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22/11 a 16/26

$H_2S \rightarrow$ (Sulfur)

what is
this substance? (what does
that mean?)
makes things smell bad

Def?

$H_2S + H_2SO_4$

?? i. All life died (Except small things) (Volcanoes in $RuSO_4$ again)

- P.E.T.M thermal maximum

BC of
 $CO_2 + H_2S?$
(+ H_2SO_4)

Temp SPIKED

a) small things could survive main idea

This
much

We have released the
same amount of CO_2 in
200 years as the volcanoes
did in 10,000 yrs

CO_2 did this (temp spike + killed everything)

- Planet got so hot animals on land
had to shrink

Eocene Animal : Andrewsarchus

- Extinct genus of artiodactyl
- Lived during the Middle Eocene
- a) in what is now China

Andrew sarchus

Genus first described
by Henry Fairfield
Osborn 1924



- a) Type species *A. mongoliensis*
- b) Based on incomplete cranium

- May have been related to entelodonts → relatives of hippos + whales
- Fossils recovered from Middle Eocene Irdin Manhan, Lushi + Dongjin Formations of Inner Mongolia

(came from Asia)

← a) dated to the Irdinmanhan Asian land mammal age

- Sole member of [Lutetian-Bartonian stages (48-38 million yrs ago)] its family a) Andrewsarchidae

Def?

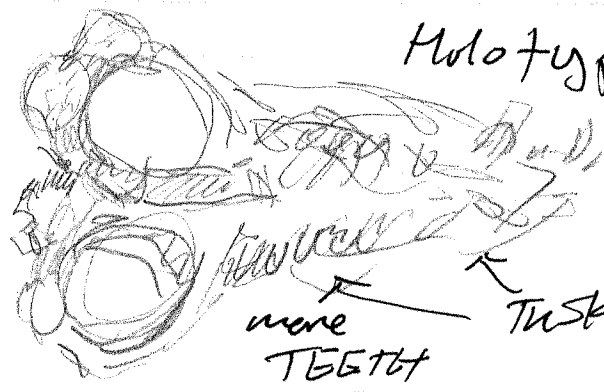
- Reputed as the largest terrestrial Carnivorous mammal given its skull length a) overall body size was probably overestimated

(32.8 in)

Def?

- b) No carnassial teeth
- c) maybe a scavenger??

Holotype → Not a hypercarnivore



Skull cast of A. mongoliensis

FROM BELOW

more TEETH

TUSKS?

Ellie Gimzek

9/16/2026

$$\Delta Q = m \cdot \Delta T \cdot C_p$$

 ΔQ (Joules) = mass (g) $\cdot$ ΔT (°C) $\cdot$ Specific Heat Capacity (C_p)

Q = energy!

1 ml = 1 gram only water

4.2 joules per gram per degree Celsius

Heat is a form of energy
Q = heat energy



1 ml = 1 gram

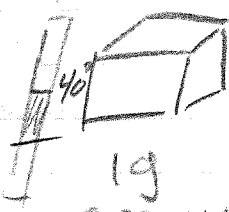
density = mass / volume

(room temp)

WATER = 1 gram / 1 ml

2 gram warms by 2 degree C if you put 4.2 into it

20°C



Water

metal

ceramic

Plane from match

Now much energy substance heats up

100 J substance → 100 J substance
Heat affects differently
Different substances respond differently to heat.

Heat is energy measured in joules!

Calorie
 Biology Science
 1 Calorie
 100 J
 100 J
 27°C
 1 gram
 B.T.U.
 = Food lowercase = science

CANT measure energy,
 Can measure how much energy you put into something

BRITISH Thermal unit

Quantify → what's the quantity?
 "how many — ?"

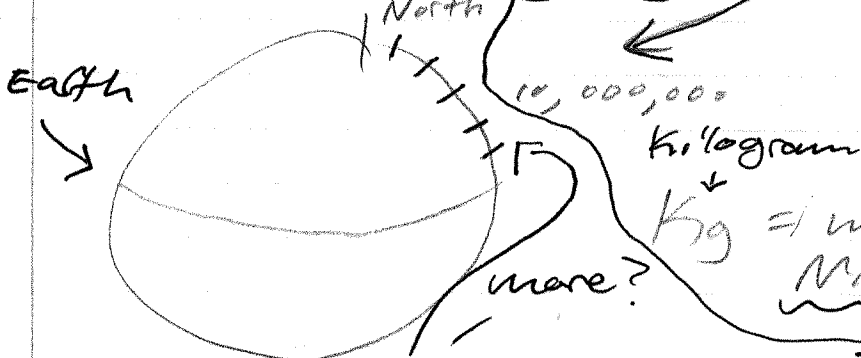
Calorie = Capital C = Food Calorie
unit

• 1,000 science calorie = 1 Food Calorie

• Work = Force * distance

made to make the amount of cal's in food seem less scary

• Object 5 lb motion stay in motion



(where water came from)

Newton = $\frac{\text{Force} \times \text{distance}}{\text{measurement}}$ (instead of lbs)

$$1 \text{ N} = \frac{1}{4} \text{ lb} = .225 \text{ lb}$$

one joule = 1 newton of force

$\frac{1 \text{ J}}{\text{N}} = \text{work u did pushing 1n of force}$

B.T.U.

1 pint = 16 ounces

British

Thermal

Unit

more info?
what does it really mean?

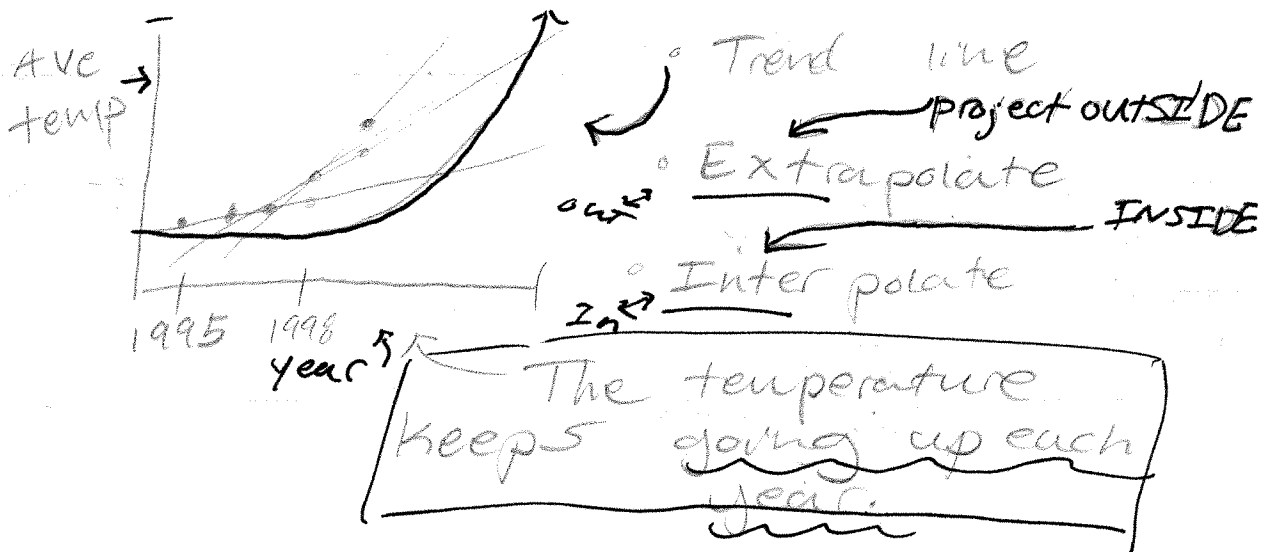
Does that mean just the measurement used in UK?

Ellie Gimzek

9/16/26

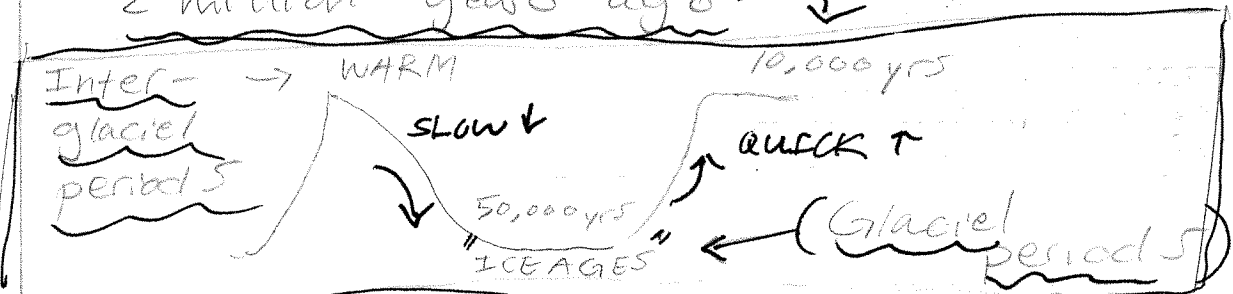
Record Breaking Heat ← Each year after 1995 continued to break the record for hottest year

~ 50 years ago we started recording global temperatures
1995, hottest year
a) 1996 broke that heating record
PLANET keeps heating UP!



Planet is heating up exponentially
Def?

2 million years ago



Earth's temp naturally fluctuates
ICE AGE represents the earth's cycle of temperature, not just the cold periods
Also the hot periods.

- Earth heats up QUICKLY
 - a) Cools down SLOWLY
 - b) We don't know how many years it takes to warm up

But, we know that it heats up very quickly!

- Volcanic eruptions + Inter-glacial periods
 - Every time, due to massive eruptions when the glacial periods ended, it was always due to MASS volcanic eruptions.

- Has to do with the OCEAN chemistry

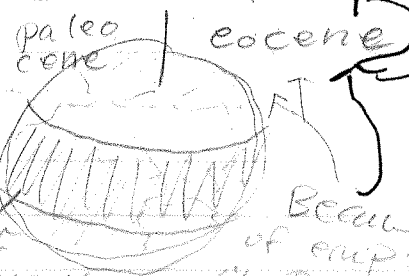
what does that mean?
↓
Can I get a basic def?

- Volcanoes = lots of CO₂
 - Lots of CO₂ = planet heats up
 - Oceans turn CO₂ into rock (limestone)

oceans take the CO₂
IF humans never started burning coal, the planet would be going into the next glacial period

CO₂ heats planet. We b/c of all the excessive CO₂ productions are heating up the planet TOO FAST and TOO MUCH!

55 million years ago, massive volcanic eruptions in Russia for ten thousand years
65mya → 55mya



we've already produced MORE than that in only 200 YRS!

- Dinosaurs died
- mesozoic ends

cenozoic started

Because of eruptions
Killed everything in Russia
Lost oxygen