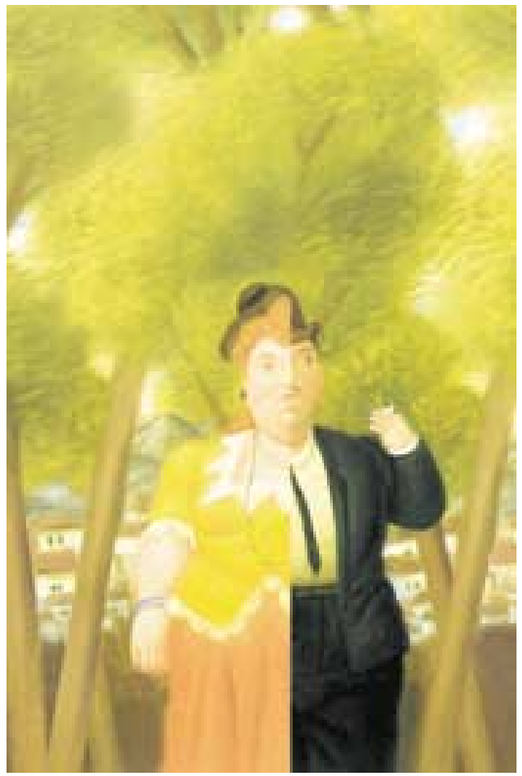
Nature and Science, 4(1), 2006, Tamir, Sicentific Paints in the Museum of Art & Science , pages 72-76

# Law of Conservation of Mass



$0.5m_2 + 0.5m_1$

+

$0.5m_1 + 0.5m_2$

=

$m_1 + m_2$

Fernando Botero

In any change of state the total mass is conserved

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# The First Law of Thermodynamics

Heat

De Es Schwertberger

Q -

Work

Vincent Van Gogh

W =

Internal energy

Tamara Lempica

ΔU

"Energy is always conserved. It is impossible to destroy energy or to create it out of nothing.
It is possible to transform energy from one form to the other"

The interaction between heat Q and work W causes a change in the internal energy ΔU of the system according to the equation Q−W=ΔU, where the internal energy is a property related to the inwardness of the system as demonstrated by Lempica's artwork.

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# Gibbs's Phase Rule: F=C+2-P

Yves Tanguy

solid-gas: F=1+2-2=1

Jaime Galicia

Ice-water-vapor: F=1+2-3=0

The number of variables F that can be varied without causing a change in the number of phases (in a system in which no chemical reactions occur) is given by F=C+2-P, where C is the number of components and P is the number of phases

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# Avogadro's Law

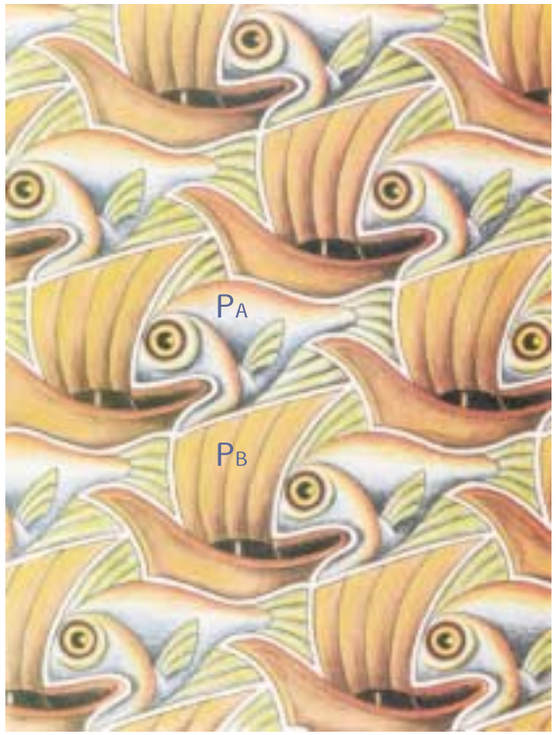
P, V, T; n=6

M.C.Escher (modified)

Equal volumes of different ideal gases contain equal number of molecules n under the same T, V and P

# Dalton's Law: $P=P_A+P_B$


$P_A$, V, T




M.C.Escher

P, V, T

The total pressure P is equal to the sum of the partial pressures $P_A$ and $P_B$ of the gases A and B.

The partial pressure $P_A$ is the pressure that component A will exert if it occupies the entire volume of the mixture at the temperature of the mixture

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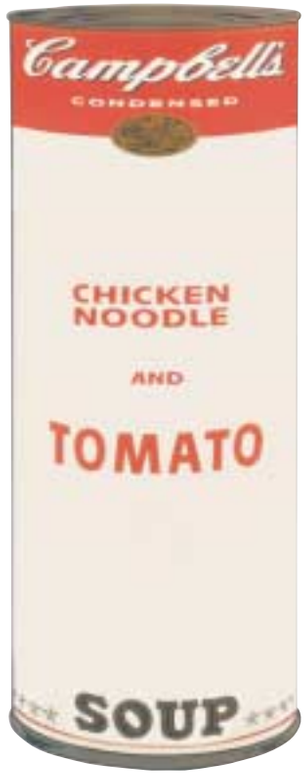
# Law of Additive of Volumes through Andy Warhol

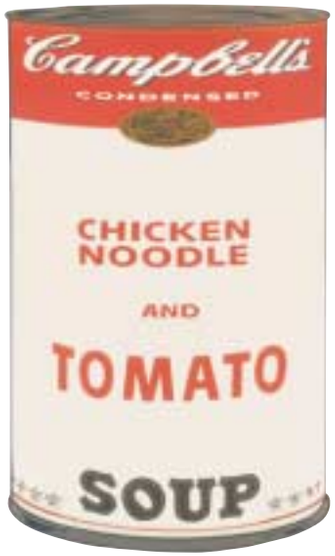

$V_1$


$V_2$


$V=V_1+V_2$ for immiscible liquids




$V=V_1+V_2$ for an ideal solution of miscible liquids




V not equal $V_1+V_2$ for a non-ideal solution of miscible liquids

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