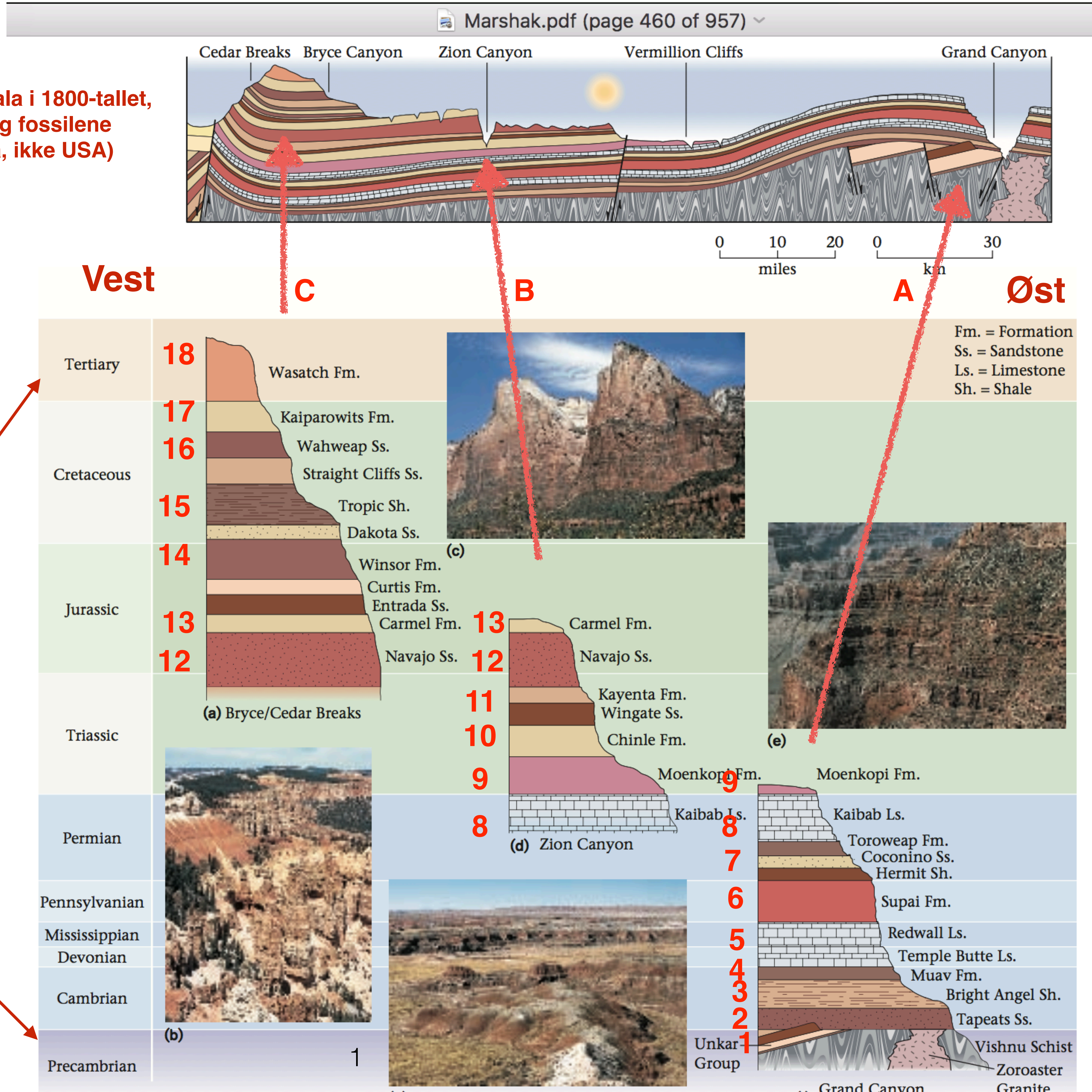
For å lage et Geologisk tidsskala i 1800-tallet, korrelerte man stratigrafiene og fossilene flere steder (stort sett i Europa, ikke USA)



Tertiær

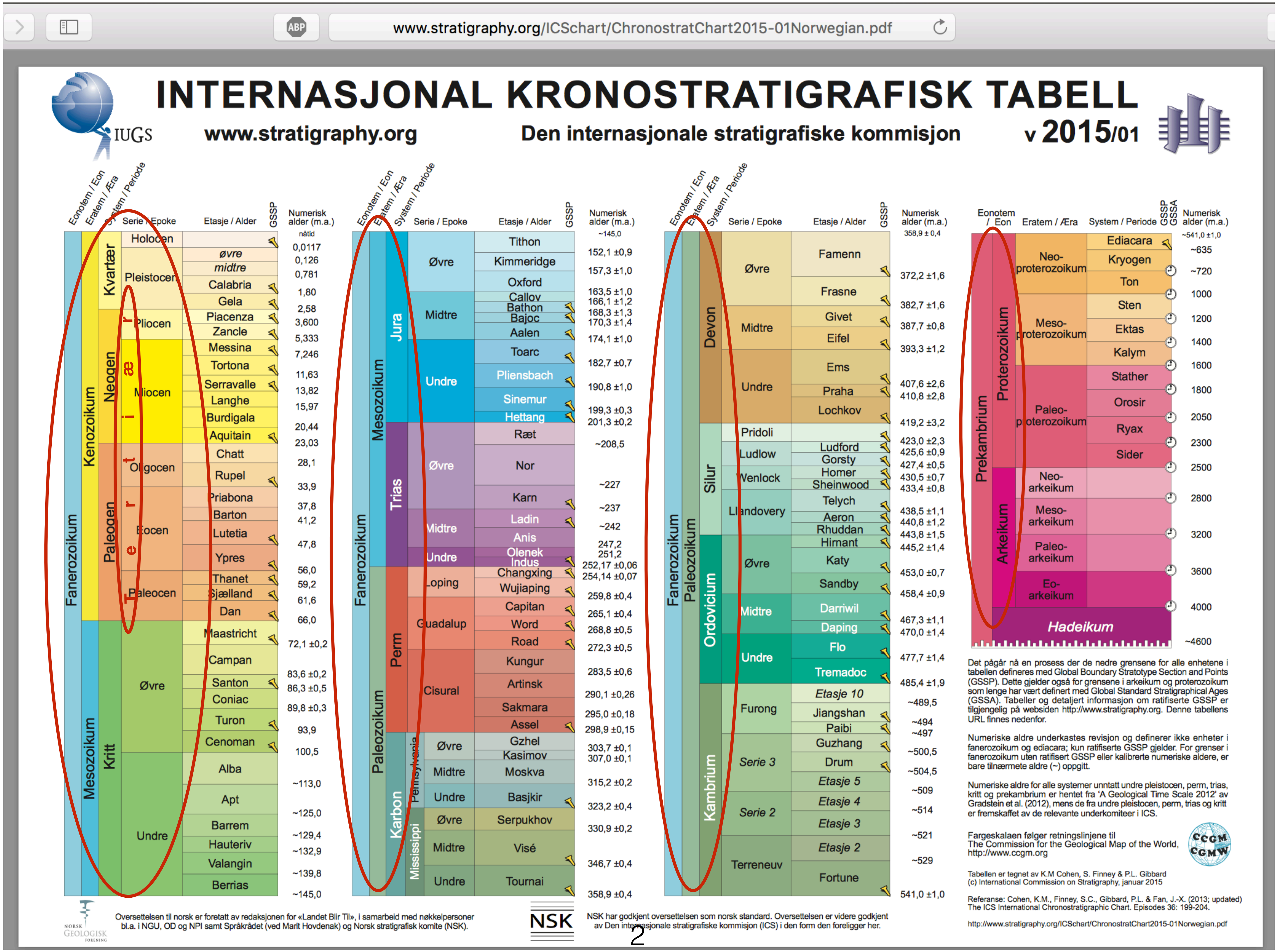
Prekambrium

Geologisk tidsskala. https://stratigraphy.org/ICSchart/ChronostratChart2021-05Norwegian.pdf

Norske ord og stavemåter.

(På norsk bruker man *ikke* store forbokstaver for tidsnavn: januar, mandag, ….. prekambrium, kambrium …)

De viktige ordene er sirklet.



Nelson.pdf (page 139 of 248)

Geologic Time Scale Geologisk tidsskala

Det er viktig for geologer å kunne disse rekker når de snakker med andre geologer om hva som har hendt før i tiden.

(Som det er viktig å kunne:

januar, februar, mars… mandag, tirsdag,…)

Eon	Era	Period	Epoch	Age(my)
Phanerozoic (Visible Life) fanerozoikum	kenozoikum Cenozoic (Recent Life) (Age of Mammals)	kvartær Quaternary	Holocene	0.01 (ca.10 ka)
			Pleistocene	1.8
		neogen Tertiary tertiær	Pliocene	5.3
			Miocene	23.0
		paleogen	Oligocene	33.9
			Eocene	55.8
			Paleocene	65.5 (ca. 66 Ma)
	mesozoikum Mesozoic (Middle Life) (Age of Reptiles)	kritt Cretaceous		145
		jura Jurassic		200
		trias Triassiac		251
	paleozoikum Paleozoic (Ancient Life)	perm Permian		299
		Pennsylvanian karbon		318
		Mississippian		359
		Devonian devon		416
		Silurian silur		444
		ordovicium Ordovician		488
		kambrium Cambrian		542 (ca. 540 Ma)
Proter-ozoic (Early Life) protero zoikum		prekambrium		Oldest Known Life 2500
Archean arkeikum				Oldest Known Rocks 3800
Hadean				Age of the Earth 4600 (ca. 4,6 Ga)

Kun disse fire aldere bør pugges for eksamen

Disse navn bør pugges på engelsk eller norsk for eksamen.

Geologic Time Scale

Eon	Era	Period	Epoch	Age(my)
Phanerozoic (Visible Life)	Cenozoic (Recent Life) (Age of Mammals)	Quaternary	Holocene	0.01
			Pleistocene	1.8
		Tertiary	Pliocene	5.3
			Miocene	23.0
			Oligocene	33.9
			Eocene	55.8
			Paleocene	65.5
	Mesozoic (Middle Life) (Age of Reptiles)	Cretaceous		145
		Jurassic		200
		Triassiac		251
	Paleozoic (Ancient Life)	Permian		299
		Pennsylvanian		318
		Mississippian		359
		Devonian		416
		Silurian		444
		Ordovician		488
		Cambrian		542
Proter-ozoic (Early Life)		Oldest Known Life		2500
Archean		Oldest Known Rocks		3800
Hadean		Age of the Earth		4600

“kambrisk eksplosjon” av synlig liv

ca. 540 Ma

prekambrium (“før-kambrium”)

prekambrium

Geologic Time Scale

Eon	Era	Period	Epoch	Age(my)
Phanerozoic (*Visible Life*)	("ny dyr") Cenozoic (*Recent Life*) (*Age of Mammals*)	Quaternary	Holocene	0.01
			Pleistocene	1.8
		Tertiary	Pliocene	5.3
			Miocene	23.0
			Oligocene	33.9
			Eocene	55.8
			Paleocene	65.5
	("mellom dyr") Mesozoic (*Middle Life*) (*Age of Reptiles*)	Cretaceous		145
		Jurassic		200
		Triassiac		251
	("urgammel dyr") Paleozoic (*Ancient Life*)	Permian		299
		Pennsylvanian		318
		Mississippian		359
		Devonian		416
		Silurian		444
		Ordovician		488
		Cambrian		542
Proter-ozoic (*Early Life*)	Oldest Known Life			2500
Archean	Oldest Known Rocks			3800
Hadean	Age of the Earth			4600

prekambrium

fanerozoikum ("synlig dyr")

proterozoikum ("tidlig dyr")

"kambrisk eksplosjon" dyr oppfant harde kroppsdeler av SiO_2 og $CaCO_2$ som ble til fossiler

Nelson.pdf (page 139 of 248)

Geologisk tidsskala

Geologic Time Scale

Eon	Era	Period	Epoch	Age(my)
Phanerozoic (Visible Life) [fanerozoikum]	Cenozoic (Recent Life) (Age of Mammals) [kenozoikum]	Quaternary [kvartær]	Holocene	0.01
			Pleistocene	1.8
		Tertiary [tertiær] [neogen]	Pliocene	5.3
			Miocene	23.0
		[paleogen]	Oligocene	33.9
			Eocene	55.8
			Paleocene	65.5
	Mesozoic (Middle Life) (Age of Reptiles) [mesozoikum]	Cretaceous [kritt]		145
		Jurassic [jura]		200
		Triassic [trias]		251
	Paleozoic (Ancient Life) [paleozoikum]	Permian [perm]		299
		Pennsylvanian [karbon]		318
		Mississippian		359
		Devonian [devon]		416
		Silurian [silur]		444
		Ordovician [ordovicium]		488
		Cambrian [kambrium]		542
Proterozoic (Early Life) [proterozoikum]				2500
	Oldest Known Life			
Archean [arkeikum]				3800
	Oldest Known Rocks			
Hadean				4600
	Age of the Earth			

Disse navn bør pugges på engelsk eller norsk for eksamen.

perm
karbon
djevel
S ilur
O rdovicium
K ambrium

"KOS med Djevelen, spis Karbonader på Perm" ?

Geologisk tidsskala

Nelson.pdf (page 139 of 248)

Geologic Time Scale

Eon	Era	Period	Epoch	Age(my)
Phanerozoic (Visible Life) — fanerozoikum	kenozoikum — Cenozoic (Recent Life) (Age of Mammals)	Quaternary — kvartær	Holocene	0.01
			Pleistocene	1.8
		Tertiary — tertiær; neogen	Pliocene	5.3
			Miocene	23.0
		paleogen	Oligocene	33.9
			Eocene	55.8
			Paleocene	65.5
	mesozoikum — Mesozoic (Middle Life) (Age of Reptiles)	Cretaceous — kritt		145
		Jurassic — jura		200
		Triassic — trias		251
	paleozoikum — Paleozoic (Ancient Life)	Permian — perm		299
		~~Pennsylvanian~~ — karbon		318
		~~Mississippian~~		359
		Devonian — devon		416
		Silurian — silur		444
		Ordovician — ordovicium		488
		Cambrian — kambrium		542
Proterozoic (Early Life) — proterozoikum		Oldest Known Life		2500
Archean — arkeikum		Oldest Known Rocks		3800
Hadean		Age of the Earth		4600

Disse navn bør pugges på engelsk eller norsk for eksamen.

Huskeregler:
PEOM P P

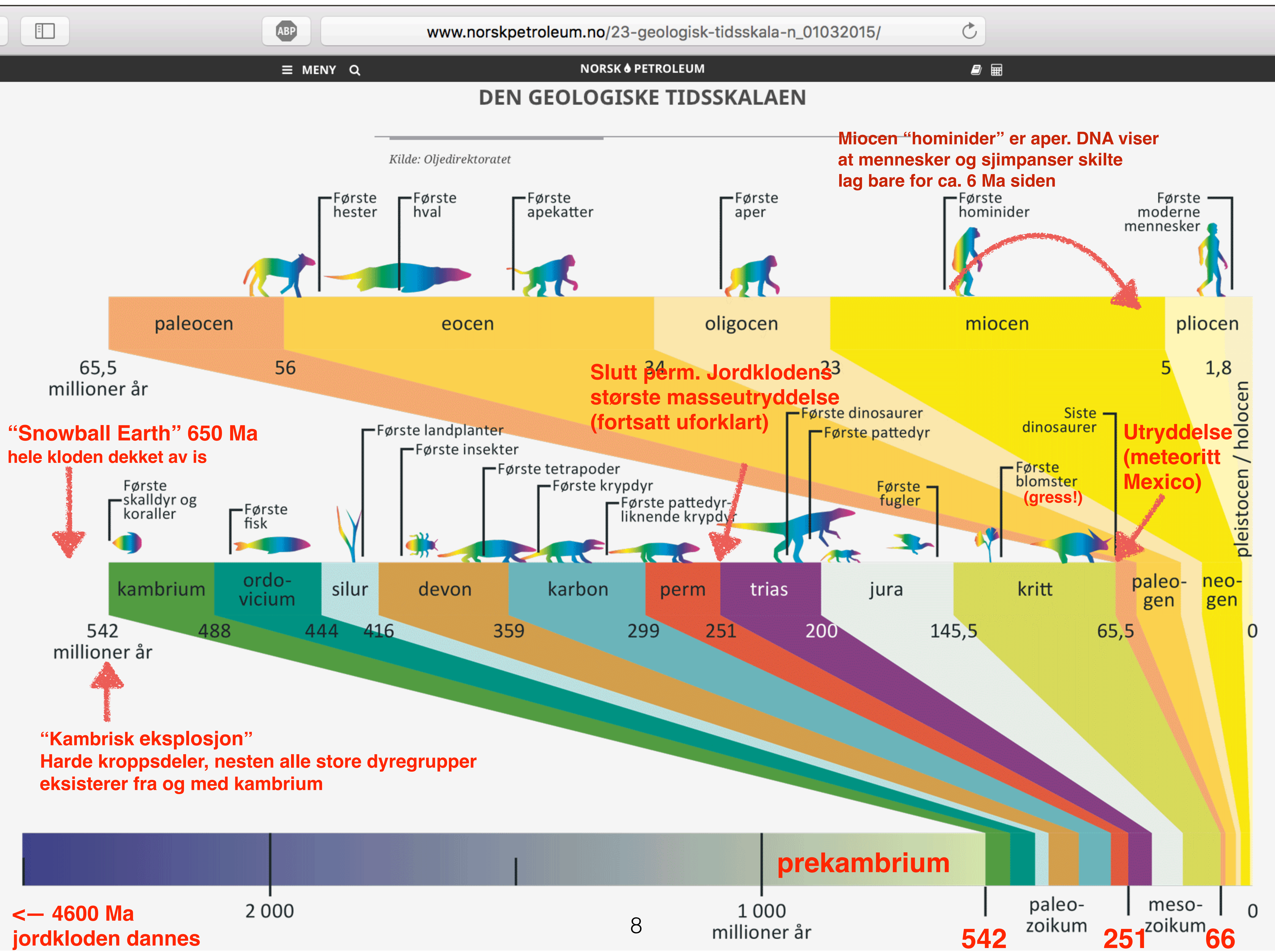
Kritt
Jura
Trias

"Tre Jur av Kritt"

perm
karbon
djevel
S ilur
O rdovicium
K ambrium

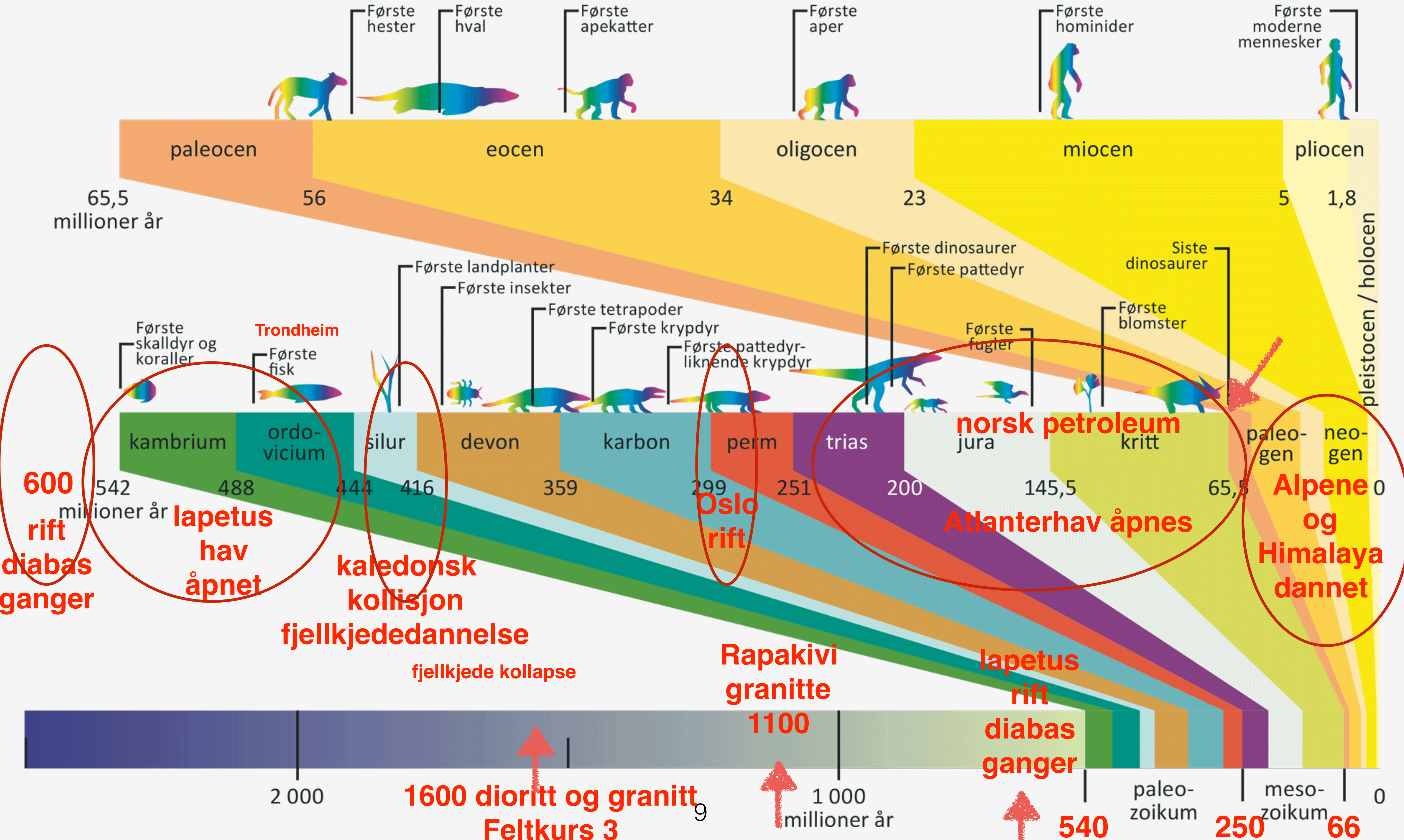
"KOS med Djevelen, spis Karbonader på Perm"

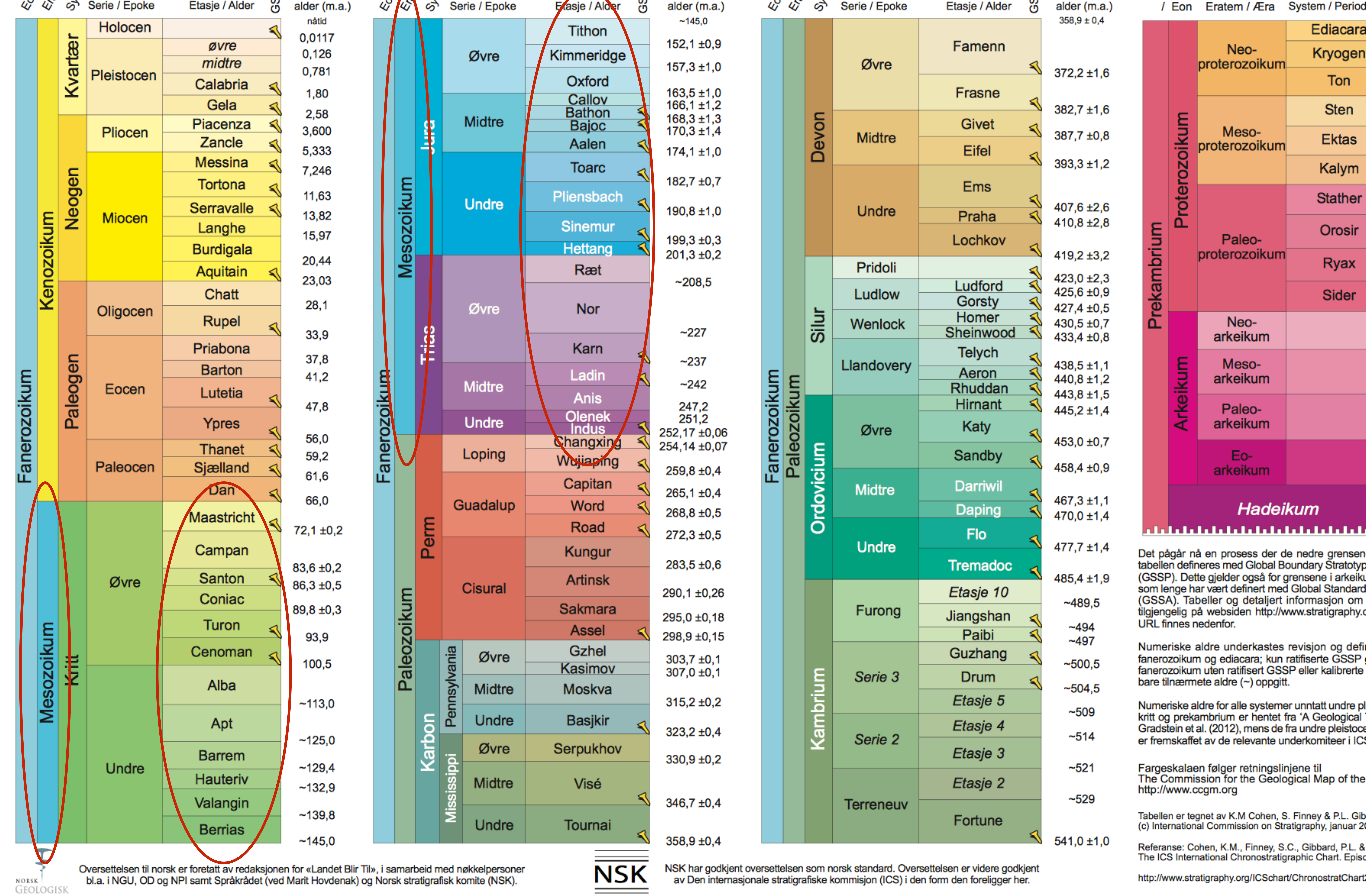
"KOS DoK på Perm"


www.norskpetroleum.no/23-geologisk-tidsskala-n_01032015/
MENY
NORSK PETROLEUM
DEN GEOLOGISKE TIDSSKALAEN
Kilde: Oljedirektoratet
Miocen "hominider" er aper. DNA viser at mennesker og sjimpanser skilte lag bare for ca. 6 Ma siden
Første hester
Første hval
Første apekatter
Første aper
Første hominider
Første moderne mennesker
paleocen
eocen
oligocen
miocen
pliocen
65,5 millioner år
56
34
23
5
1,8
pleistocen / holocen
Slutt perm. Jordklodens største masseutryddelse (fortsatt uforklart)
"Snowball Earth" 650 Ma
hele kloden dekket av is
Første skalldyr og koraller
Første fisk
Første landplanter
Første insekter
Første tetrapoder
Første krypdyr
Første pattedyr-liknende krypdyr
Første dinosaurer
Første pattedyr
Første fugler
Første blomster (gress!)
Siste dinosaurer
Utryddelse (meteoritt Mexico)
kambrium
ordo-vicium
silur
devon
karbon
perm
trias
jura
kritt
paleo-gen
neo-gen
542 millioner år
488
444
416
359
299
251
200
145,5
65,5
0
"Kambrisk eksplosjon"
Harde kroppsdeler, nesten alle store dyregrupper eksisterer fra og med kambrium
prekambrium
<— 4600 Ma jordkloden dannes
2 000
1 000 millioner år
542
paleo-zoikum
251
meso-zoikum
66
0

DEN GEOLOGISKE TIDSSKALAEN

Kilde: Oljedirektoratet





Norske petroleumsgeologer jobber mest med mesozoikum.
De bruker disse 30 detaljerte tidsnavn. Men de fleste geologer klarer ikke lære dem utenat.

Du må finne opp
visuelle huskeord **som ligner.**
For eksempel:

Maastricht blir et *Mast-rike.*
(et rike av antenner.)

Campan blir *Campingplass.*

Santon blir Det *Sant One*. (sant person)

Coniac blir *Konjakk*.

Turon blir Tur-hann (en turguide)

Cenoman blir *Scene-mann*.

Maastricht
Campan
Santon
Coniac

Så “lenker” du bildene sammen 2 og 2.
***Ikke lag en fortelling*.**

Med en lenke kan du gå framover eller bakover.
Eller starte i midten.

I en Mast-rike er det en Campingplass.

I en Campingplass er det Sant One (en guru).

Sant One drikker Konjakk.

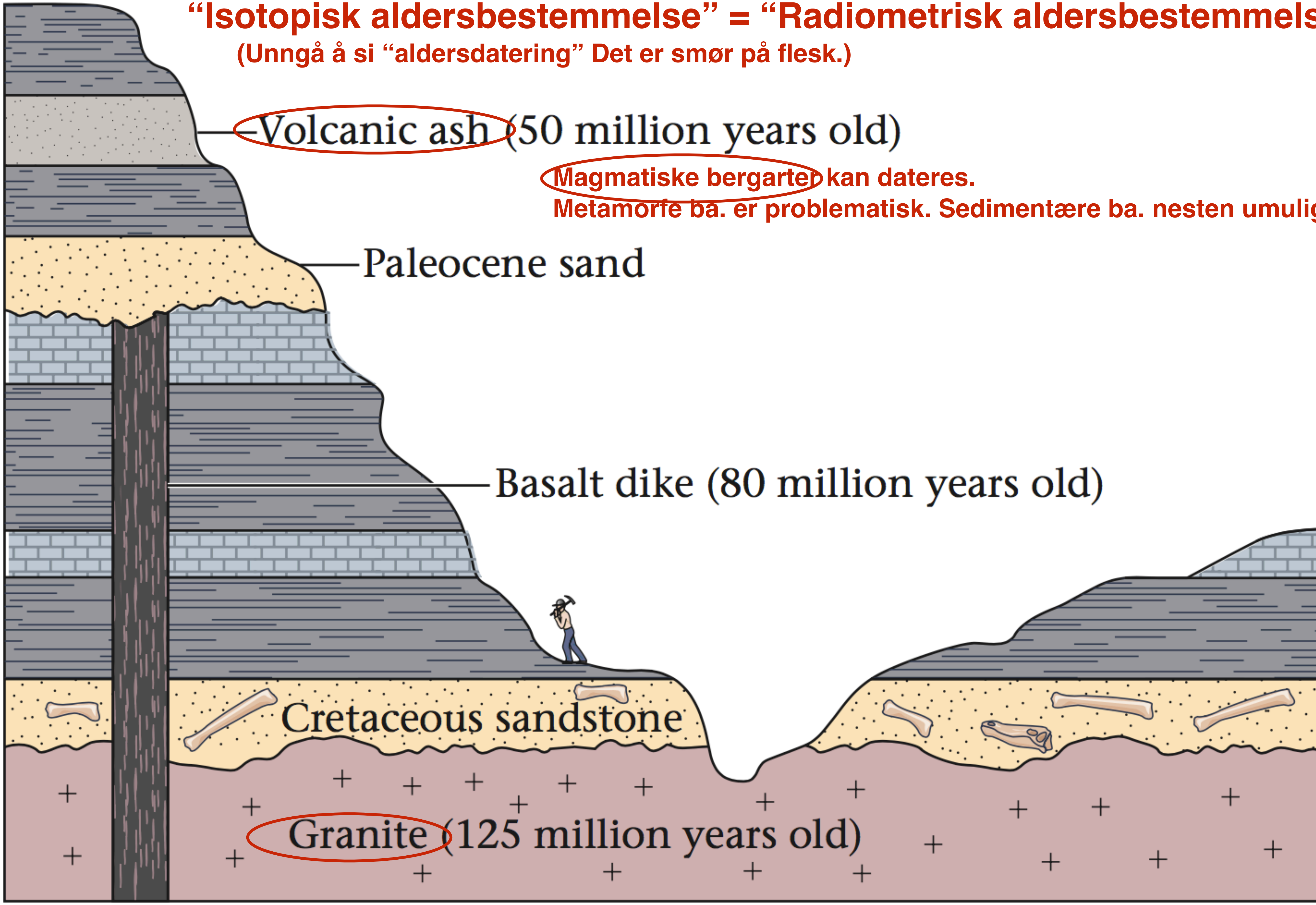
bare 2 ord lenkes
(Konjakk har ingen forbindelse til Camp)

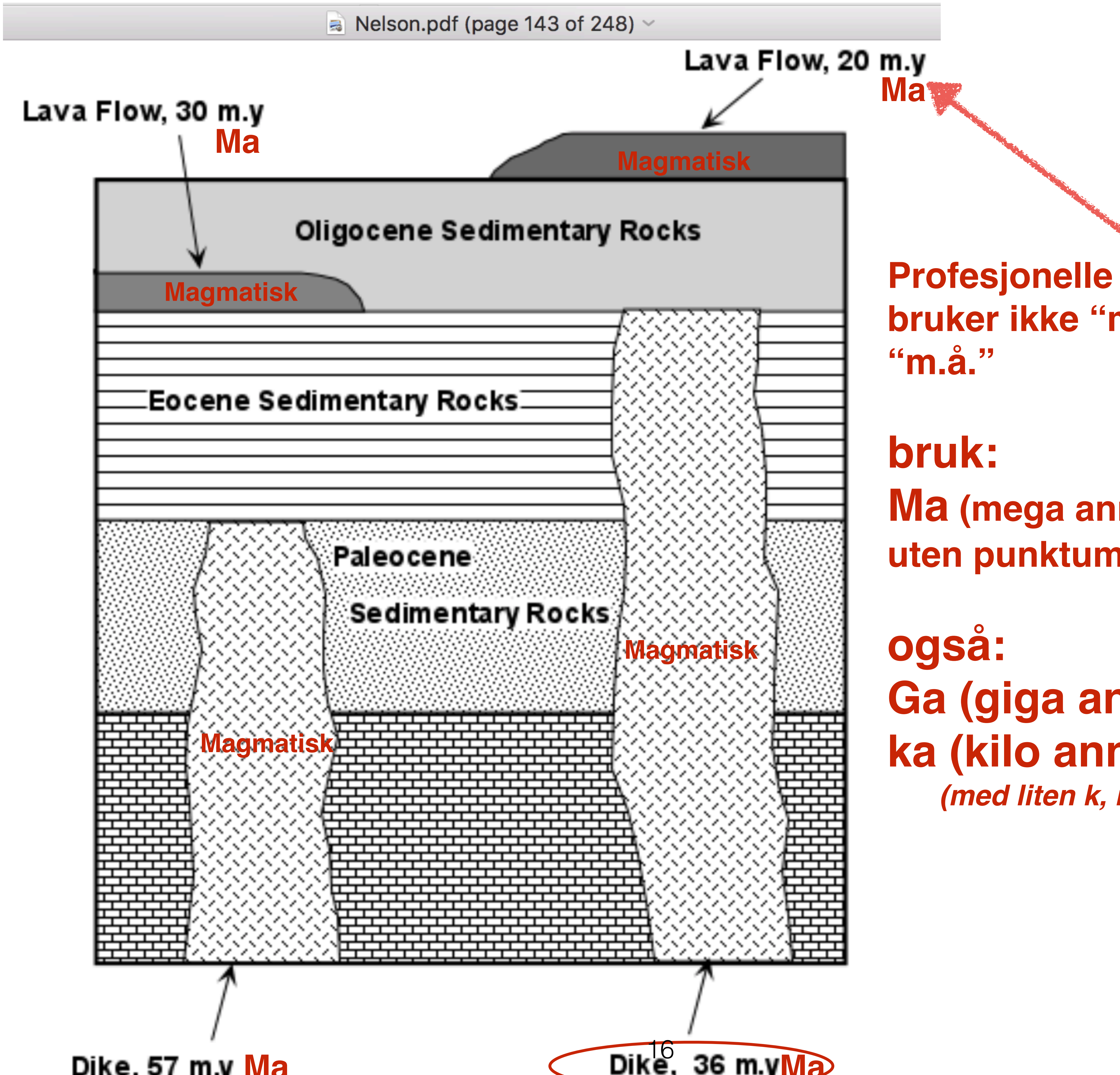
Maastricht	Mast-rike
Campan	Campingplass
Santon	Sant One
Coniac	Konjakk
Turon	Tur-hann
Cenoman	Scene-mann
Alba	Albuer
Apt	Ape
Barrem	Bar-rem
Hauteriv	Hytte-rive
Valangin	Hval-ungen
Berrias	Bær-is
Tithon	Titanic
Kimmeridge	Kammer-edge
Oxford	Oxford Univ.
Callov	Kalv
Bathon	Batong
Bajoc	Bæsj
Aalen	Allan
Toarc	2 ark (Noah typ)
Pliensbach	Pleie ens bak
Sinemur	Sinus-mur
Hettang	En het tang
Ræt	Ratt
Nor	Nordpolen
Karn	Karneval
Ladin	Bin Laden
Anis	Anus
Olenek	Julenek
Indus	Industriområde

Mast-rike
Campingplass
Sant One
Konjakk
Tur-hann
Scene-mann
Albuer
Ape
Bar-rem
Hytte-rive
Hval-ungen
Bær-is
Titanic
Kammer-edge
Oxford Univ.
Kalv
Batong
Bæsj
Allan
2 Ark (Noah typ)
Pleie ens bak
Sinus-mur
En het tang
Ratt
Nordpolen
Karneval
Bin Laden
Anus
Julenek
Industriområde

"Isotopisk aldersbestemmelse" = "Radiometrisk aldersbestemmelse"

(Unngå å si "aldersdatering" Det er smør på flesk.)





Profesjonelle geologer bruker ikke "m.y." eller "m.å."

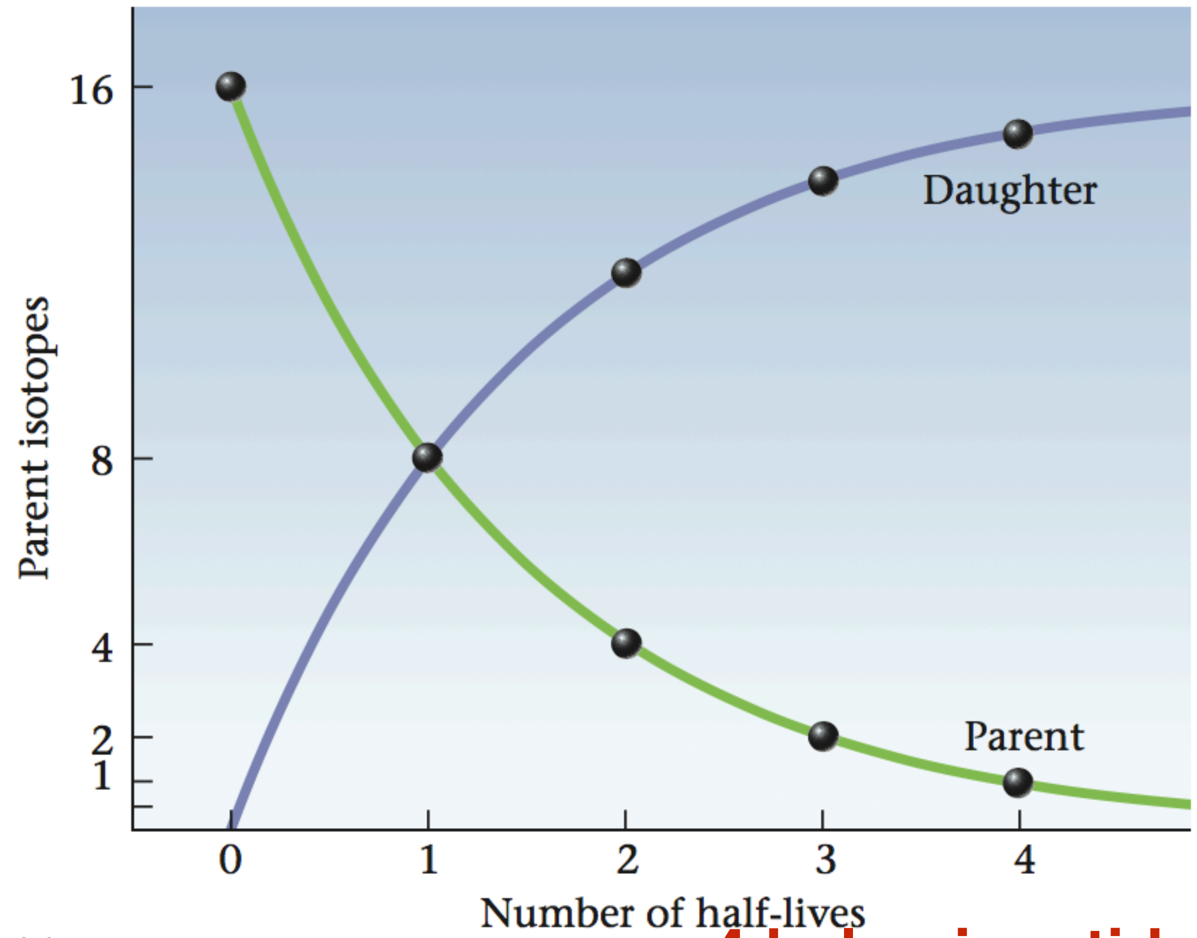
bruk:

Ma (mega annum)
uten punktum

også:

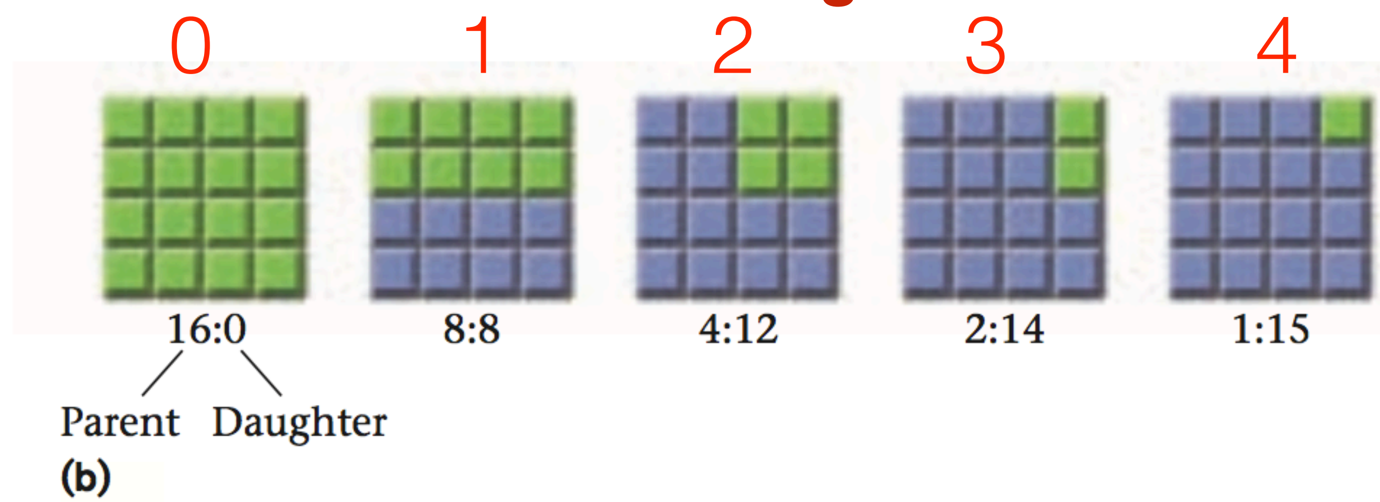
Ga (giga annum)
ka (kilo annum)
(med liten k, merkelig nok)

Marshak.pdf (page 461 of 957)



(a)

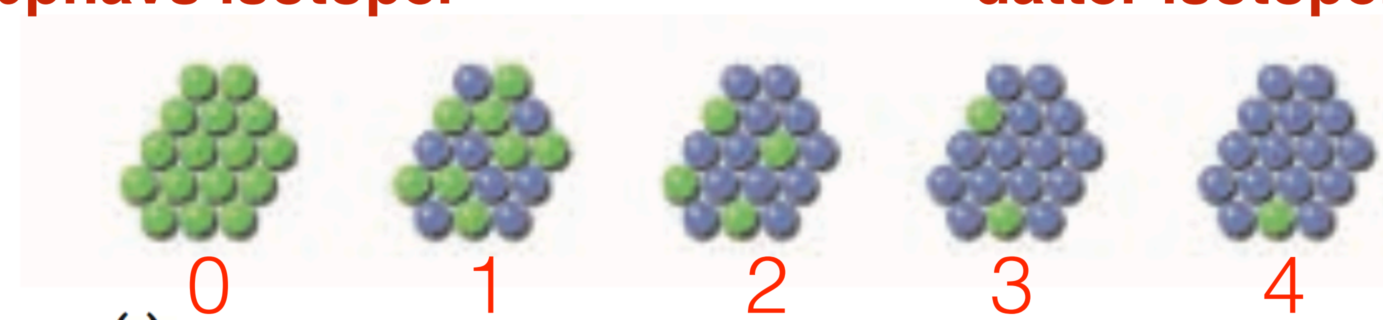
4 halveringstider



(b)

opphavs isotoper

datter isotoper



(c)

4 halveringstider

Nelson.pdf (page 141 of 248)

Man må beregne forhold mellom antall opphavsisotoper og antall datterisotoper. Derfor må man være sikker at "systemet er lukket"

etter 5 halveringstider er det lite igjen!

etter 10 halveringstider er det for lite å måle presist.

“Radioaktive” isotoper kalles også “ustabile.” De blir til helt annen grunnstoffer.

K har 19 protoner.
Vanlig stabil K isotop er 39K (19 protoner + 20 neutroner)
Radioaktiv K isotop er 40K (19 protoner + 21 neutroner)
40K atomer blir til Ar atomer ved at K mister en proton.

Marshak.pdf (page 862 of 957)

Searc

FIGURE a.3 The modern periodic table of the elements. The columns group elements with related properties. For example, inert gases are listed in the column on the right. Metals are found in the central and left parts of the chart.

Alkali metals

Symbol | He 2 Helium 4.002 | Atomic number / Name / Atomic weight

Inert gases

Nonmetals

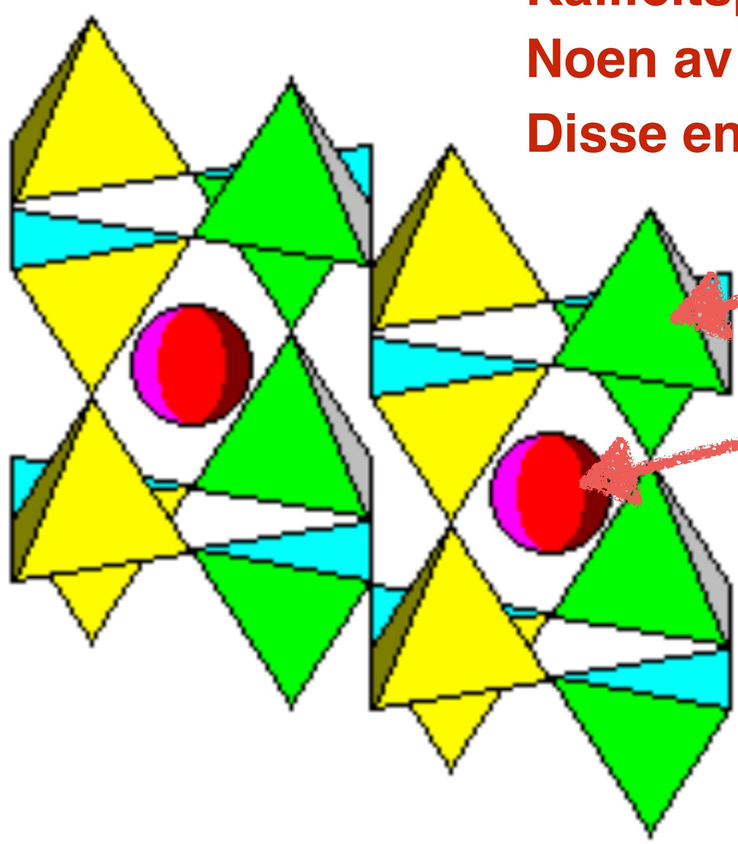
Transition elements (metals)

H 1 Hydrogen 1.007																	He 2 Helium 4.002
Li 3 Lithium 6.941	Be 4 Beryllium 9.0121											B 5 Boron 10.811	C 6 Carbon 12.011	N 7 Nitrogen 14.006	O 8 Oxygen 15.999	F 9 Fluorine 18.998	Ne 10 Neon 20.179
Na 11 Sodium 22.989	Mg 12 Magnesium 24.305											Al 13 Aluminum 26.981	Si 14 Silicon 28.085	P 15 Phosphorus 30.973	S 16 Sulfur 32.066	Cl 17 Chlorine 35.452	Ar 18 Argon 39.948
K 19 Potassium 39.098	Ca 20 Calcium 40.078	Sc 21 Scandium 44.955	Ti 22 Titanium 47.88	V 23 Vanadium 50.941	Cr 24 Chromium 51.996	Mn 25 Manganese 54.938	Fe 26 Iron 55.847	Co 27 Cobalt 58.933	Ni 28 Nickel 58.693	Cu 29 Copper 63.546	Zn 30 Zinc 65.39	Ga 31 Gallium 69.723	Ge 32 Germanium 72.61	As 33 Arsenic 74.921	Se 34 Selenium 78.96	Br 35 Bromine 79.904	Kr 36 Krypton 83.80
Rb 37 Rubidium 85.467	Sr 38 Strontium 87.62	Y 39 Yttrium 88.905	Zr 40 Zirconium 91.224	Nb 41 Niobium 92.906	Mo 42 Molybdenum 95.94	Tc 43 Technetium 98.907	Ru 44 Ruthenium 101.07	Rh 45 Rhodium 102.905	Pd 46 Palladium 106.42	Ag 47 Silver 107.868	Cd 48 Cadmium 112.411	In 49 Indium 114.82	Sn 50 Tin 118.710	Sb 51 Antimony 121.757	Te 52 Tellurium 127.60	I 53 Iodine 126.904	Xe 54 Xenon 131.29
Cs 55 Cesium 132.905	Ba 56 Barium 137.327	La 57 Lanthanum 138.905	Hf 72 Hafnium 178.49	Ta 73 Tantalum 180.947	W 74 Tungsten 183.85	Re 75 Rhenium 186.207	Os 76 Osmium 190.2	Ir 77 Iridium 192.22	Pt 78 Platinum 195.08	Au 79 Gold 196.966	Hg 80 Mercury 200.59	Tl 81 Thallium 204.383	Pb 82 Lead 207.2	Bi 83 Bismuth 208.980	Po 84 Polonium 208.982	At 85 Astatine 209.987	Rn 86 Radon 222.017
Fr 87 Francium 223.019	Ra 88 Radium 226.025	Ac 89 Actinium 227.027															

Ce 58 Cerium 140.115	Pr 59 Praseodymium 140.907	Nd 60 Neodymium 144.24	Pm 61 Promethium 144.912	Sm 62 Samarium 150.36	Eu 63 Europium 151.965	Gd 64 Gadolinium 157.25	Tb 65 Terbium 158.925	Dy 66 Dysprosium 162.50	Ho 67 Holmium 164.930	Er 68 Erbium 167.26	Tm 69 Thulium 168.934	Yb 70 Ytterbium 173.04	Lu 71 Lutetium 174.967

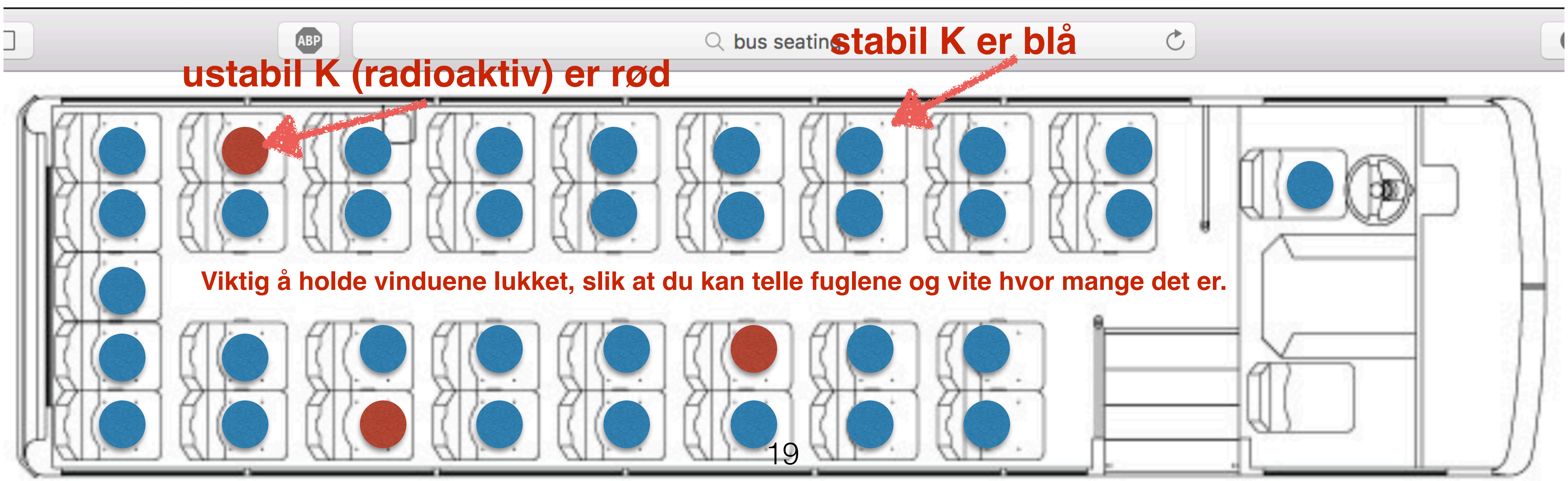
www.uwgb.edu/dutchs/EarthSC202Notes/minerals.htm

Kalifeltspat har en gitter, med SiO_4 tetraedrer (trekanter) og K atomer i mellom.
Noen av kalifeltspat er ustabile ^{40}K isotoper.
Disse endres til ^{40}Ar gass, som kanskje kommer bort.



The structure of the feldspars. The red atoms are potassium, sodium, or calcium. Since these atoms are cations, some of the tetrahedra contain aluminum (+3) instead of silicon (+4) to maintain charge balance.

Krills bussmodell: noen personer på bussen er "ustabile" (tilsvarer radioaktive K atomer)
De endres til fugler (tilsvarer Ar gass atomer) og flyr ut av bussen hvis et vindu er åpen.



Zirkon mineral har uran, og zirkon holdes lukket.
Derfor det mest pålitelig mineral for datering av norske ba.

Nelson.pdf (page 142 of 248)

Parent	Daughter	$t_{1/2}$	Useful Range	Type of Material
^{238}U zirkon m.m.	^{206}Pb	4.5 b.y	>10 million years	Igneous Rocks and Minerals
^{235}U zirkon m.m.	^{207}Pb	710 m.y		
^{232}Th zirkon m.m.	^{208}Pb	14 b.y		
^{40}K kalifeltspat m.m.	^{40}Ar ~~& ^{40}Ca~~	1.3 b.y	>10,000 years	
^{87}Rb kalifeltspat m.m.	^{87}Sr	47 b.y	>10 million years	
^{14}C kun organisk material	^{14}N	5,730 y	100 - 70,000 years	Organic Material

Marshak.pdf (page 464 of 957)

TABLE 12.1 Isotopes Used in the Radiometric Dating of Rocks

Parent → Daughter	Half-Life (years)	Minerals in which the Isotopes Occur
$^{147}Sm \rightarrow {}^{143}Nd$	~~106 billion~~	Garnets, micas
$^{87}Rb \rightarrow {}^{87}Sr$	~~48.8 billion~~	Potassium-bearing minerals (mica, feldspar, hornblende)
$^{238}U \rightarrow {}^{206}Pb$	~~4.5 billion~~	Uranium-bearing minerals (zircon, apatite, uraninite)
$^{40}K \rightarrow {}^{40}Ar$	~~1.3 billion~~	Potassium-bearing minerals (mica, feldspar, hornblende)
$^{235}U \rightarrow {}^{207}Pb$	~~713 million~~	Uranium-bearing minerals (zircon, uraninite, apatite)

ikke viktig

ikke viktig

Halveringstider er ikke viktig for geologer som bruker dem.

Hvilke mineraler som kan brukes er mer viktig

Sm = samarium, Nd = neodymium, Rb = rubidium, Sr = strontium, U = uranium, Pb = lead, K = potassium, Ar = argon

Marshak.pdf (page 464 of 957)

Kun dette bør pugges fra Marshaks liste

$^{\sout{238}}U \rightarrow {}^{\sout{206}}Pb$	~~4.5 billion~~	Uranium-bearing minerals (zircon, apatite, uraninite)
$^{\sout{40}}K \rightarrow {}^{\sout{40}}Ar$	~~1.3 billion~~	Potassium-bearing minerals (mica, feldspar, hornblende) kalifeltspat

nyttig forklaring om radiometrisk datering

Second, we must identify the right kind of minerals to work with. Not all minerals contain radioactive elements, but fortunately some common minerals do. For example, feldspar, mica, and hornblende contain potassium and rubidium, zircon contains uranium, and garnet contains samarium. Once we have identified appropriate minerals containing appropriate elements, we can set to work. Radiometric dating consists of the following steps.

- *Collecting the rocks:* Geologists collect fresh (unweathered) rocks for dating. The chemical reactions that happen during weathering may allow isotopes to leak out of minerals, in which case a date from the rock has no valid meaning.
- *Separating the minerals:* The fresh rocks are crushed, and the appropriate minerals are separated from the debris.
- *Extracting parent and daughter isotopes:* To separate out the parent and daughter isotopes from minerals, geologists either dissolve the minerals in acid or evaporate portions of them with a laser. This work must take place in a very clean lab, to avoid contaminating samples with parent or daughter isotopes from the atmosphere (▶Fig. 12.19a).
- *Analyzing the parent-daughter ratio:* Geologists pass the dissolved or evaporated atoms through a mass spectrometer, a complex instrument that uses a magnet to separate isotopes from one another according to their respective weight, and then measures the ratio of parent to daughter isotopes (▶Fig. 12.19b).

At the end of the laboratory process, geologists can define the ratio of parent to daughter isotopes in a mineral, and from this ratio, calculate the age of the mineral. Needless to say, the description of the procedure here has been simplified—in reality, obtaining a radiometric date is time consuming and expensive and requires complex calculations. When they report radiometric dates, geologists report the uncertainty of the measurement. Uncertainty, which defines the range of values in which the true measurement probably lies, arises because no instrument can count atoms perfectly. Uncertainties for radiometric dates may be on the order of 1% or less. For example, a date may be reported as 200 ± (plus or minus) 2 million years. Newer methods of dating produce results with uncertainties as small as 0.1%.

FIGURE 12.19 **(a)** A lab where samples are prepared for radiometric dating. The air must be exceedingly clean so that stray parent or daughter isotopes don't contaminate the samples. **(b)** The heart of this mass spectrograph, used for measuring isotope ratios, is a large magnet (the yellow coils).

(a)

Marshak.pdf (page 464 of 957)

FIGURE 12.19 **(a)** A lab where samples are prepared for radiometric dating. The air must be exceedingly clean so that stray parent or daughter isotopes don't contaminate the samples. **(b)** The heart of this mass spectrograph, used for measuring isotope ratios, is a large magnet (the yellow coils).

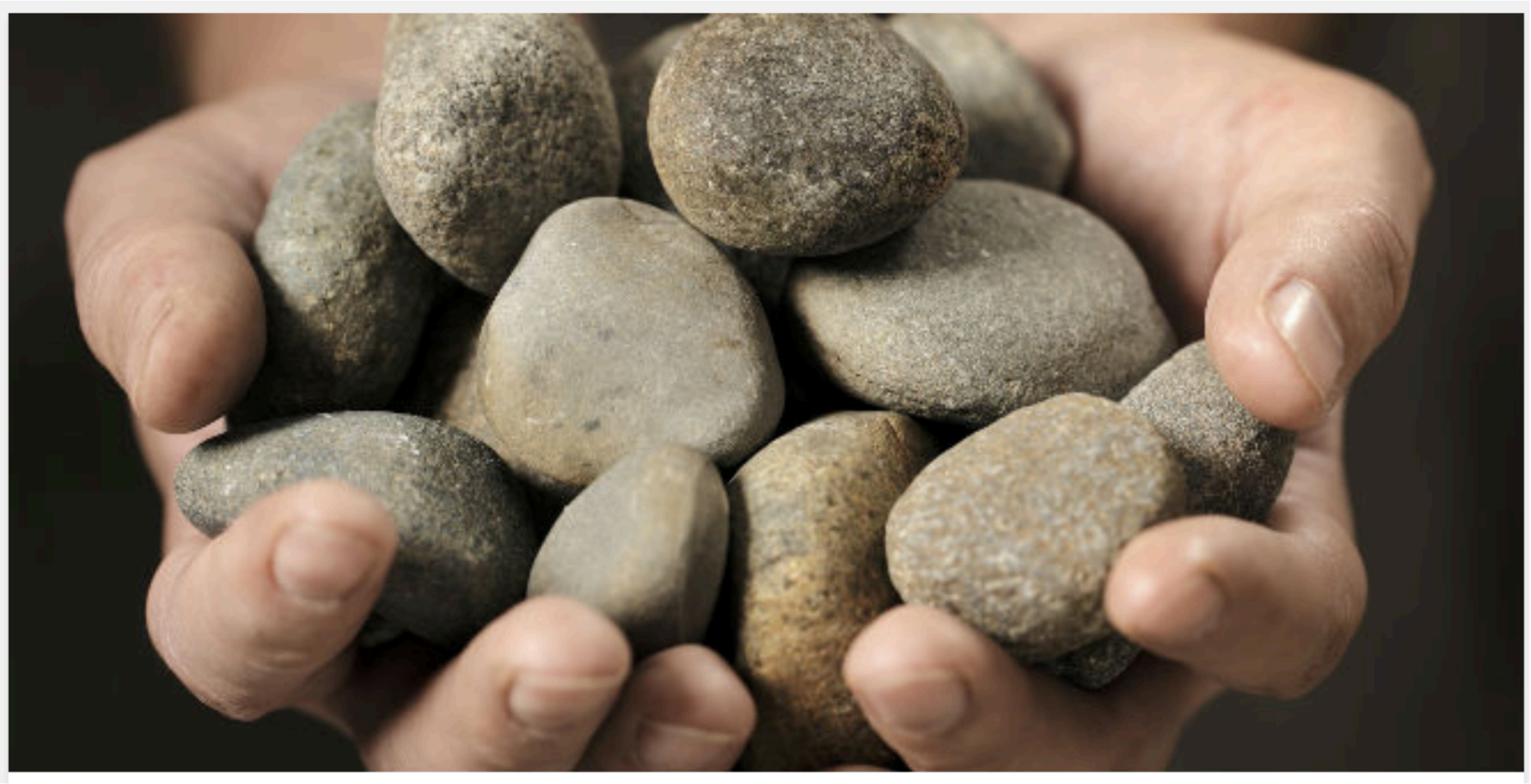
(a)

Her skilles det ønsket grunnstoffer
fra andre grunnstoffer

Massespektrometer.

Maskin som lager et *spektrum* av isotoper med hjelp av sine ulike *masser*

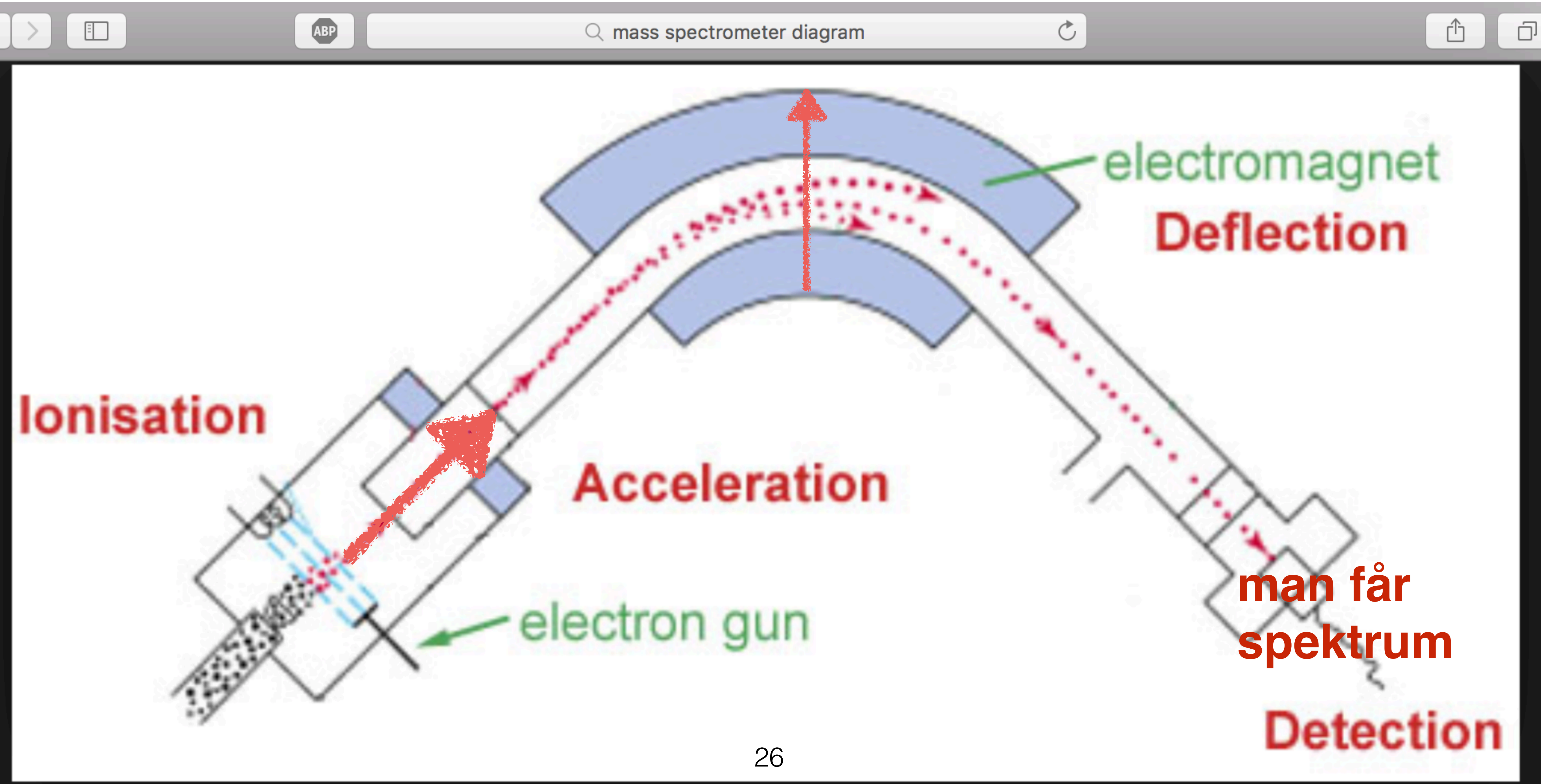
Du kan være en personlig “masse-spektrometer”.



Du kaster stein så langt som mulig. De går en viss avstand, avhengig av sine masser. Tyngere stein går kortere avstander.

Massespektrometer
Man “skytter” atomer med ulike vekt (isotoper) i en rør forbi en magnet (farget blå i tegningen).

Magneten drar atomene (se pil), og lette isotoper blir dratt mest.



What Does a Radiometric Date Mean?

At high temperatures, isotopes in a crystal lattice vibrate so rapidly that chemical bonds can break and reattach relatively easily. As a consequence, parent and daughter isotopes escape from or move into crystals, so parent-daughter ratios are meaningless. Because radiometric dating is based on the parent-daughter ratio, the "radiometric clock" starts only when crystals become cool enough for both parent and daughter isotopes to be locked into the lattice. The temperature below which isotopes are no longer free to move is called the **closure temperature** of a mineral. The closure temperature is typically significantly cooler than the melting temperature of a mineral. Not all minerals have the same closure temperature; for example, the closure temperature of hornblende (an amphibole) is higher than that of biotite (a mica). When we specify a radiometric date for a rock, we are defining the time at which a specific mineral in the rock cooled below its closure temperature.

With the concept of closure temperature in mind, we can interpret the meaning of radiometric dates. In the case of igneous rocks, radiometric dating tells you when a magma or lava cooled to form a solid, cool igneous rock. In the case of metamorphic rocks, a radiometric date tells you when a rock cooled from the high temperature of metamorphism down to a low temperature. If a rock cools quickly (as when a lava flow freezes), then all minerals yield roughly the same age, but if a rock cools slowly (as when a pluton cools slowly at depth in the Earth), minerals with high closure temperatures give older ages than minerals with low closure temperatures.

Can we radiometrically date a sedimentary rock directly? No. If we date the minerals in a sedimentary rock, we determine only when the minerals making up the sedimentary rock first crystallized as part of an igneous or metamorphic rock, not when the minerals were deposited as sediment or when the sediment lithified to form a sedimentary rock. For example, if we date the feldspar grains contained in a granite pebble in a conglomerate, we're dating the time when the granite cooled below feldspar's closure temperature, not when the pebble was deposited by a stream. The age of mineral grains in sediment, however, can be useful. In recent years, geologists have undertaken studies to determine the ages of detrital (clastic) grains; by doing so, they can learn the age of the rocks in the region where the sediment originated.

Om systemet er "åpen" eller "lukket" avhenger i stor grad av temperatur. "*Closure temperature*"

(Husk bussmodellen. Hvis temp er høy, åpnes vinduene.)

Nelson.pdf (page 142 of 248)

Parent	Daughter	$t_{1/2}$	Useful Range	Type of Material
^{238}U	^{206}Pb	4.5 b.y	>10 million years	Igneous Rocks and Minerals
^{235}U	^{207}Pb	710 m.y		
^{232}Th	^{208}Pb	14 b.y		
^{40}K	^{40}Ar & ^{40}Ca	1.3 b.y	>10,000 years	
^{87}Rb	^{87}Sr	47 b.y	>10 million years	
^{14}C	^{14}N	5,730 y	100 - 70,000 years	Organic Material

Karbon 14 datering er best kjent hos folk flest.
Men 14C halveringstid er for kort for geologi.
Kan ikke datere noe som er eldre enn ca. 10 halveringstider.
Så ved mer enn ca 57000 år er 14C ikke brukbar.
14C er godt egnet for arkeologi og organisk material.