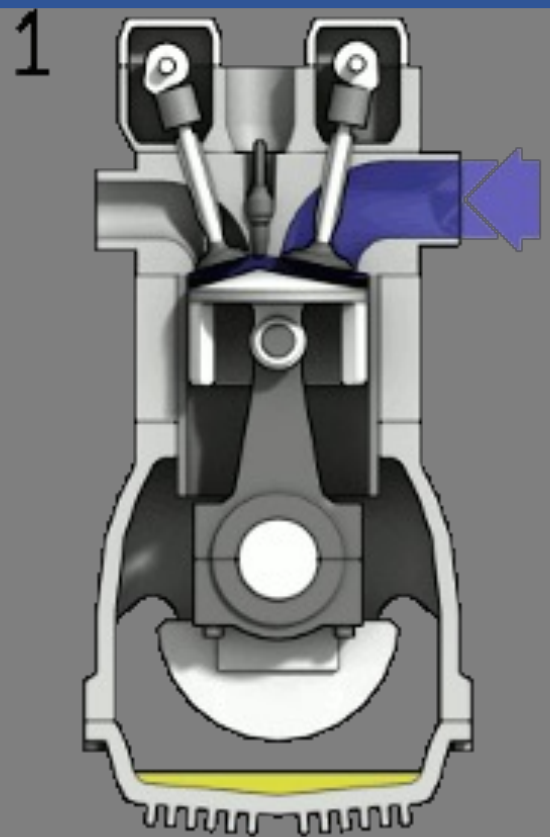
**1. INTAKE:**
AIR-FUEL MIXTURE PULLED IN BY PISTON

**2. COMPRESSION:**
PISTON COMPRESSES AIR-FUEL MIXTURE

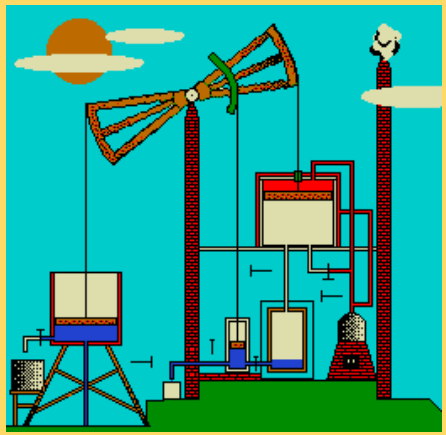
**3. COMBUSTION:**
SPARK PLUG IGNITES FUEL

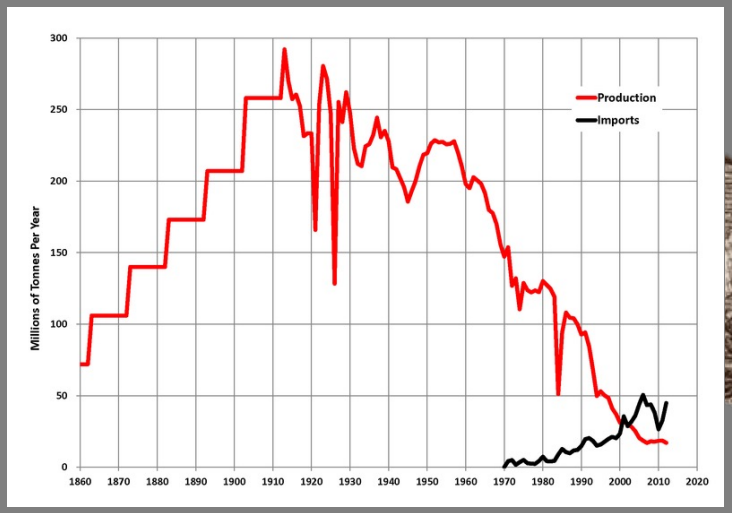
**4. EXHAUST**
EXHAUST VALVE OPENS EXPELS SPENT AIR

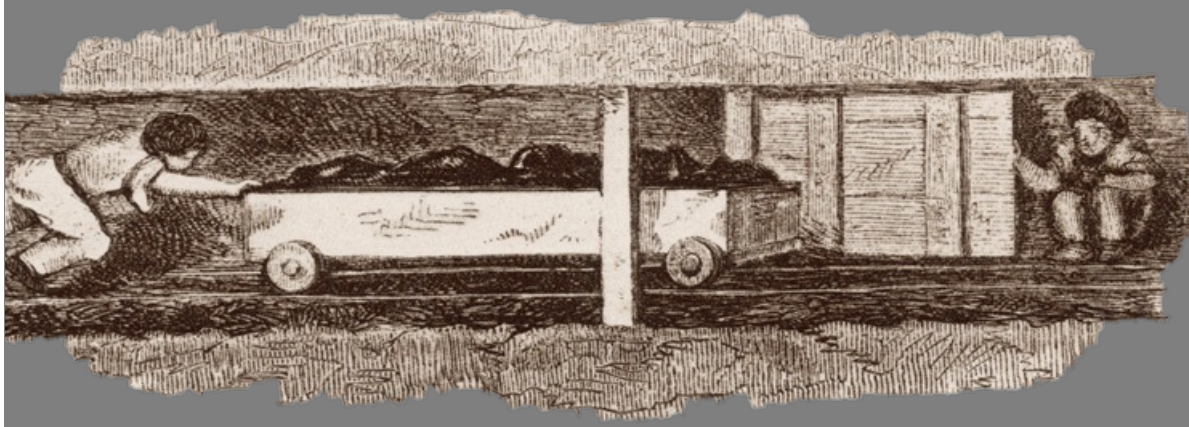




# HOW DO YOU FUEL THESE NEW MACHINES?

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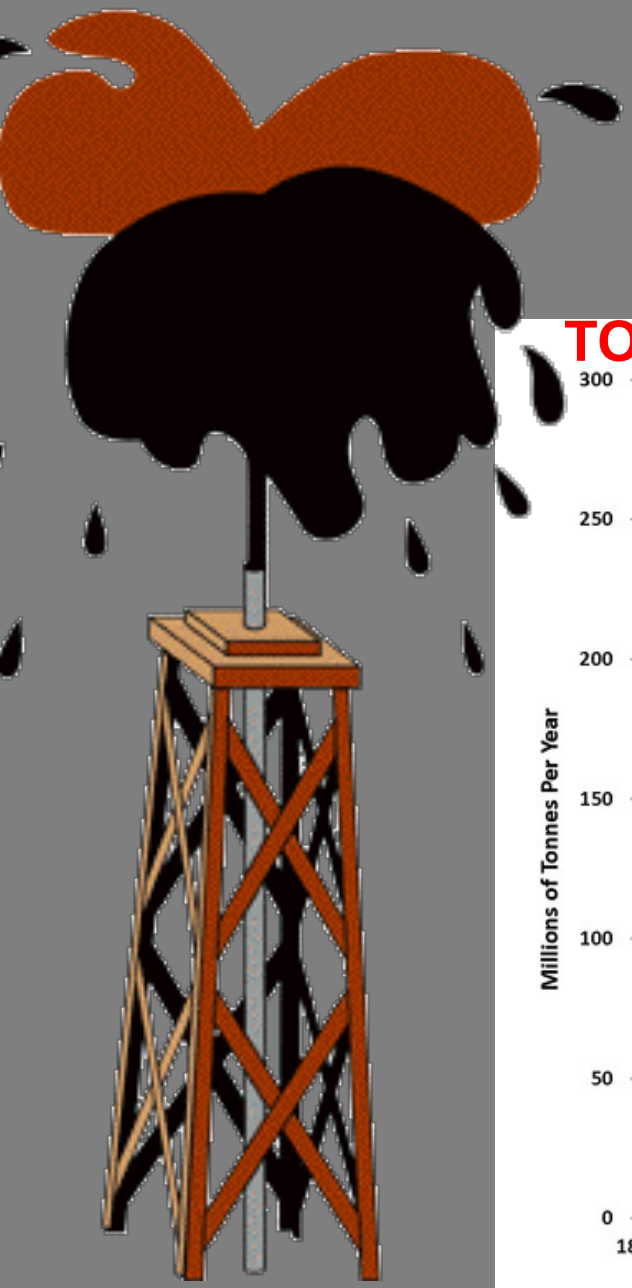
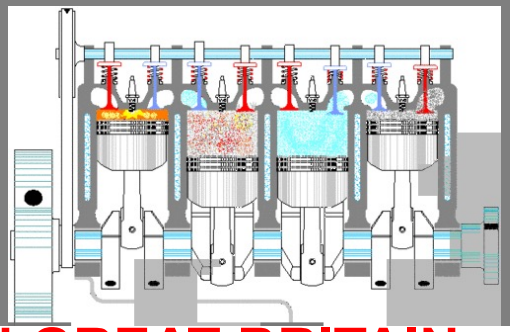
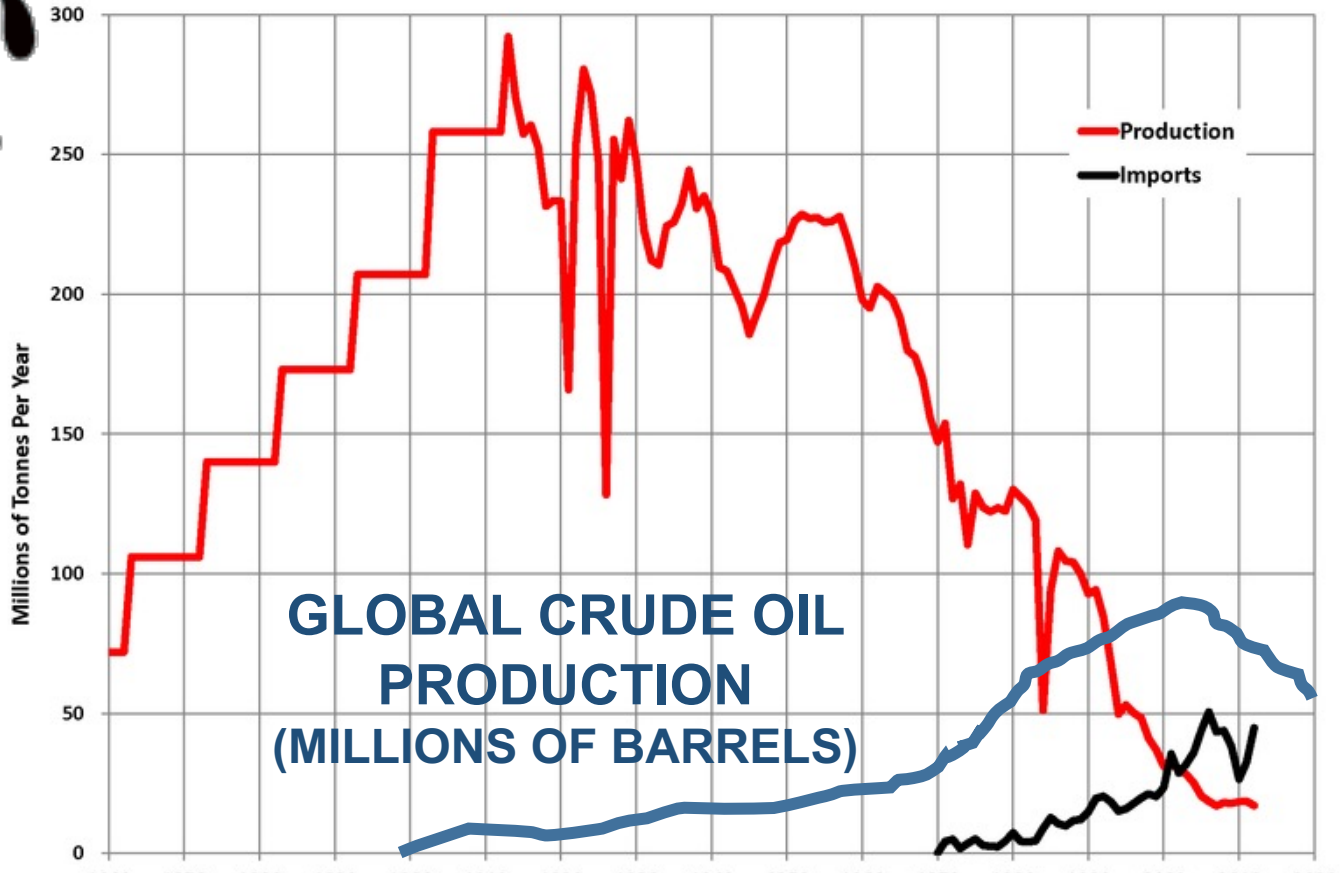




## TOTAL COAL PRODUCTION IN GREAT BRITAIN




## GLOBAL CRUDE OIL PRODUCTION (MILLIONS OF BARRELS)


MANKIND
TM

# LIFE IN THE FACTORY

- CHIEF MEANS OF ORGANIZING LABOR AROUND THE NEW MACHINES
- BOURGEOISIE NEEDS TO GET THE PROLETARIAT TO:
  - WORK REGULAR HOURS
  - WORK LONG HOURS
  - WORK FOR LOW WAGES
  - PERFORM REPETITIVE TASKS


MODERN TIMES

# INDUSTRIAL REVOLUTION 2.0

AKA THE TECHNOLOGICAL REVOLUTION, WAS THE RAPID INCREASE IN INNOVATION FROM 1870s INTO THE 20TH CENTURY W/INTRO OF CHEMS, STEEL, PRECISION MACHIN

**MVP: HENRY BESSEMER:** CREATED BESSEMER PROCESS
CHEAPER, FASTER, MORE PURE STEEL… RESULTS:

OTHER MAJOR INNOVATIONS FROM THE 2ND INDUSTRIAL REVOLUTION:

## AMERICAN RR

COMPLETION OF TRANS-CONT. RR (1869)

## ELECTRICITY

MICHAEL FARADAY'S (#23) WORK IN ELECTRO MAGNETISM LEADS TO DIRECT CURRENT (1820s)

## LIGHT BULB

THOMAS EDISON (#35) MAKES A BETTER, LONGER LASTING, LIGHT BULB (1879)

## VULCANIZATION

CHARLES GOODYEAR , LATER JOHN DUNLOP MADE RUBBER MORE DURABLE (1840, 1871)

## IRON SHIPS

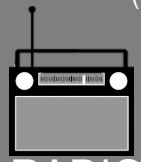
HMS *DEVASTATION*= 1ST IRON OCEAN GOING SHIP WITH NO SAIL (1871)

## AUTOMOBILE

KARL BENZ PATENTS FIRST AUTOMOBILE (1886)

## ASSEMBLY LINE

HENRY FORD'S (#91) ASSEMBLY LINE; NEW MODEL T EVERY 24s; 1923=1/2 OF ALL CARS=FORD (1886)



## RADIO

GUGLIELMO MARCONI (#38) INVENTS RADIO (1896)

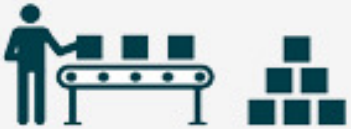
## TELE-

GRAPH=1837 PHONE=BELL (#42) IN 1876

## INDUSTRY 1.0

Mechanization, steam power, weaving loom

1784



## INDUSTRY 2.0

Mass production, assembly line, electrical energy

1870

## INDUSTRY 3.0

Automation, computers and electronics

1969


## INDUSTRY 4.0

Cyber Physical Systems, internet of things, networks

TODAY