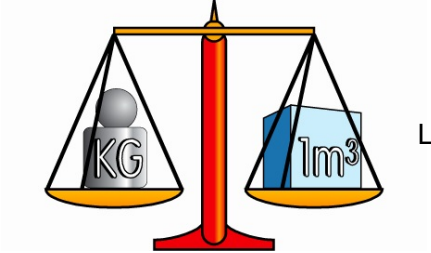
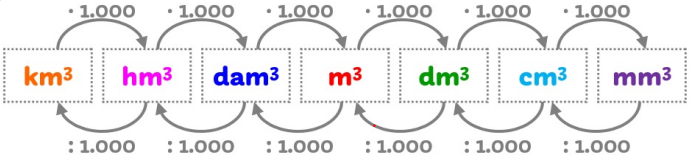
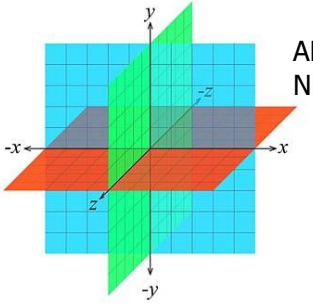
I SOLIDI



LA DENSITA'

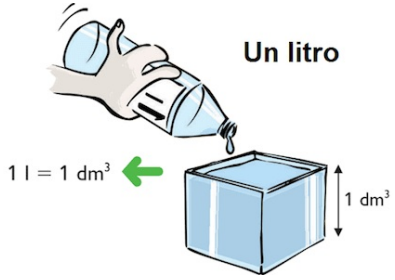
COME SI MISURA IL VOLUME?



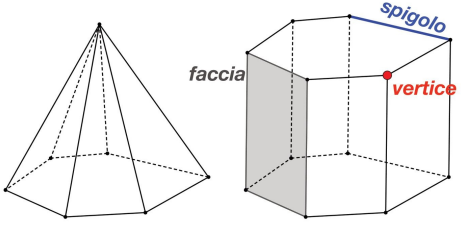


ANGOLI E RETTE
NELLO SPAZIO

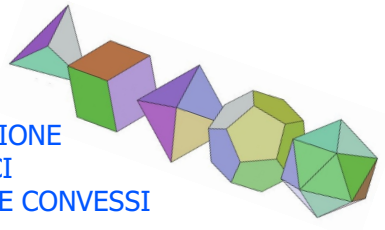
COME SI TRASFORMA
DA DM CUBI A LITRI?

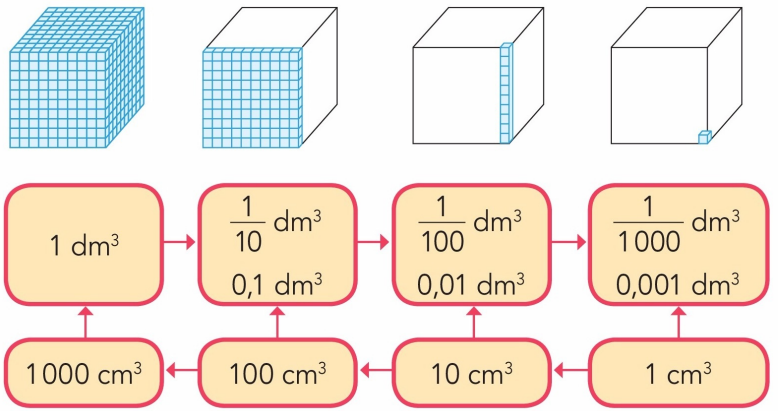


RELAZIONE DI EULERO



TIPI DI SOLIDI
- POLIEDRI
- SOLIDI DI ROTAZIONE
- SOLIDI PLATONICI
- SOLIDI CONCAVI E CONVESSI





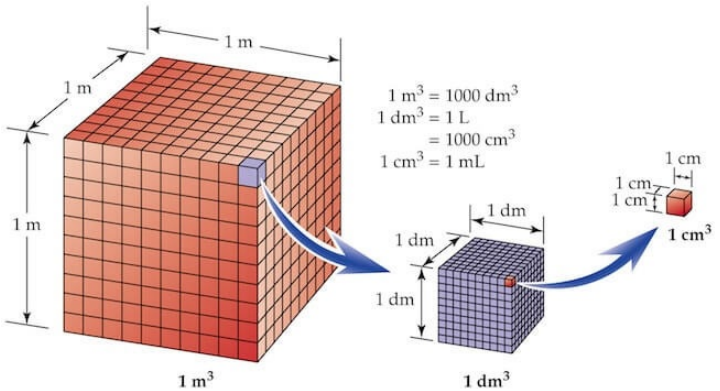
ESEMPI DI EQUIVALENZE

$2{,}3\ km^3 = 2300\ hm^3$

× 1000

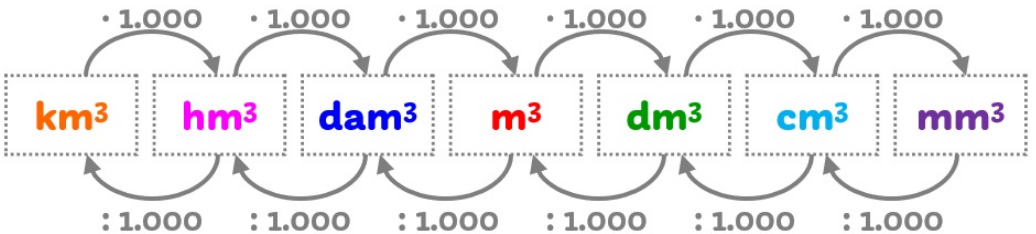
$382\ cm^3 = 0{,}382\ dm^3$

: 1000

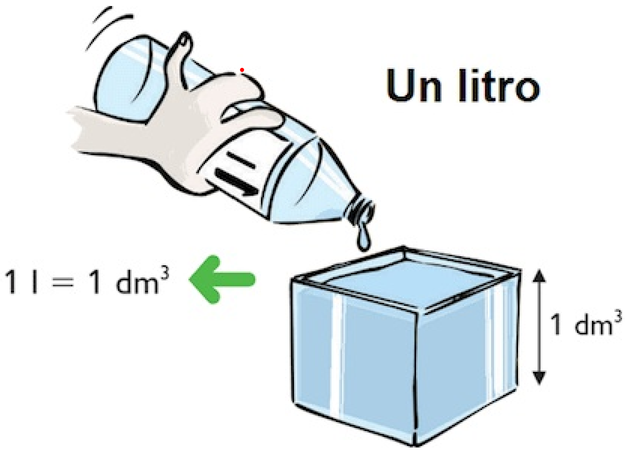


$0{,}003\ m^3 = 3000\ cm^3$

× 1000 → $3\ dm^3$ × 1000



COME SI TRASFORMA DA DM CUBI A LITRI?



1.000.000 litri	Megalitri	dam^3
		: 1000 ↑ ↓ x 1000
1000 litri	kl	m^3
100 litri	hl	: 1000 ↑ ↓ x 1000
10 litri	dal	
1 litro	L	dm^3
0,1 litri	dl	: 1000 ↑ ↓ x 1000
0,01 litri	cl	
0,001 litri	ml	cm^3
		: 1000 ↑ ↓ x 1000
0,0000001 litri	microlitri	mm^3

Tra le unità in litri: ×10 scendendo, :10 salendo.

ESEMPI

4,3 dl = ... cm^3

4,3 dl = 430 ml = 430 cm^3

×10 → 43 cl ×10

CONVERTO SEMPRE SULLE LINEE VERDI MODIFICANDO SOLO L'UNITA' DI MISURA

230 cm^3 = ... cl

230 cm^3 = 230 ml = 23 cl

:10

LA DENSITA'

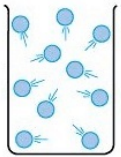
FORMULE $D = \frac{M}{V}$ $V = \frac{M}{D}$ $M = D \times V$

Può essere espressa in due modi:

- Kg/m^3 — Unità di misura usata quasi sempre per gas e liquidi
- $Kg/dm^3 = g/cm^3$ — lo stesso numero rappresenta entrambe le unità di misura

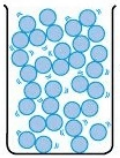
Gas

Hydrogen:	0.089 kg/m³
Oxygen:	1.43 kg/m³
Carbon Dioxide:	1.96 kg/m³



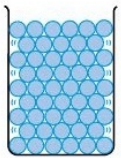
Liquid

Alcohol:	789 kg/m³
Water:	1000 kg/m³
Mercury:	13534 kg/m³



Solid

Aluminium:	2700 kg/m³
Steel:	7500 kg/m³
Uranium:	18800 kg/m³



ESEMPI

$M = 20\ Kg \quad D = ?$

$V = 12\ dm^3$

$D = \frac{M}{V} = \frac{20\ Kg}{12\ dm^3} = 1{,}6\ Kg/dm^3$

$M = 98\ Kg$

$D = 1{,}96\ Kg/m^3$

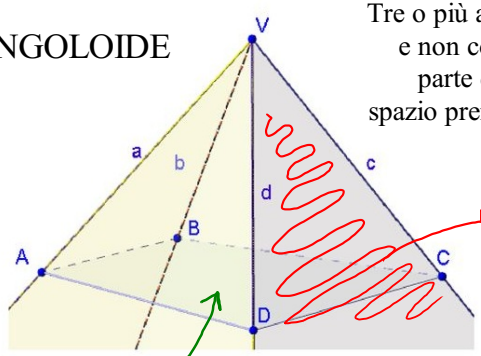
$V = \frac{M}{D} = \frac{98\ Kg}{1{,}96\ Kg/m^3} = 50\ m^3$

Material	(g/cm^3)
Platinum	21.5
Lead	11.3
Steel	7.8
Titanium	4.5
Aluminum	2.7
Glass	2.7
Granite	2.6
Concrete	2.3
Plastic	2.0
Rubber	1.2

ANGOLI E RETTE NELLO SPAZIO

ANGOLOIDE

Tre o più angoli consecutivi tra loro e non complanari delimitano una parte di spazio. Questa parte di spazio prende il nome di angoloide.

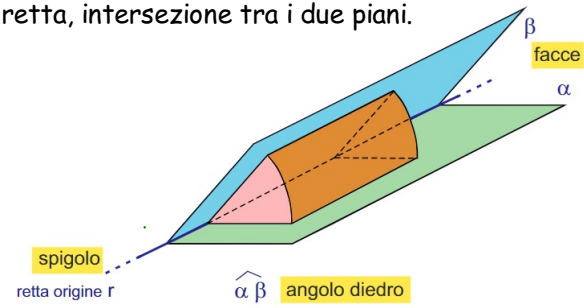


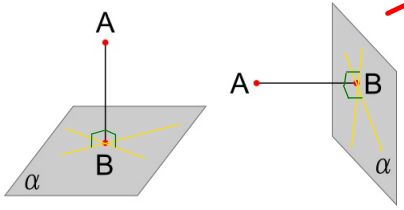
Angolo: è una superficie!

Angoloide: è un volume!

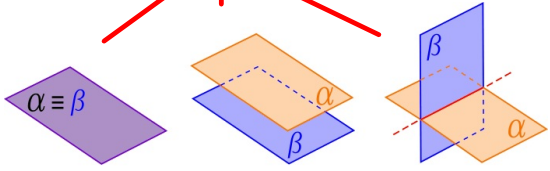
ANGOLO DIEDRO

L'angolo diedro può essere concavo o convesso. E' la parte di SPAZIO delimitata da due piani incidenti. l'origine dell'angolo è la retta, intersezione tra i due piani.

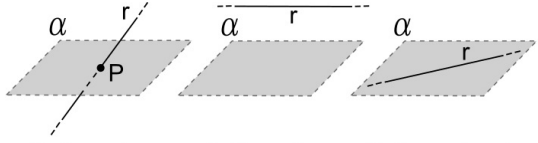




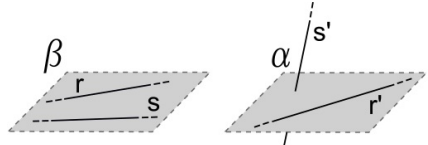
La distanza di un punto da un piano è rappresentata da un segmento. Tale segmento giace sulla retta perpendicolare al piano. Occorrono almeno due angoli retti per essere sicuri che il segmeno sia



Piani coincidenti | Piani paralleli | Piani incidenti



Retta e piano incidenti | Retta e piano paralleli | Retta contenuta nel piano



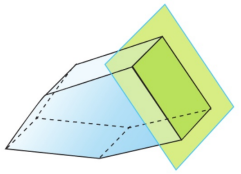
Rette complanari | Rette sghembe

TIPI DI SOLIDI

POLIEDRI

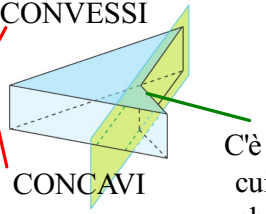
Sono solidi delimitati da poligoni situati su piani differenti e aventi a due a due un lato in comune

possono essere



CONVESSI

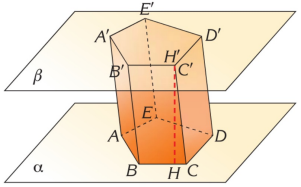
Tutti i piani su cui giacciono le facce NON intersecano il solido



CONCAVI

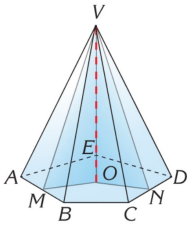
C'è almeno un piano, su cui giacciono le facce, che interseca il solido

PRISMI

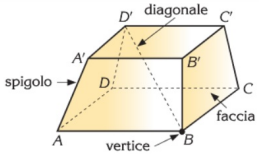


basi congruenti e su piani paralleli!

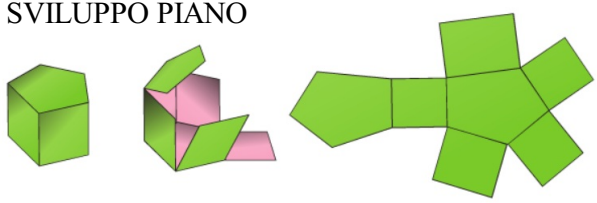
PIRAMIDI



ALTRI POLIEDRI



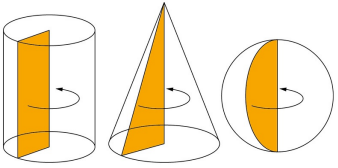
SVILUPPO PIANO



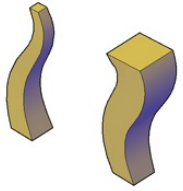
Lo sviluppo piano coincide con la superficie totale

SOLIDI A SUPERFICIE CURVA

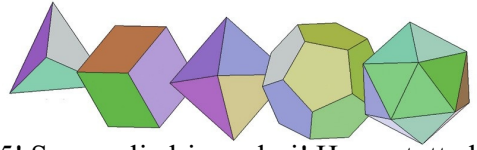
SOLIDI DI ROTAZIONE



ALTRI SOLIDI A SUPERFICIE CURVA

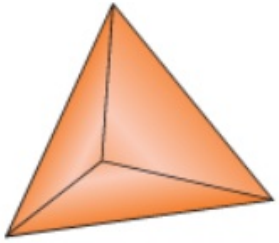


SOLIDI PLATONICI

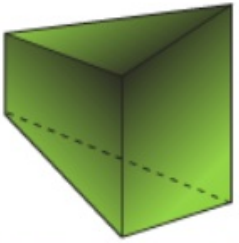


Sono solo 5! Sono poliedri regolari! Hanno tutte le facce, angoloidi e spigoli congruenti!
Tetraedro, Cubo, ottaedro, dodecaedro, icosaedro.

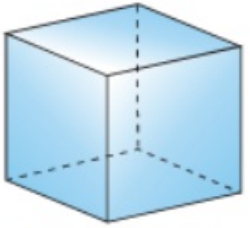
RELAZIONE DI EULERO



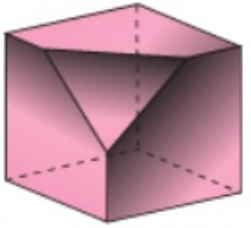
TETRAEDRO
4 facce



PENTAEDRO
5 facce



ESAEDRO
6 facce



ETTAEDRO
7 facce

FACCE + VERTICI = SPIGOLI + 2

poliedro	f	v	s	$f + v$	$s + 2$
tetraedro	4	4	6	8	8
pentaedro	5	5	8	10	10
esaedro	6	8	12	14	14
ettaedro	7	10	15	17	17