

GRAAD 12

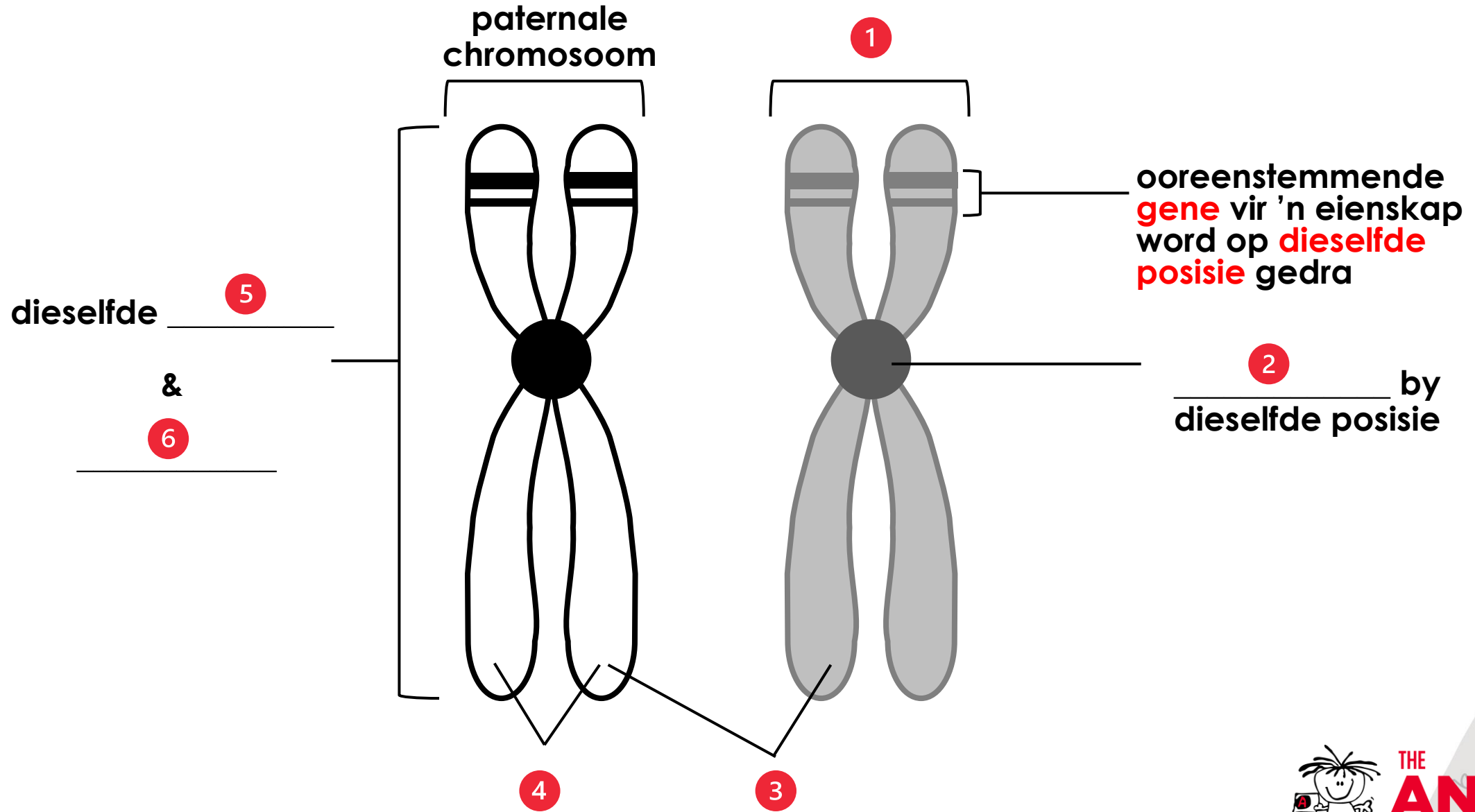
MEIOSE

HERSIENING

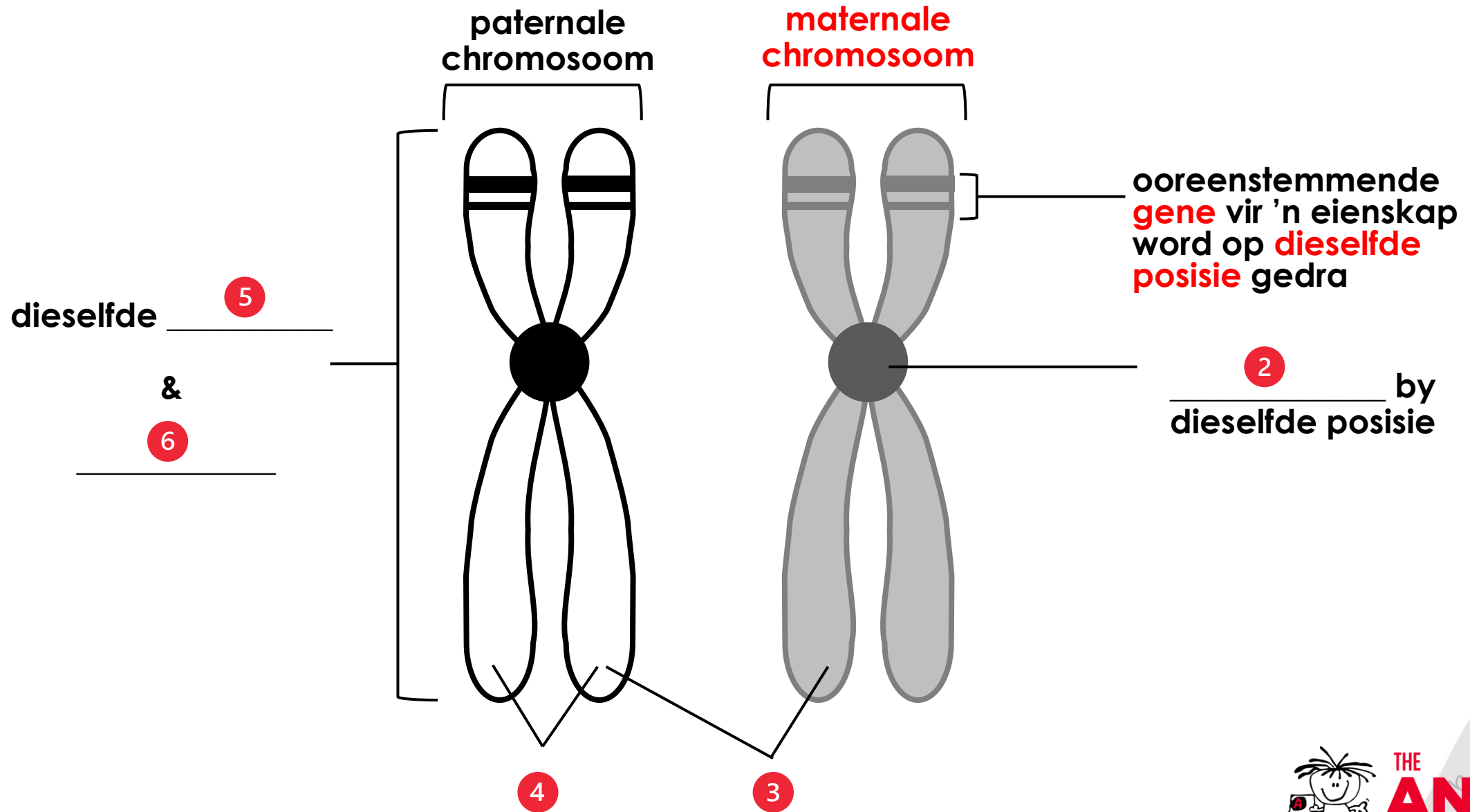


CHROMOSOME

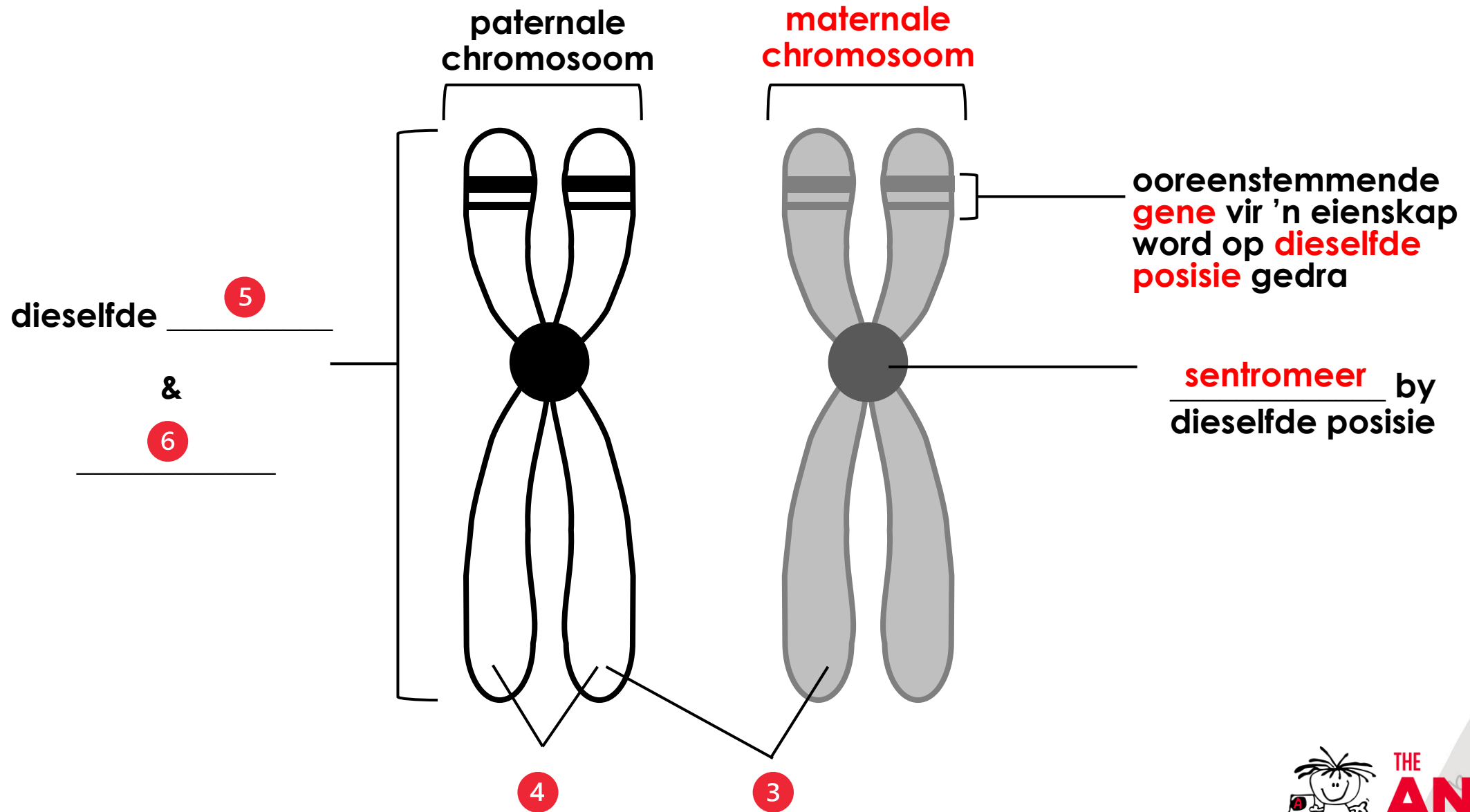
Verskaf byskrifte vir die homoloë chromosome.



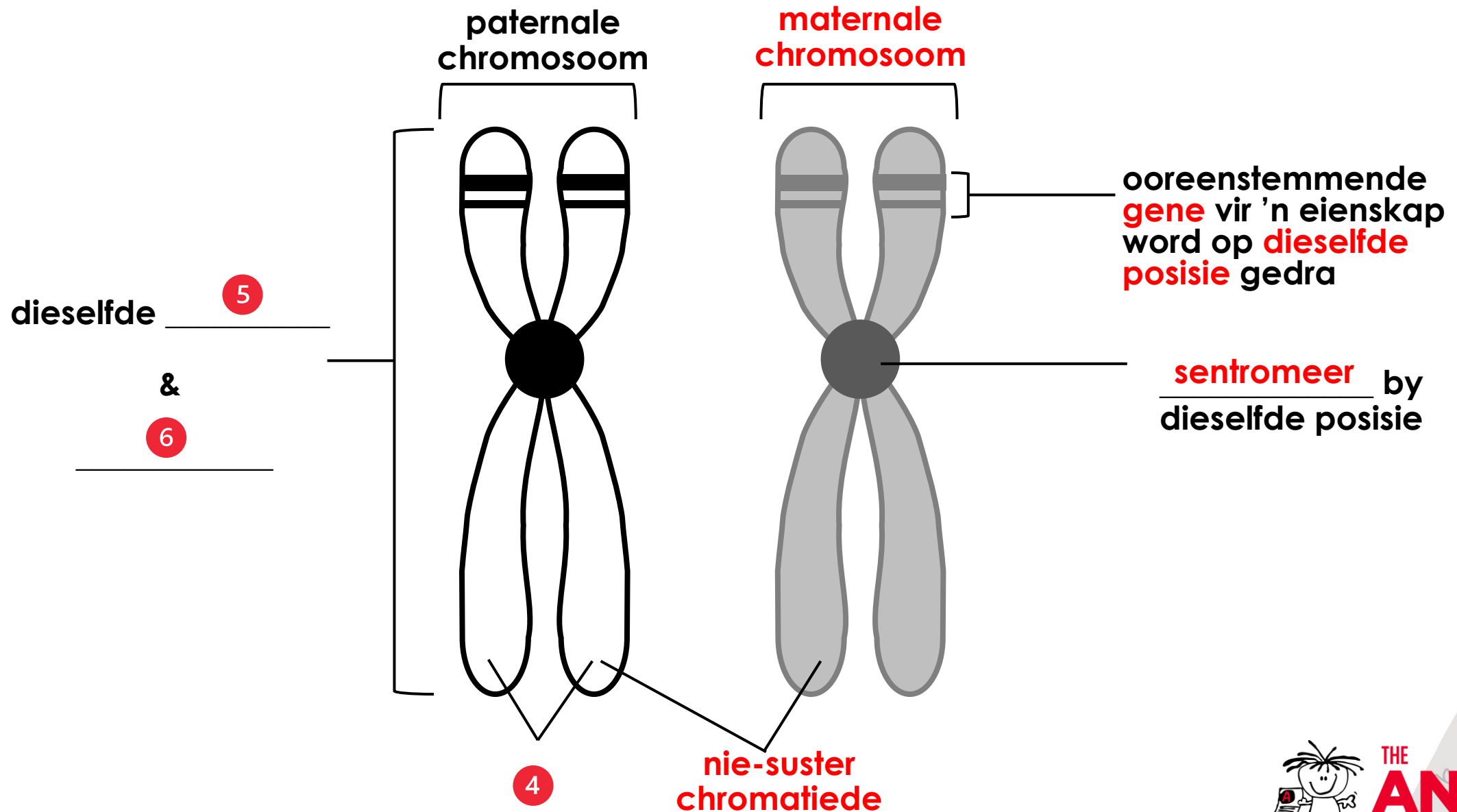
Verskaf byskrifte vir die homoloë chromosome.



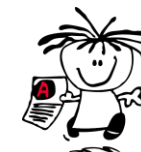
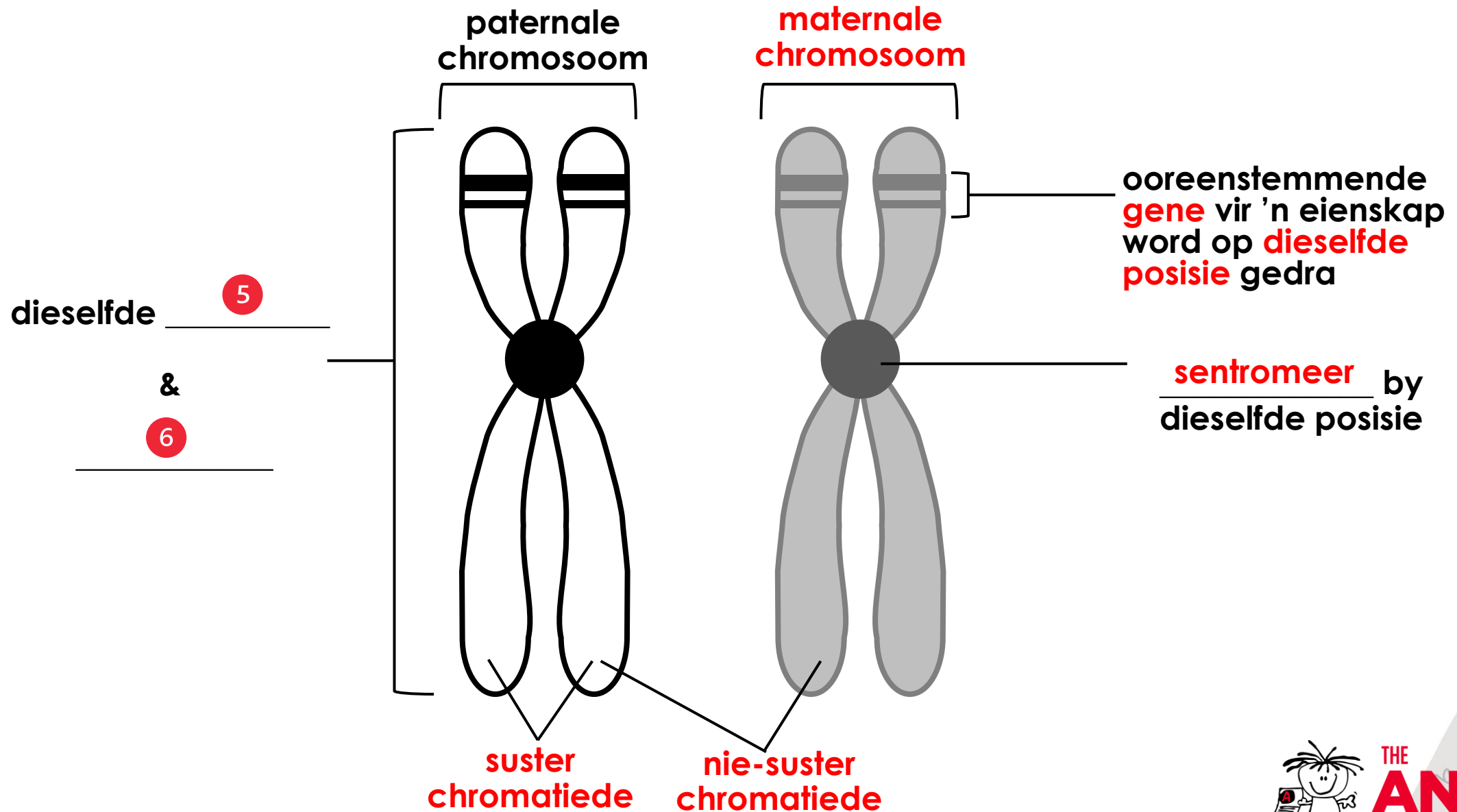
Verskaf byskrifte vir die homoloë chromosome.



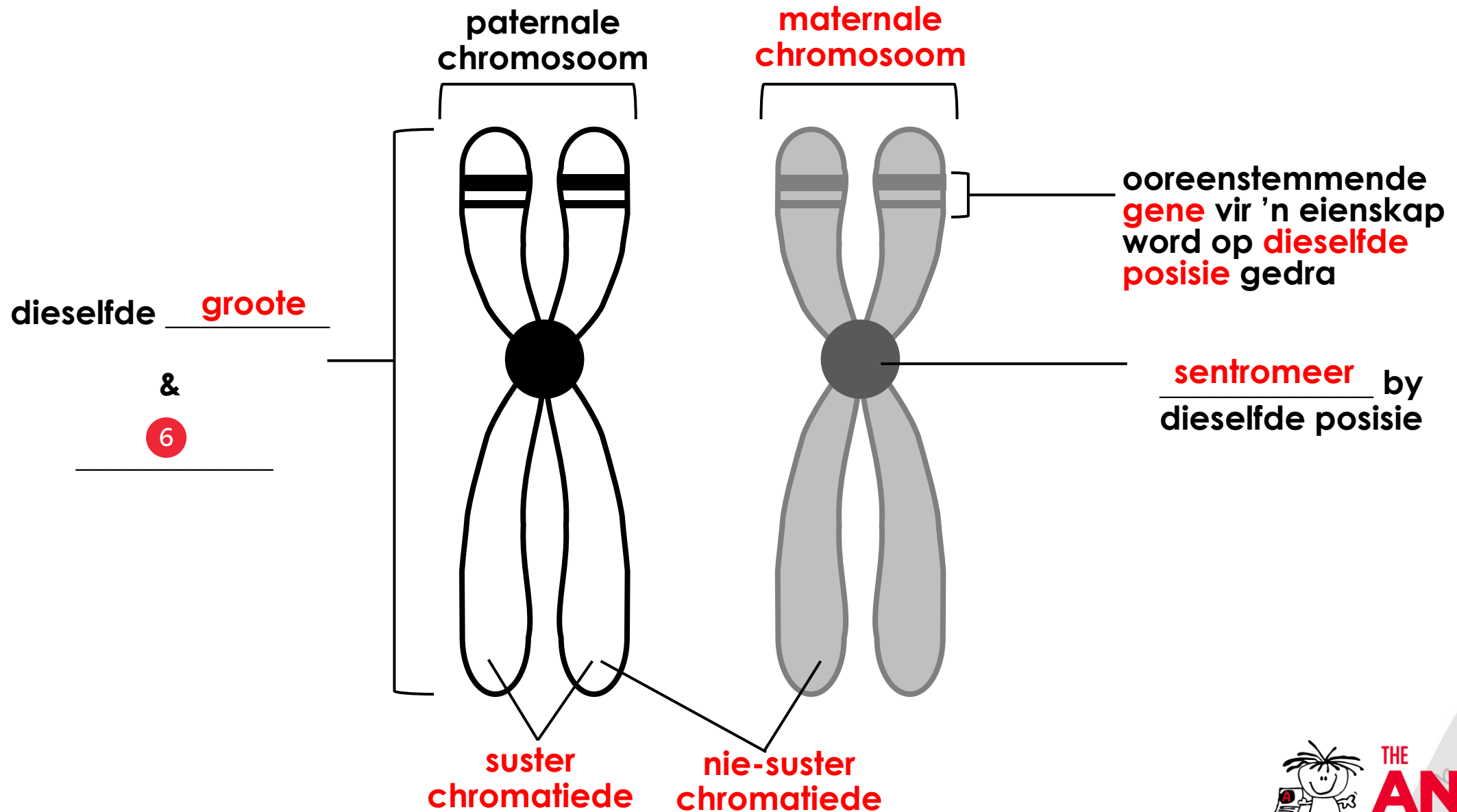
Verskaf byskrifte vir die homoloë chromosome.



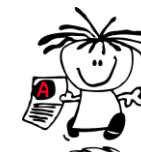
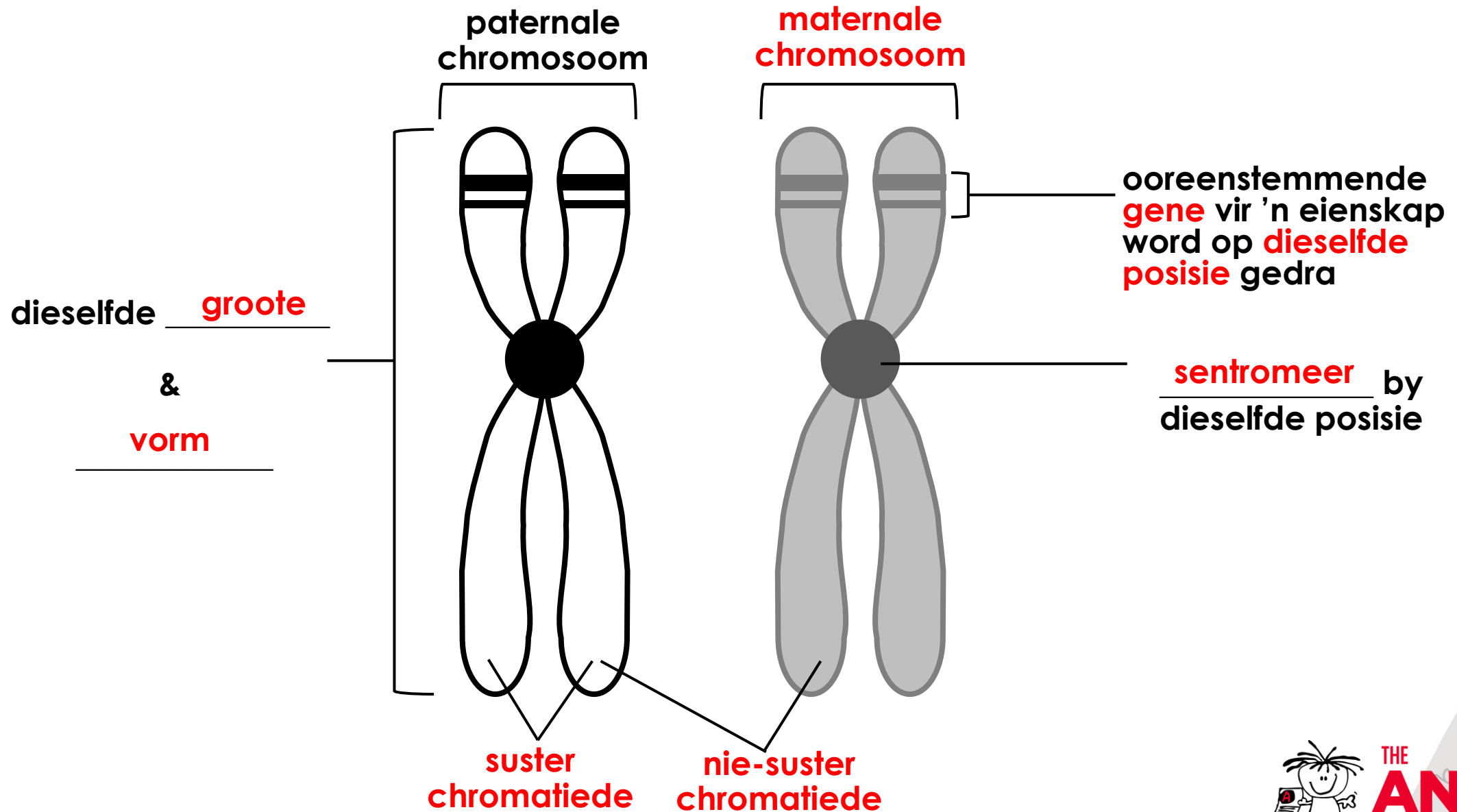
Verskaf byskrifte vir die homoloë chromosome.



Verskaf byskrifte vir die homoloë chromosome.

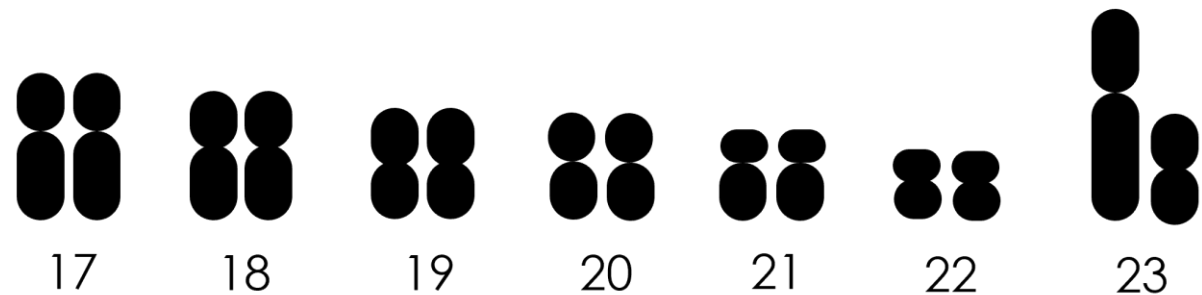
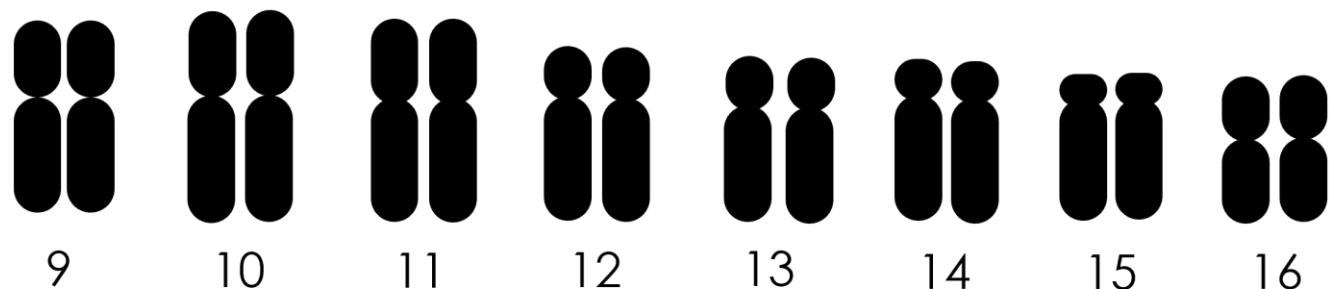
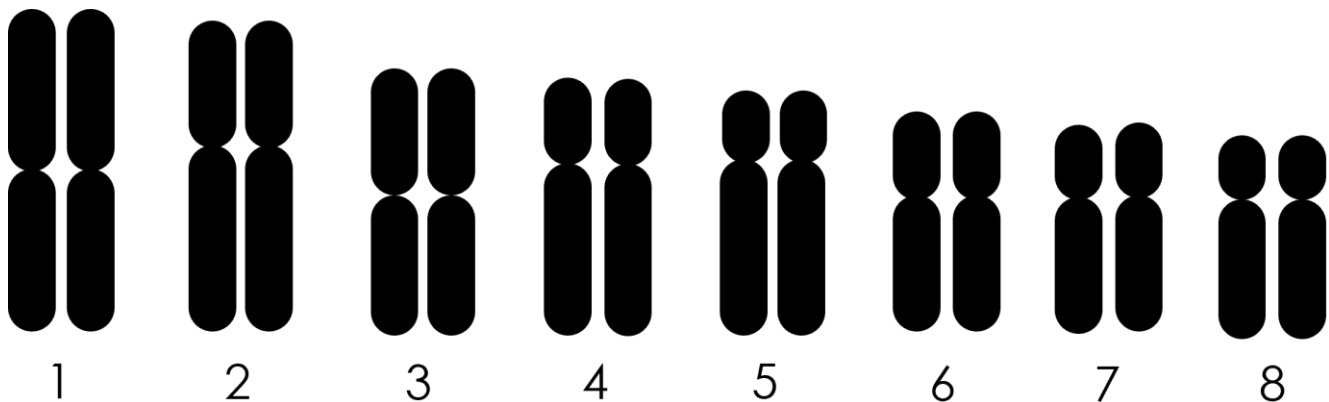


Verskaf byskrifte vir die homoloë chromosome.



KARIOTIPES

1



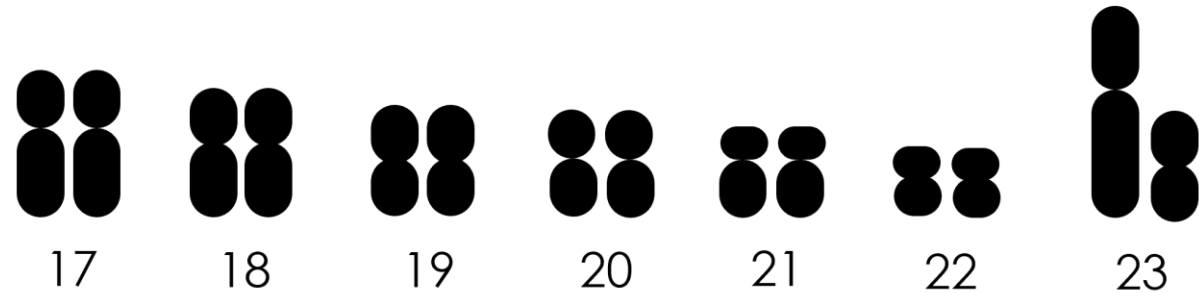
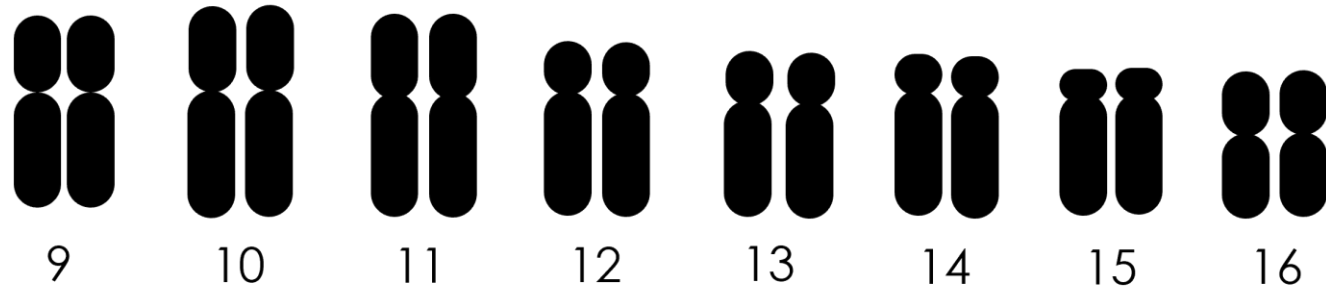
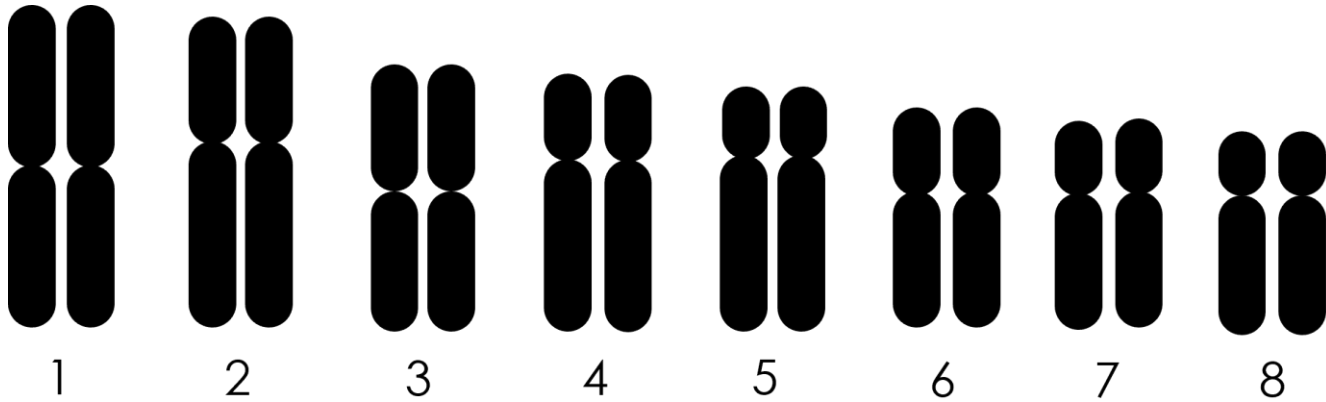
Gedurende watter fase van seldeling word 'n karyotipe geneem?

Word gerepliseerde of ongerepliseerde chromosome in hierdie karyotipe getoon?

Gee 'n NAAM vir chromosoompare 1 tot 22.

Gee 'n NAAM vir chromosoompaar 23.

1



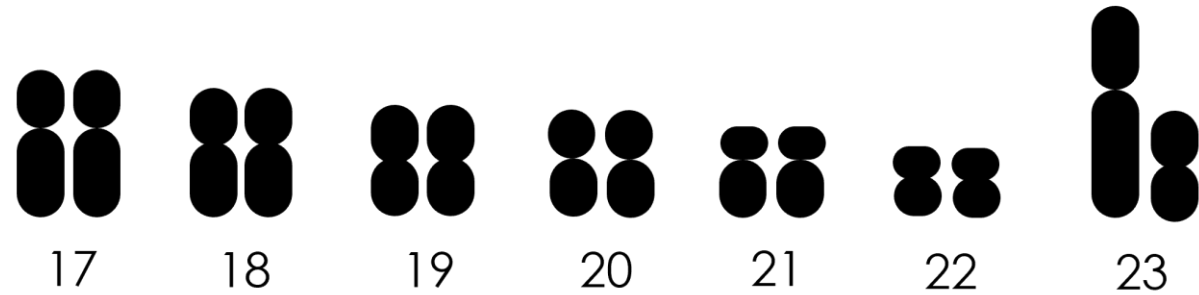
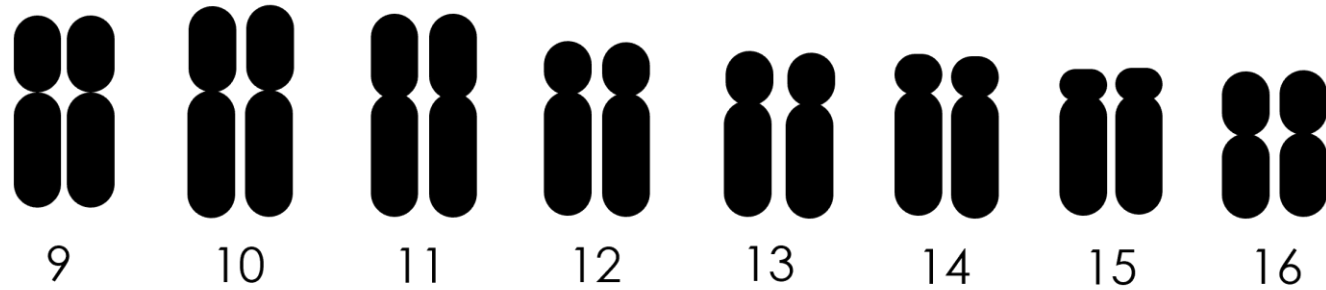
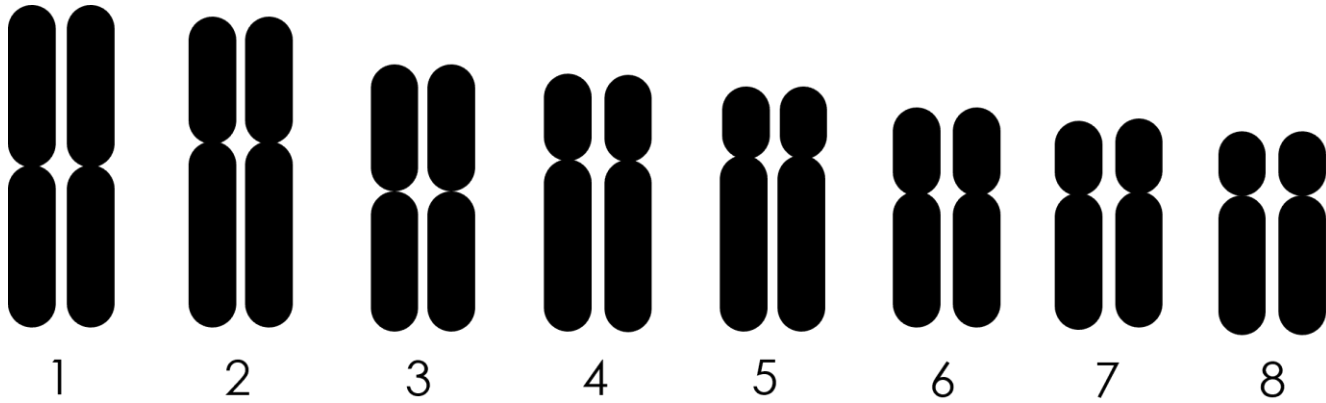
Metafase

Word gerepliseerde of
ongerepliseerde
chromosome in hierdie
kariotipe getoon?

Gee 'n NAAM vir
chromosoompare 1 tot 22.

Gee 'n NAAM vir
chromosoompaar 23.

1



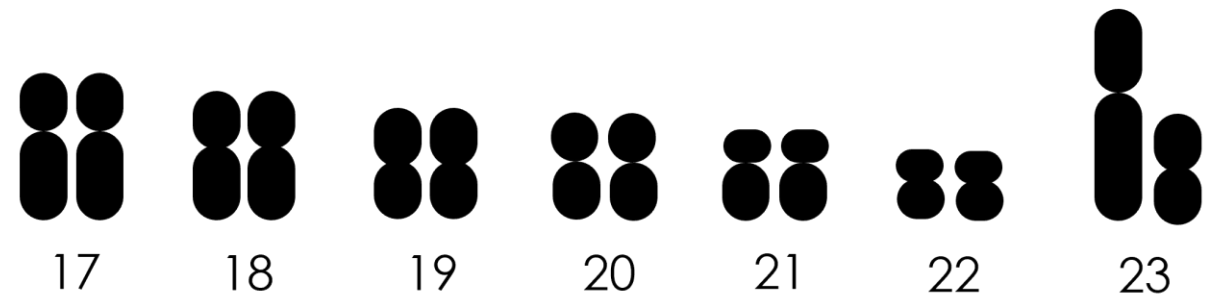
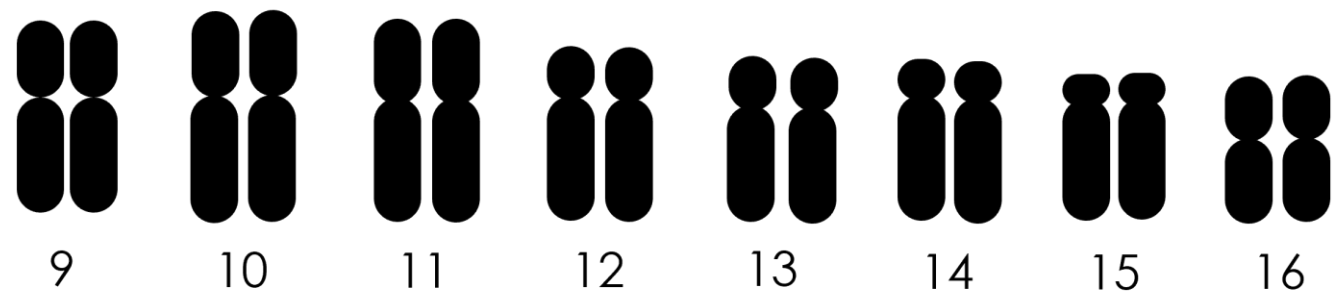
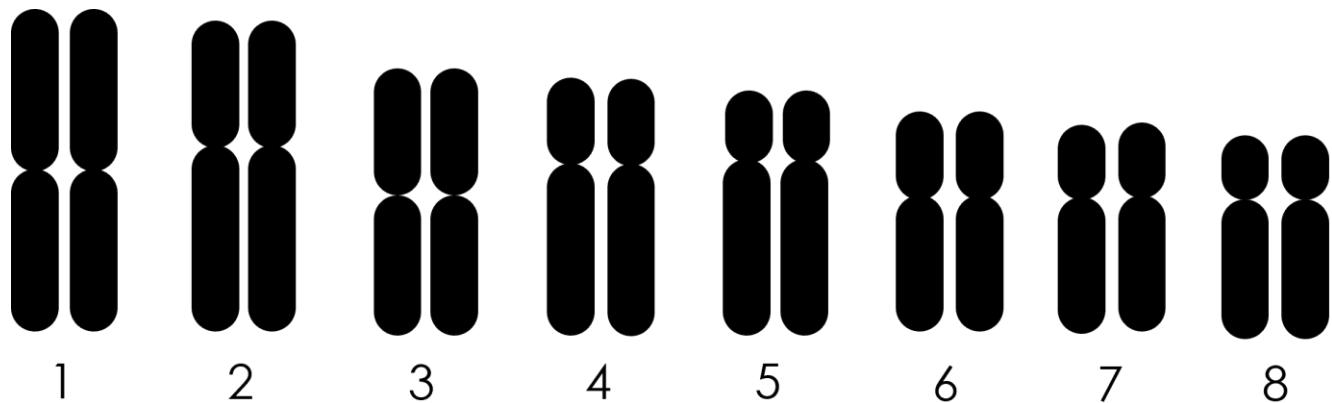
Metafase

**ongerepliseerde
chromosome**

**Gee 'n NAAM vir
chromosoompare 1 tot 22.**

**Gee 'n NAAM vir
chromosoompaar 23.**

1



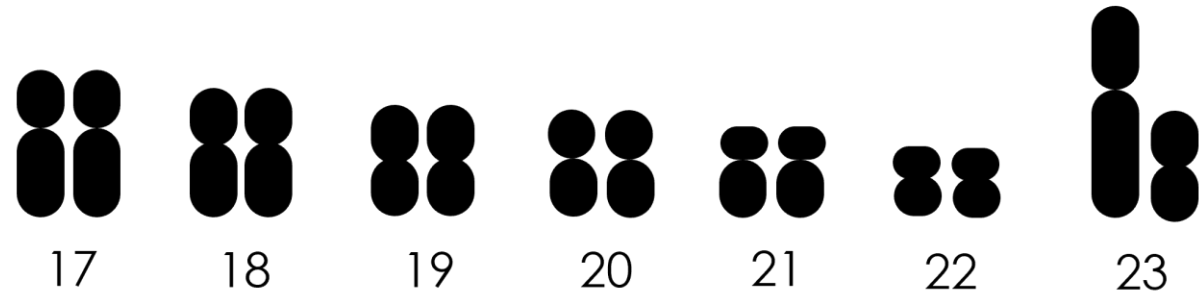
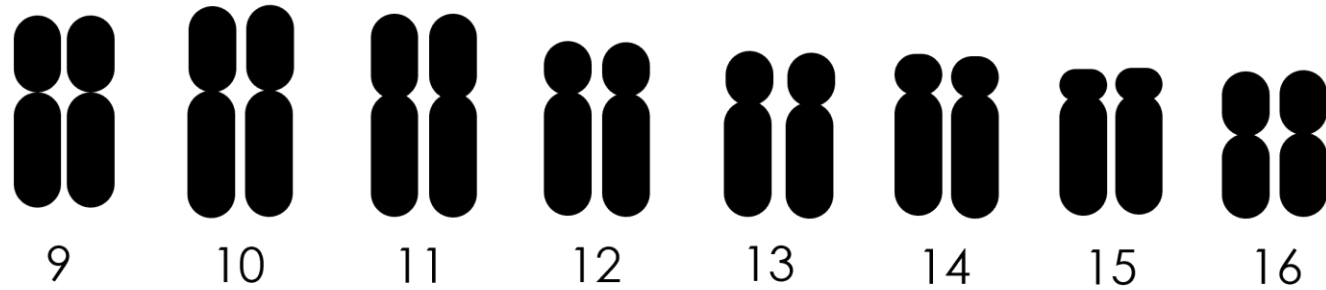
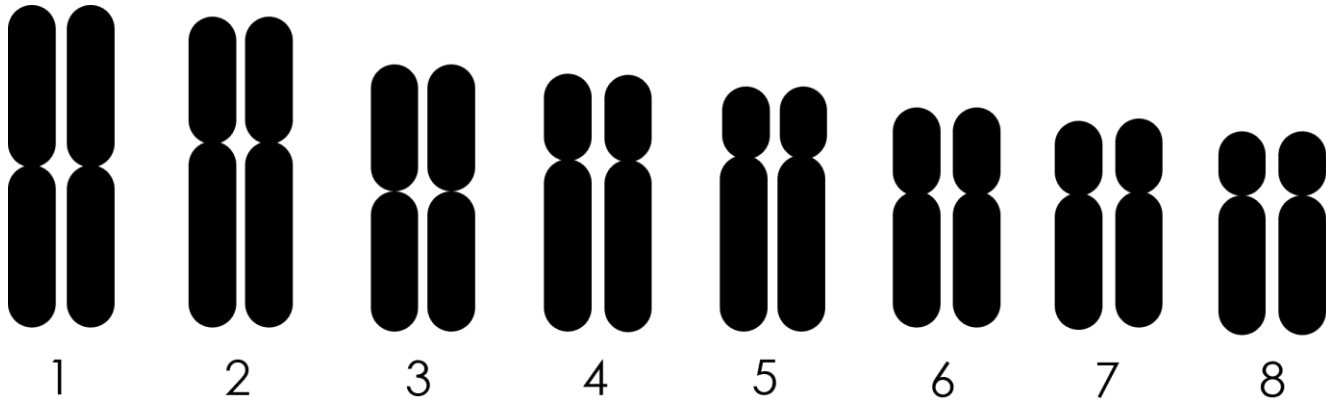
Metafase

**ongerepliseerde
chromosome**

outosome

**Gee 'n NAAM vir
chromosoompaar 23.**

1



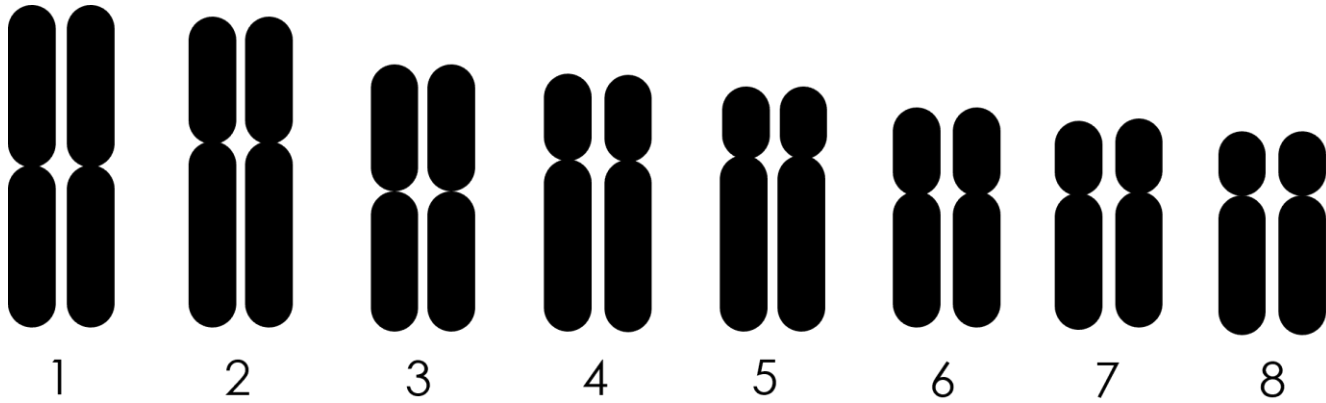
Metafase

**ongerepliseerde
chromosome**

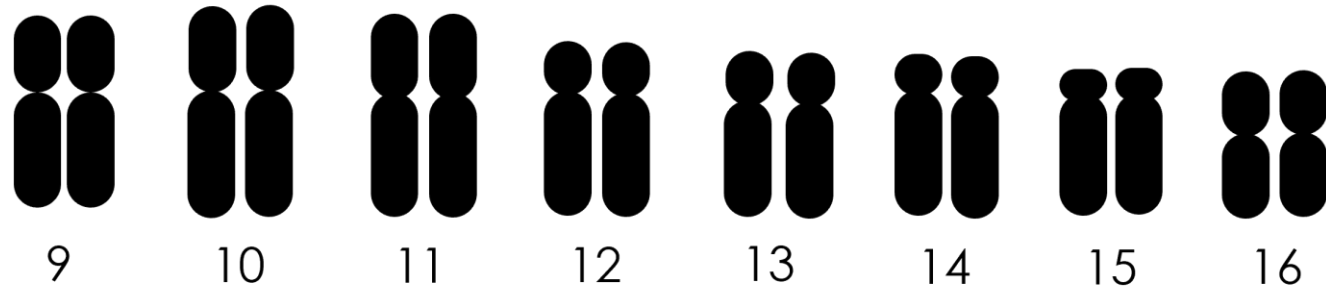
outosome

gonosome

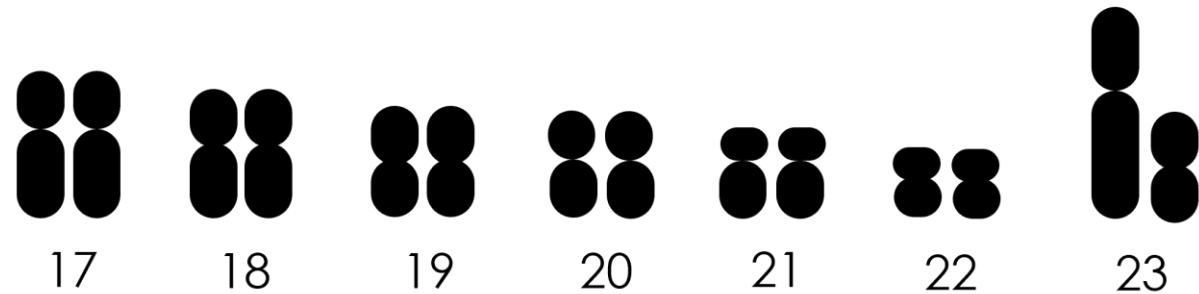
1



Gee die NOMMER(S) van die chromosoompaar/pare wat homolog is.

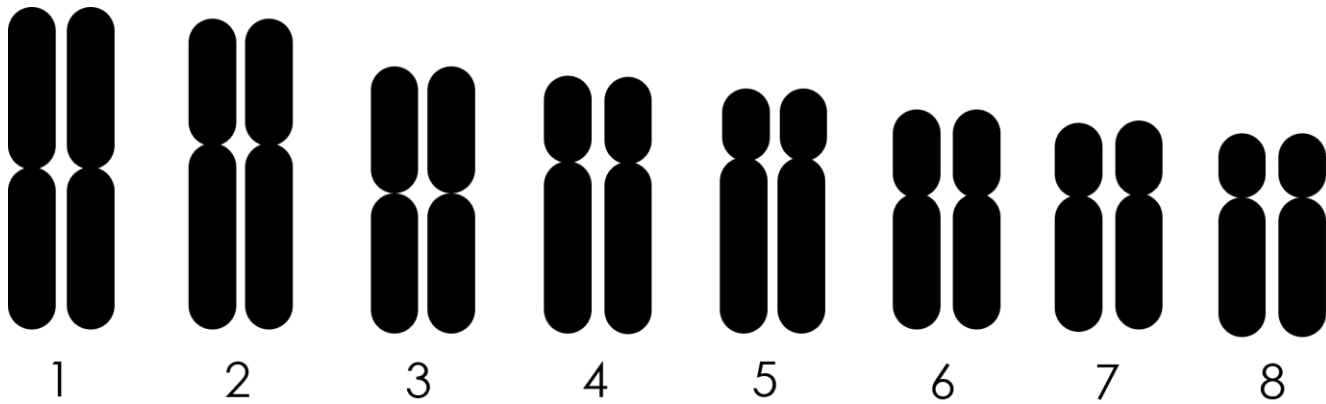


Gee die NOMMER(S) van die chromosoompaar/pare wat nie-homolog is.

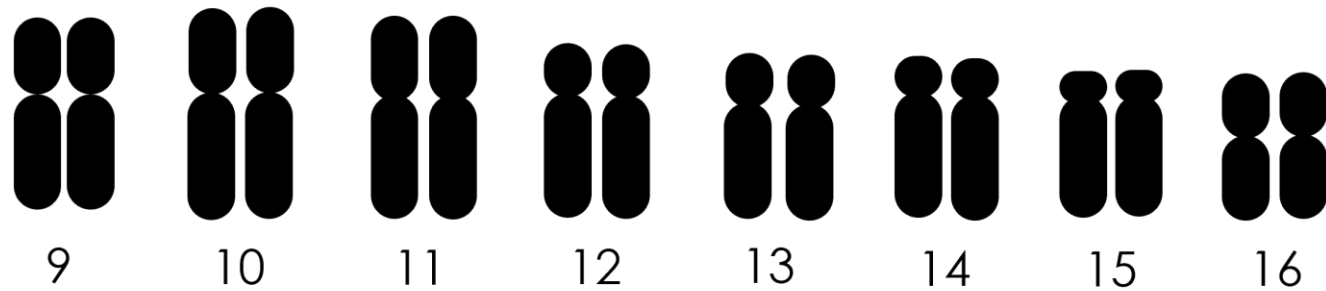


Is hierdie karyotipe dié van 'n man of vrou?

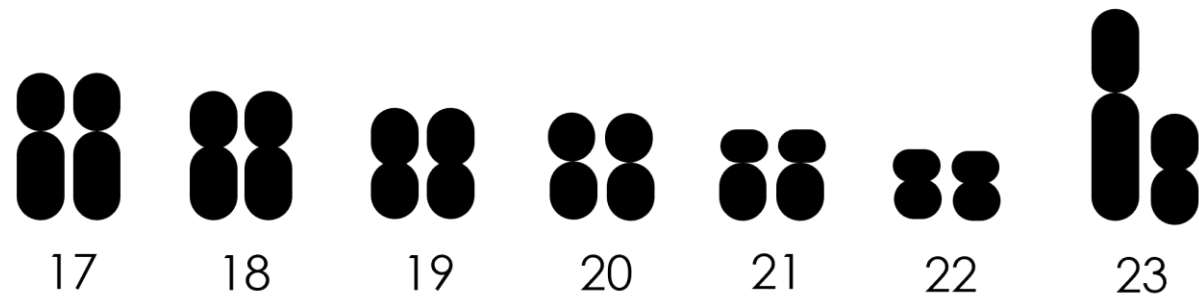
1



1 - 22

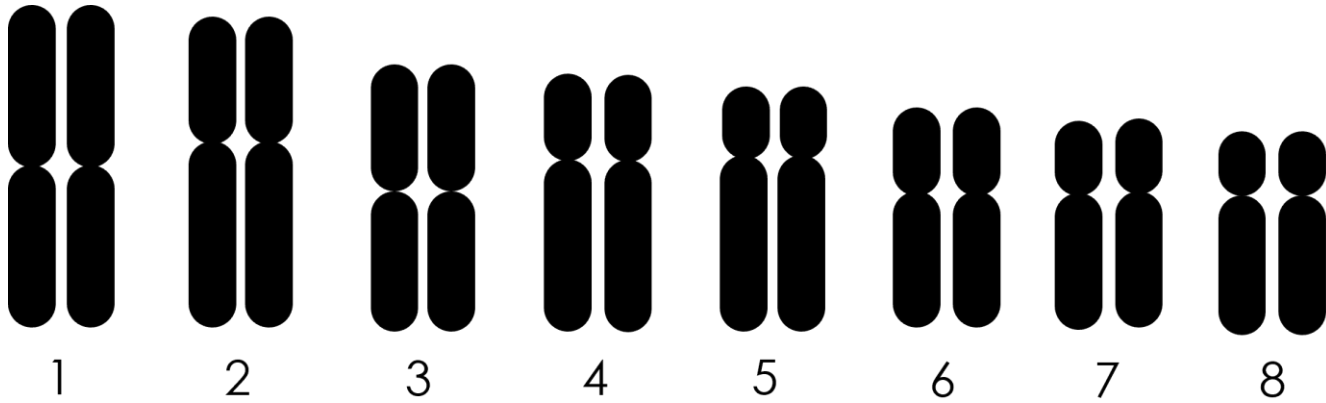


Gee die NOMMER(S) van die chromosoompaar/pare wat nie-homoloog is.

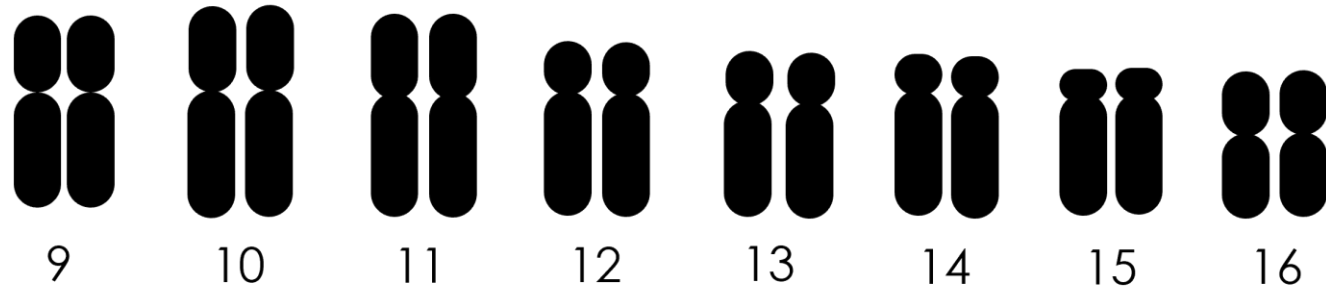


Is hierdie karyotipe dié van 'n man of vrou?

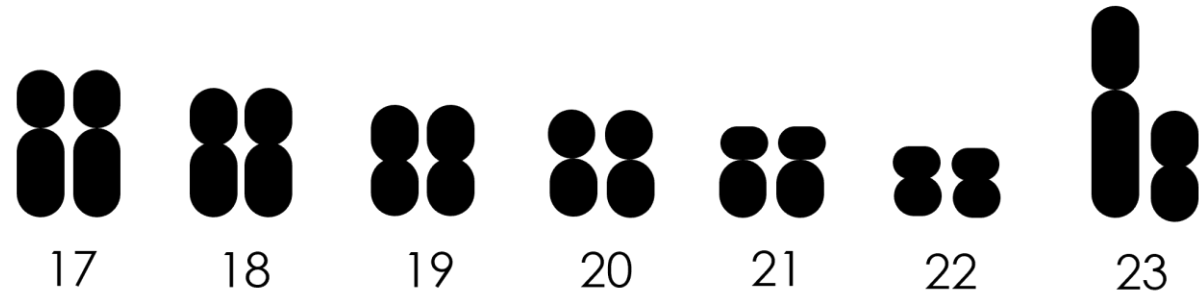
1



1 - 22

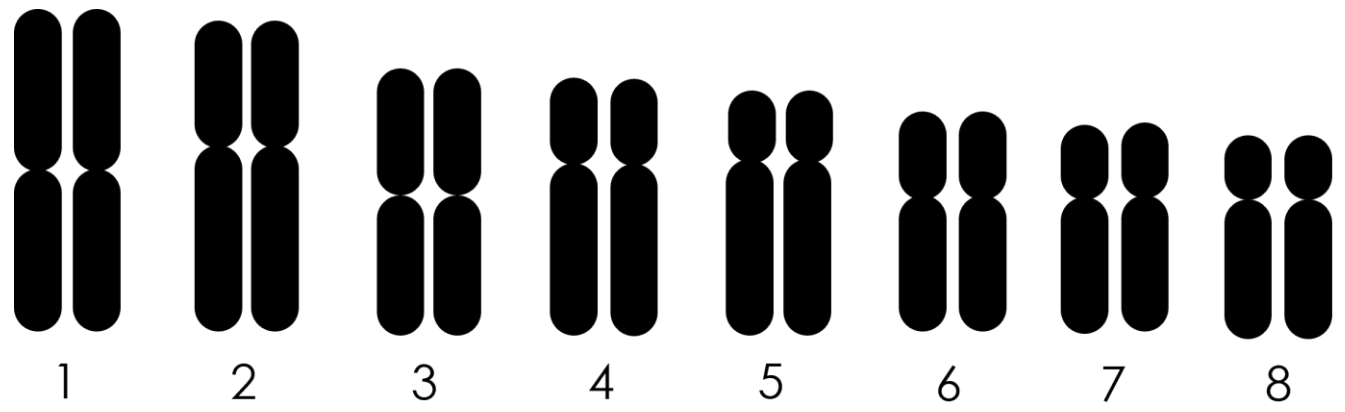


23

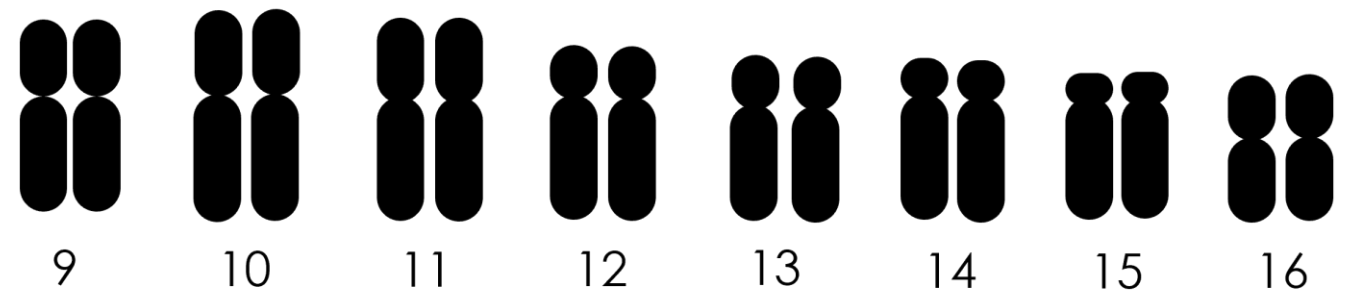


Is hierdie karyotipe dié
van 'n man of vrou?

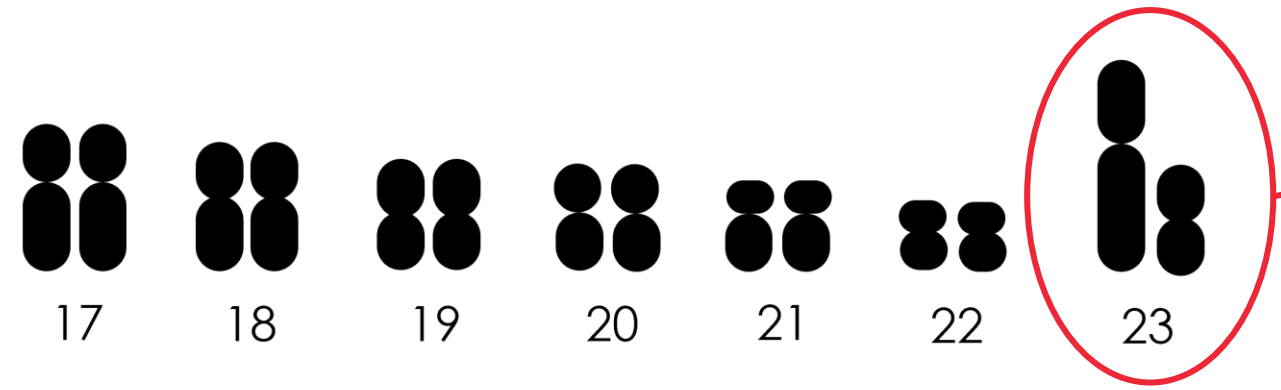
1



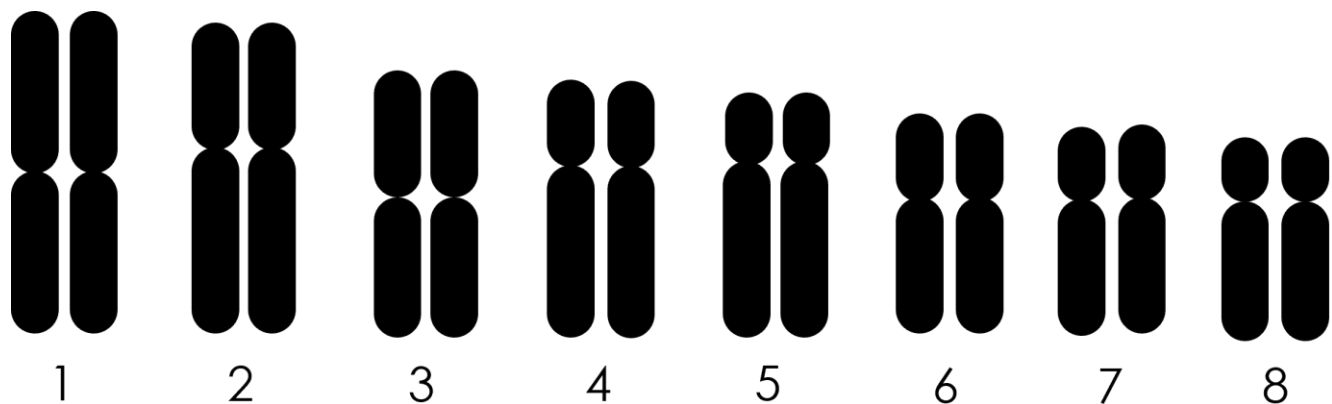
1 - 22



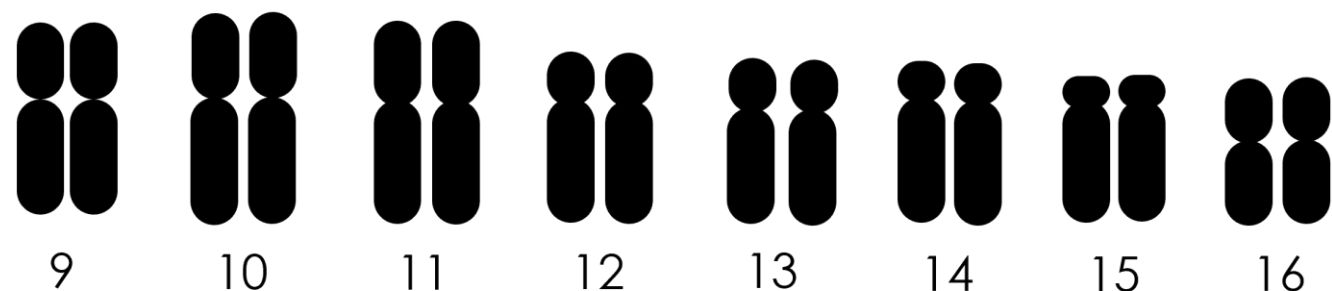
23



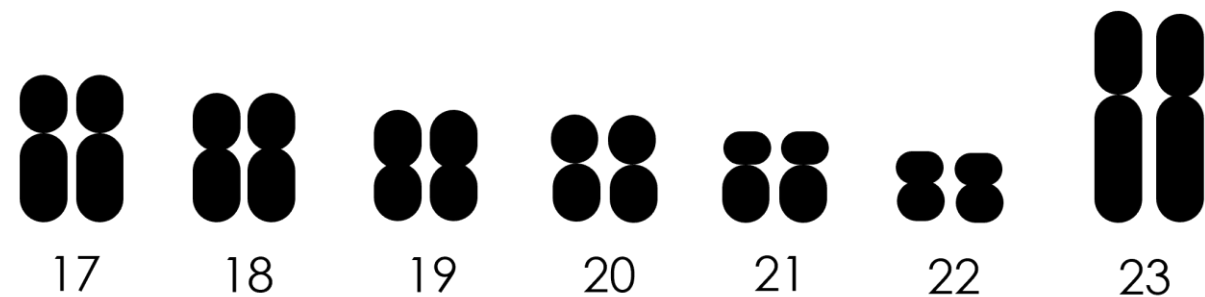
man



Gee die NOMMER(S) van die chromosoompaar/pare wat homolog is.

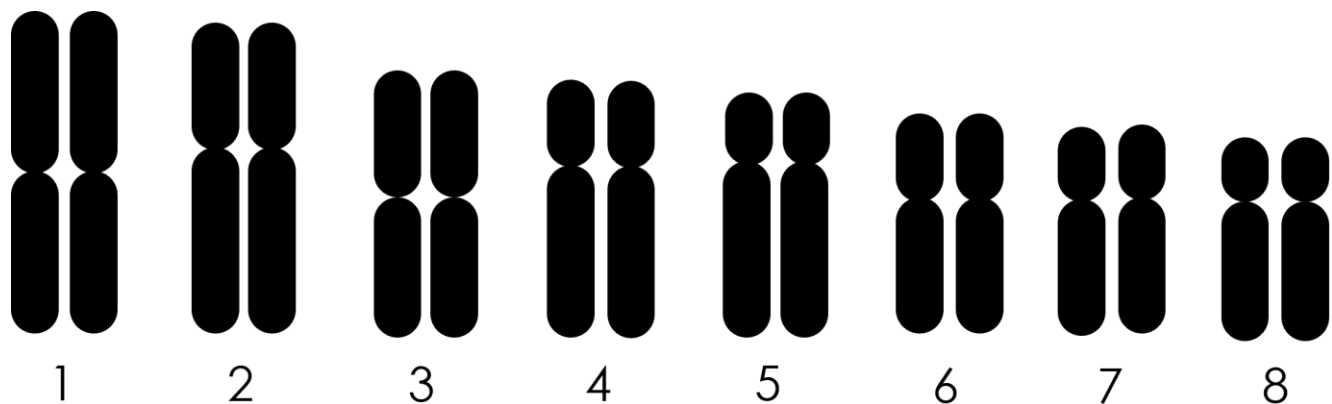


Gee die NOMMER(S) van die chromosoompaar/pare wat nie-homolog is.

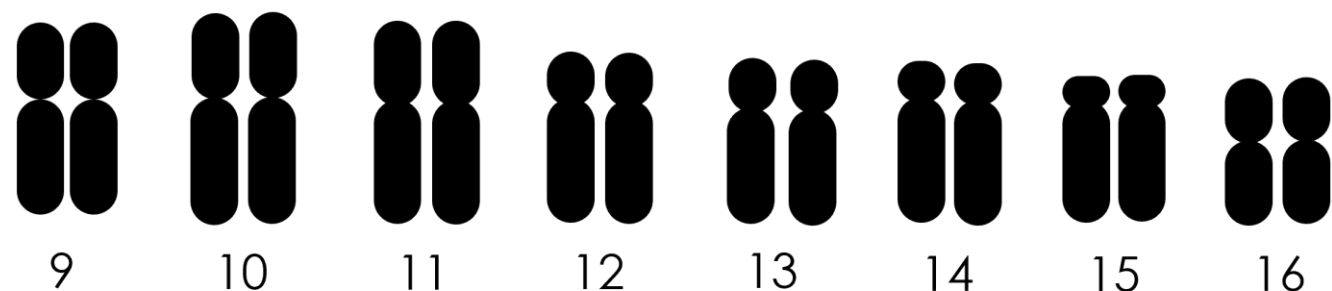


Is hierdie karyotipe dié van 'n man of vrou?

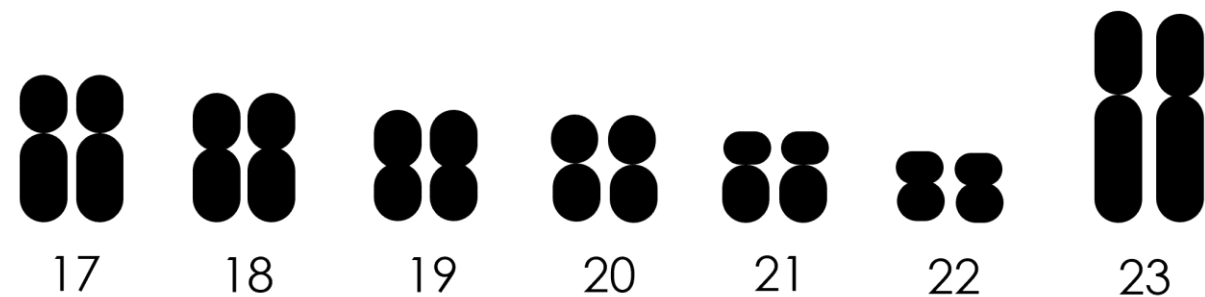
2



1 - 23

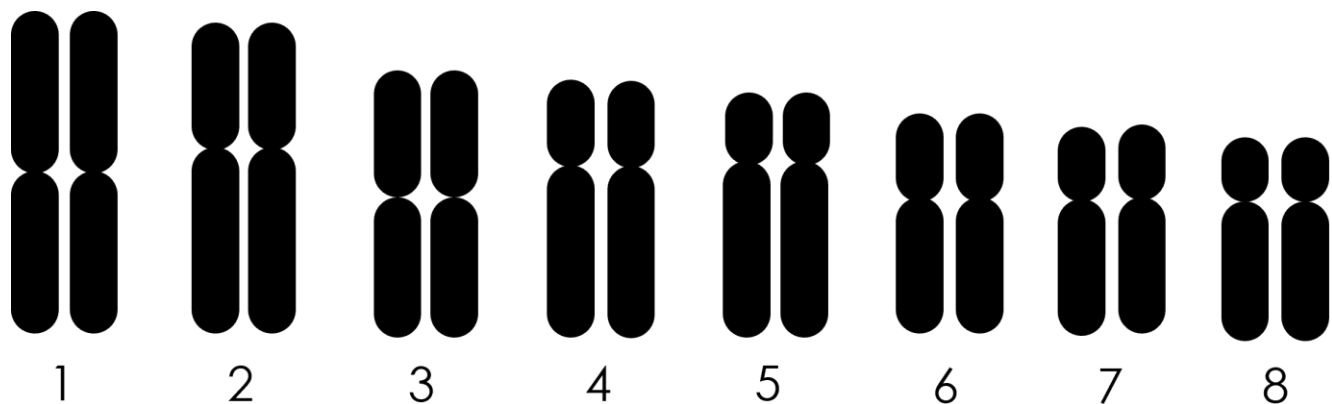


Gee die NOMMER(S) van
die chromosoompaar/pare
wat nie-homoloog is.

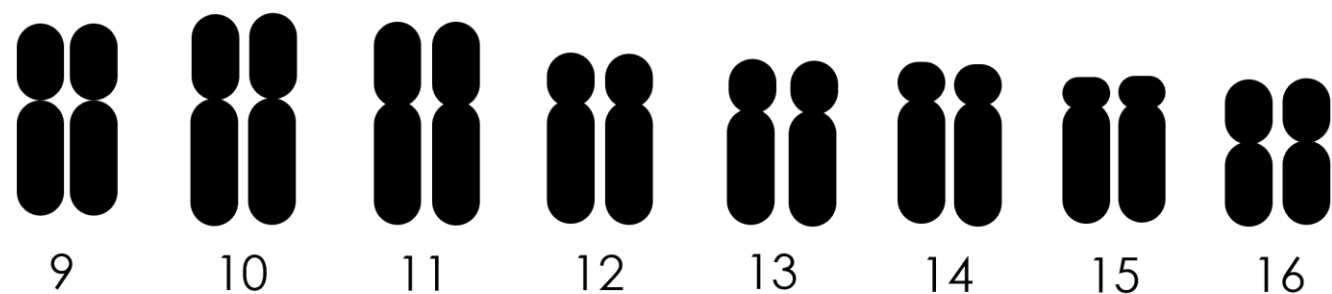


Is hierdie karyotipe dié
van 'n man of vrou?

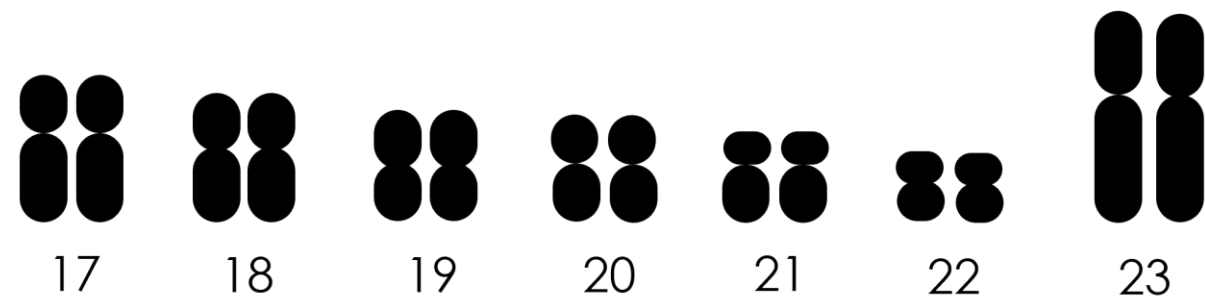
2



1 - 23

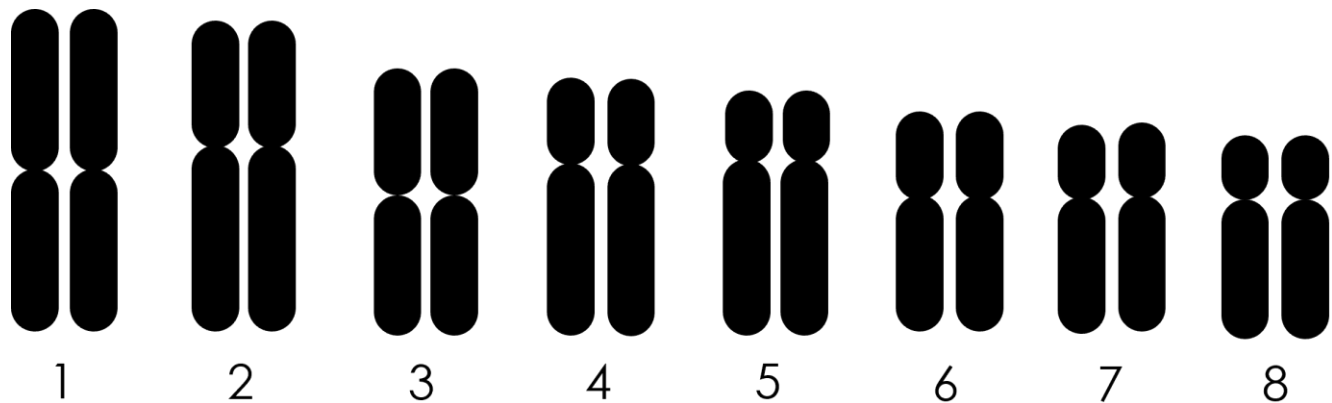


geen

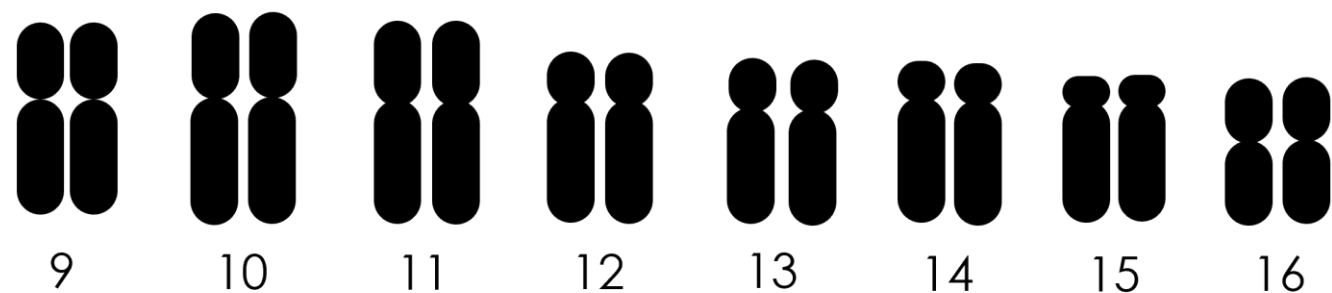


Is hierdie karyotipe dié
van 'n man of vrou?

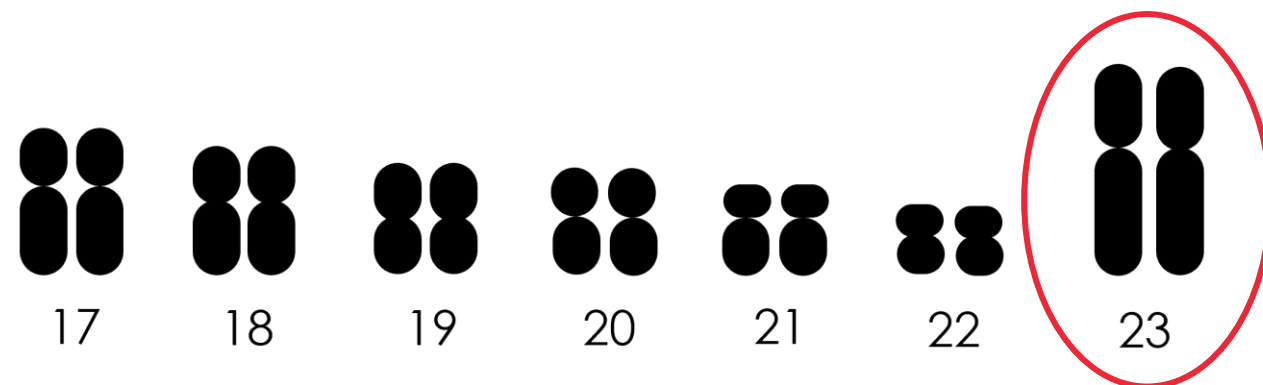
2



1 - 23



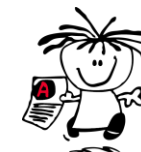
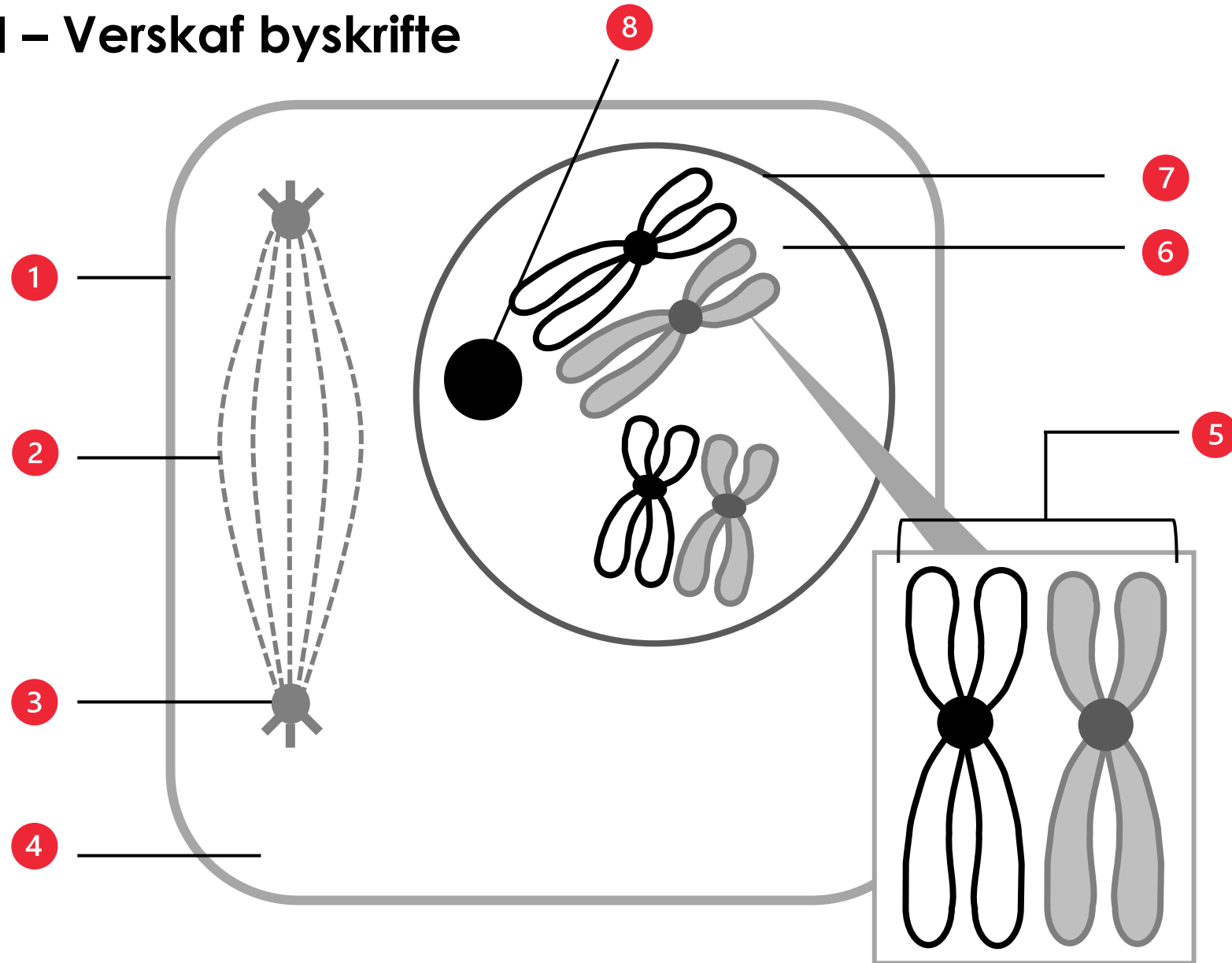
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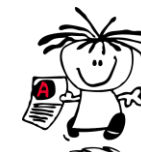
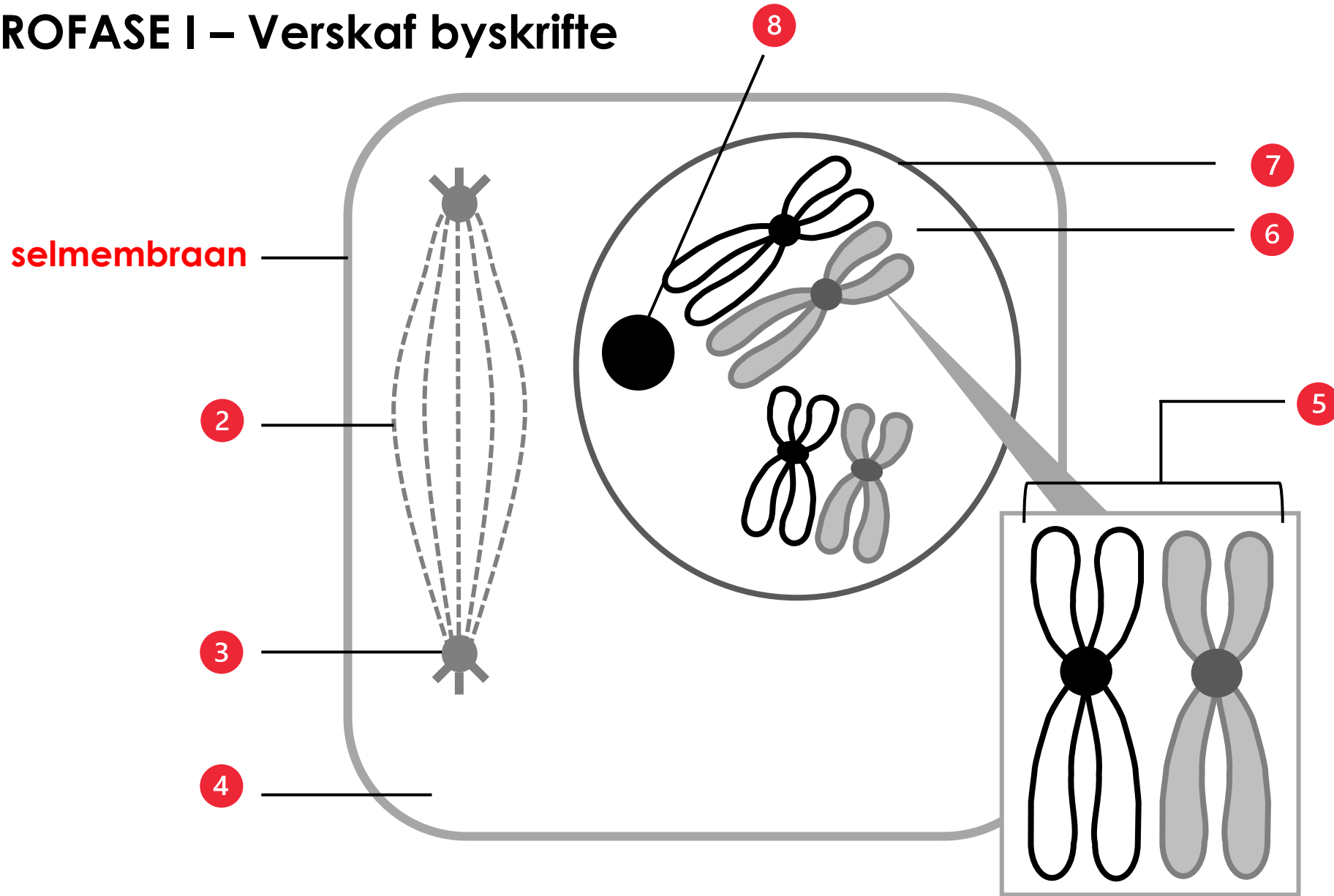
vrou

MEIOSE

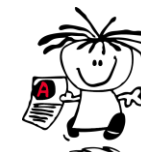
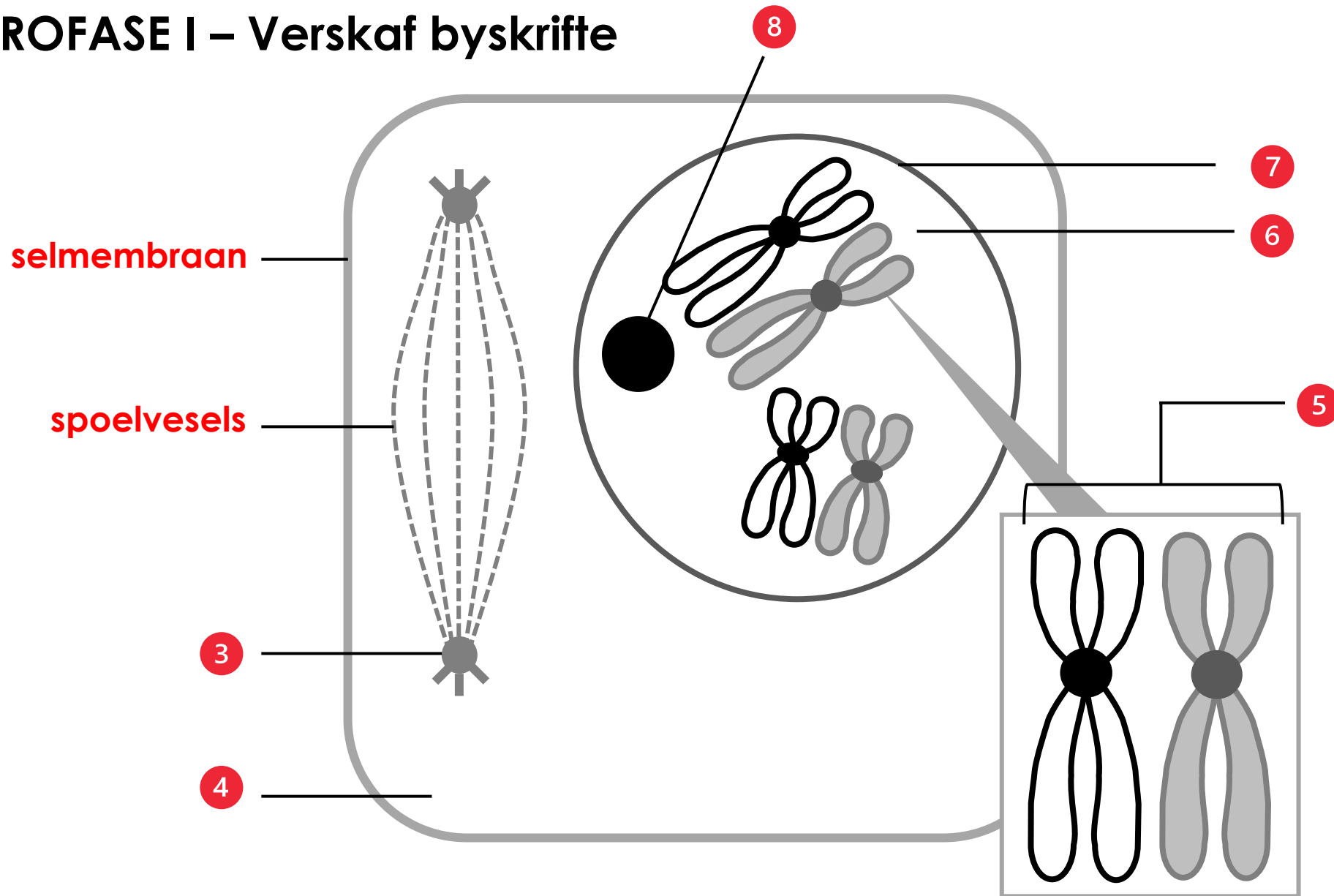
PROFASE I – Verskaf byskrifte



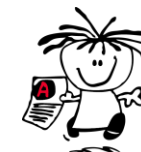
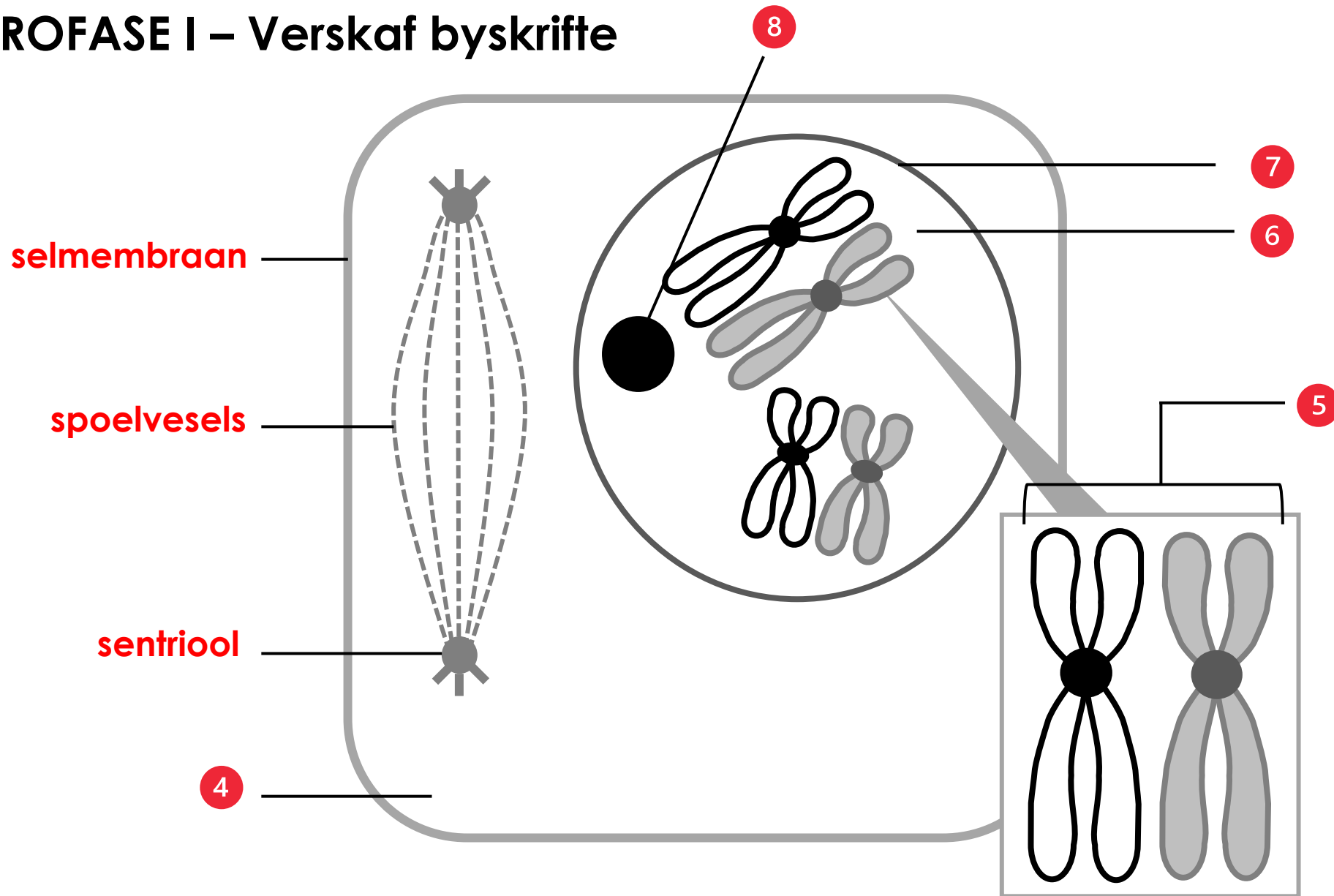
PROFASE I – Verskaf byskrifte



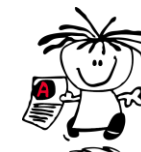
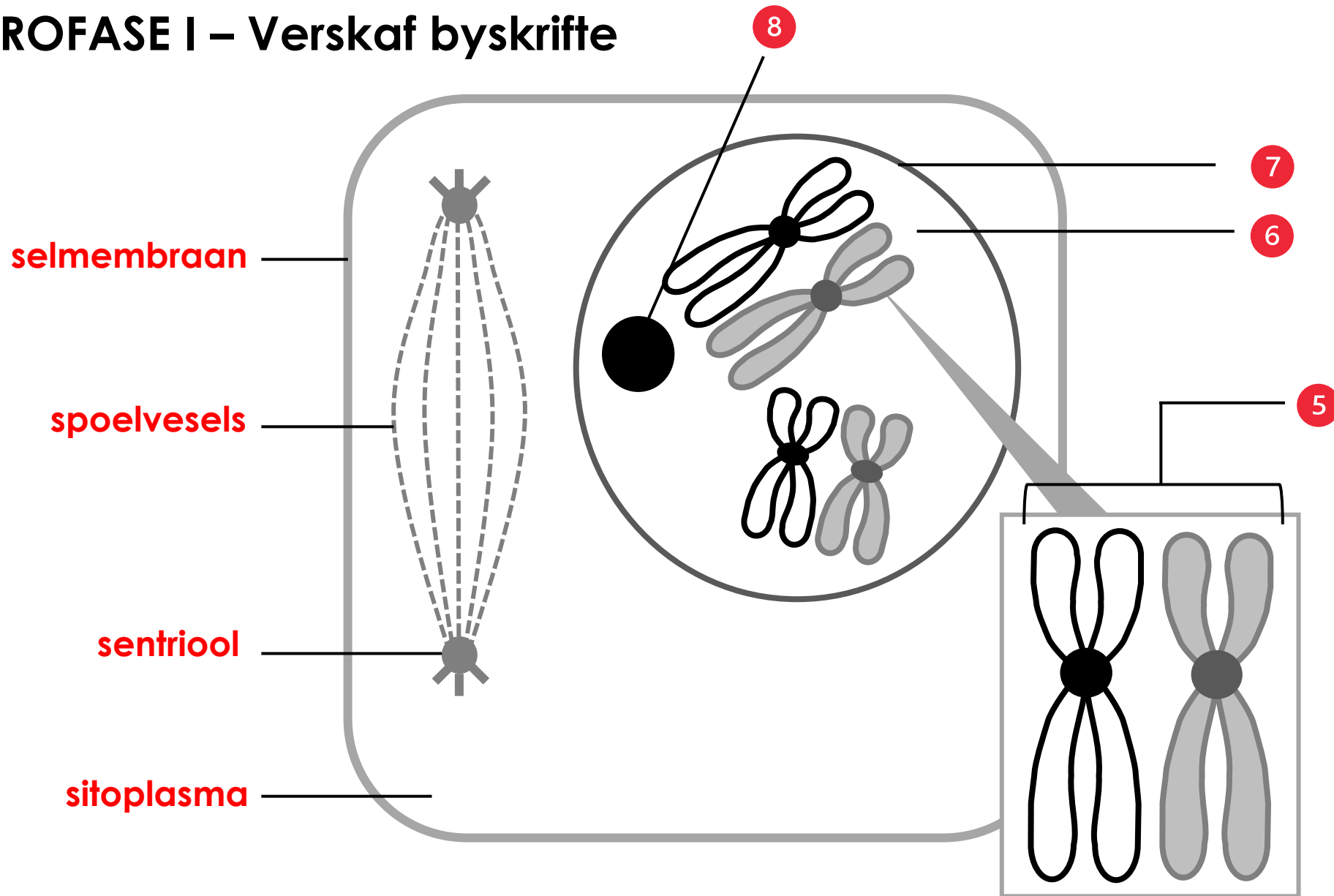
PROFASE I – Verskaf byskrifte



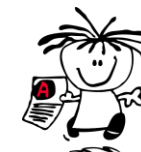
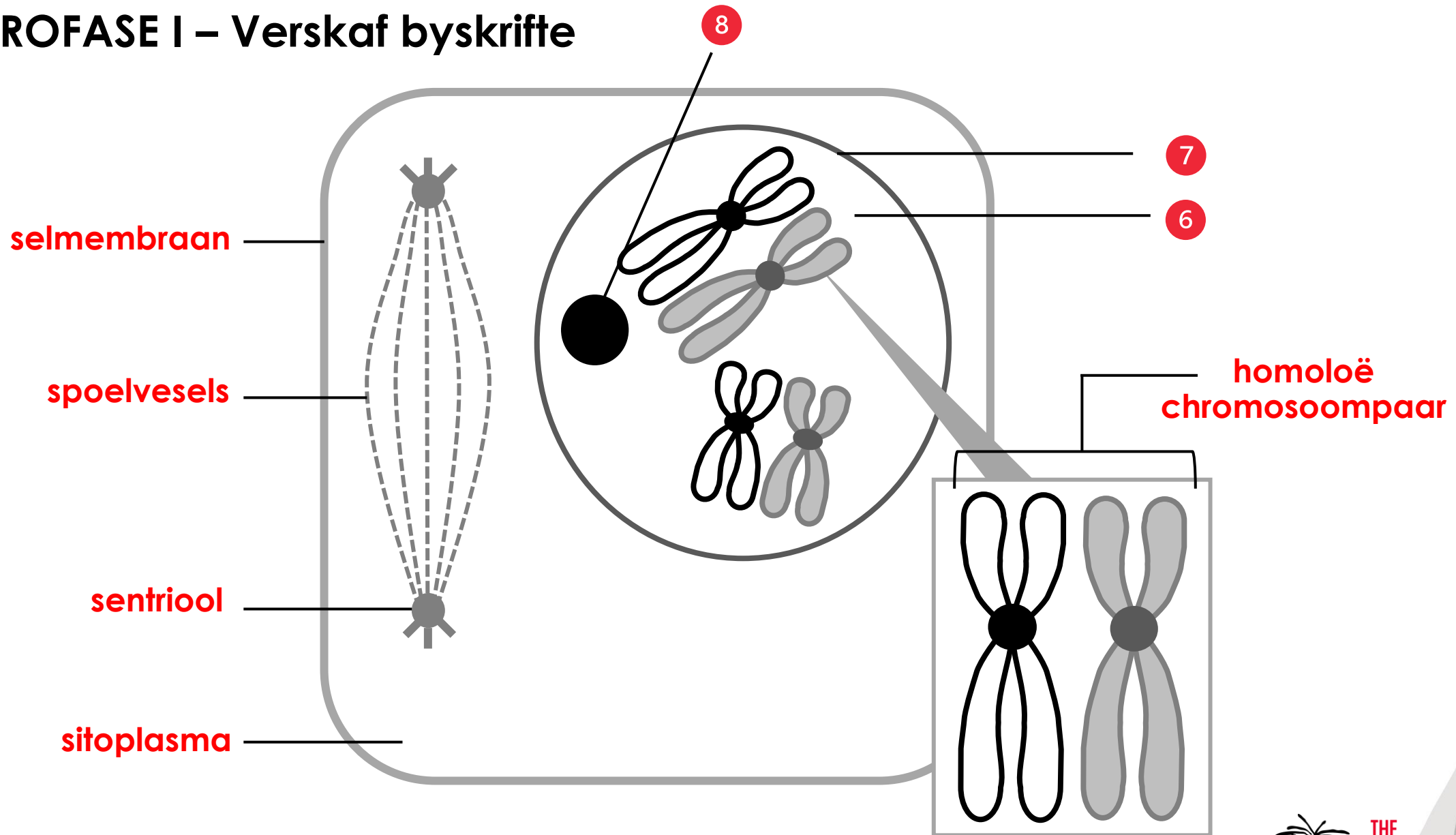
PROFASE I – Verskaf byskrifte



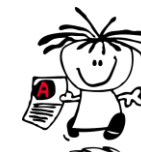
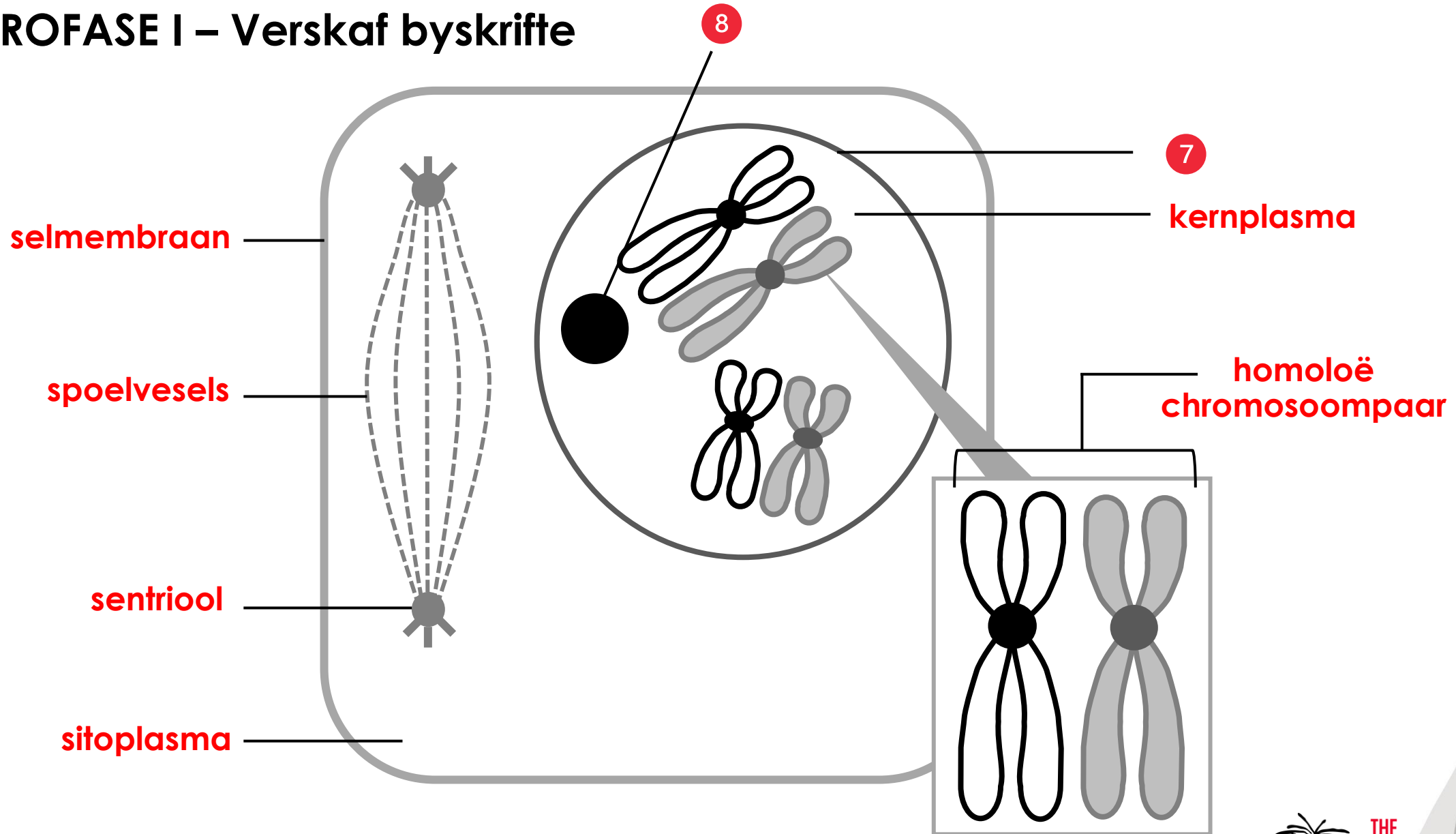
PROFASE I – Verskaf byskrifte



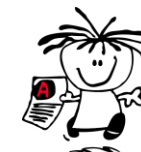
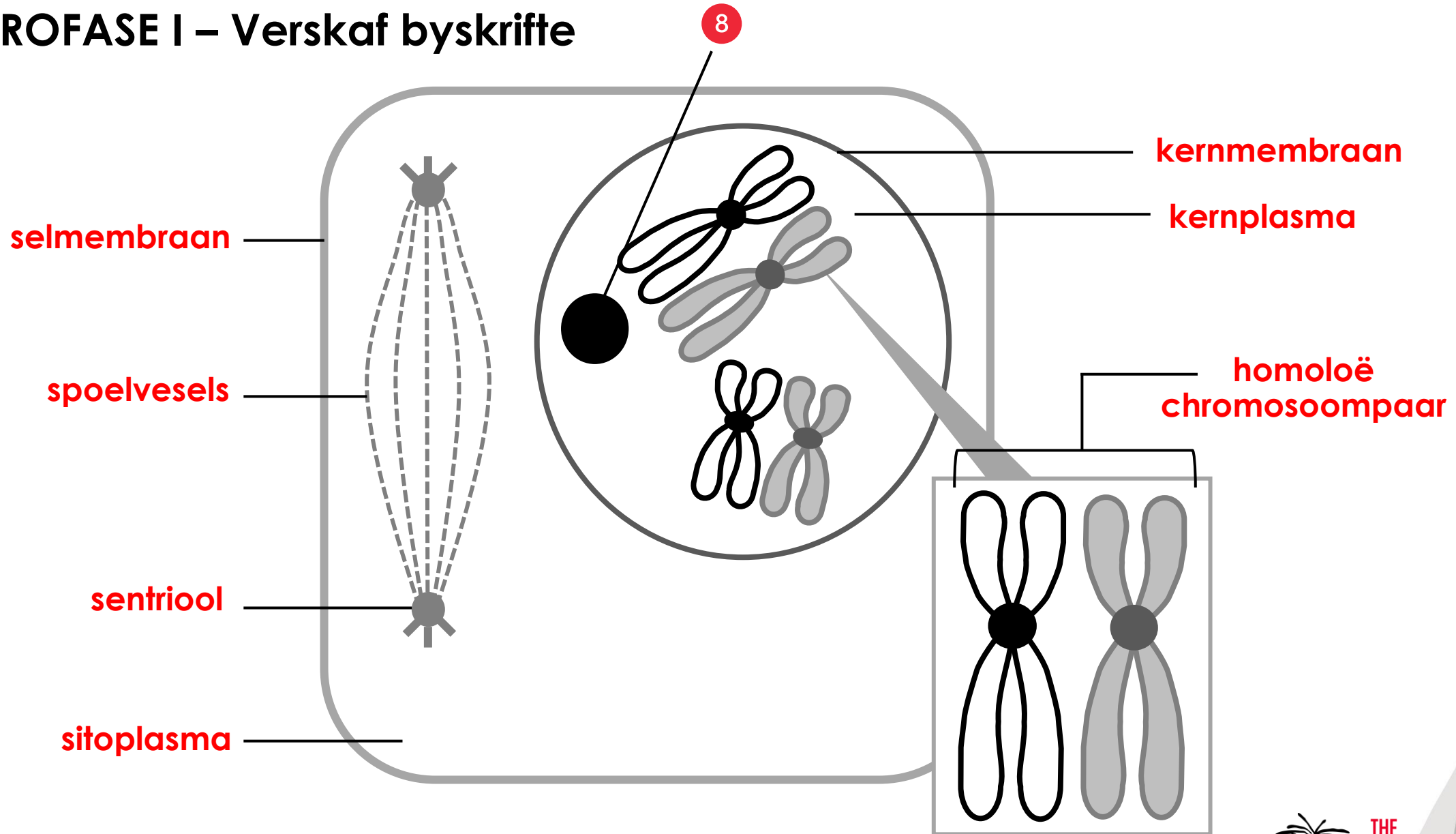
PROFASE I – Verskaf byskrifte



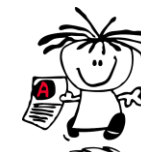
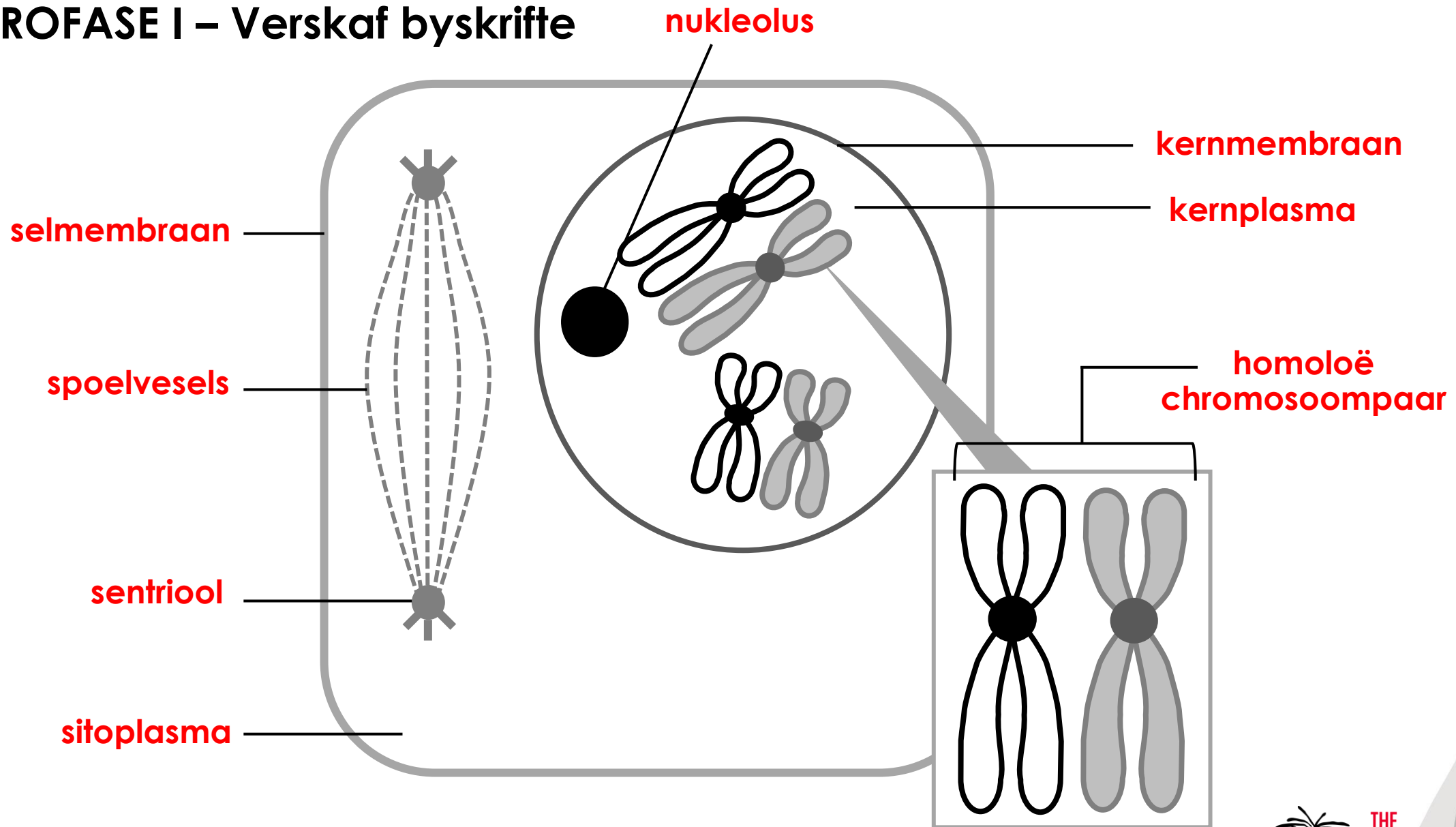
PROFASE I – Verskaf byskrifte



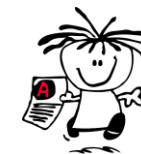
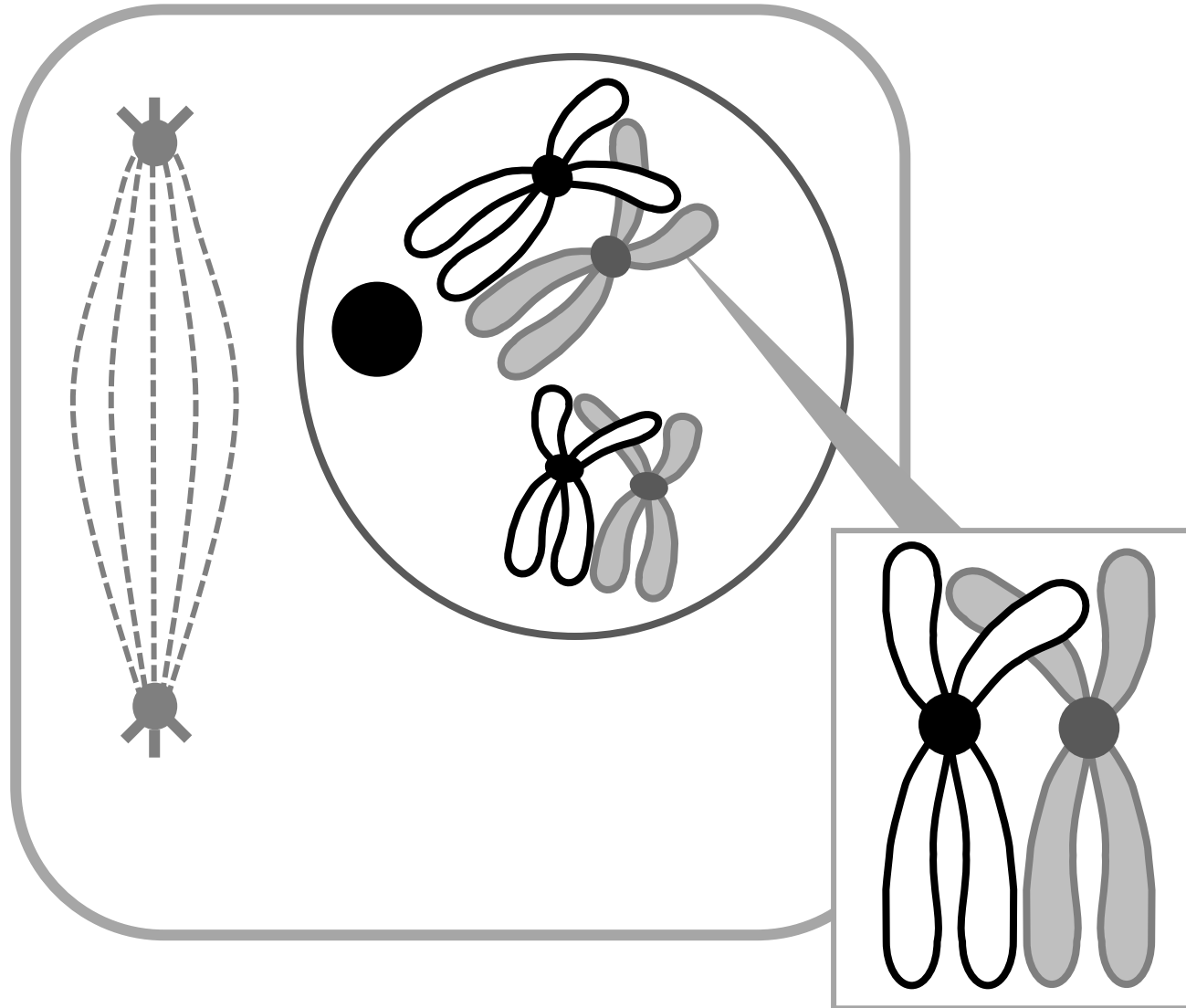
PROFASE I – Verskaf byskrifte



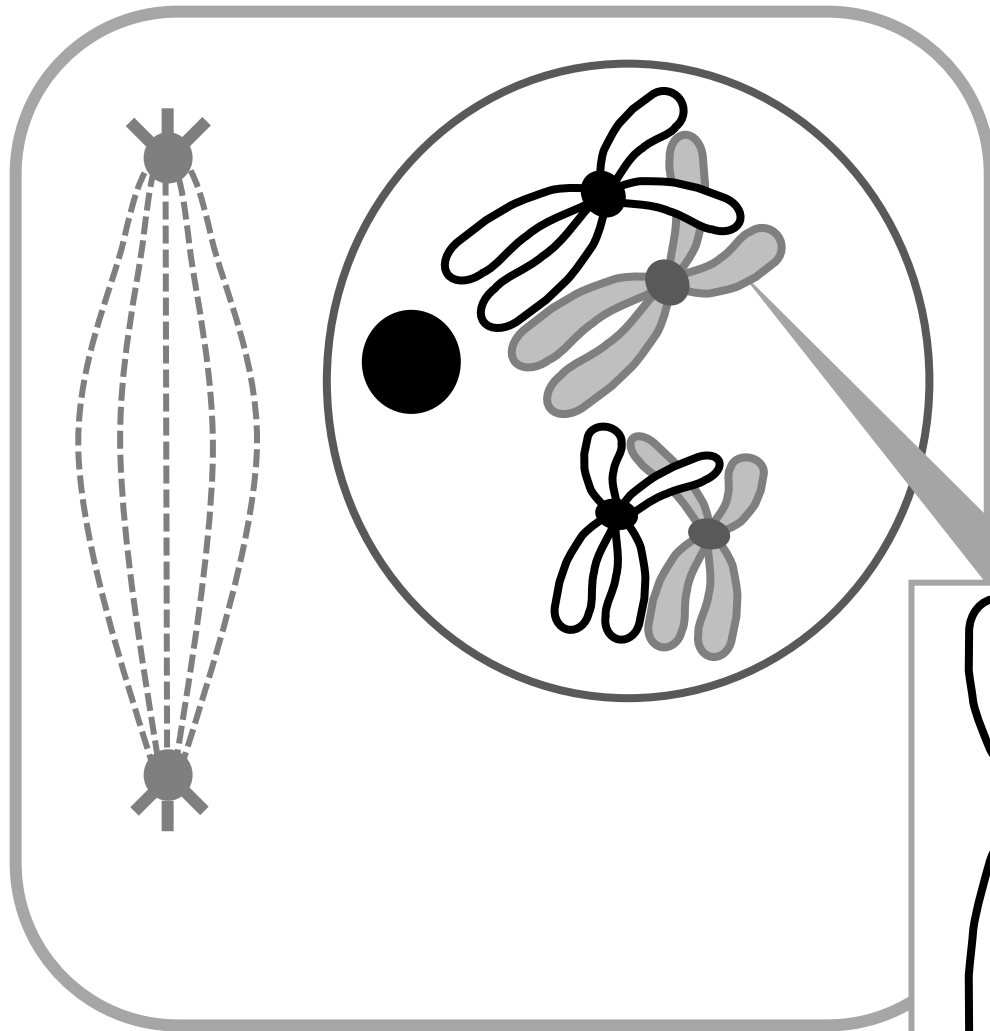
PROFASE I – Verskaf byskrifte



PROFASE I – Benoem en beskryf hierdie proses

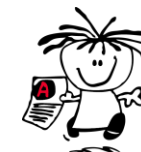
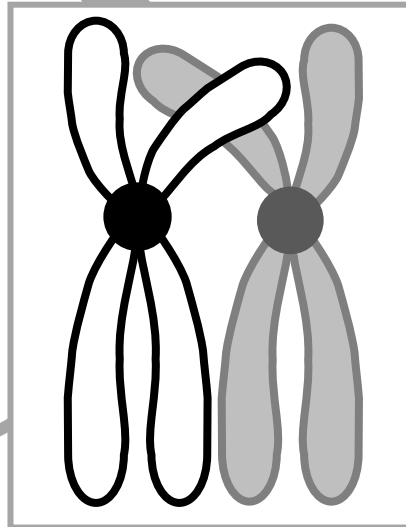


PROFASE I – Benoem en beskryf hierdie proses

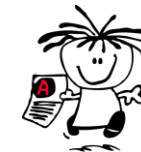
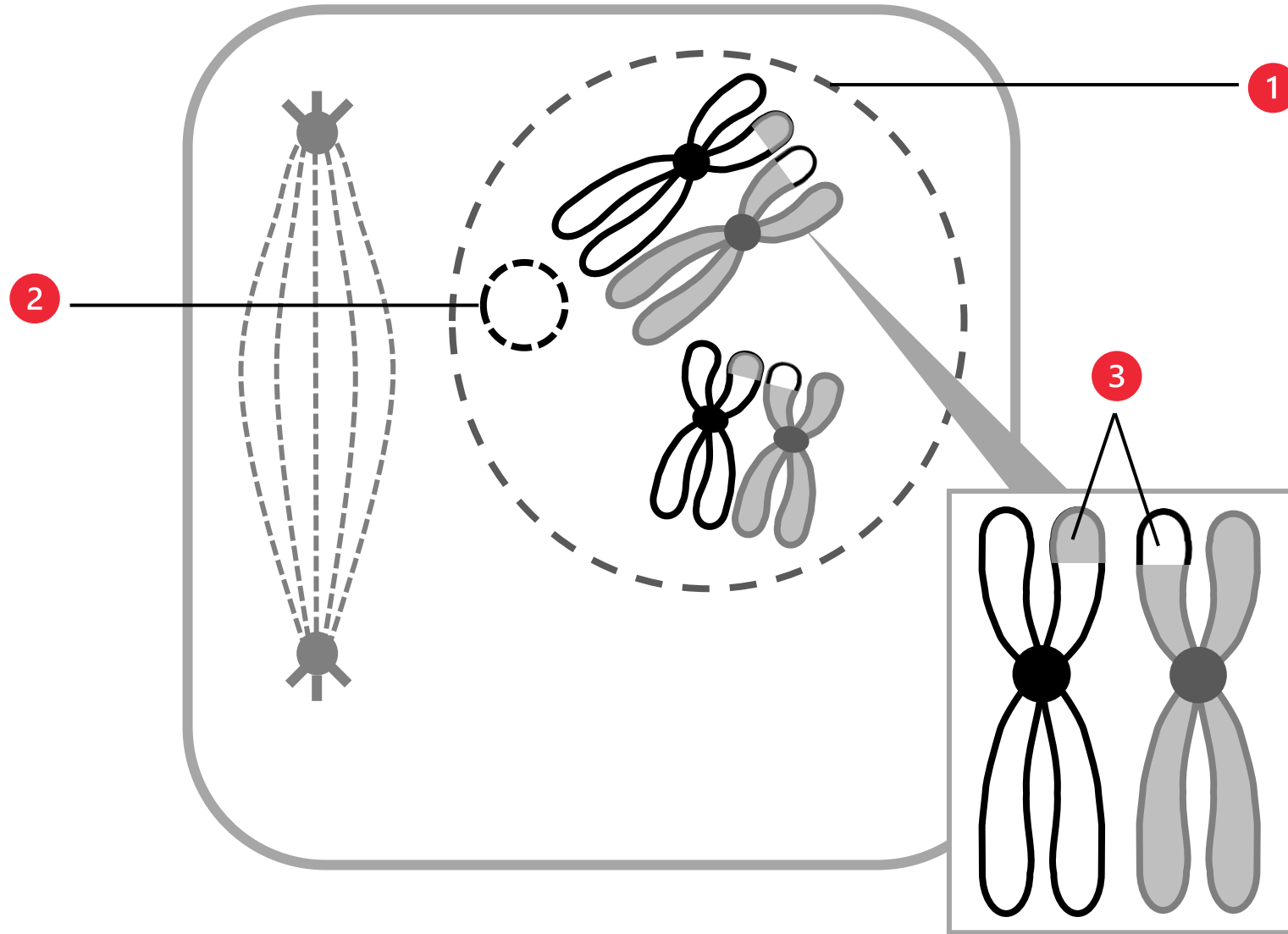


Oorkruising

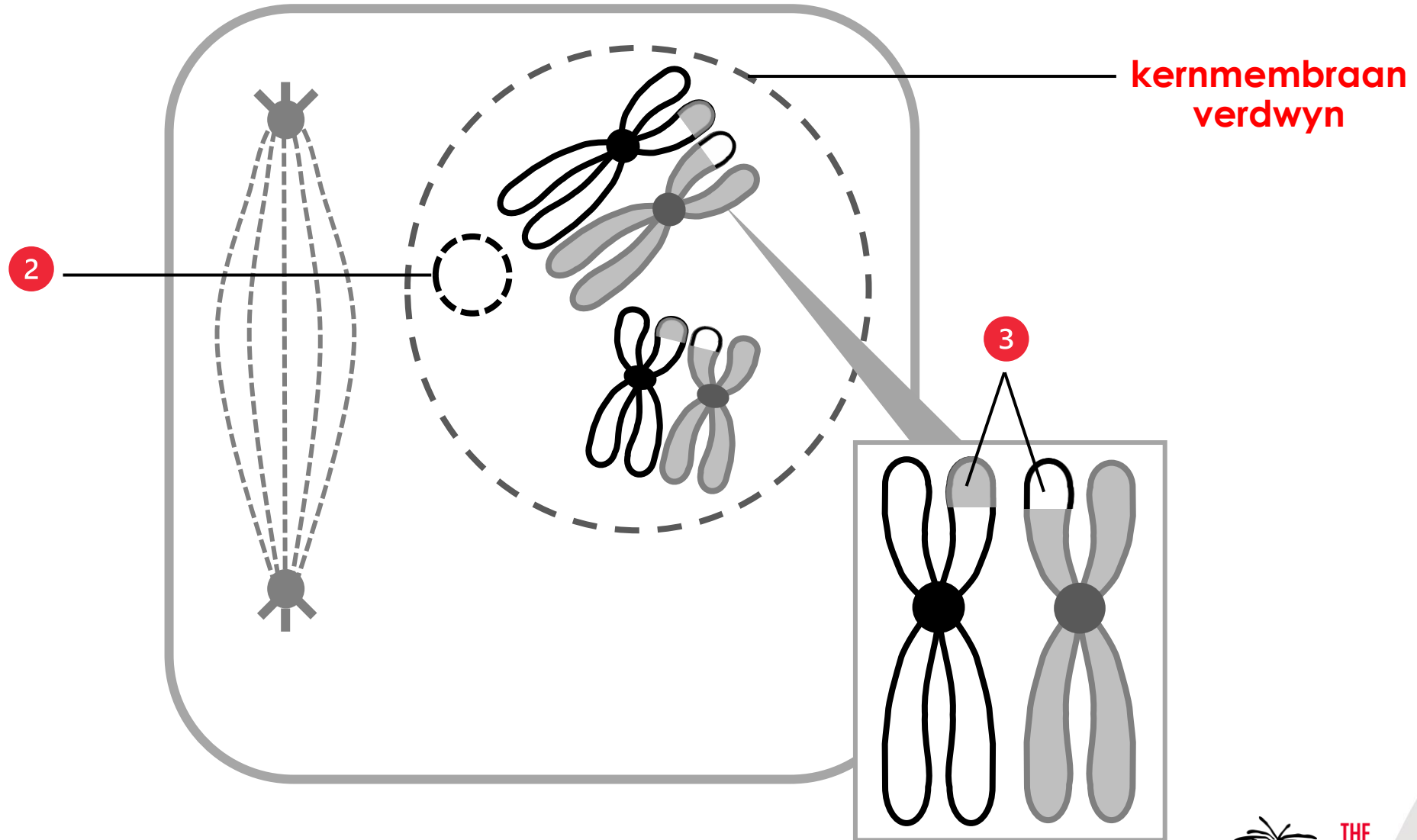
1. Homoloë chromosome lê sy-aan-sy.
2. Hulle nie-susterchromatiede oorvleuel en raak aan mekaar by punte wat chiasmata genoem word (enkelvoud: chiasma).
3. Chromatiedsegmente (genetiese inligting) word uitgeruil by die chiasmata om rekombinante chromatiede te vorm.



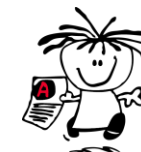
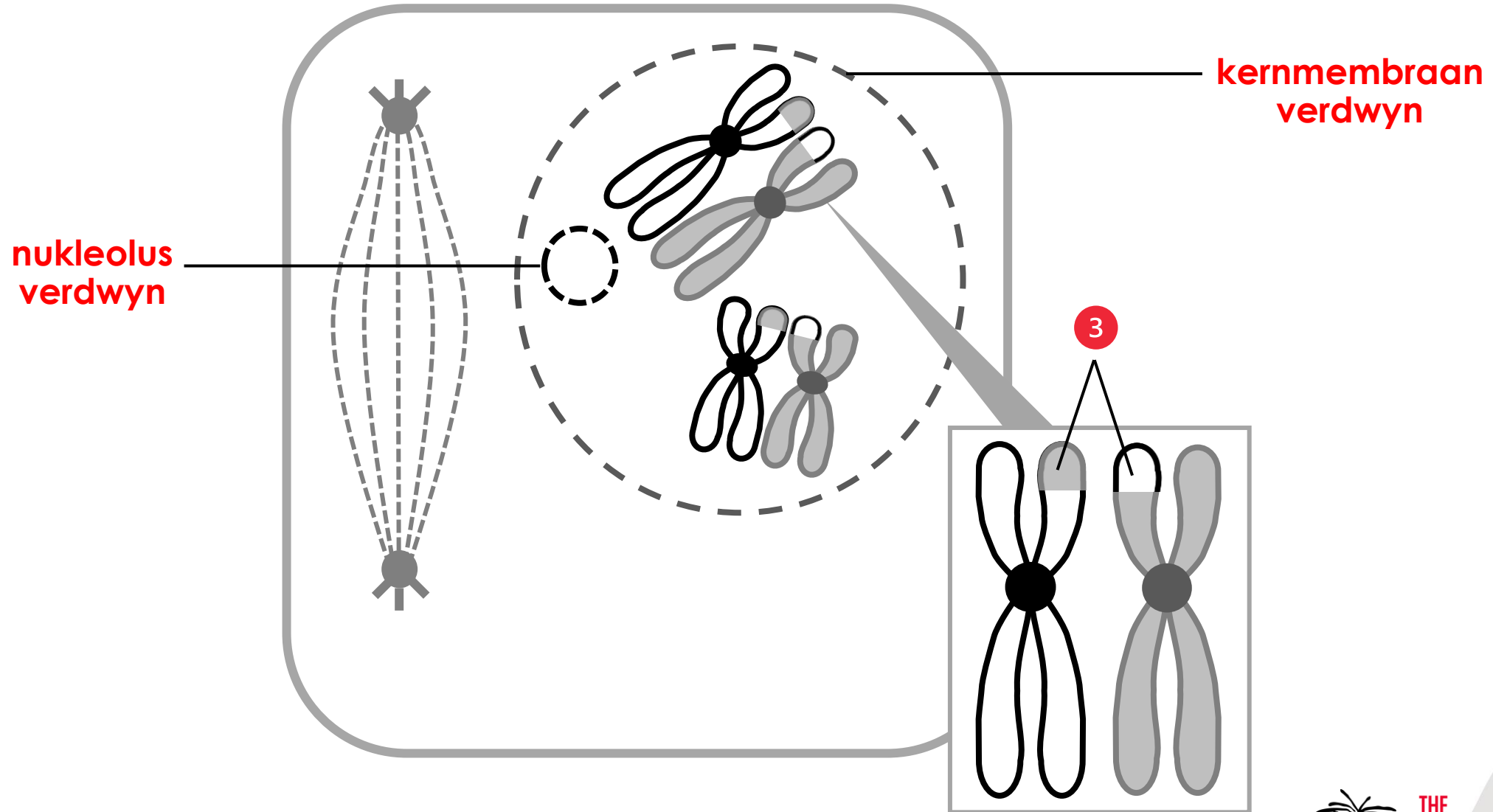
PROFASE I – Verskaf byskrifte vir die belangrike stappe/strukture



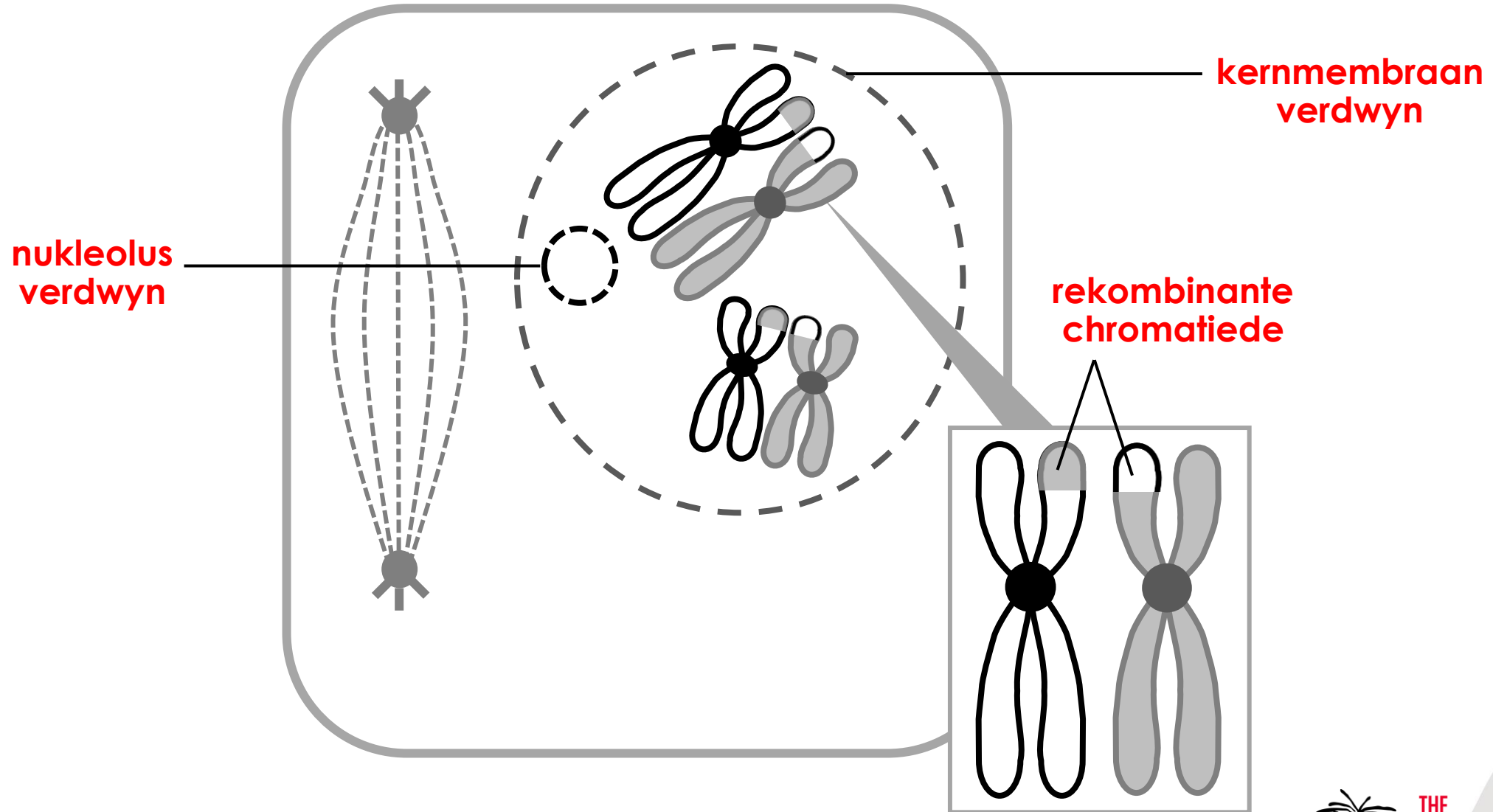
PROFASE I – Verskaf byskrifte vir die belangrike stappe/strukture



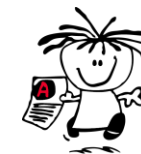
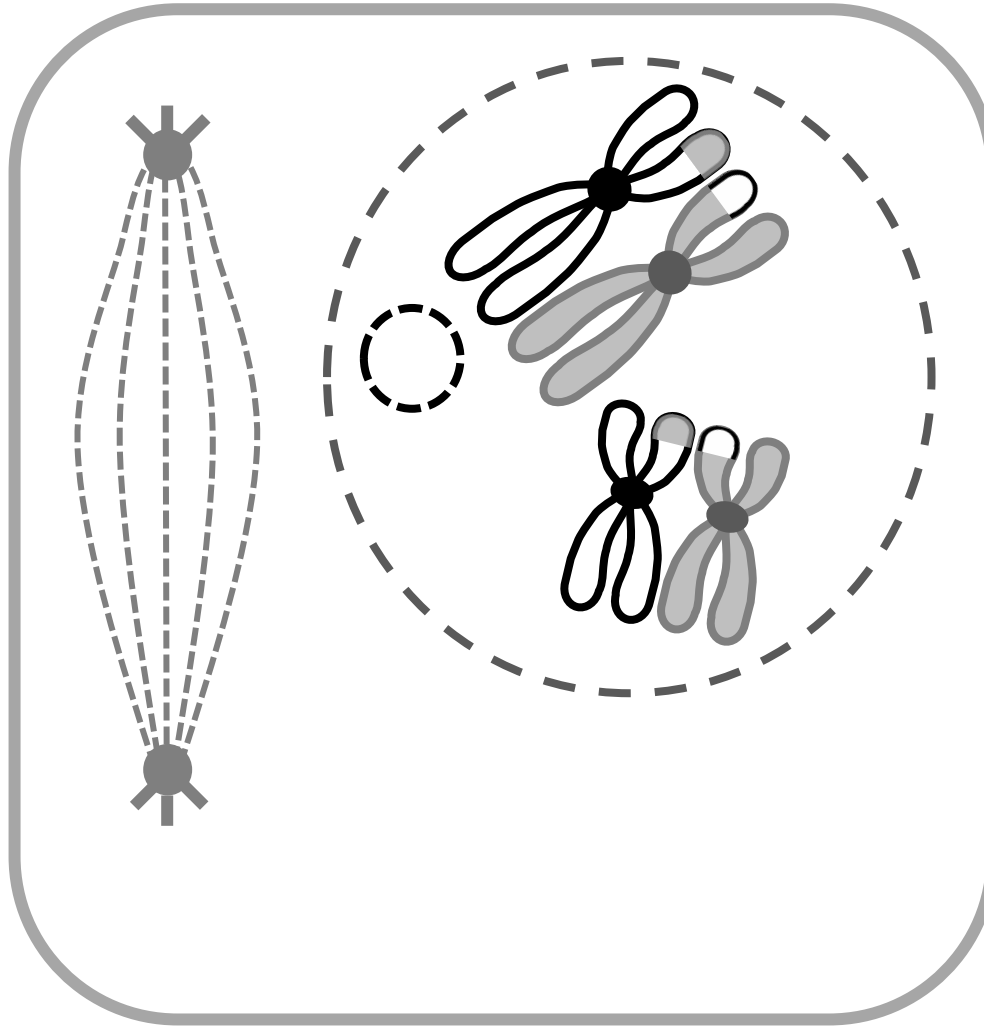
PROFASE I – Verskaf byskrifte vir die belangrike stappe/strukture



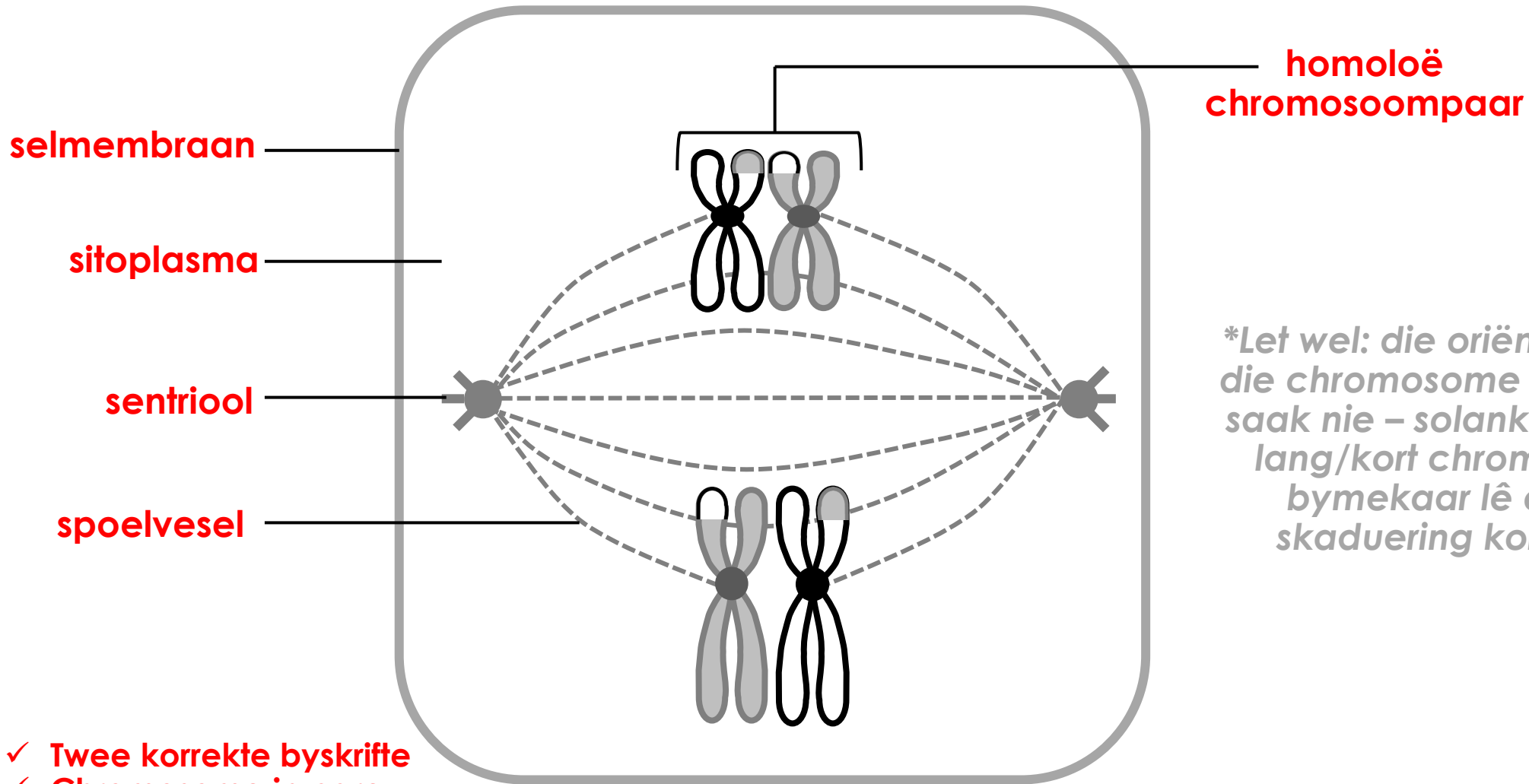
PROFASE I – Verskaf byskrifte vir die belangrike stappe/strukture



TEKEN HIERDIE SEL IN METAFASE I

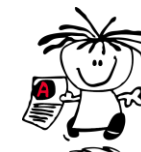


TEKEN HIERDIE SEL IN METAFASE I

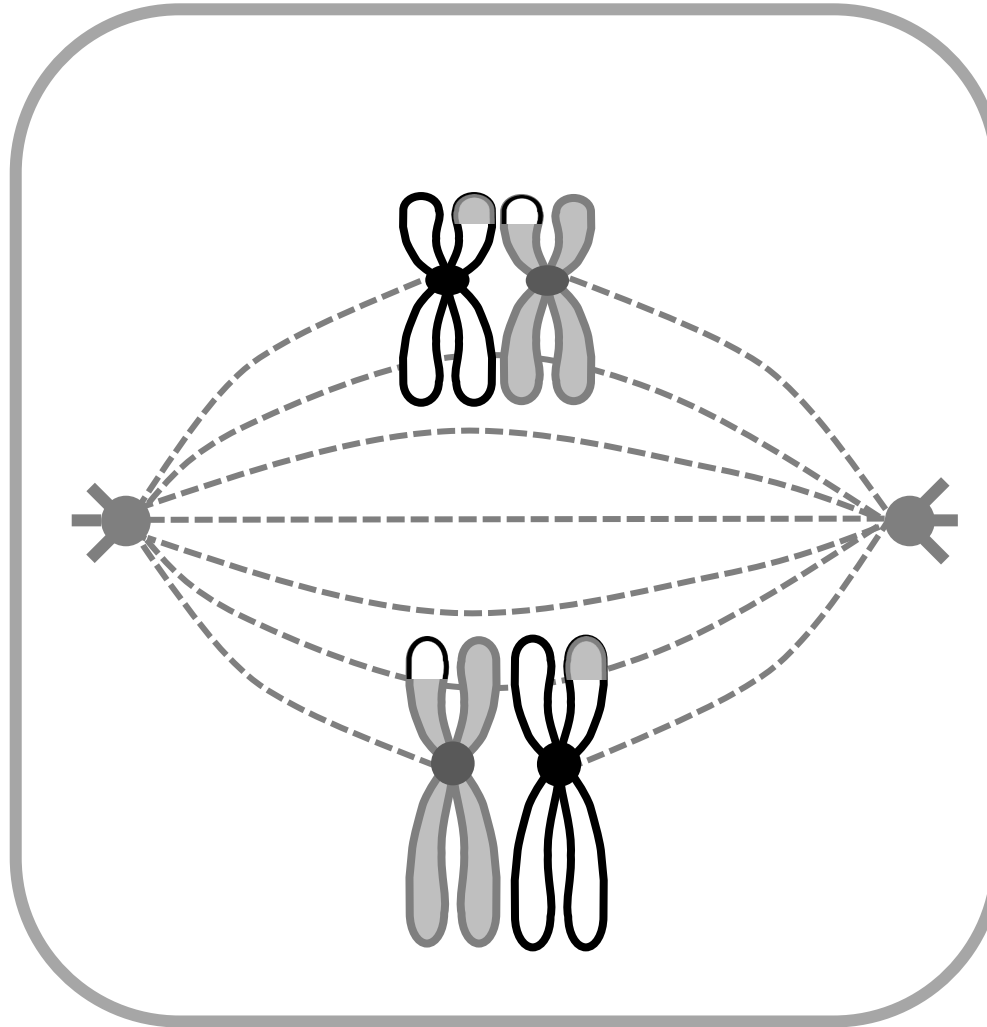


**Let wel: die oriëntasie van die chromosome maak nie saak nie – solank die twee lang/kort chromosome bymekaar lê en hul skaduering korrek is.*

- ✓ Twee korrekte byskrifte
- ✓ Chromosome in pare
- ✓ 2 pare homoloë chromosome sigbaar
- ✓ Dieselfde grootte chromosome saam
- ✓ Korrekte skaduering van chromatiede

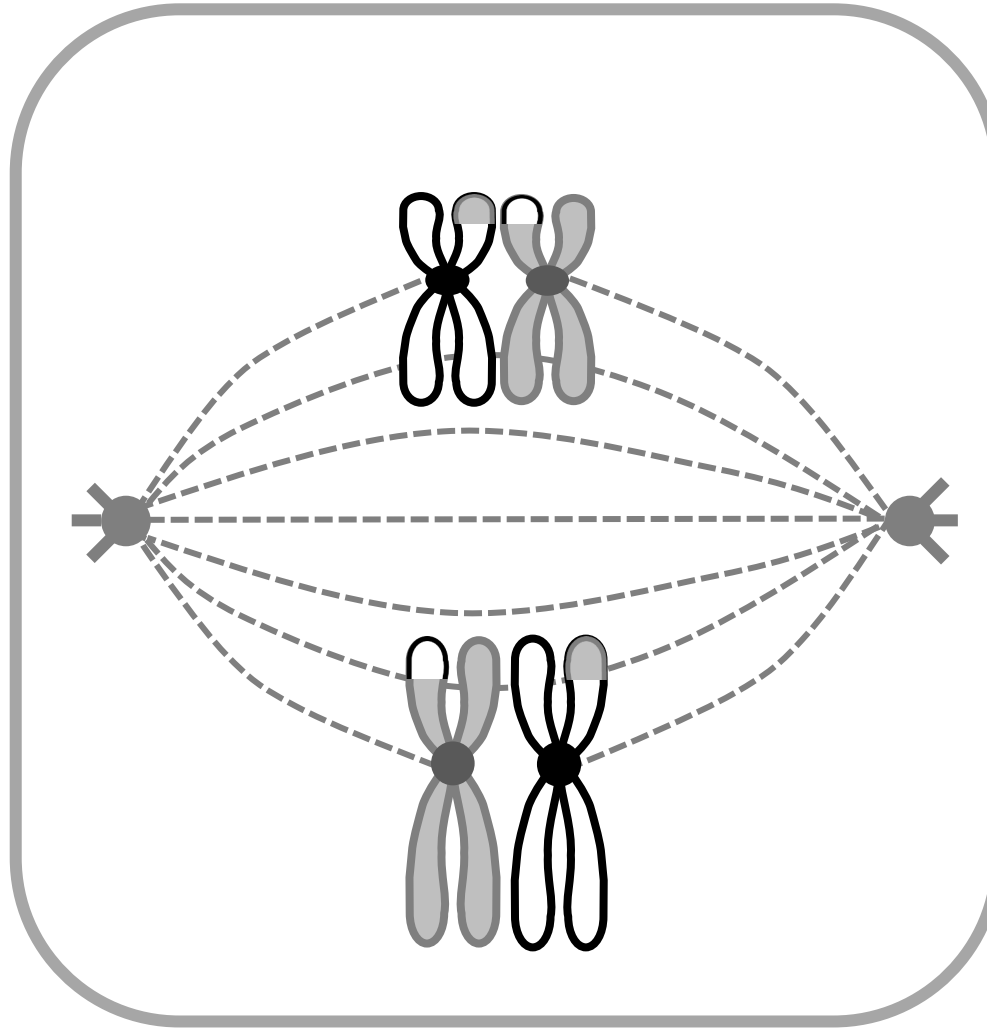


METAFASE I



Gee die NAAM van
die proses wat
genetiese variasie
tydens hierdie fase
van meiose toelaat.

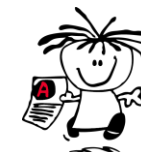
METAFASE I



**Lukrake rangskikking
van chromosome**

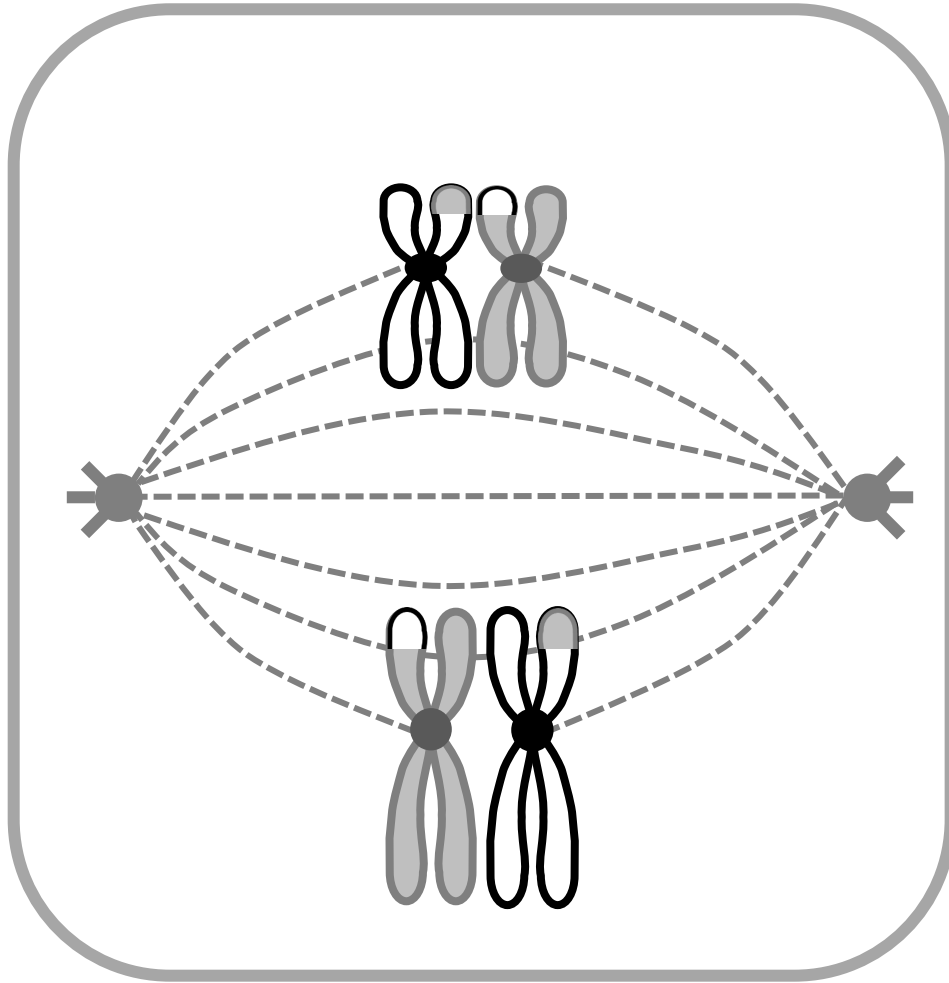
**Tydens Metafase I rangsik
die homoloë chromosome
hulself in pare op die
ewenaar van die sel.**

**Watter chromosoom aan
watter kant van die
ewenaar lê is lukraak,
d.w.s. enige chromosoom
kan na enige pool gerig
wees.**

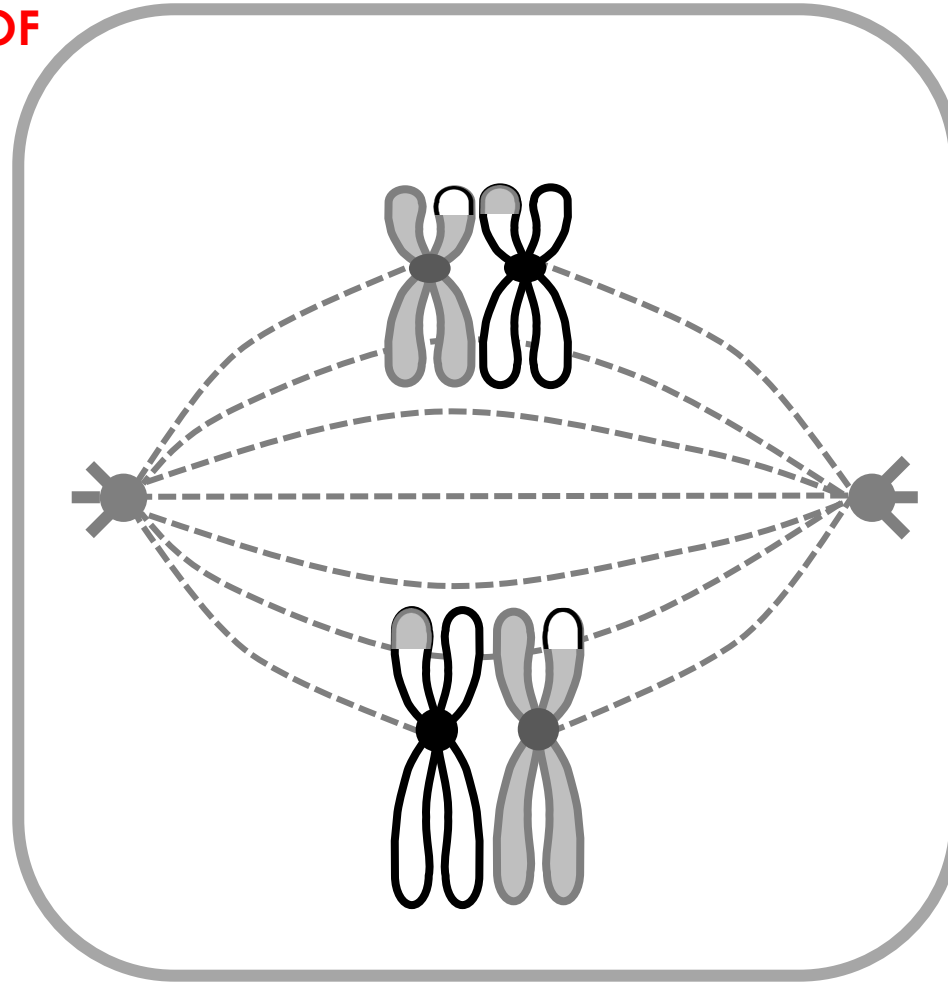


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METAFASE I – Lukrake rangskikking, bv.



OF

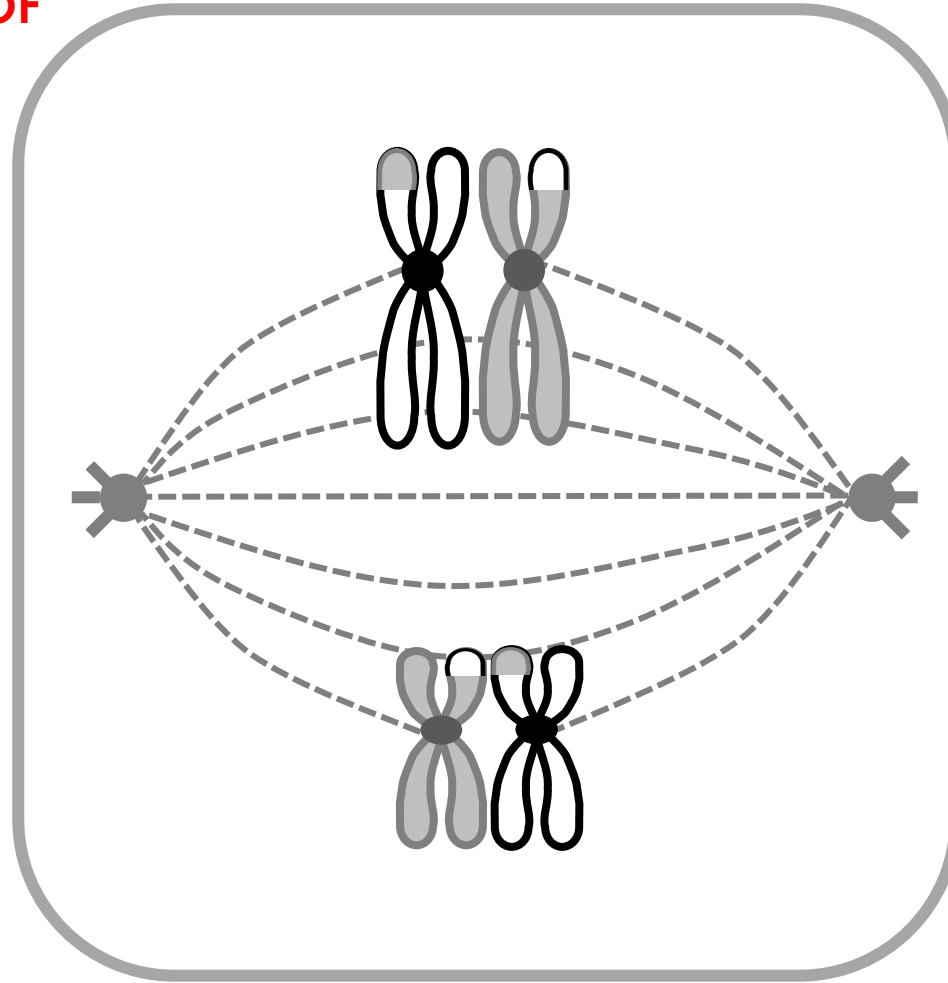
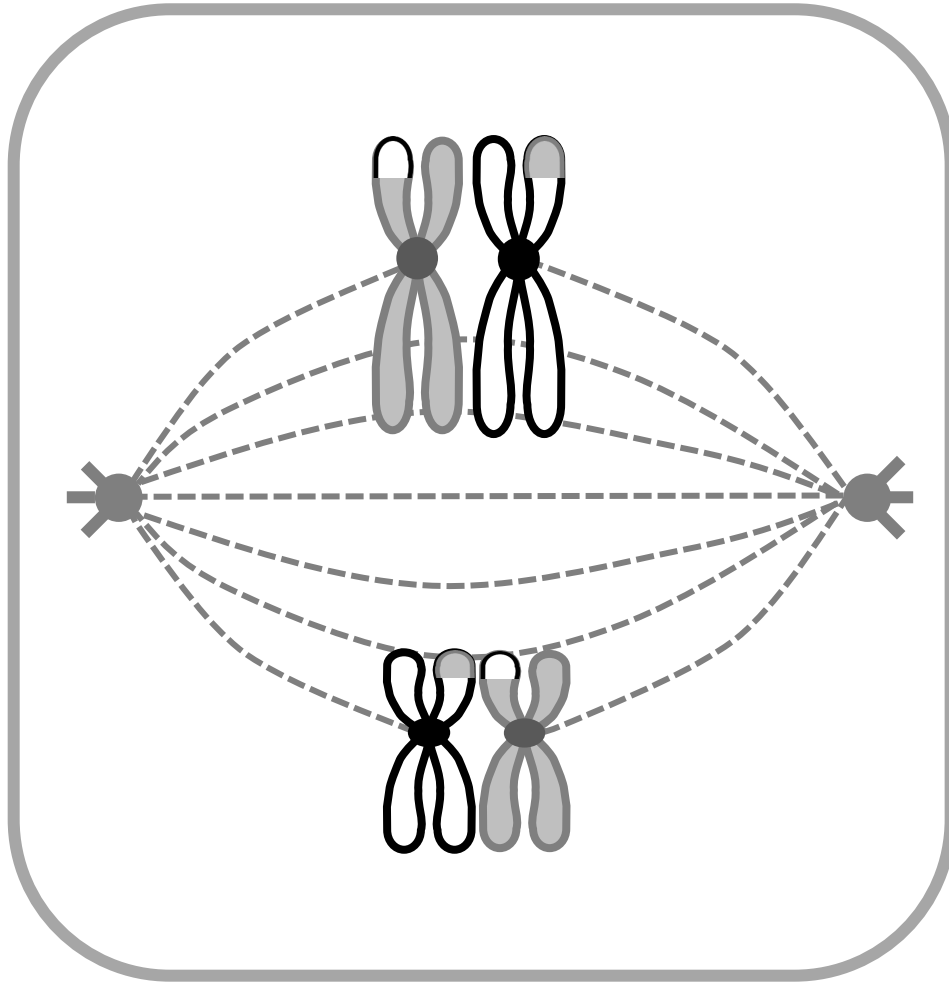


OF

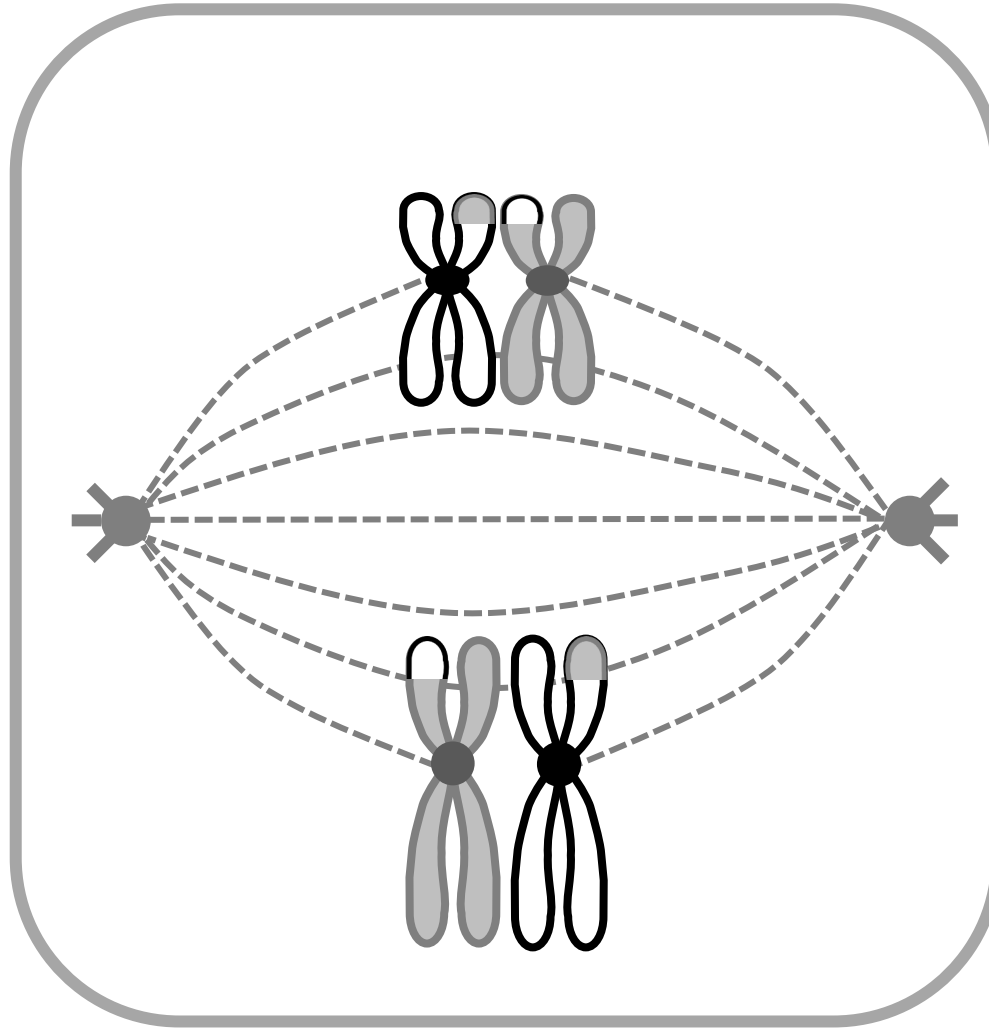


METAFASE I – Lukrake rangskikking, bv.

OF

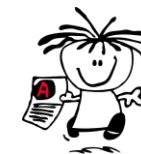
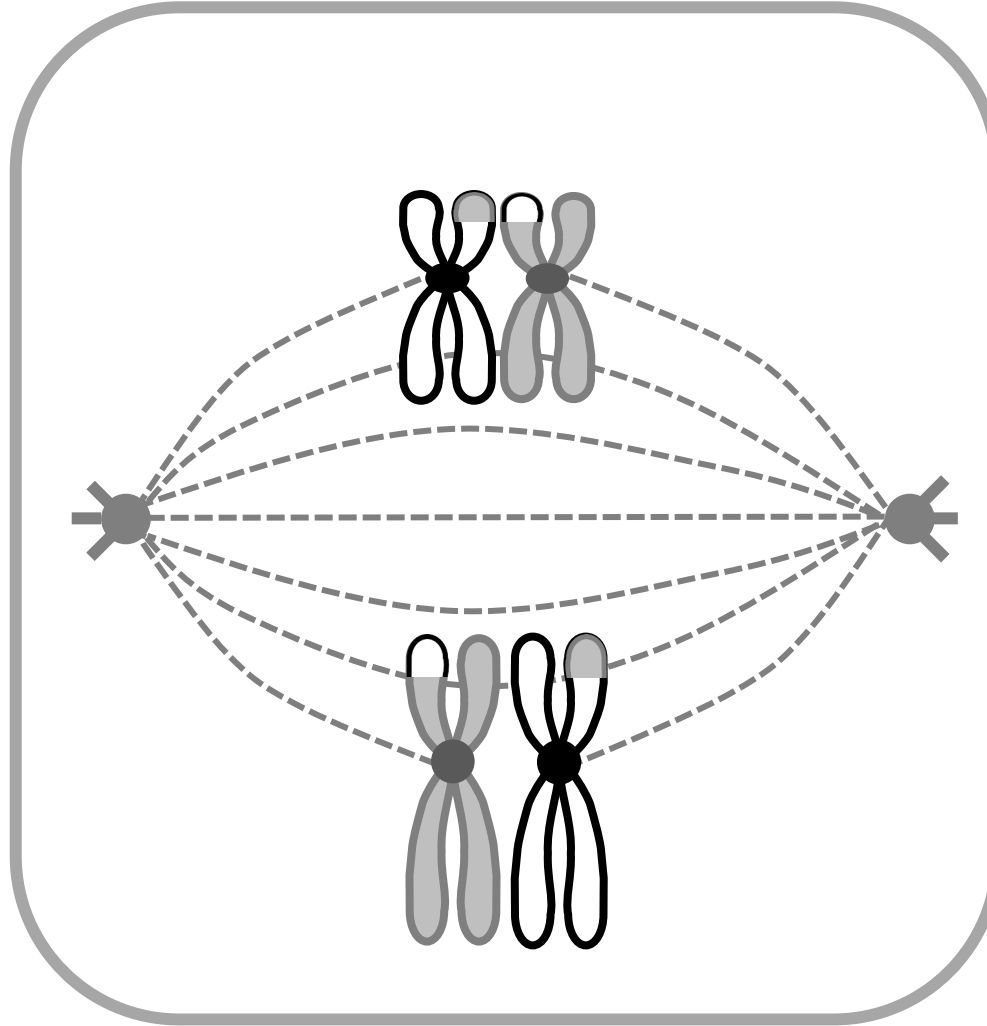


METAFASE I – Teken hierdie sel tydens Telofase I



METAFASE I – Teken hierdie sel tydens Telofase I

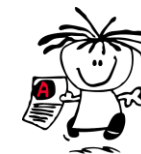
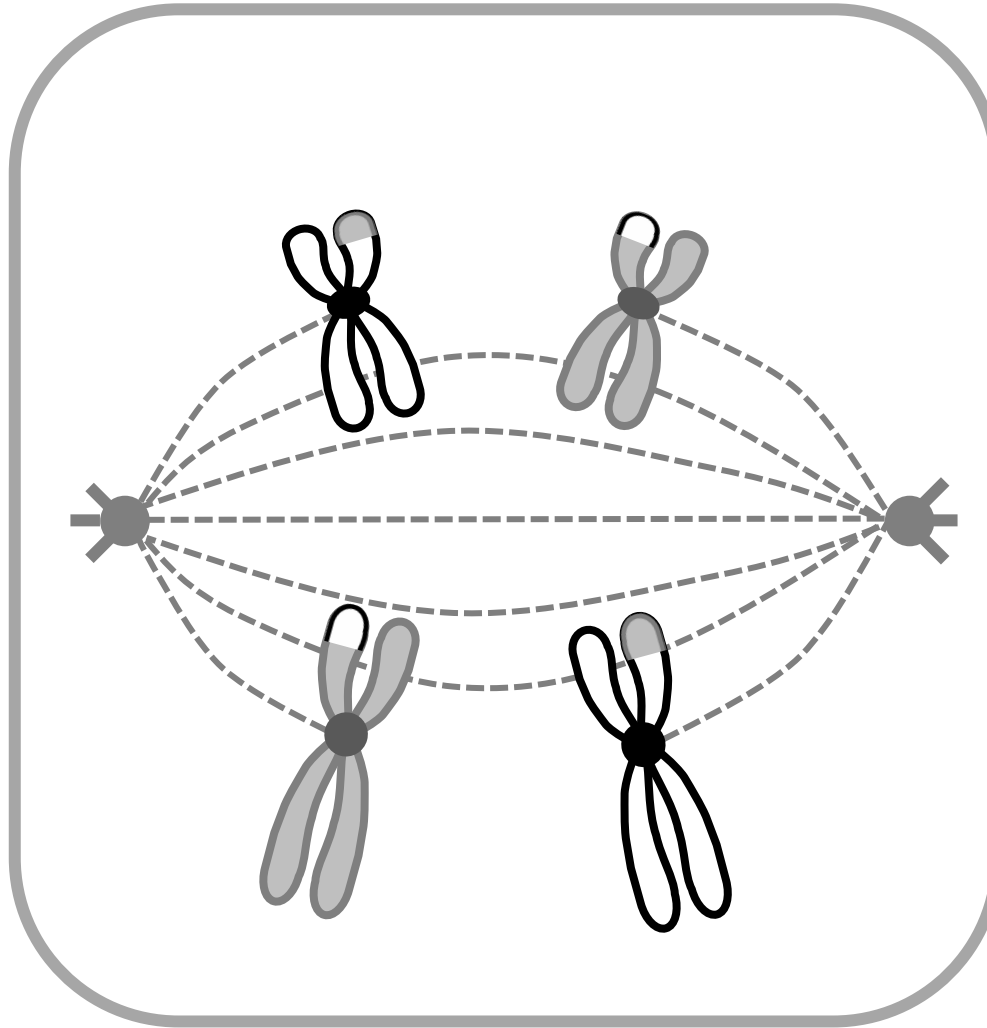
Visualiseer die volgende paar fases:



METAFASE I – Teken hierdie sel tydens Telofase I

Visualiseer die volgende paar fases:

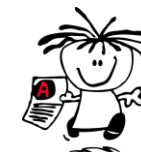
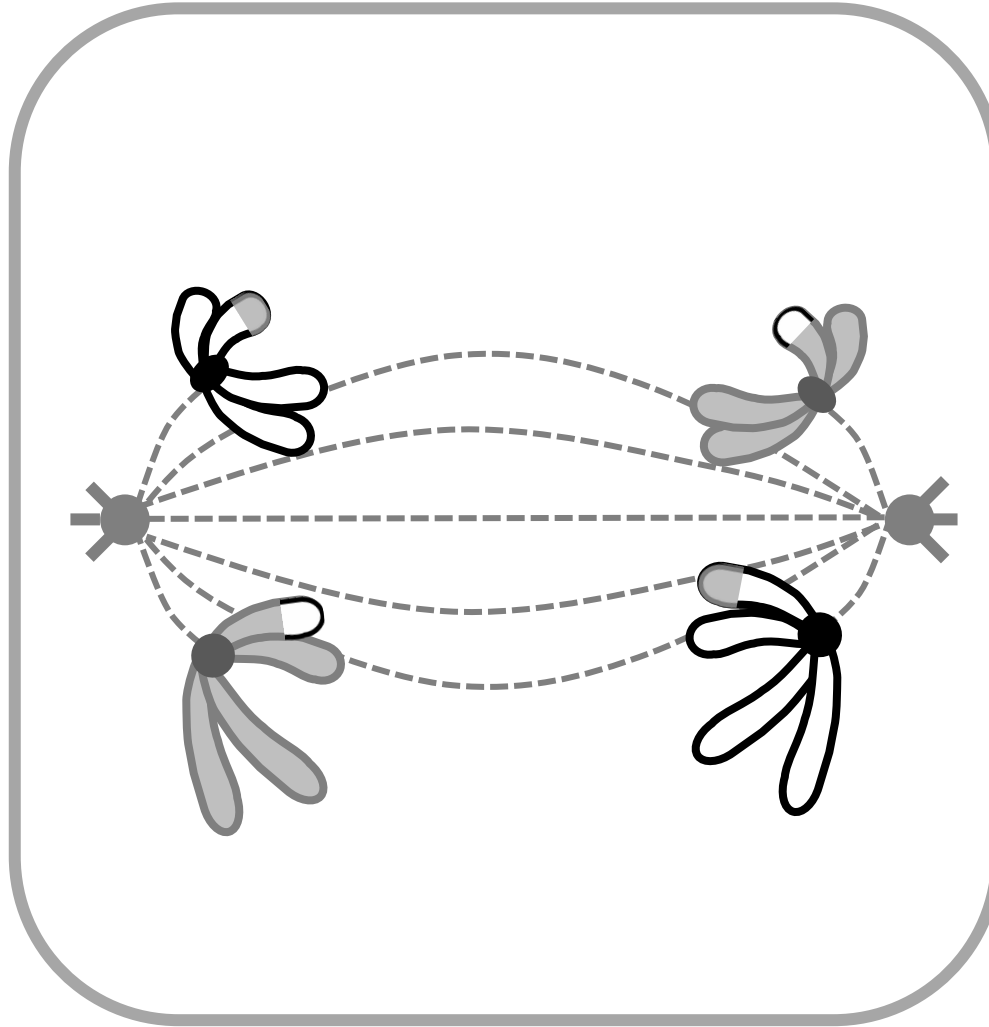
**ANAFASE I
(begin)**



METAFASE I – Teken hierdie sel tydens Telofase I

Visualiseer die volgende paar fases:

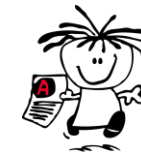
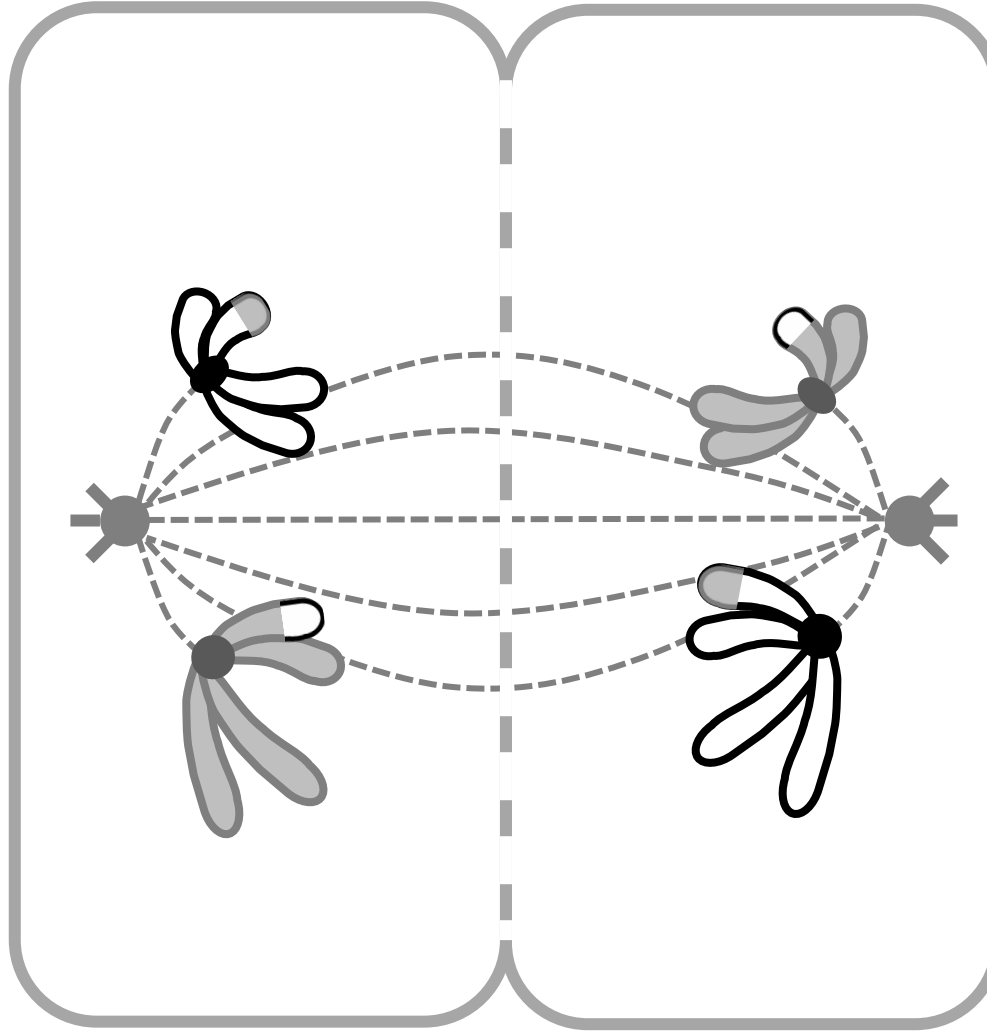
ANAFASE I
(einde)



METAFASE I – Teken hierdie sel tydens Telofase I

Visualiseer die volgende paar fases:

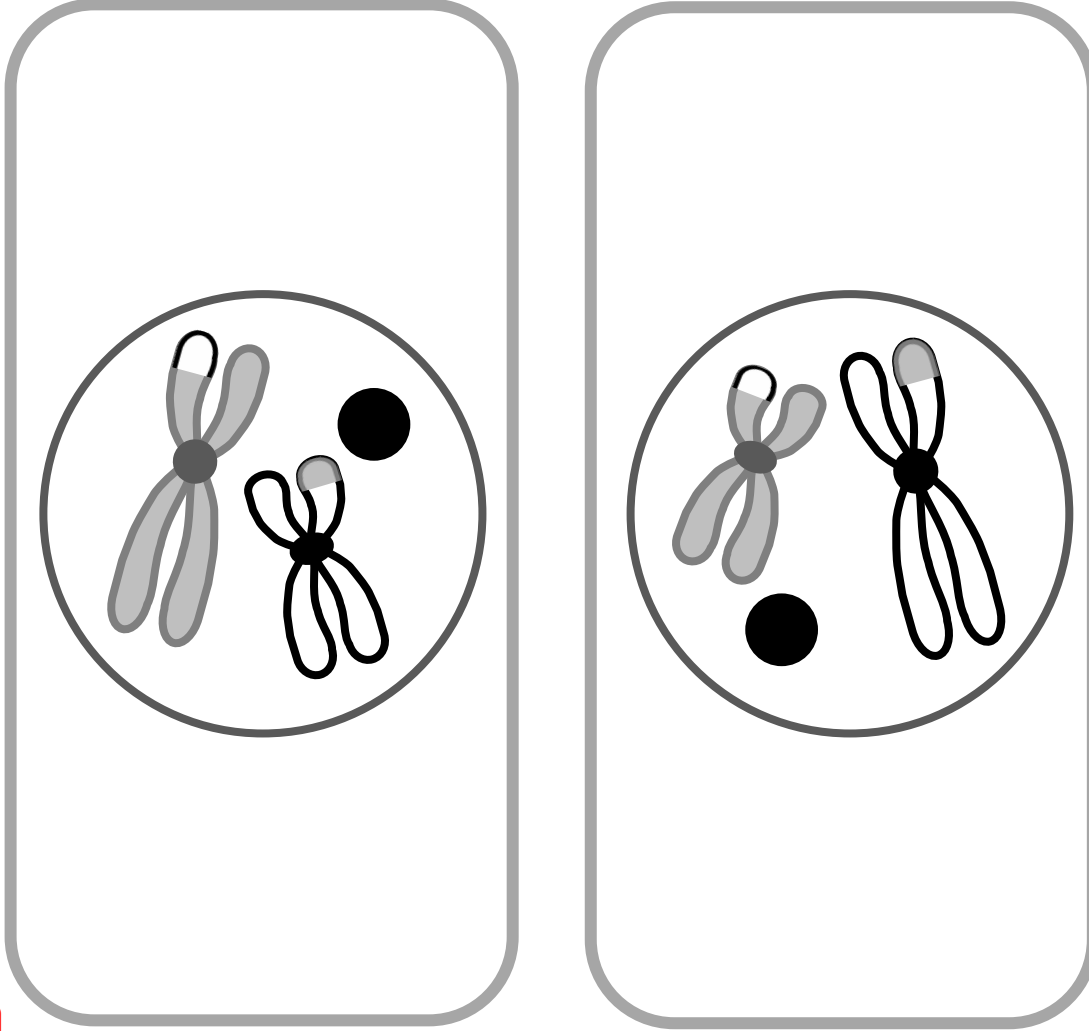
**TELOFASE I
(begin)**



METAFASE I – Teken hierdie sel tydens Telofase I

Visualiseer die volgende paar fases:

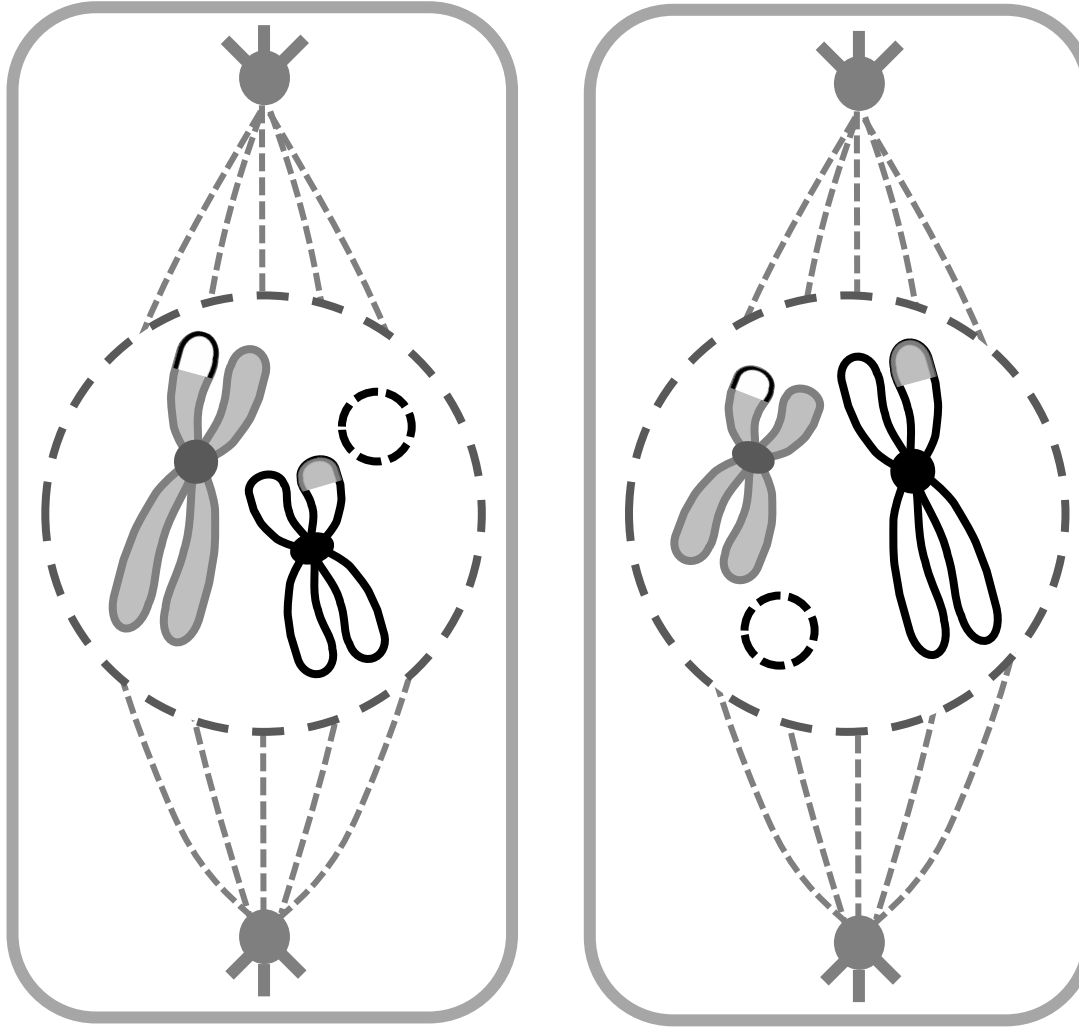
**TELOFASE I
(einde)**



- ✓ Twee selle geteken
- ✓ Twee chromosome in elke sel
- ✓ Skaduering van uitgeruilde segmente is aangedui
- ✓ Korrekte skaduering van chromatiede in elke sel

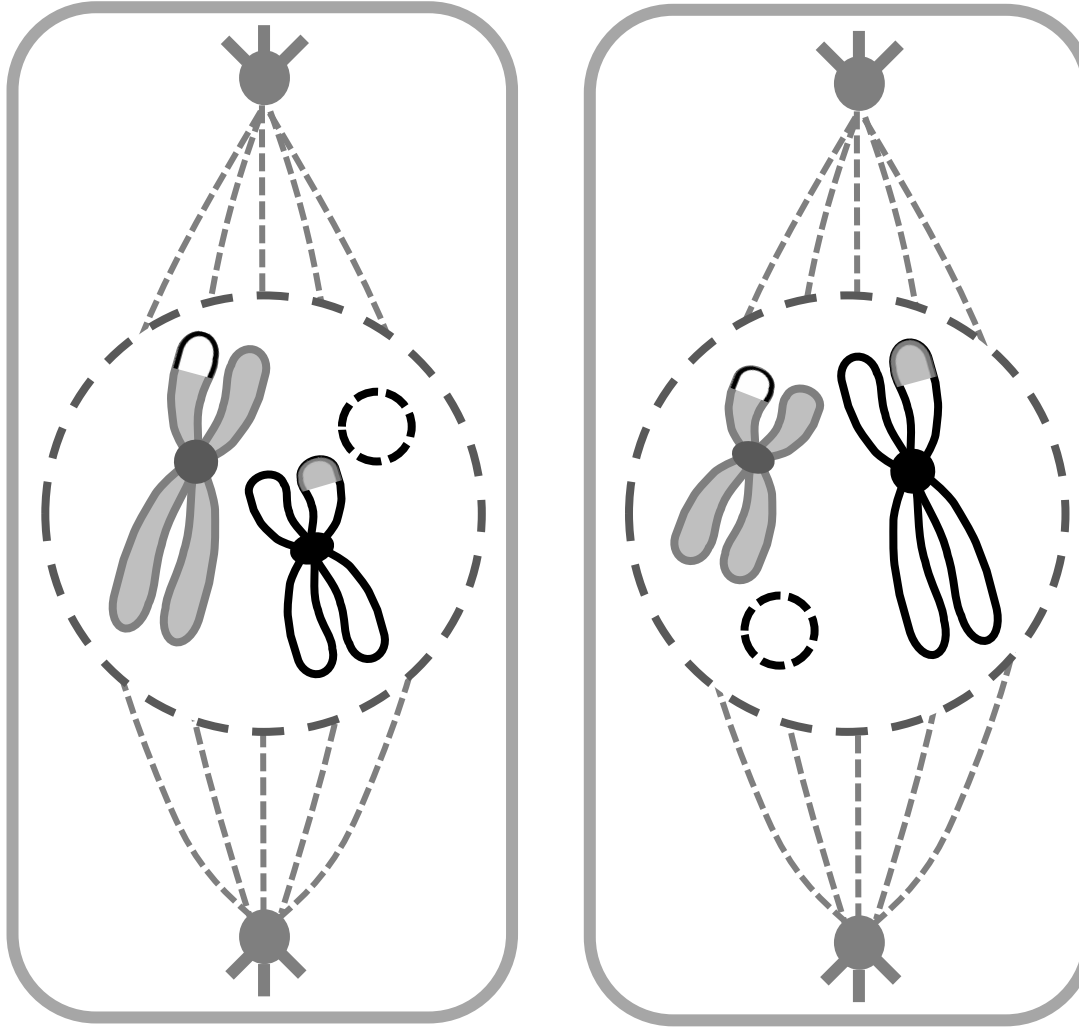


PROFASE II



Hoeveel
chromosome is in
elkeen van hierdie
selle teenwoordig?

PROFASE II



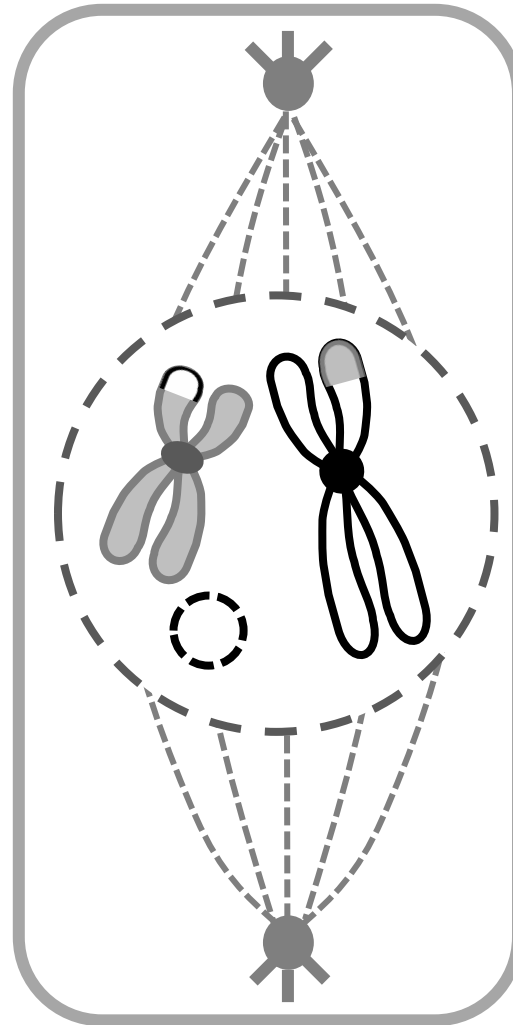
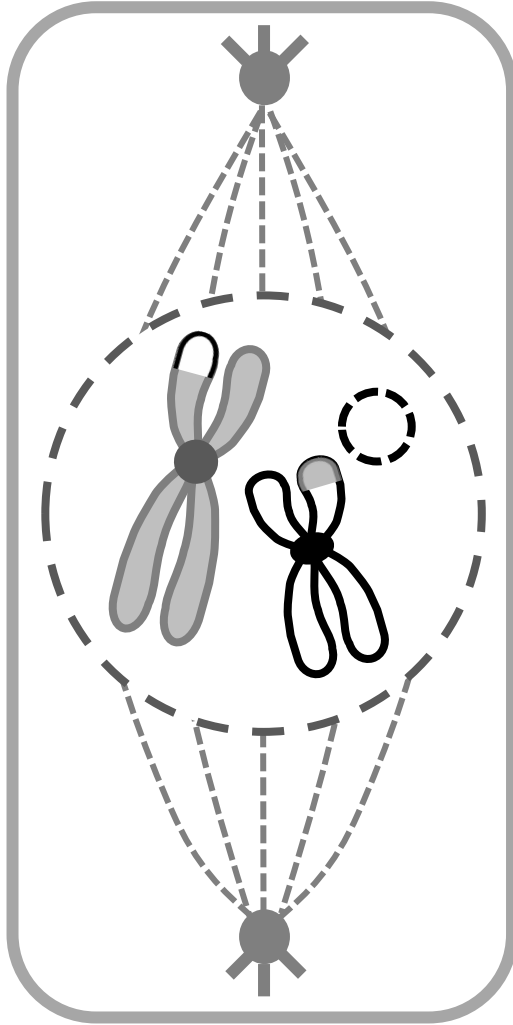
2

Hoeveel
chromatiede is in
elkeen van hierdie
selle teenwoordig?



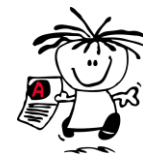
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PROFASE II



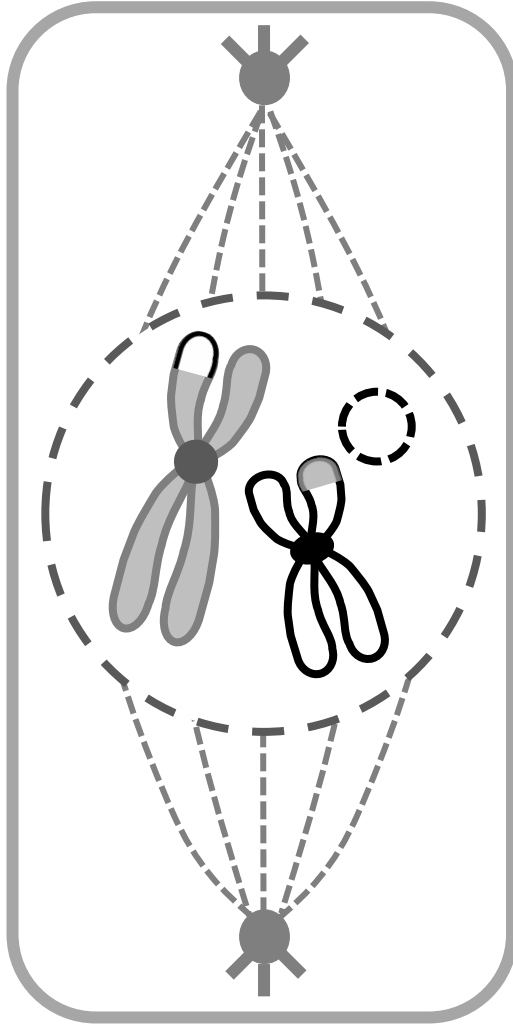
2

4

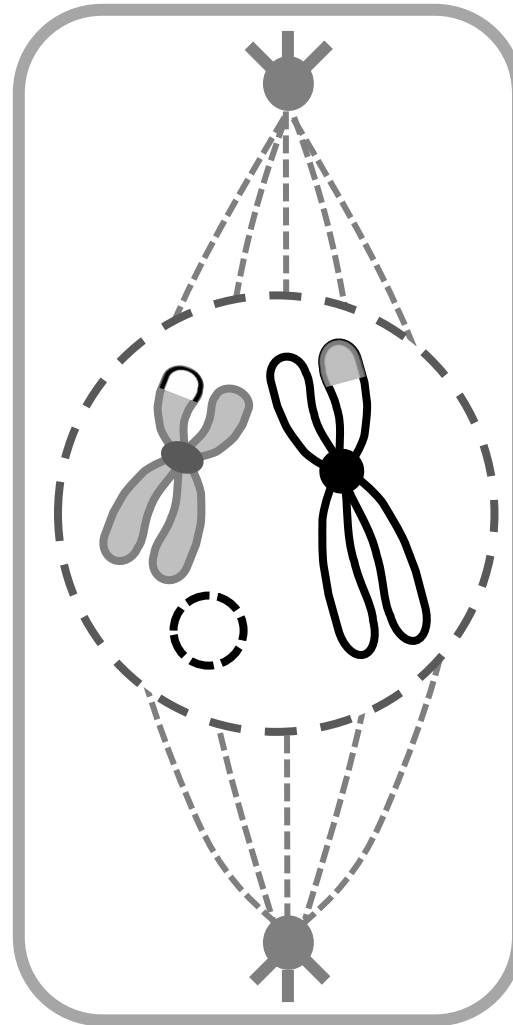


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PROFASE II



SEL 1

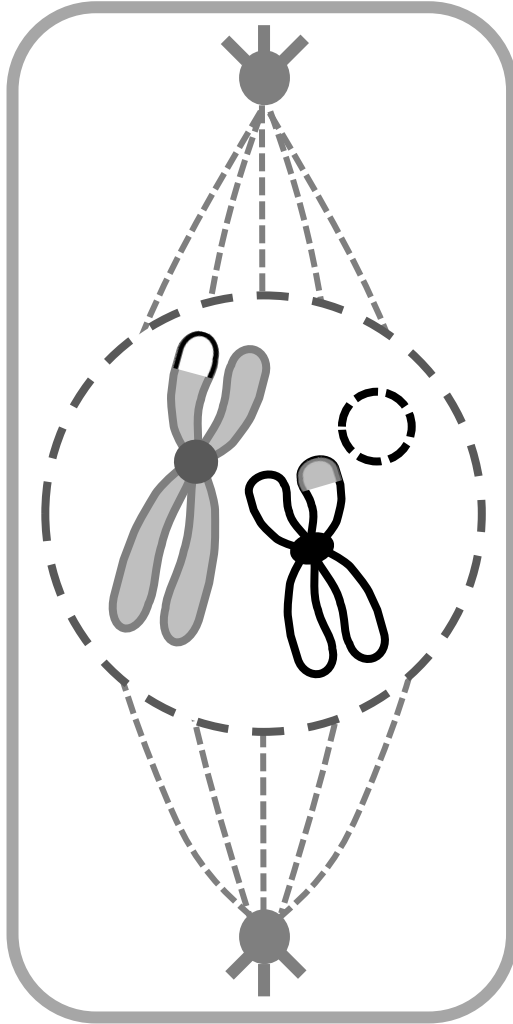


SEL 2

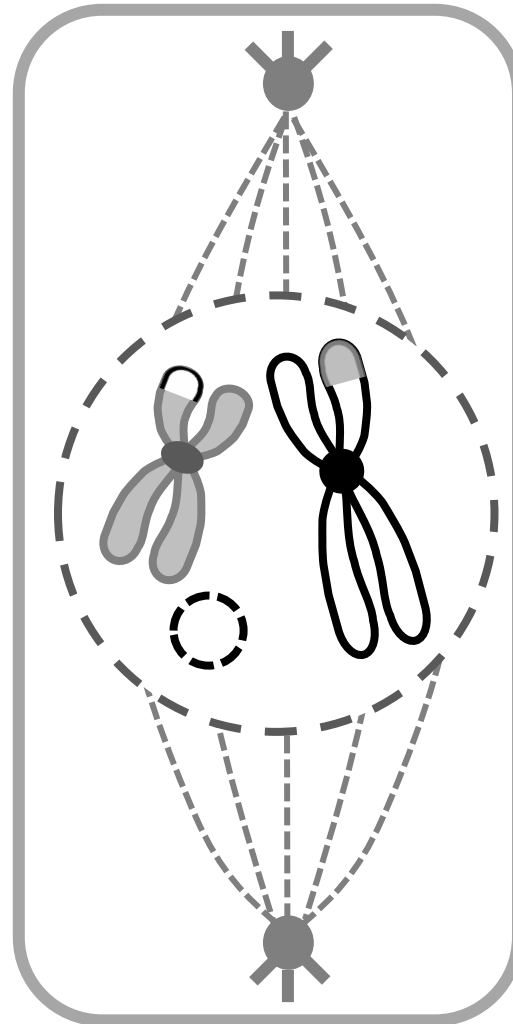
Hoeveel
chromosome sal
teenwoordig wees
in elkeen van die
dogterselle wat
aan die einde van
meiose II deur
SEL 1 geproduseer
word?



PROFASE II



SEL 1



SEL 2

2

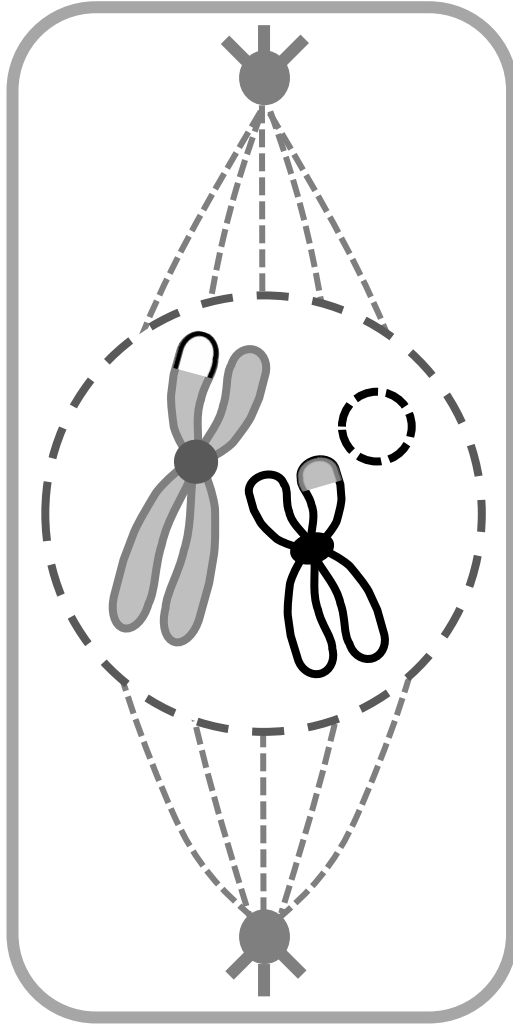
Teken 'n gameet
wat deur SEL 2
geproduseer sal
word.



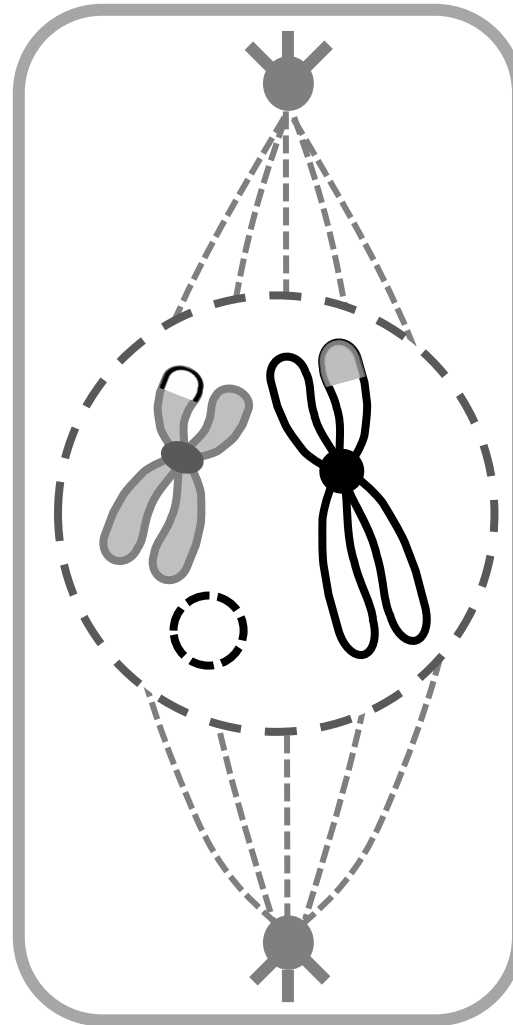
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PROFASE II – Teken 'n gameet wat uit SEL 2 geproduseer sal word

Visualiseer die volgende paar fases:



SEL 1



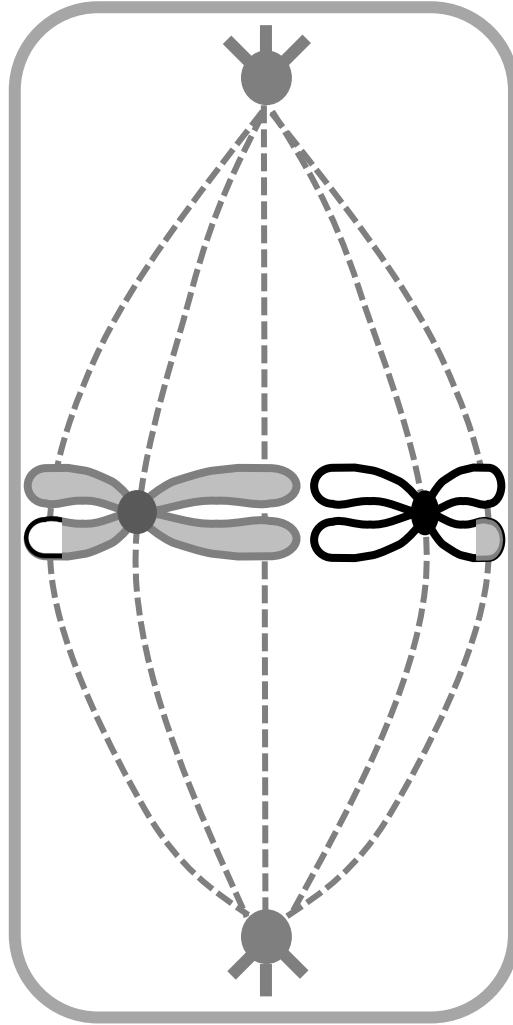
SEL 2



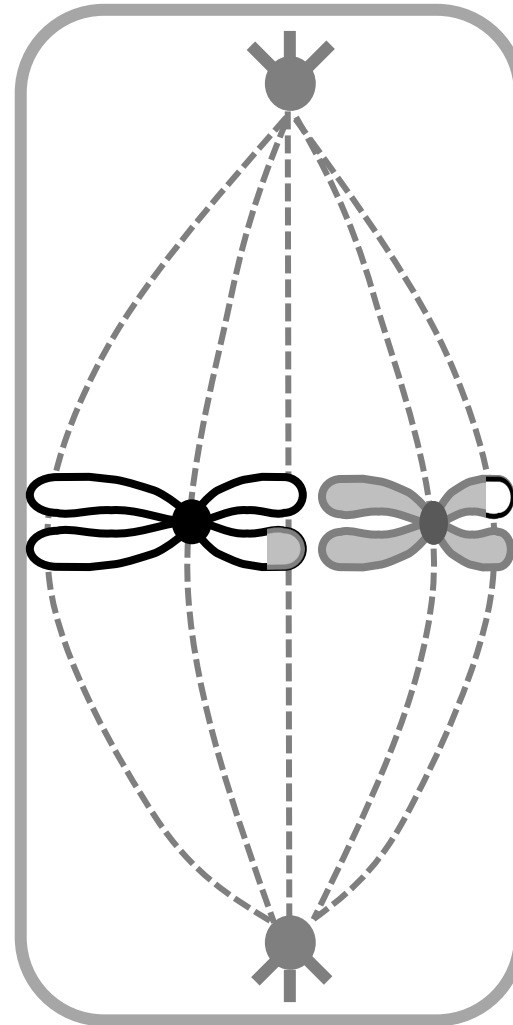
PROFASE II – Teken 'n gameet wat uit SEL 2 geproduseer sal word

Visualiseer die volgende paar fases:

METAFASE II



SEL 1



SEL 2

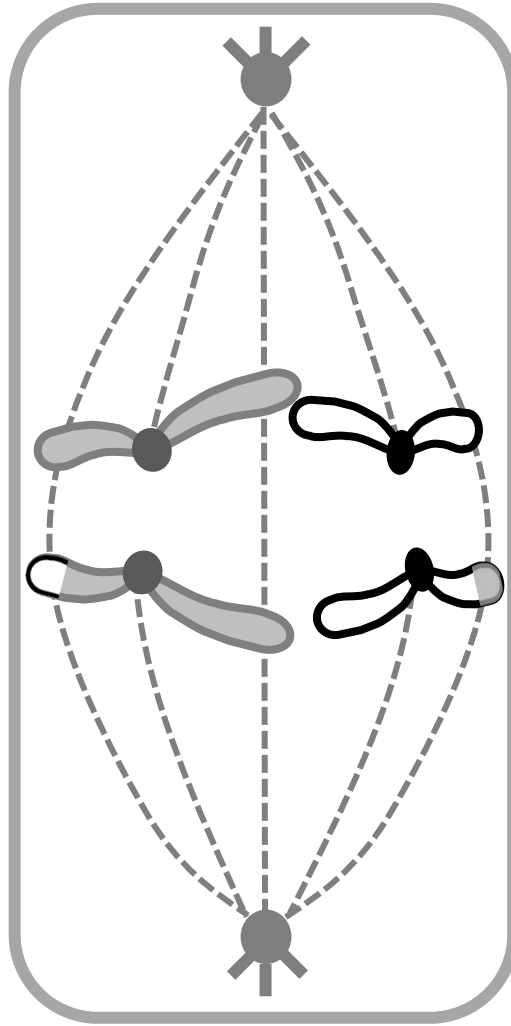


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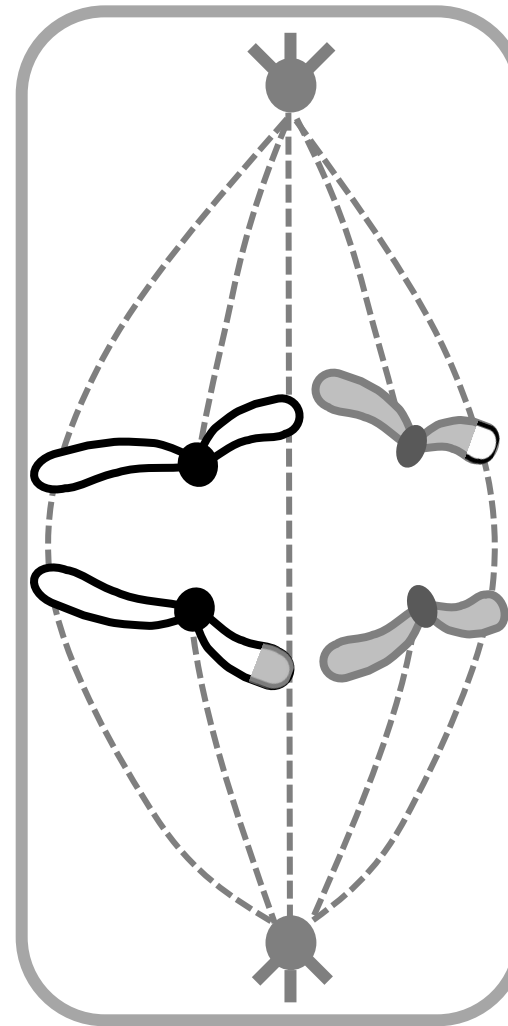
PROFASE II – Teken 'n gameet wat uit SEL 2 geproduseer sal word

Visualiseer die volgende paar fases:

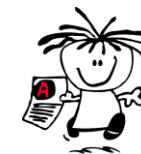
ANAFASE II
(begin)



SEL 1



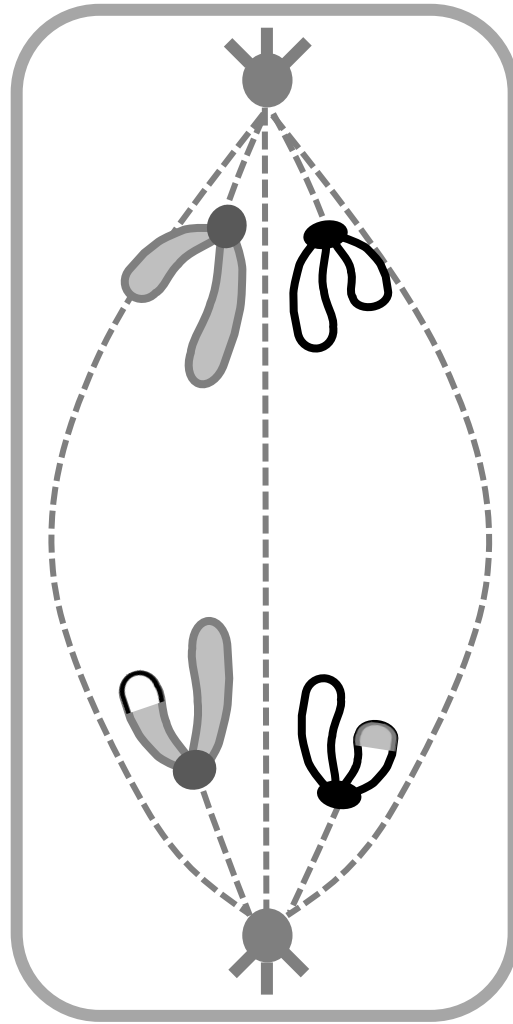
SEL 2



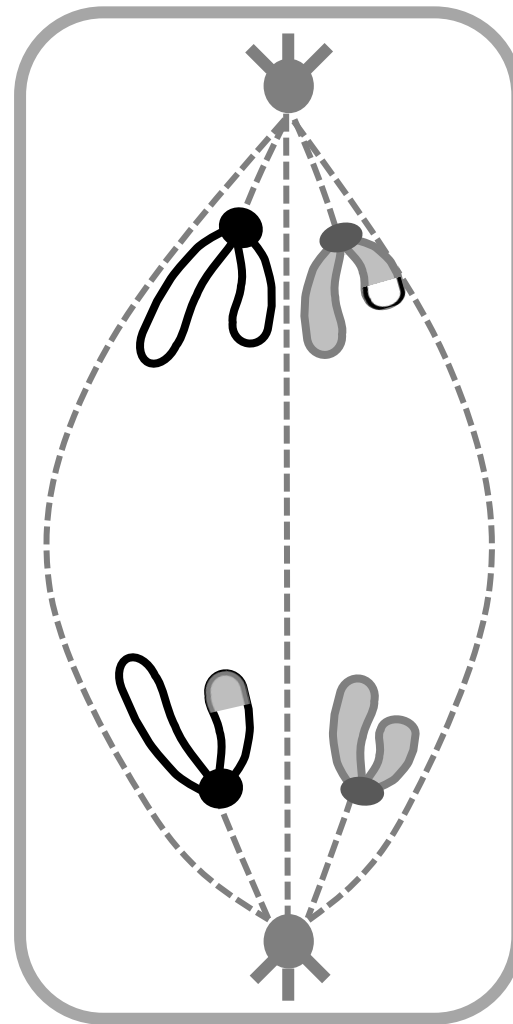
PROFASE II – Teken 'n gameet wat uit SEL 2 geproduseer sal word

Visualiseer die volgende paar fases:

ANAFASE II
(einde)



SEL 1



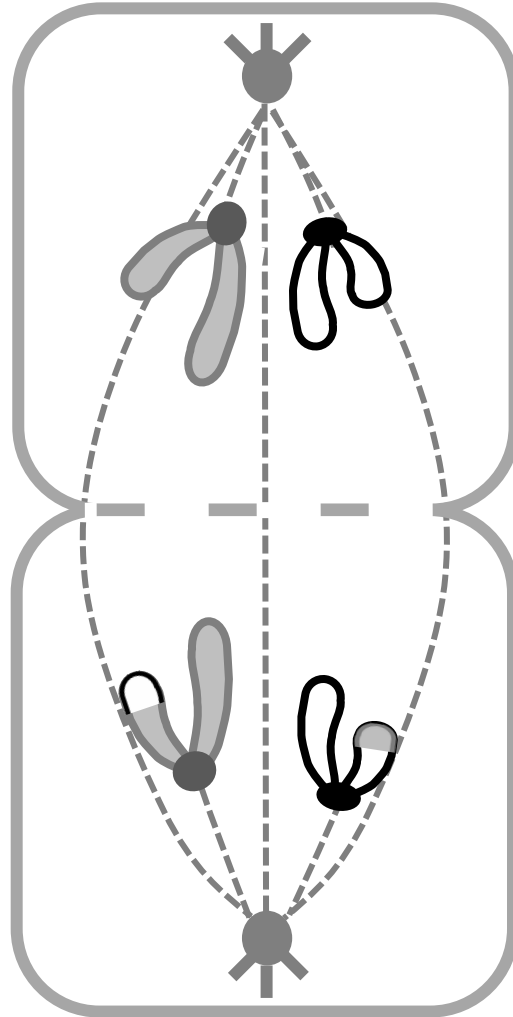
SEL 2



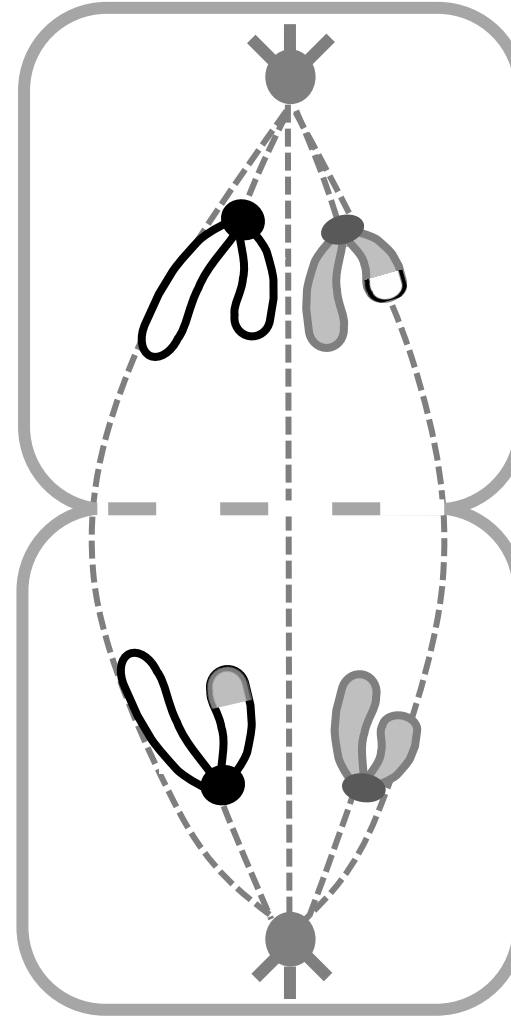
PROFASE II – Teken 'n gameet wat uit SEL 2 geproduseer sal word

Visualiseer die volgende paar fases:

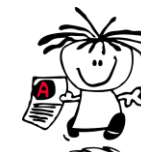
TELOFASE II
(begin)



SEL 1



SEL 2

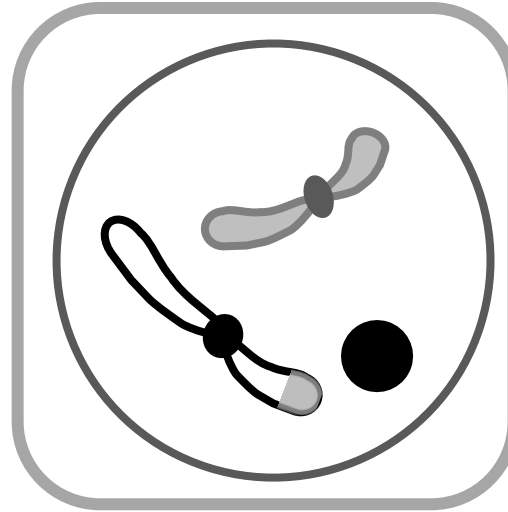
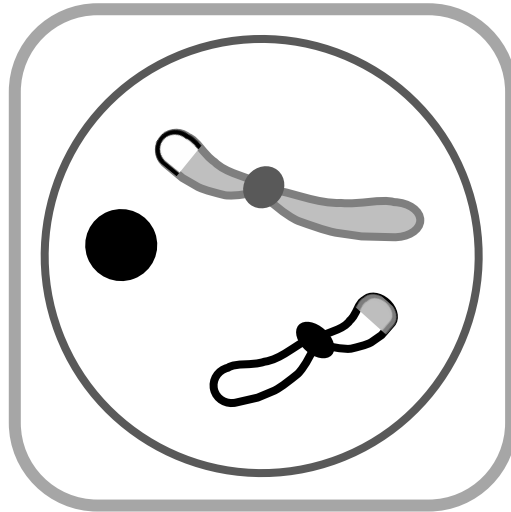
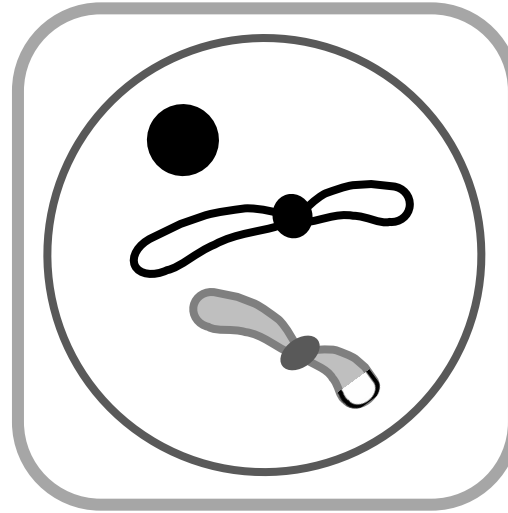
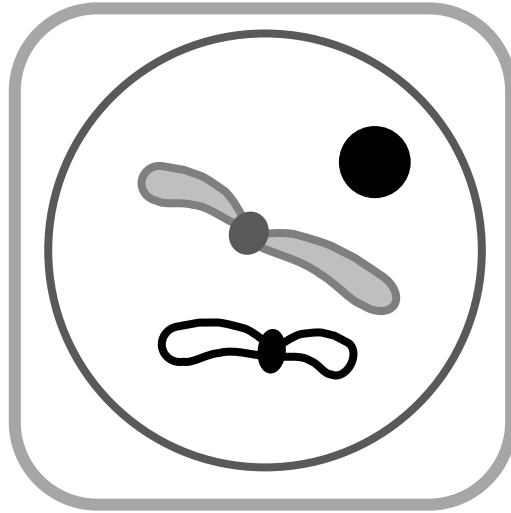


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PROFASE II – Teken 'n gameet wat uit SEL 2 geproduseer sal word

Visualiseer die volgende paar fases:

TELOFASE II
(einde)



SEL 1

SEL 2



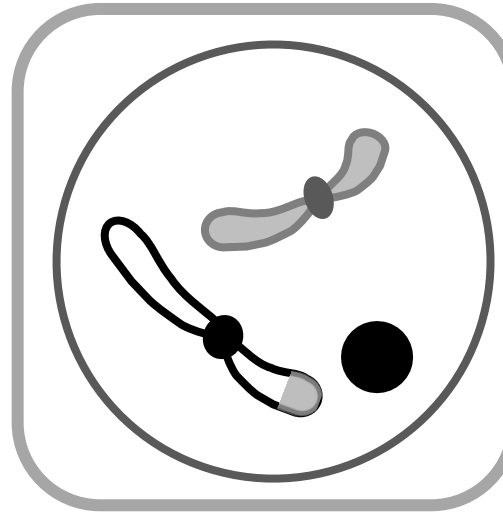
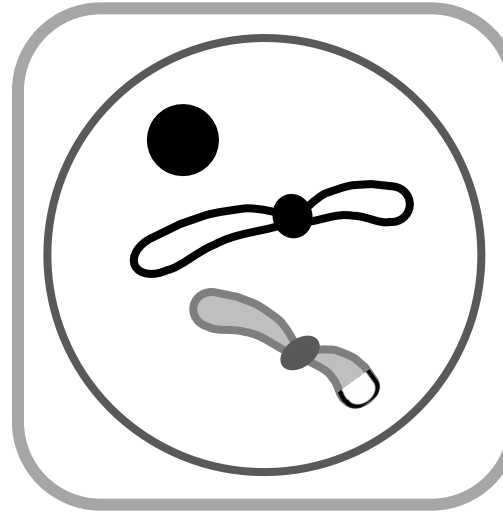
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TELOFASE II – Teken 'n gameet wat uit SEL 2 geproduseer sal word

- ✓ Een sel is geteken
- ✓ Slegs 2 ongerepliseerde chromosome teenwoordig
- ✓ Kort ongerepliseerde chromosoom met witsegment in korrekte posisie
- ✓ Lang ongerepliseerde chromosoom heeltemal wit

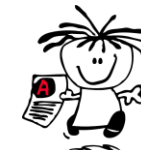
OF

- ✓ Een sel is geteken
- ✓ Slegs 2 ongerepliseerde chromosome teenwoordig
- ✓ Kort ongerepliseerde chromosoom heeltemal grys
- ✓ Lang ongerepliseerde chromosoom met gryssegment in korrekte posisie



SEL 2

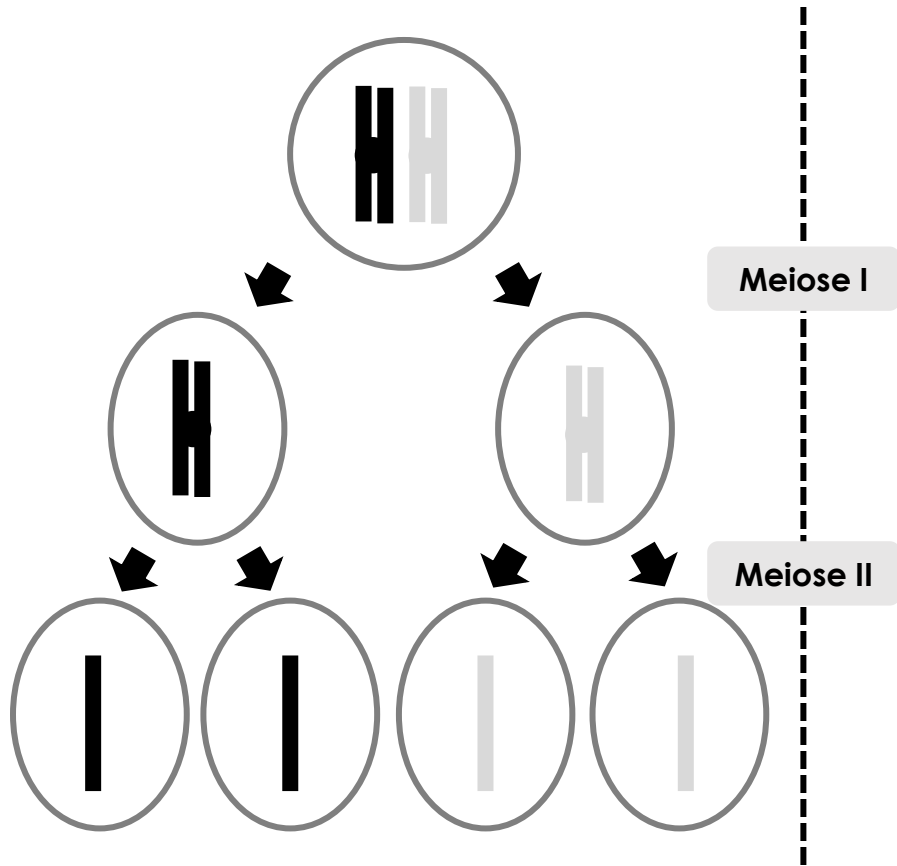
**Let wel: Daar is twee moontlike gamete – teken enige EEN*



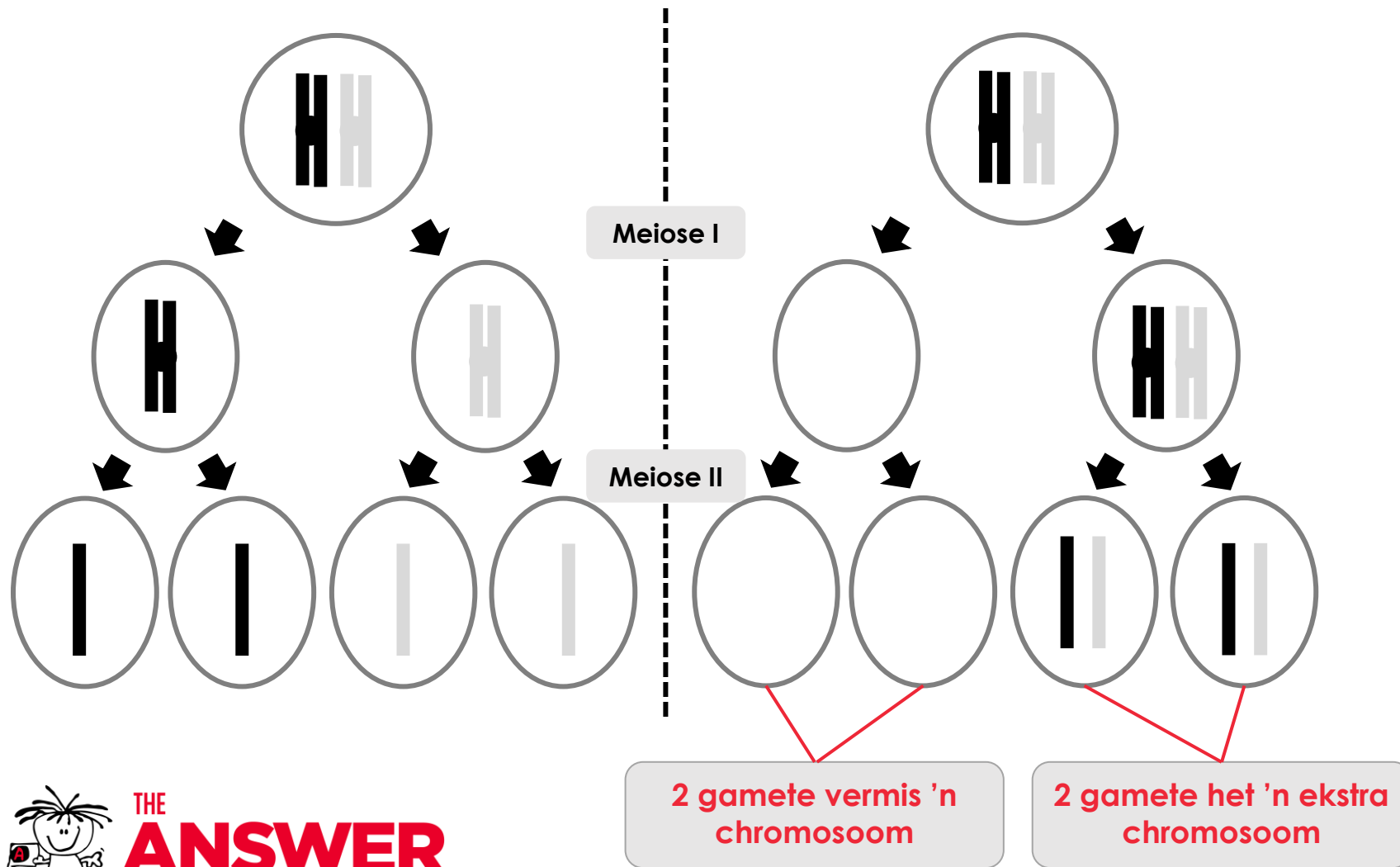
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ABNORMALE MEIOSE

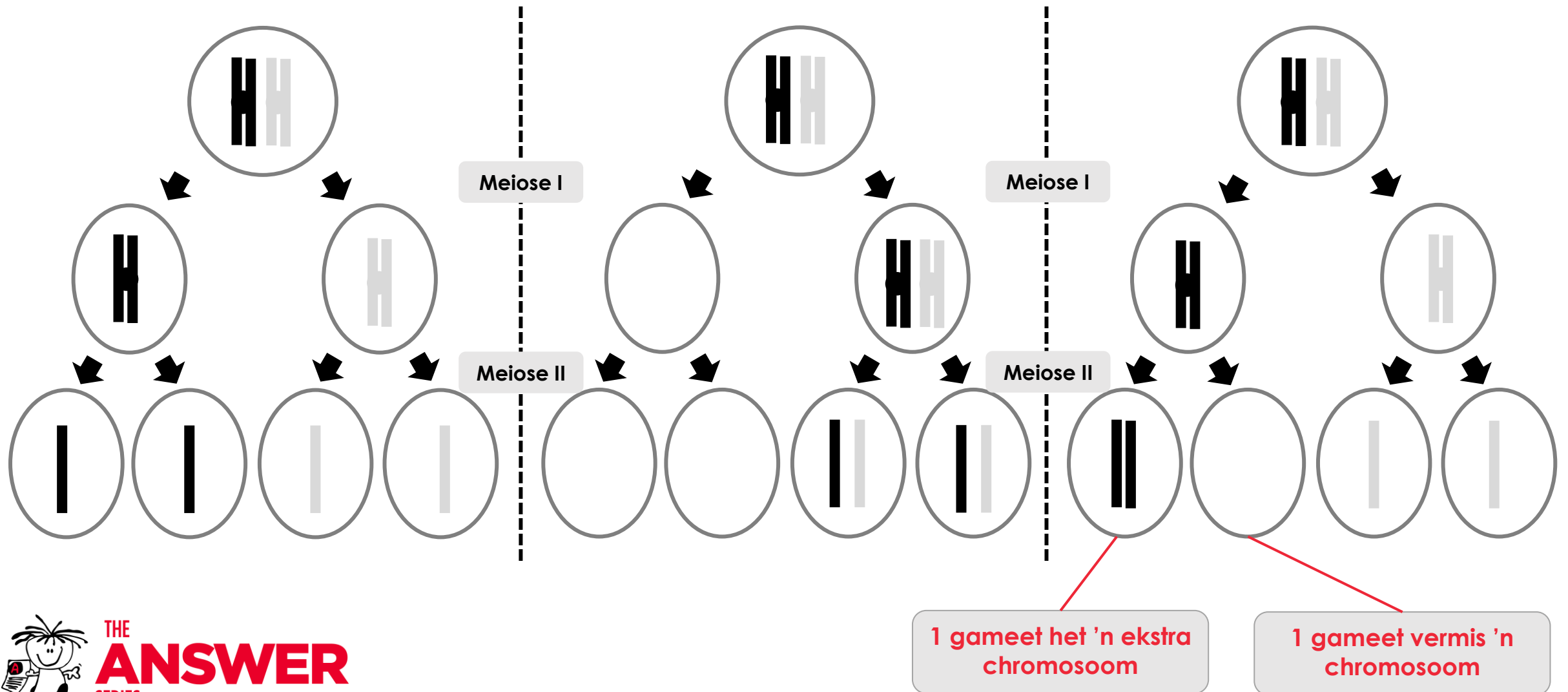
Normale disjunksie gedurende meiose word getoon.



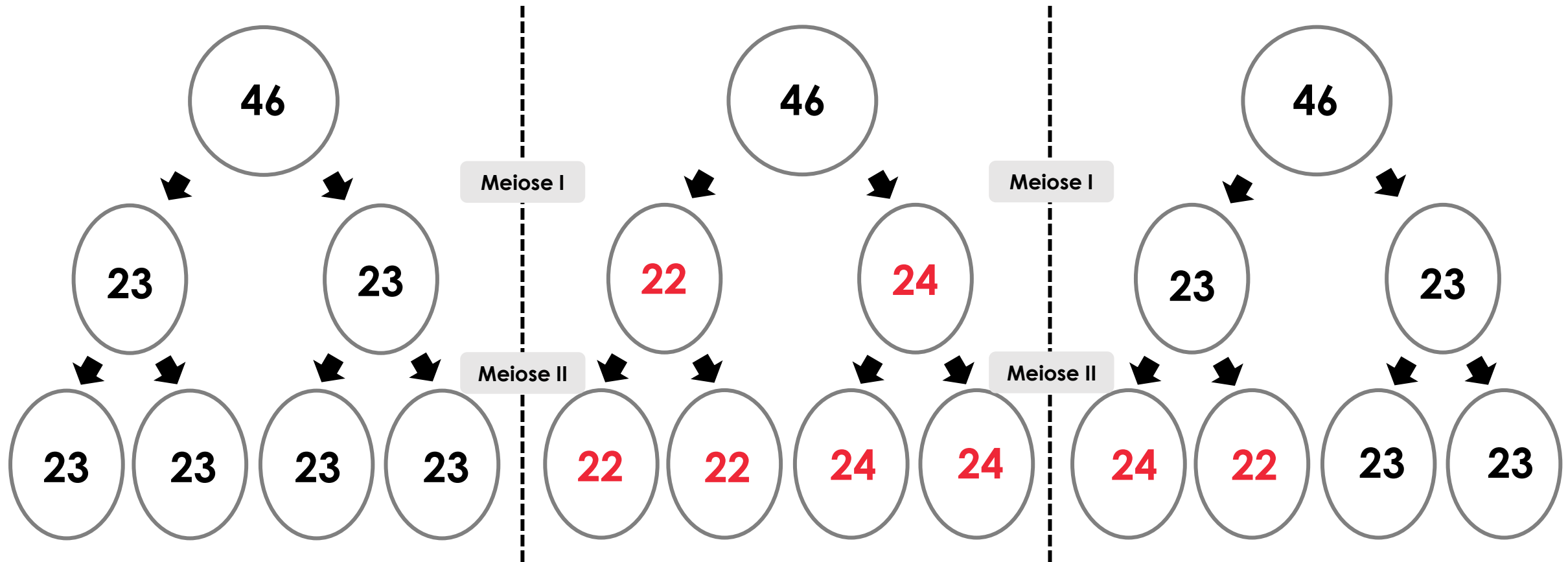
Wat gebeur indien **nie-disjunksie** tydent **meiose I** plaasvind?



Wat gebeur indien **nie-disjunksie** tydent **meiose II** plaasvind?



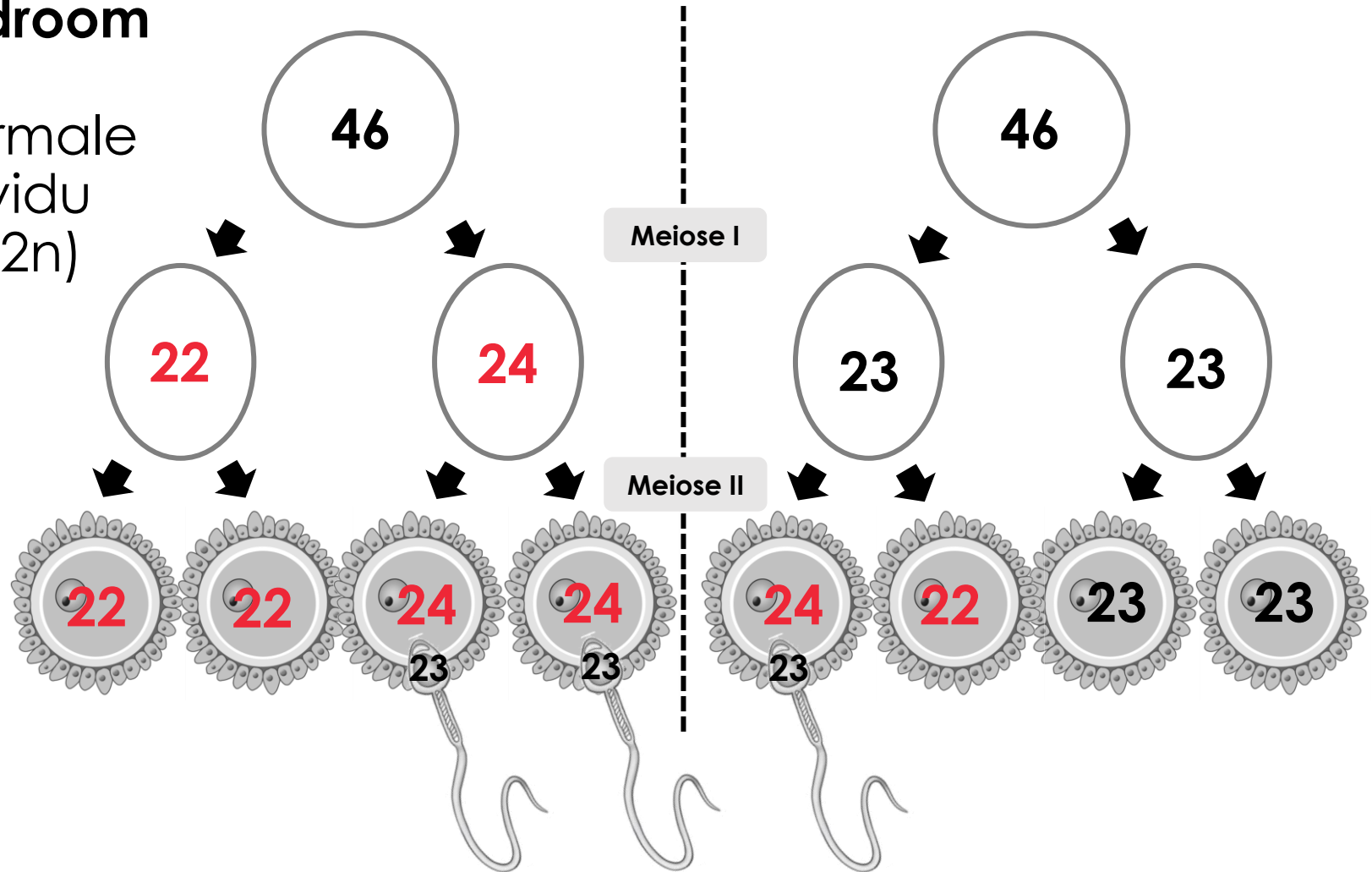
Nie-disjunksie veroorsaak **chromosoommutasies** – 'n verandering in die struktuur of **aantal chromosome** in 'n sel.



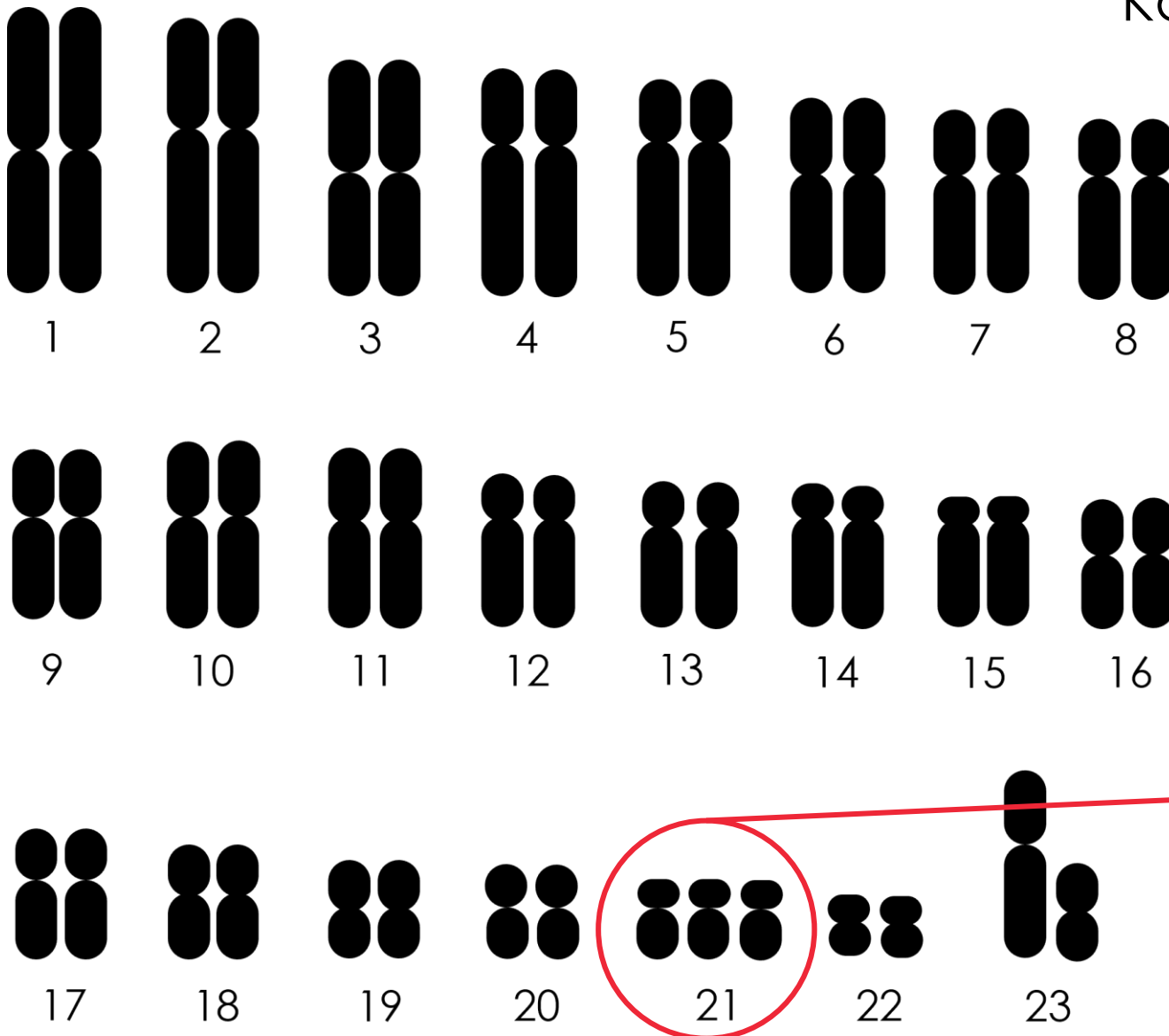
Nie-disjunksie van sekere chromosome lei tot spesifieke **genetiese afwykings**, bv.

- nie-disjunksie van **chromosoompaar 21**
- veroorsaak **Downsindroom**

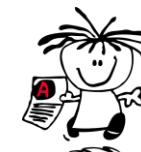
Bevrugting deur 'n normale spermsel lei tot 'n individu met **47 chromosome** ($2n$)



Kariotipe vir Downsindroom

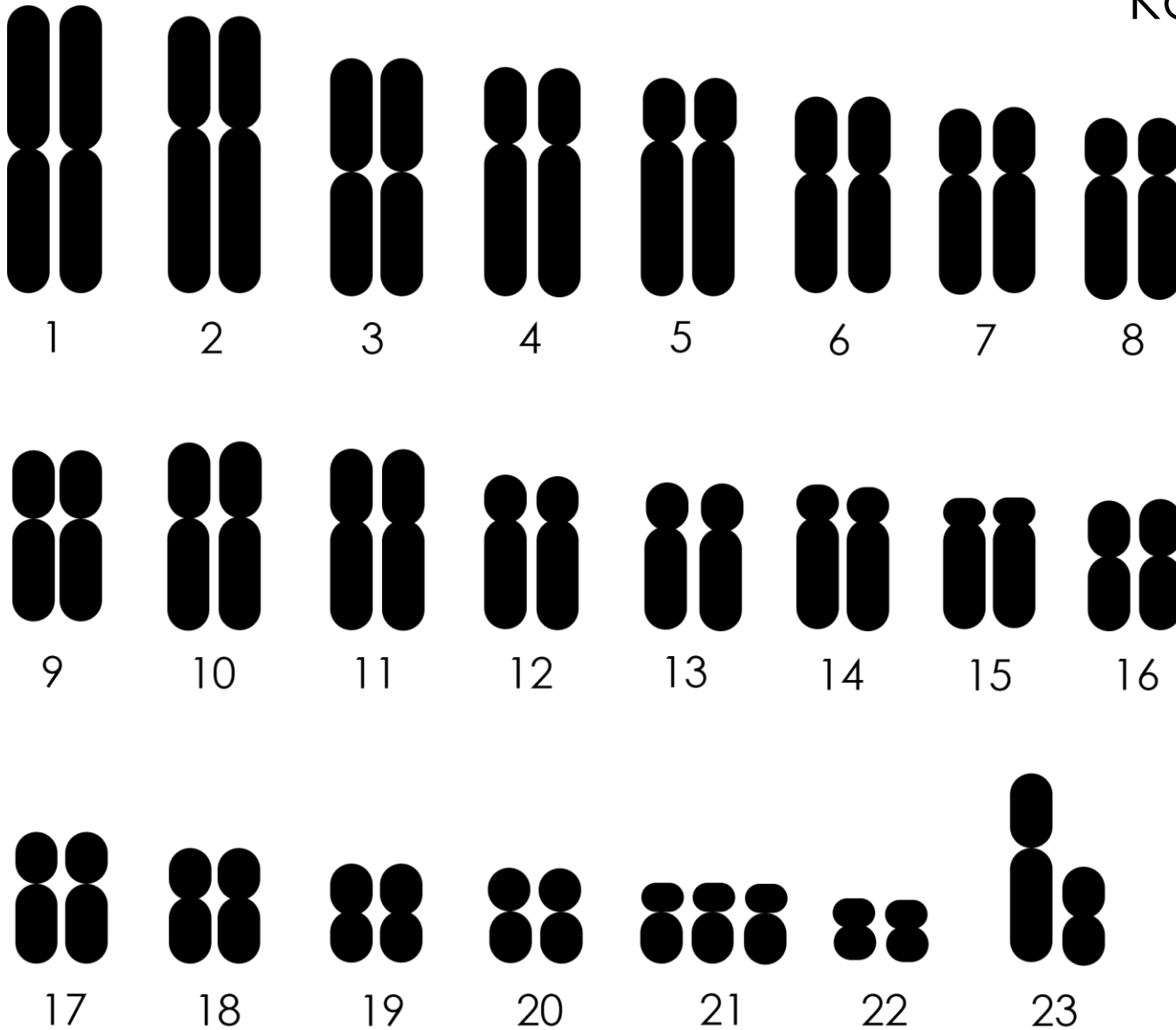


3 kopieë van
chromosoom 21

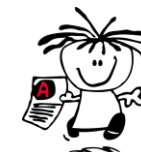


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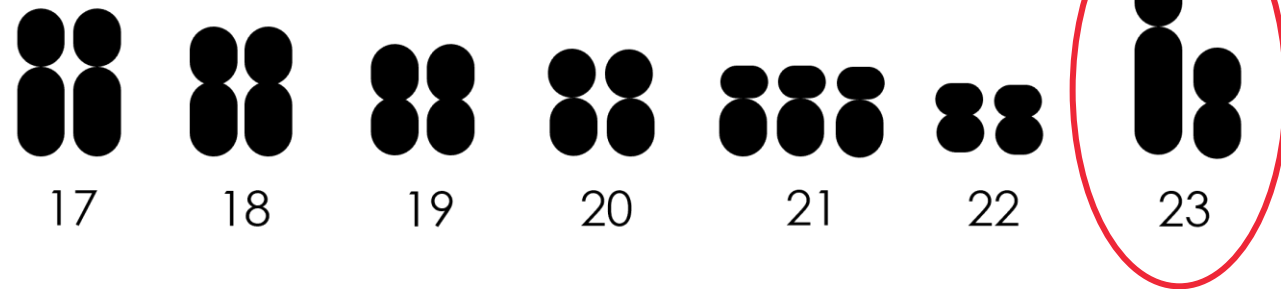
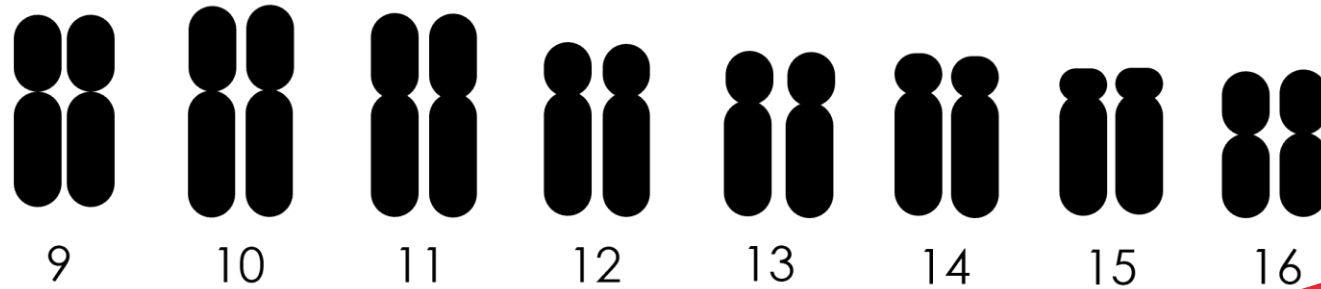
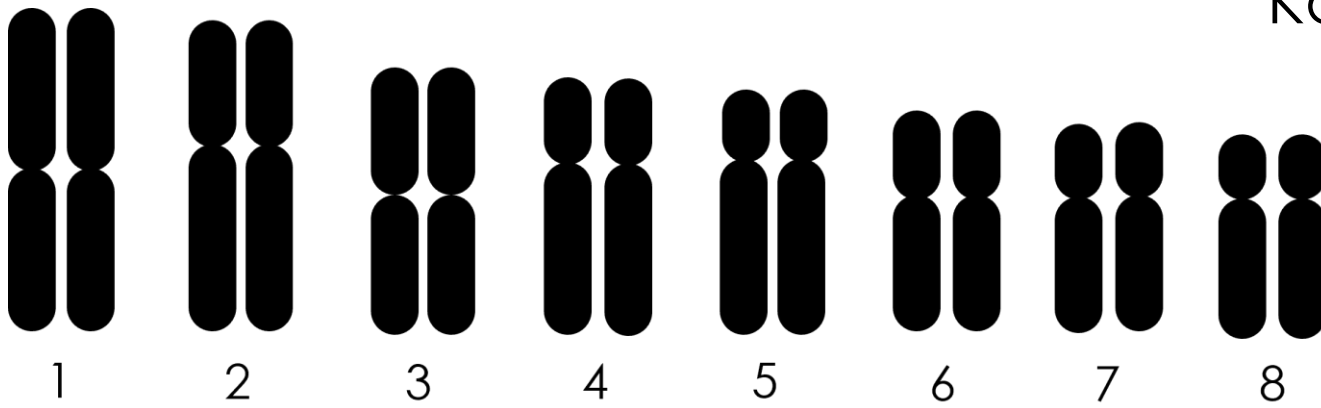
Kariotipe vir Downsindroom



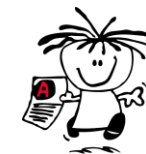
Is die individu met
Downsindroom 'n
man of vrou?



Kariotipe vir Downsindroom



man



EINDE