Refining Petroleum

- Crude oil cannot be used in its natural state, and must be shipped to oil refineries where it is separated into simpler compounds
- The refining process doesn't separate each compound, but rather several mixtures called fractions

- Fractional Distillation – separating parts of a mixture by differences in boiling points

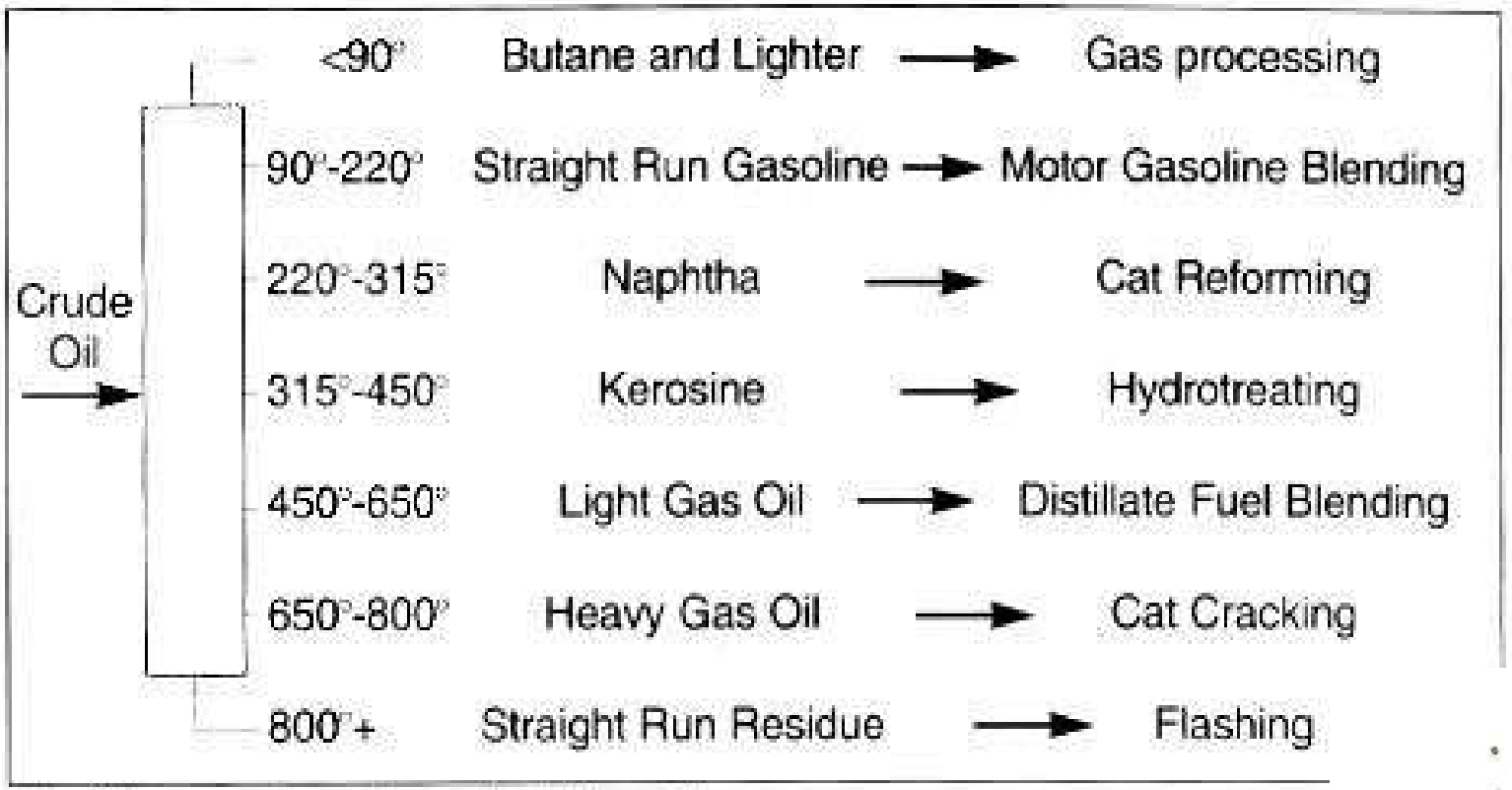
Refining Petroleum

→ crude oil cannot be used in its natural state.

Fractional Distillation - separating parts of a mixture by differences in boiling points.

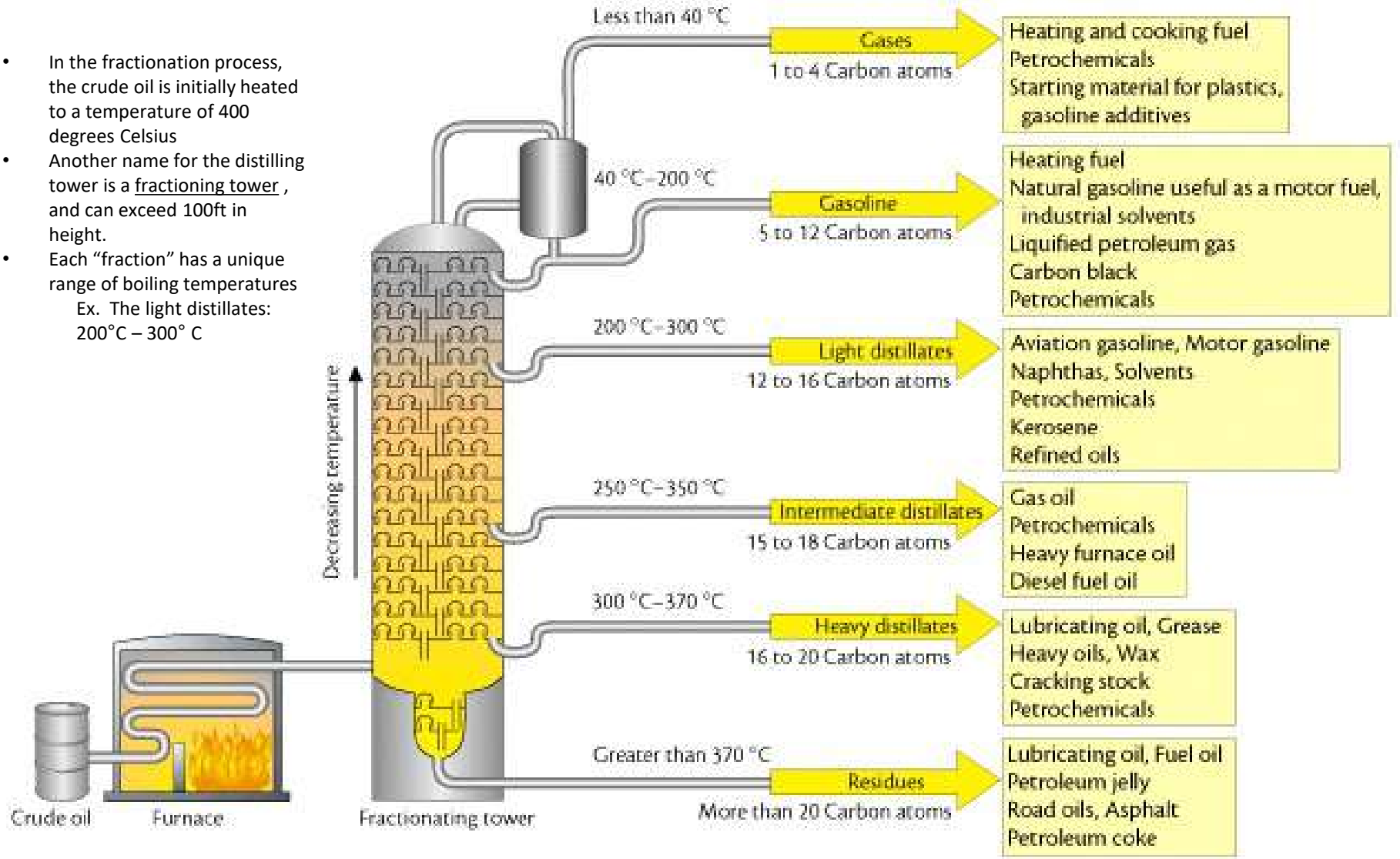
→ the separated parts are called fractions.

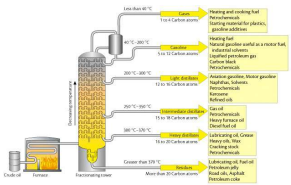
Petroleum Refining



Distilling crude and product disposition

- In the fractionation process, the crude oil is initially heated to a temperature of 400 degrees Celsius
- Another name for the distilling tower is a <u>fractioning tower</u> , and can exceed 100ft in height.
- Each "fraction" has a unique range of boiling temperatures
  Ex. The light distillates: 200°C – 300° C

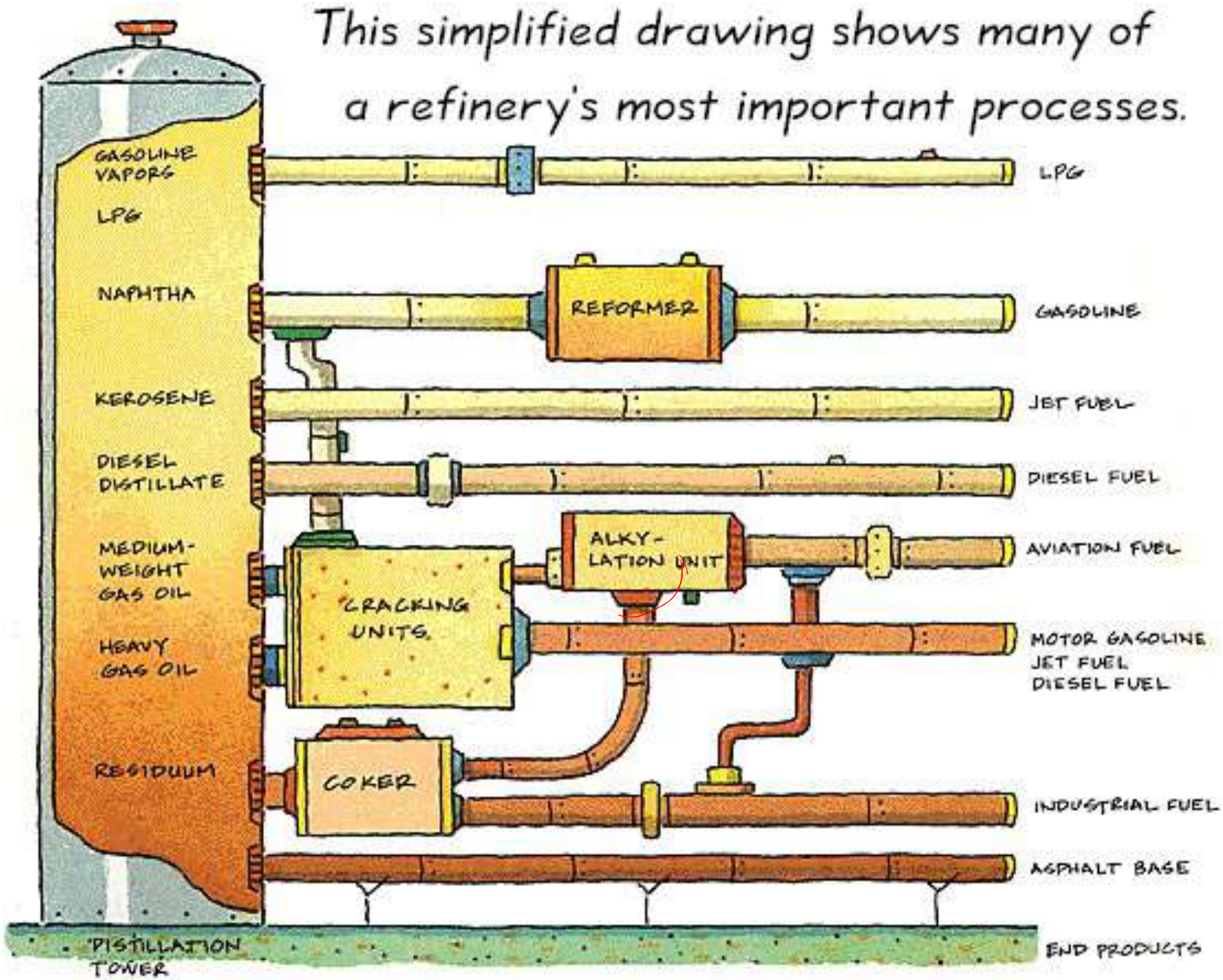


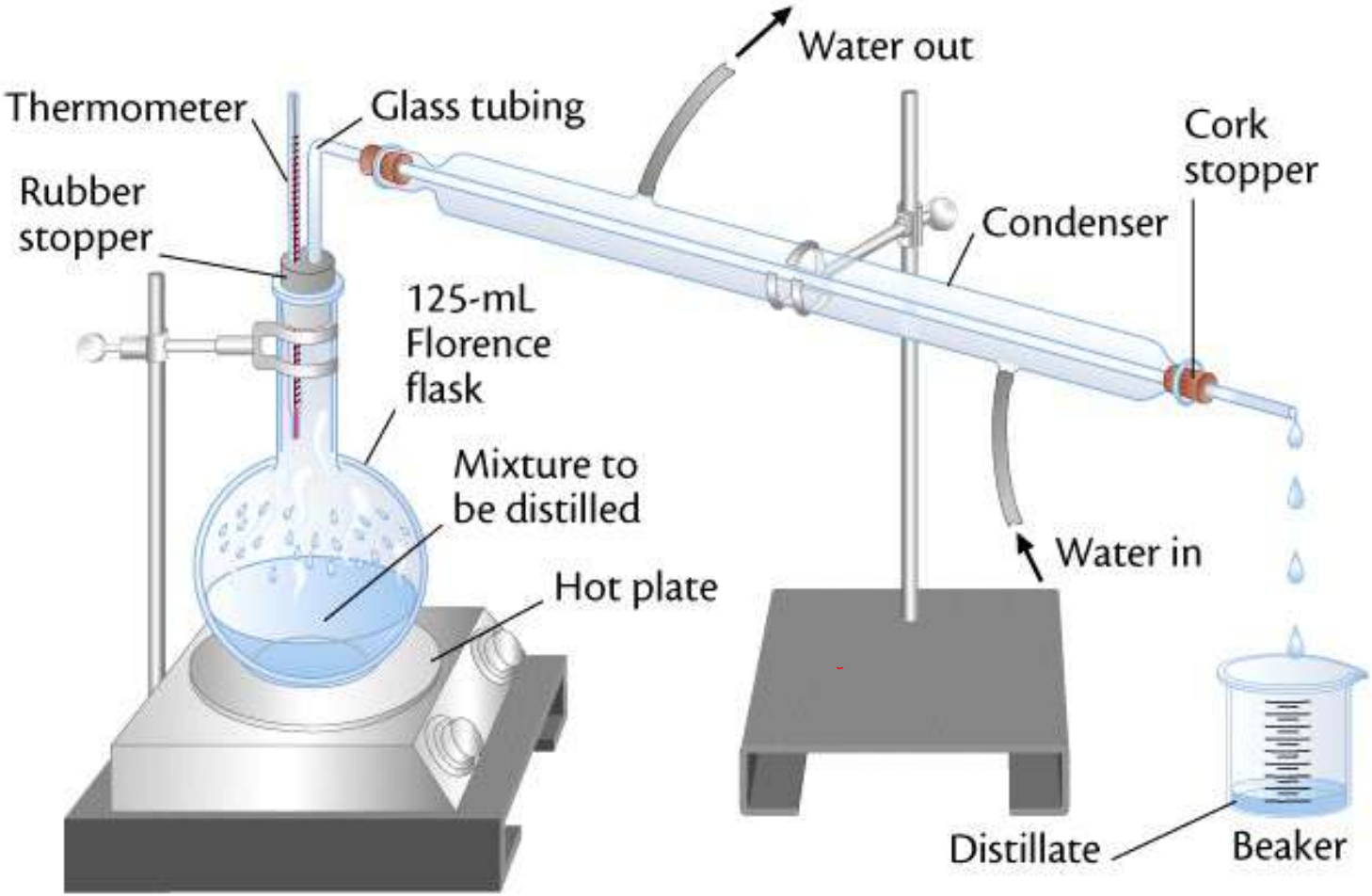


Fractionation Tower →

- heated to 400° C

Fraction	Example(s)
< 40° C 1-4 Carbons	Gases	natural gas propane
5-12 Carbons 40° - 200° C	gasoline	gasoline
12-16 C 200° - 300° C	Light Distillates	Kerosene
15-18 C 250° - 350° C	Intermediate Distillates	Diesel Fuel
16-20 C 340-370° C	heavy distillates	lubricating oil
> 20 C > 370° C	Residues	tar asphalt


This simplified drawing shows many of a refinery's most important processes.
GASOLINE VAPORS
LPG
NAPHTHA
KEROSENE
DIESEL DISTILLATE
MEDIUM-WEIGHT GAS OIL
HEAVY GAS OIL
RESIDUUM
DISTILLATION TOWER
REFORMER
ALKY-LATION UNIT
CRACKING UNITS
COKER
LPG
GASOLINE
JET FUEL
DIESEL FUEL
AVIATION FUEL
MOTOR GASOLINE
JET FUEL
DIESEL FUEL
INDUSTRIAL FUEL
ASPHALT BASE
END PRODUCTS



Distillation - a way to separate substances from one another according to boiling points.
- compounds with lower boiling points will evaporate first and leave the distillation flask
It is then converted back to liquid as it passes through the condenser, all before the second substance begins to boil and distill
- can then condense vapors to form distillates