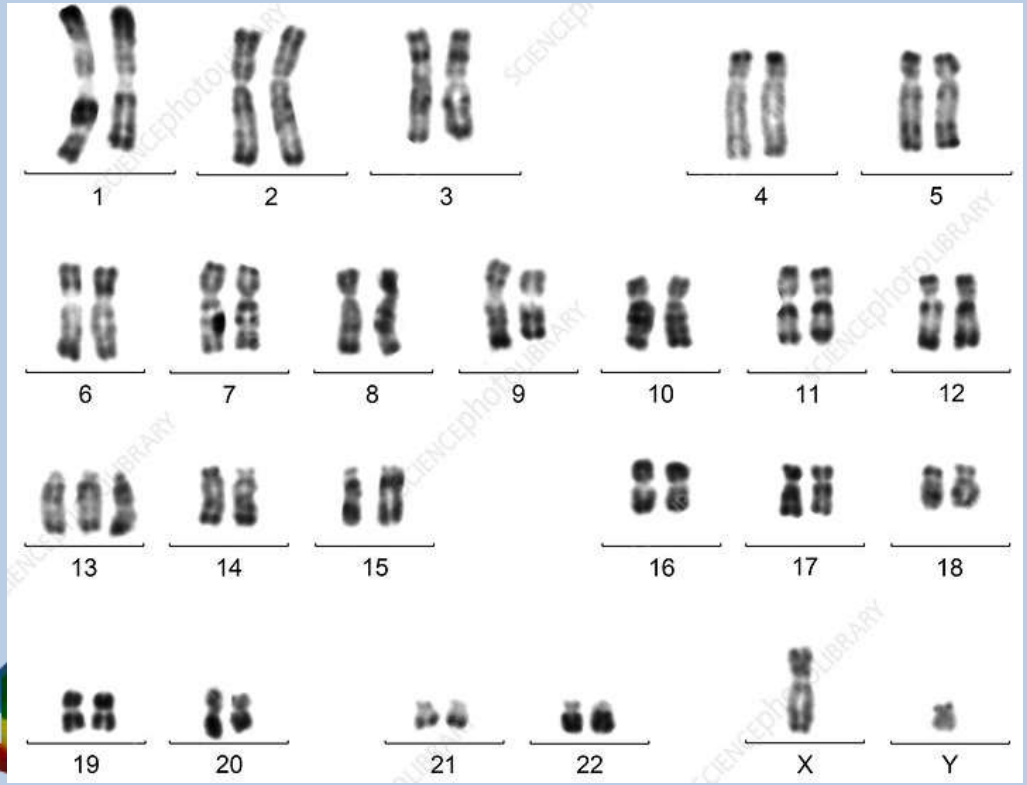
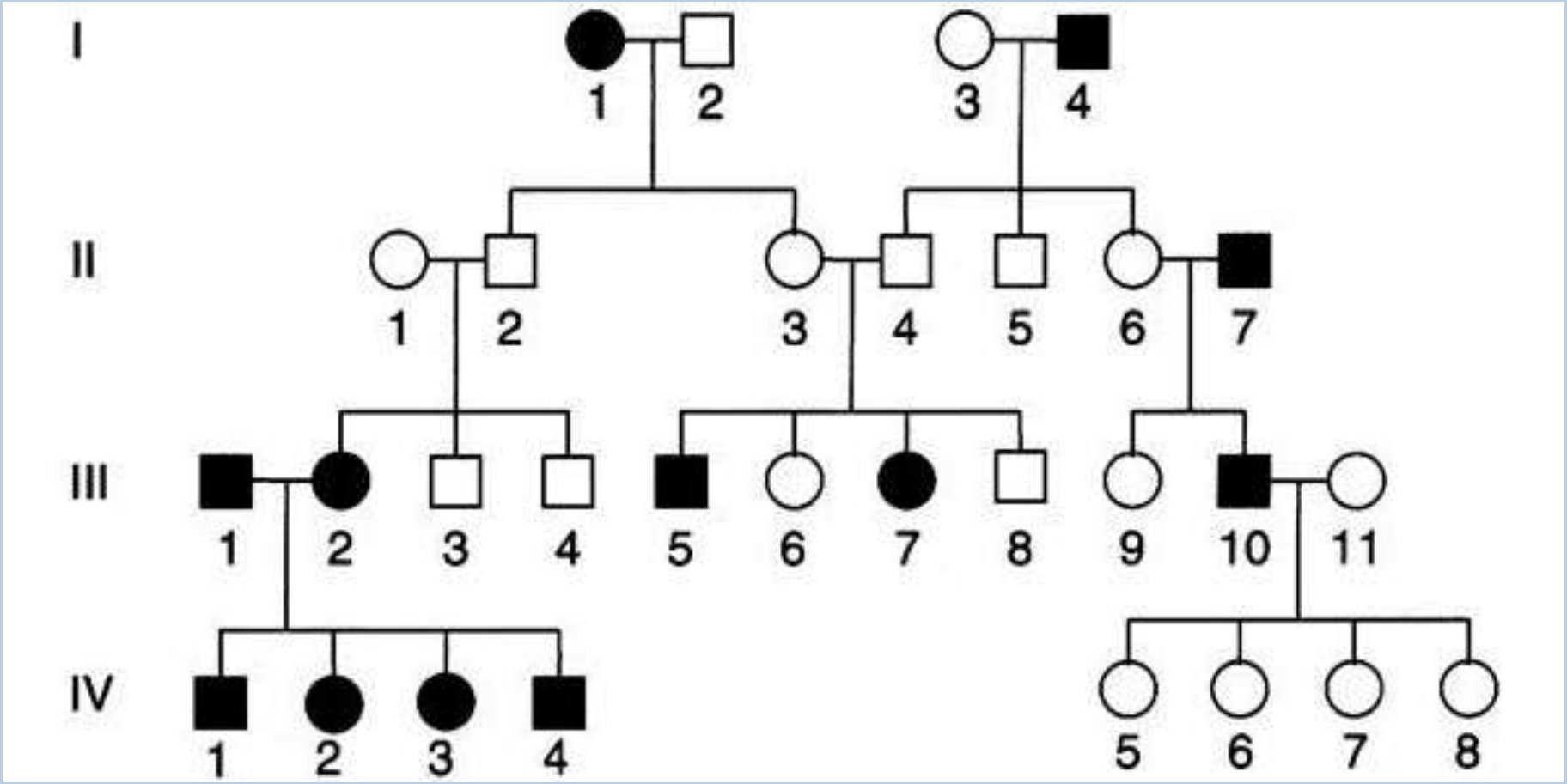
Tape “Diagnostics using Karyotypes on pg 63

1. What is nondisjunction?
2. What pattern of inheritance does the pedigree show?
3. Diagnose this patient:



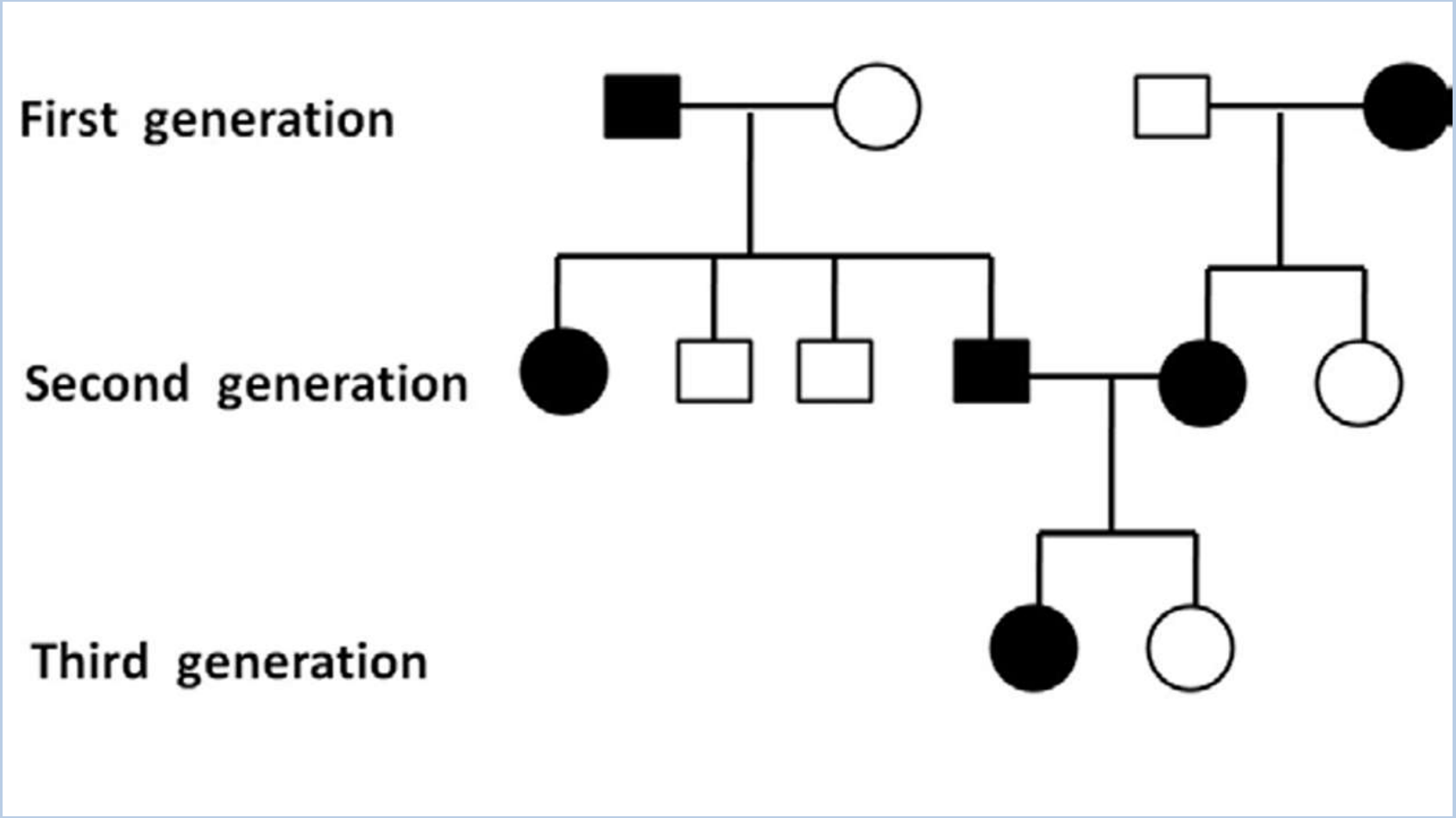
Deciphering Pedigrees



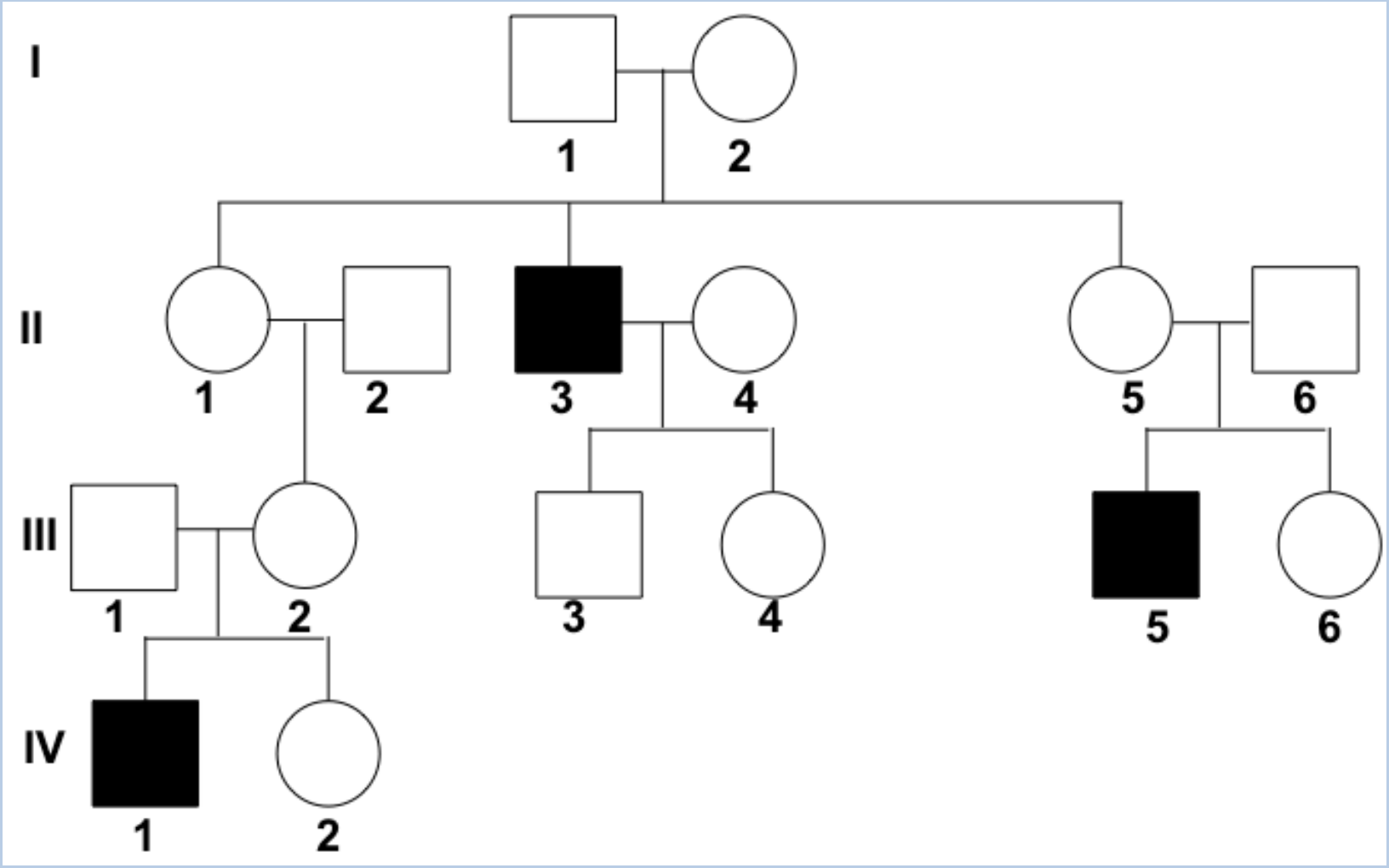
Deciphering Pedigrees

- Two general hints:
  - If the trait SKIPS a generation it is recessive
  - If the trait is close to EQUAL in males and females it is autosomal
    - You can also look for an affected male and observe his daughters

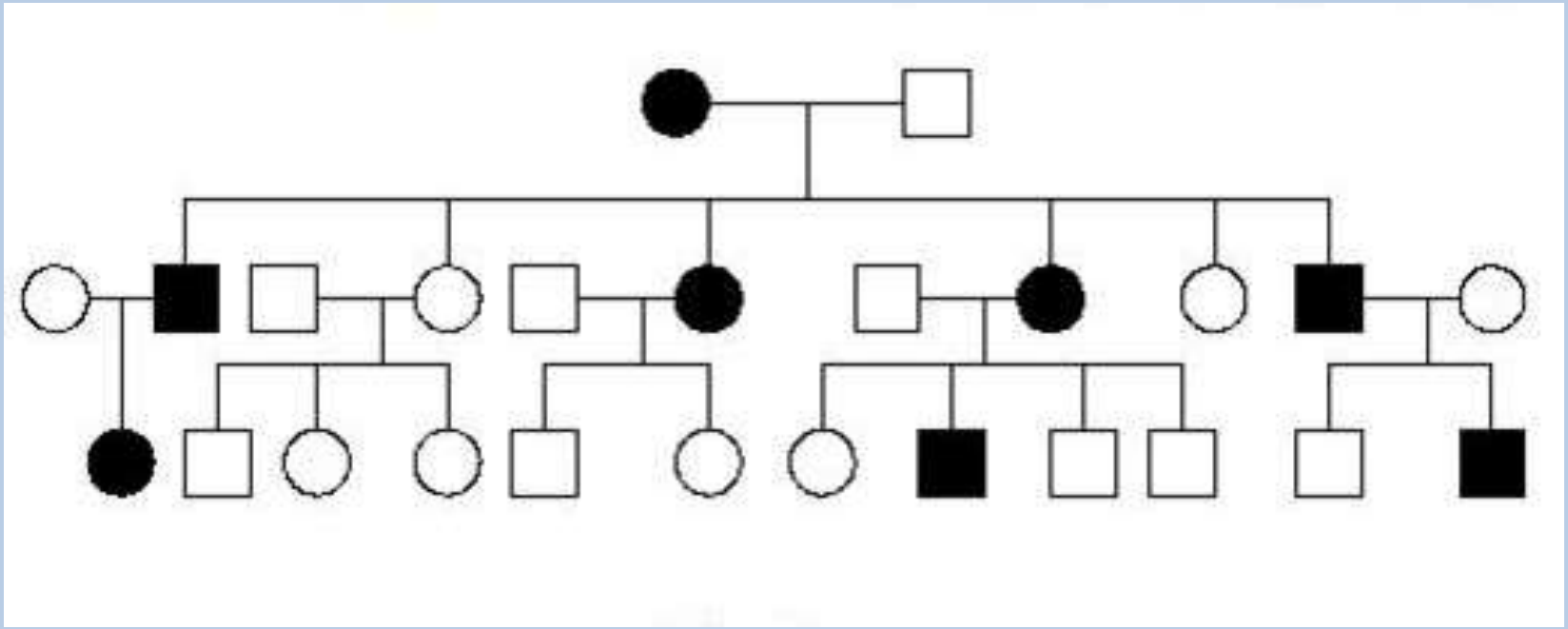
Deciphering Pedigrees



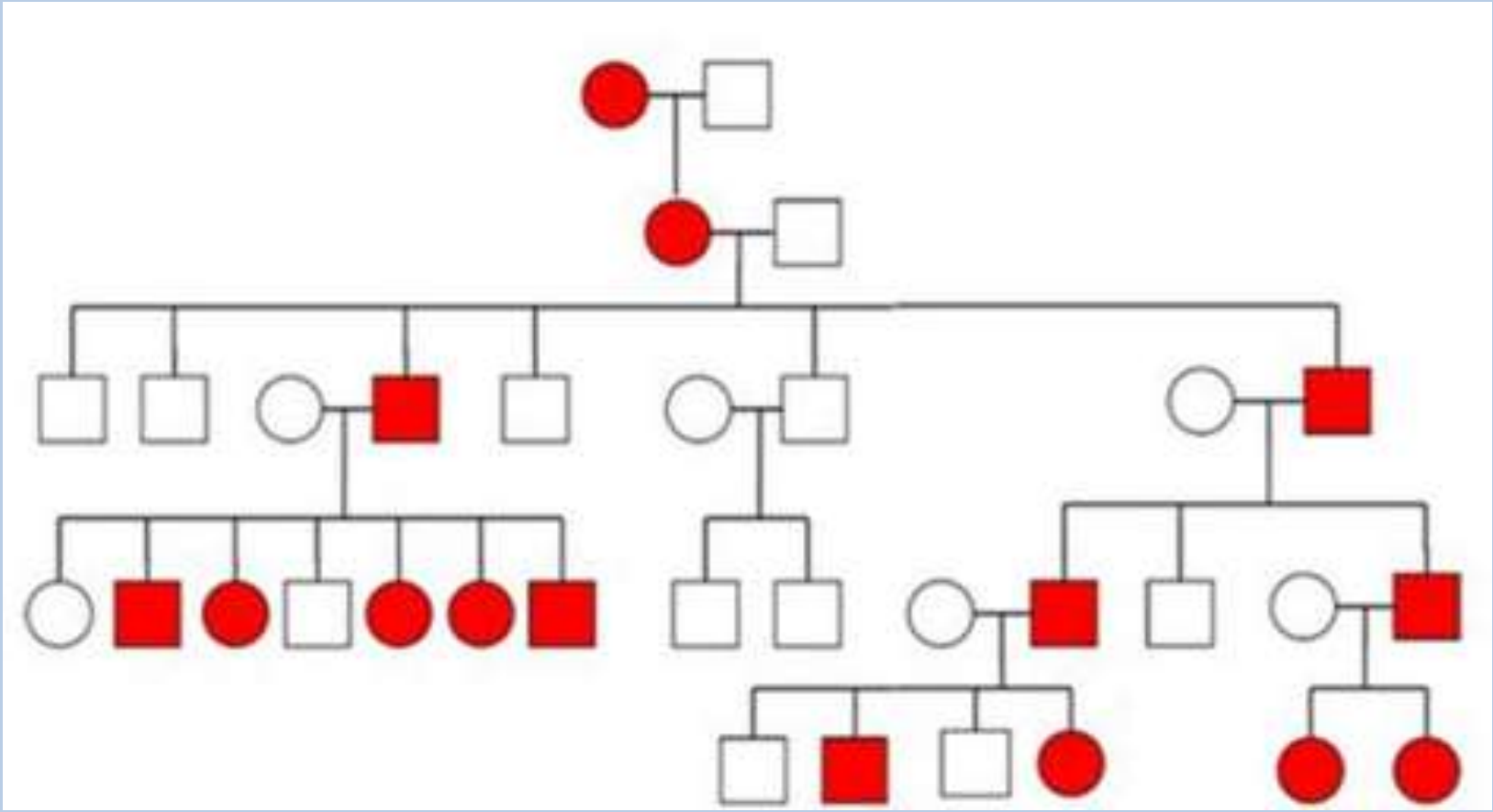
Deciphering Pedigrees



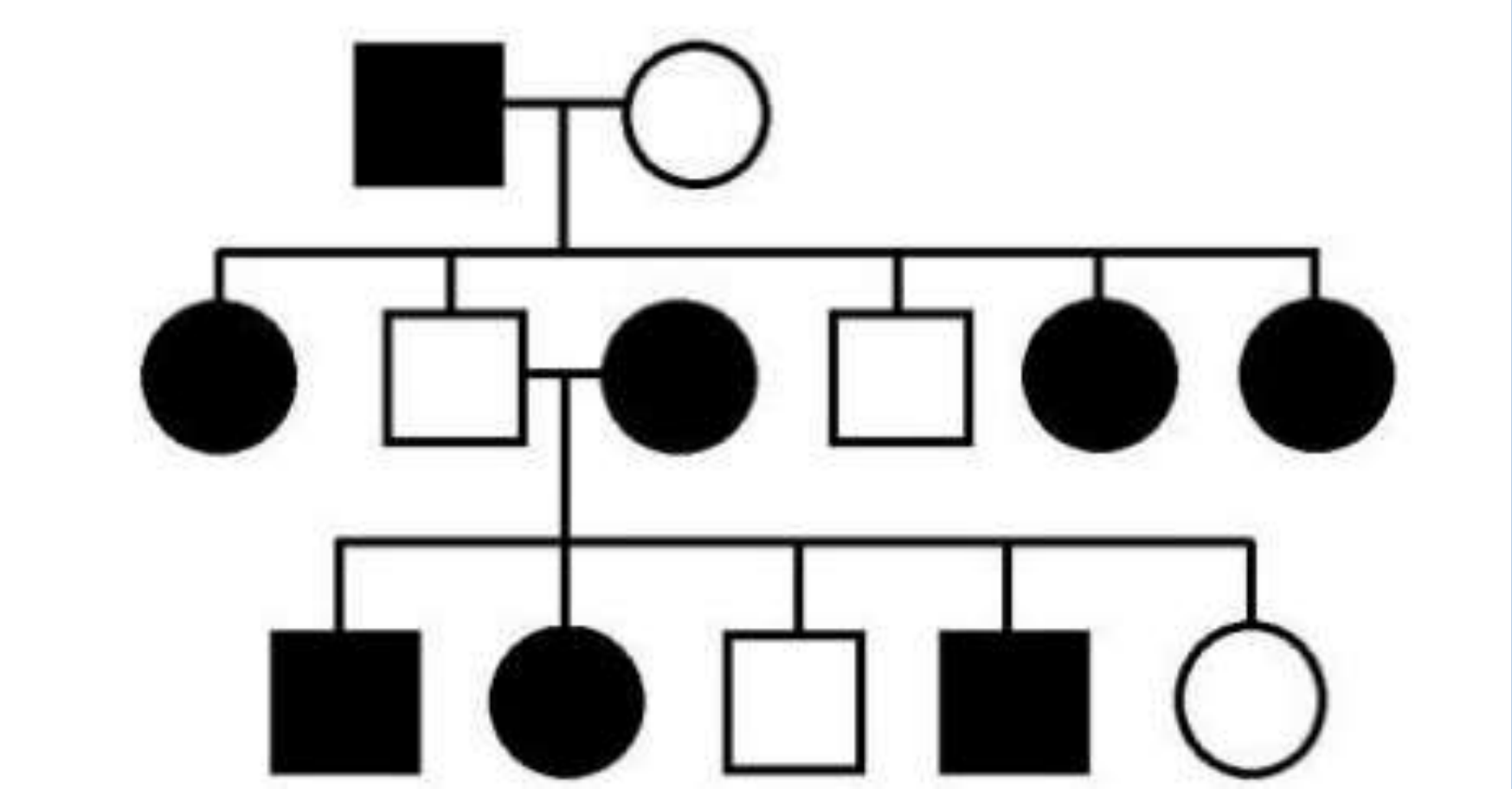
Deciphering Pedigrees



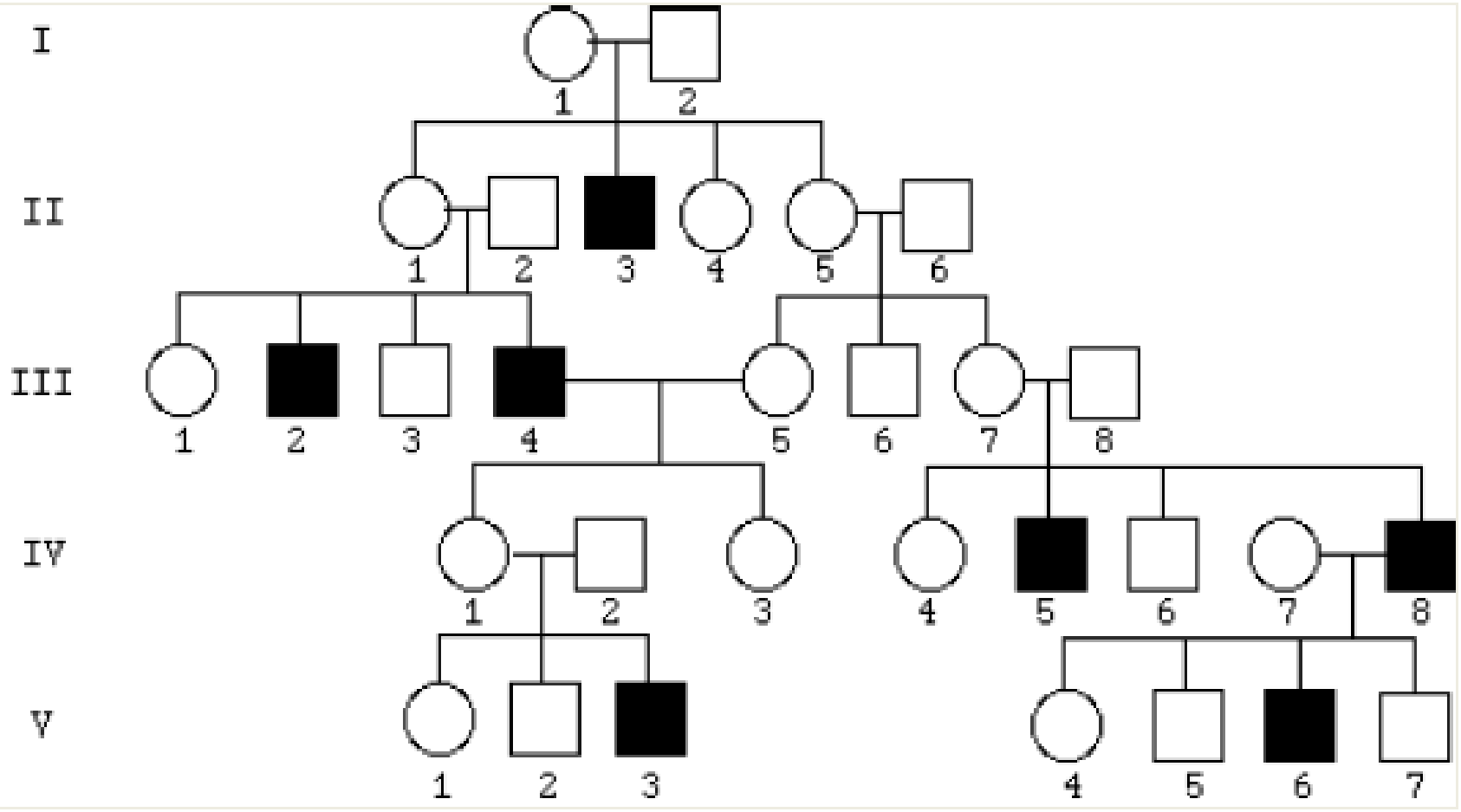
Deciphering Pedigrees



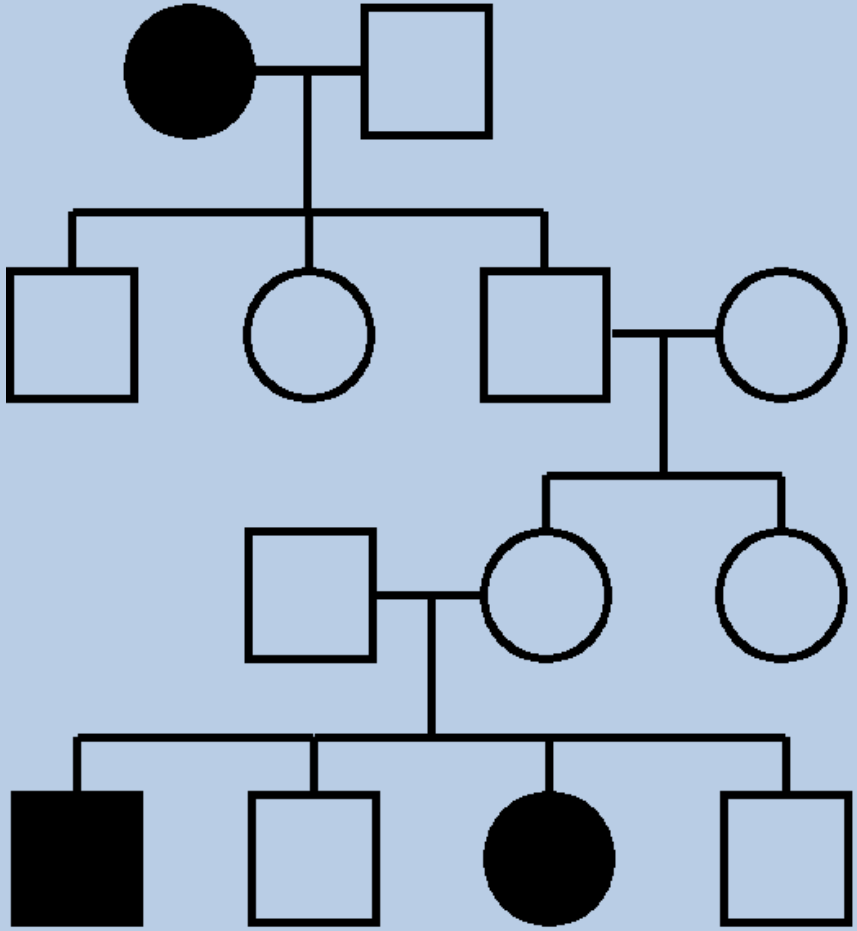
What is the pattern of inheritance?



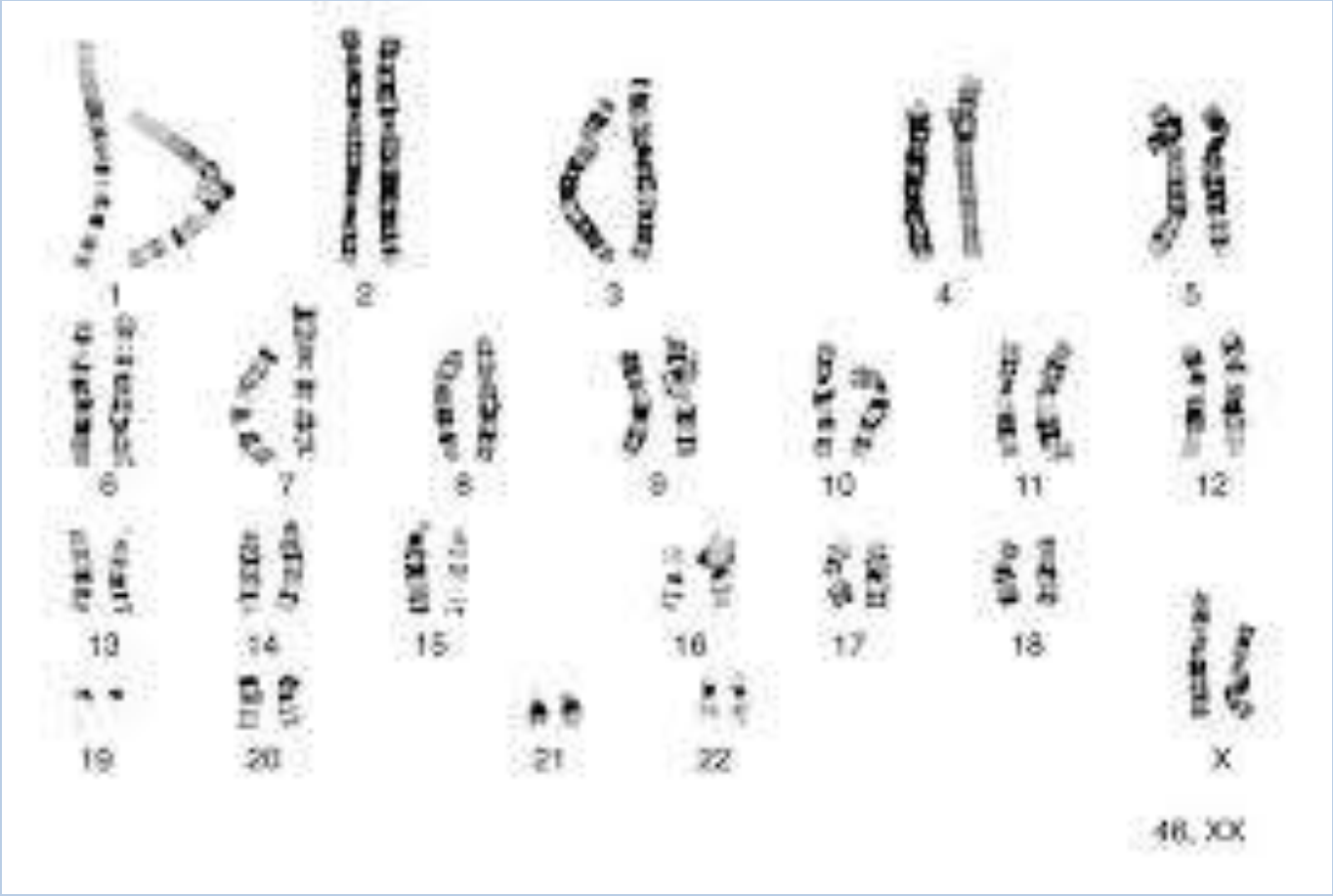
What is the pattern of inheritance?



What is the pattern of inheritance?



Get out Diagnostics Using Karyotypes (pg 63)



Diagnostics Using Karyotypes

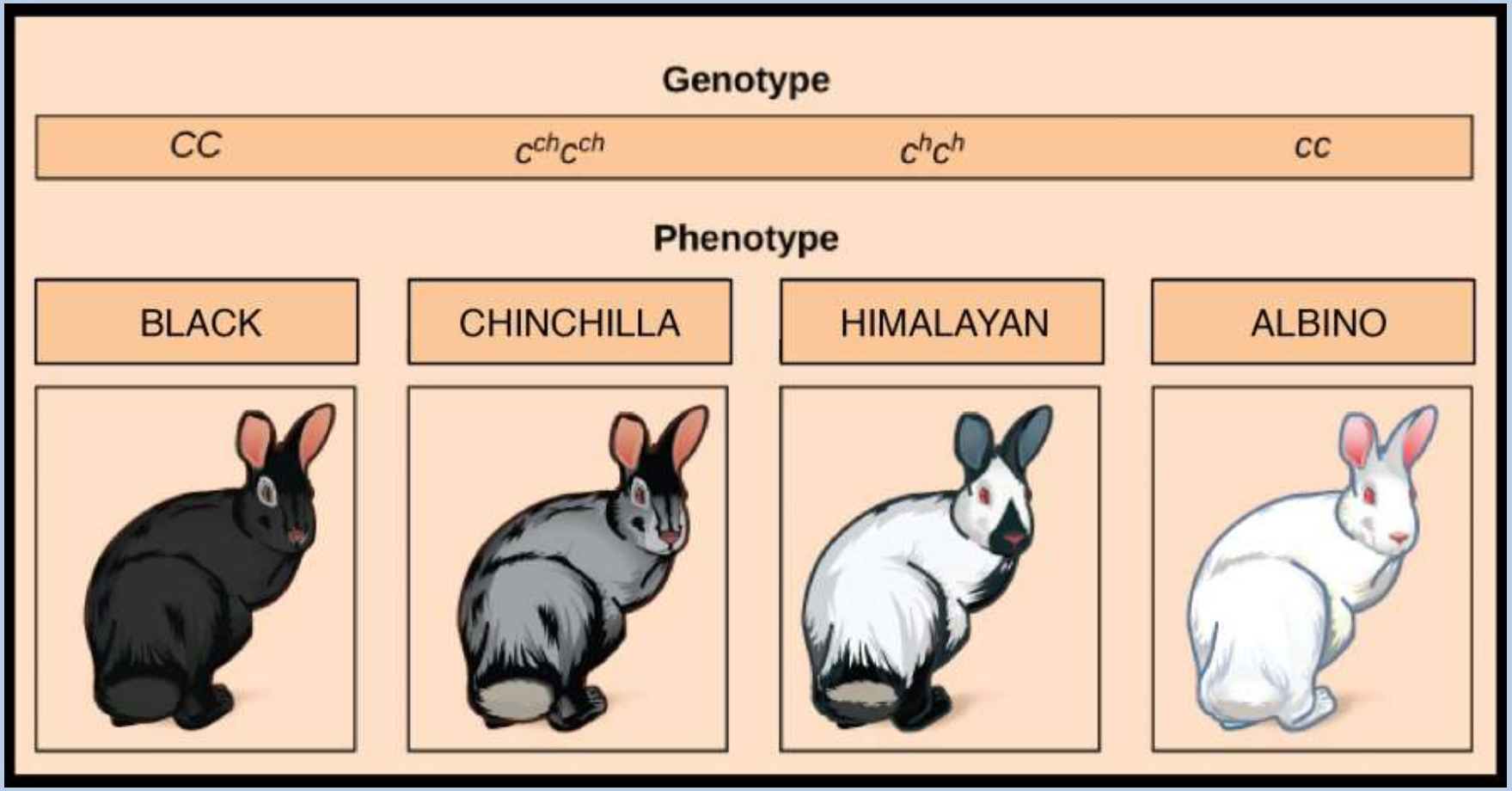
https://www.youtube.com/watch?v=5bAuUHVNvv4

Complex Inheritance – pg. 64

Environmental Effects

Environmental Effects

Multiple Alleles



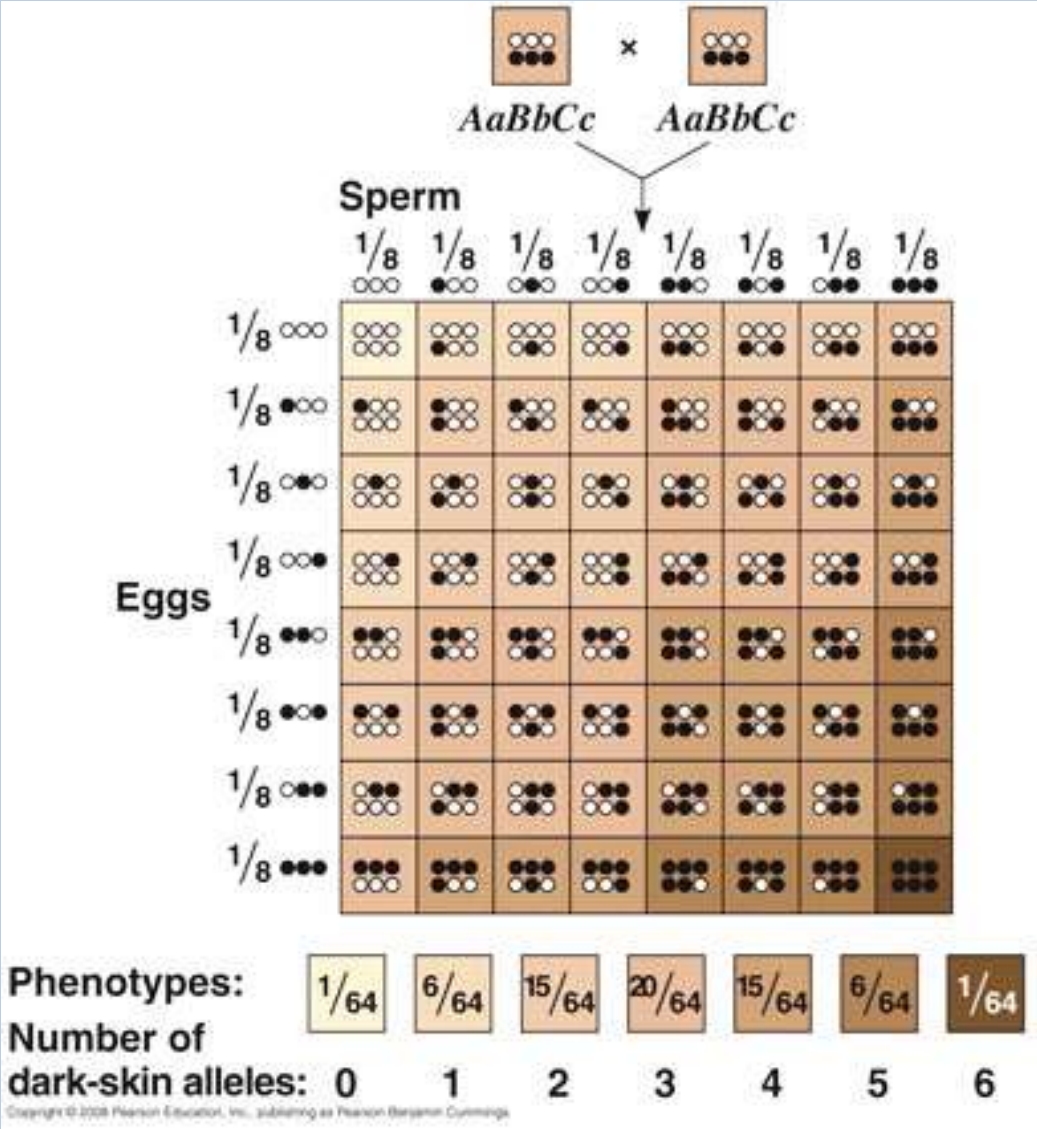
Polygenic Traits

Gene 1	d^1d^1	d^1D^1	d^1D^1	D^1D^1	D^1d^1	D^1d^1	D^1D^1
Gene 2	d^2d^2	d^2d^2	d^2D^2	D^2d^2	D^2d^2	D^2D^2	D^2D^2
Gene 3	d^3d^3	d^3d^3	d^3d^3	d^3d^3	D^3D^3	D^3D^3	D^3D^3
Total number of dark-skin genes	0	1	2	3	4	5	6
	Very light			Medium			Very dark
# of light "d" alleles	6	5	4	3	2	1	0
# of dark "D" alleles	0	1	2	3	4	5	6

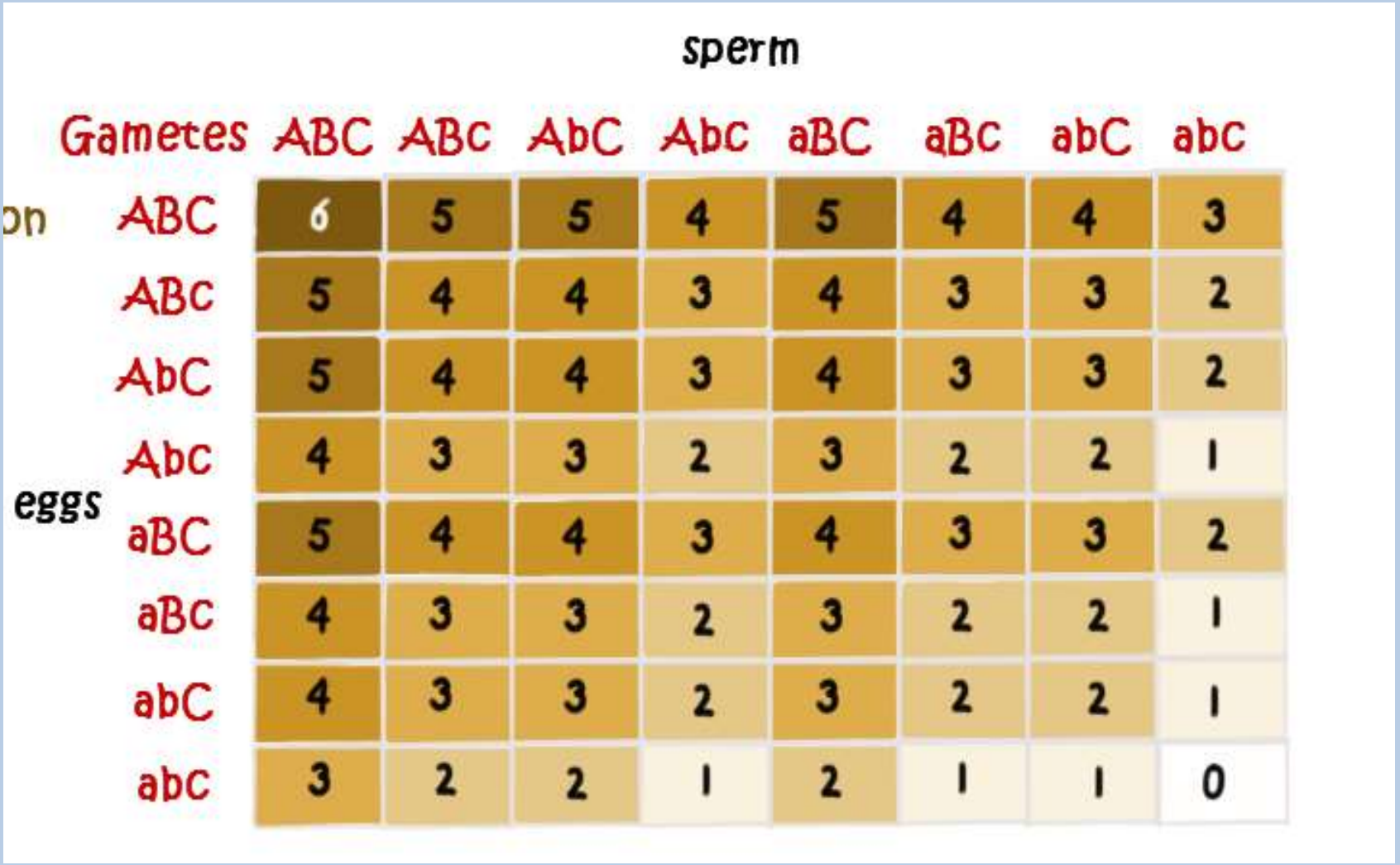
FIGURE 10.7 Polygenic Inheritance

Skin color in humans is an example of polygenic inheritance. The dark "D" alleles are found in several different genes and have an additive effect on skin color. The top portion of the figure shows examples of genotypes that can produce the different skin colors. The number of dark "D" alleles is more important than how the "D" alleles are distributed in the different genes.

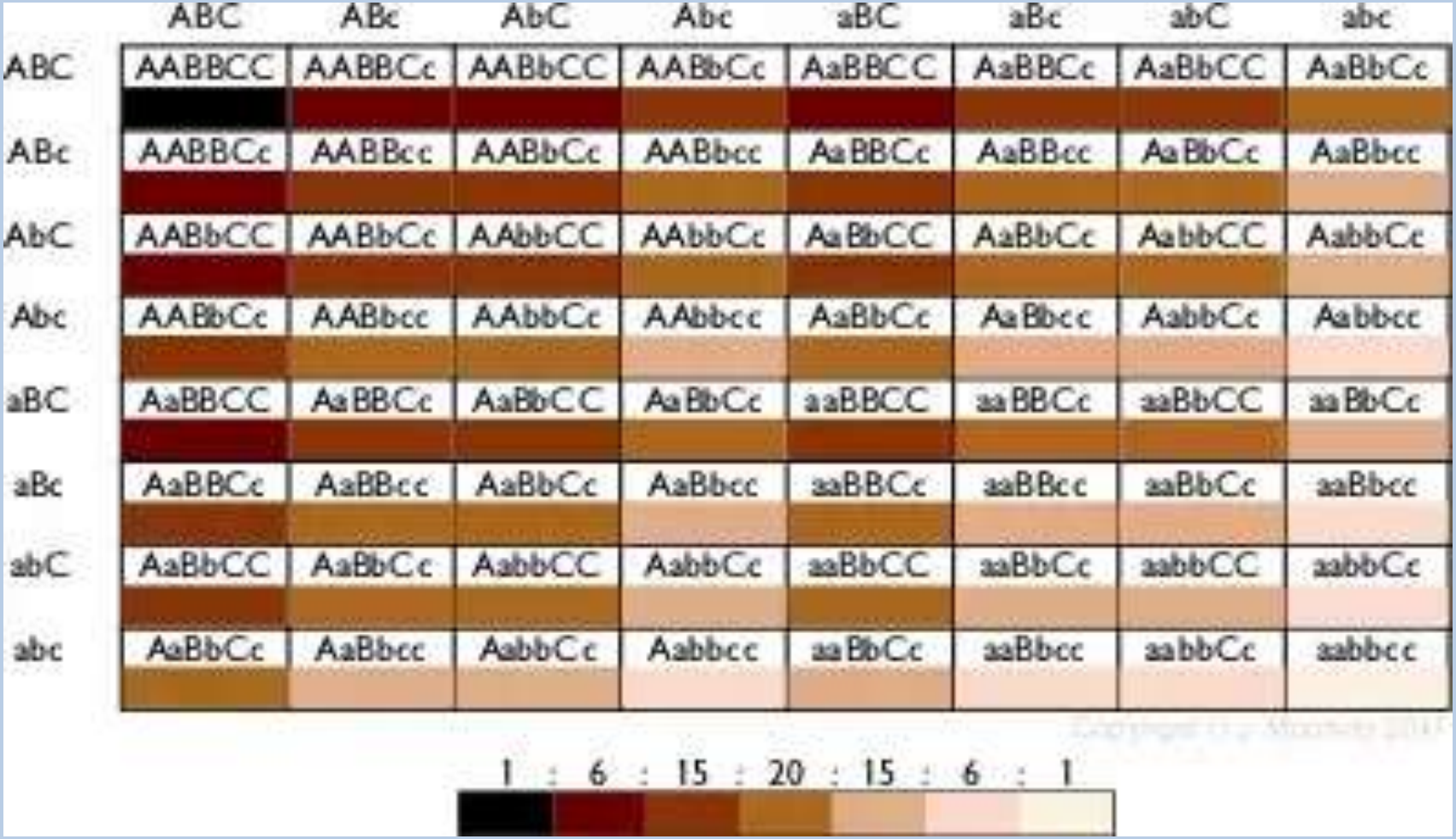
Polygenic Traits



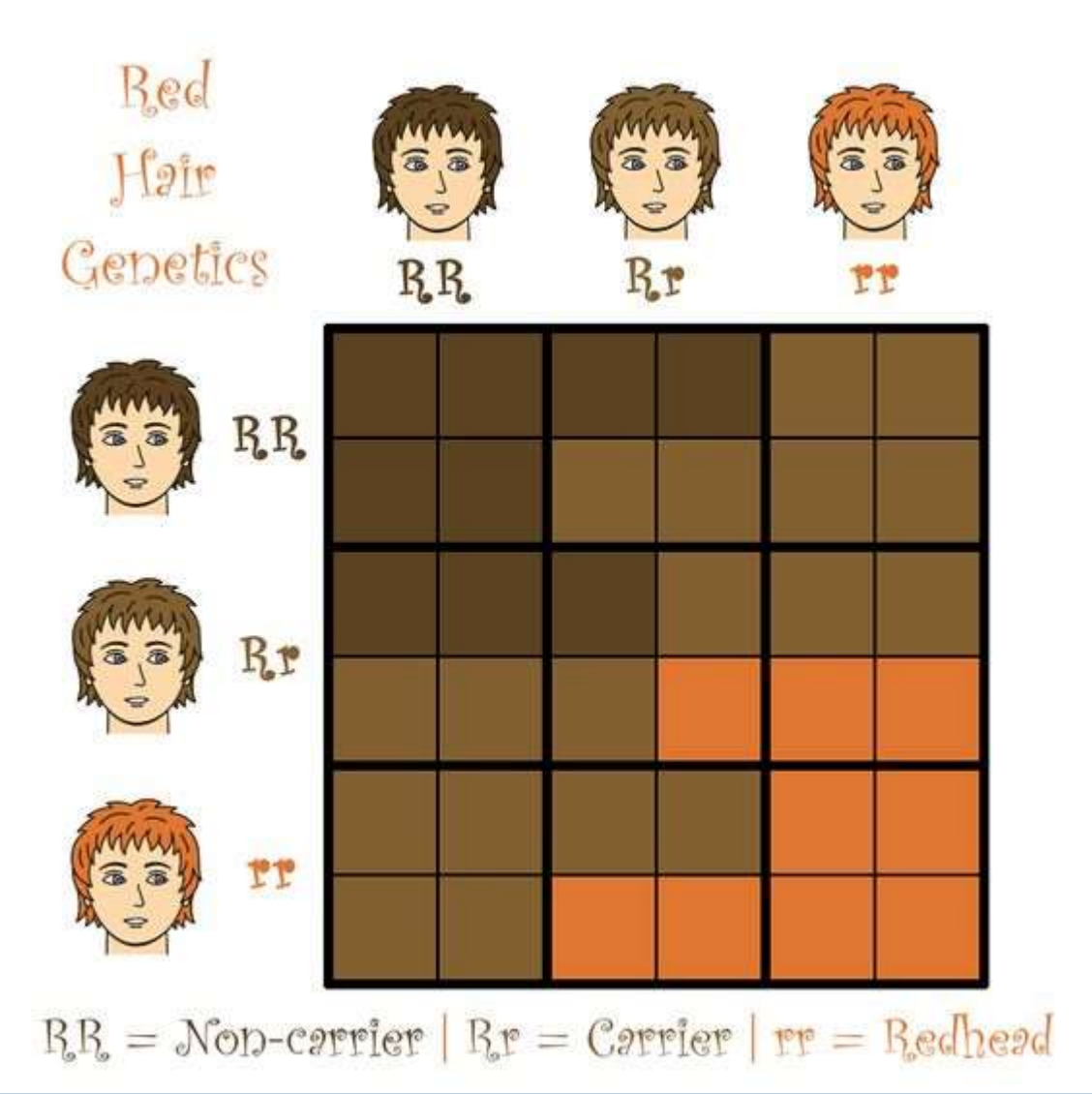
Polygenic Traits



Polygenic Traits



Polygenic Traits



Polygenic Traits

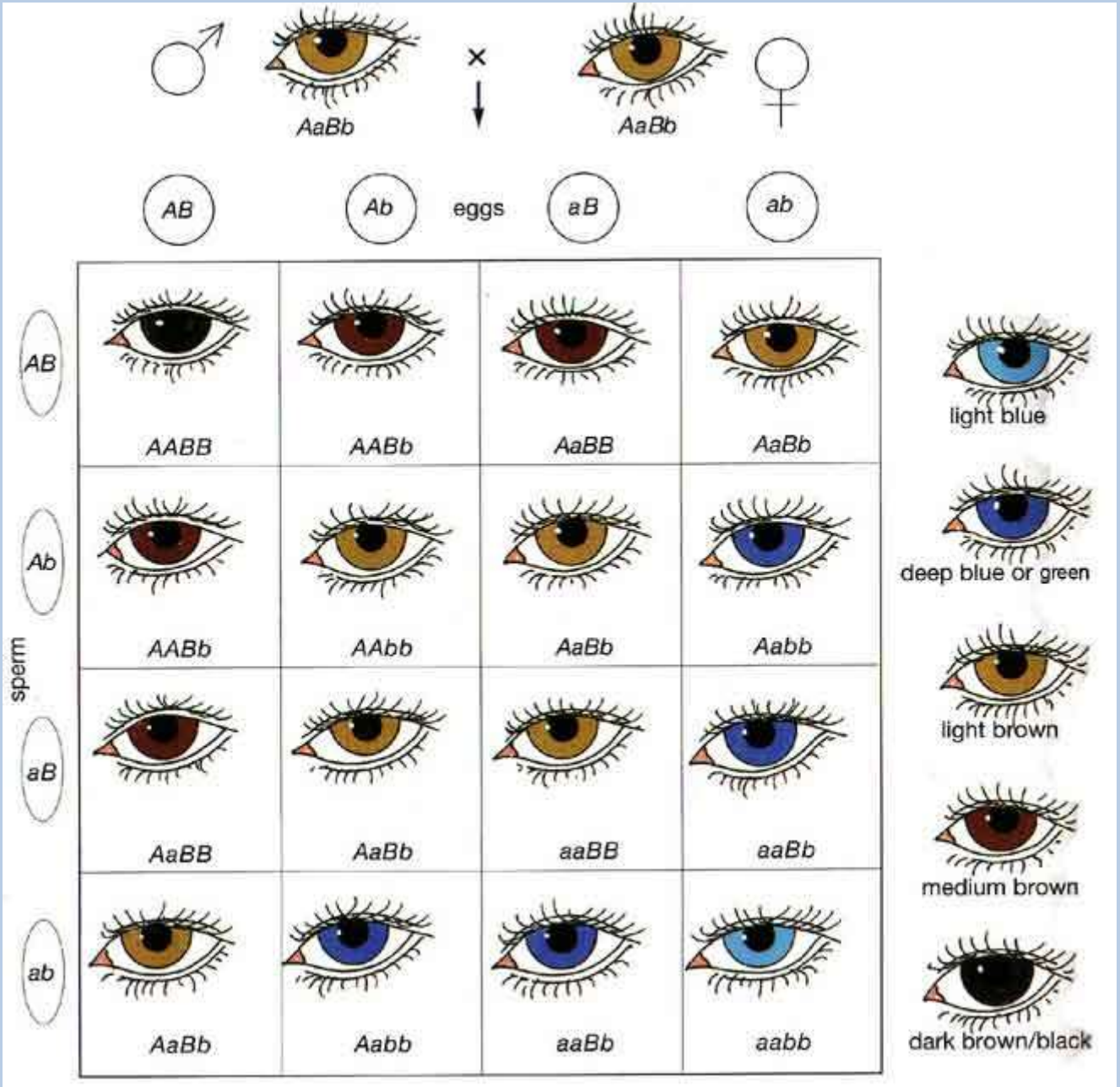
Polygenic Traits

Polygenic Traits

Polygenic Traits

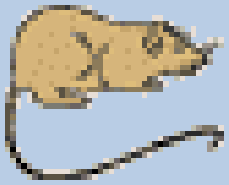
HERC2	*Gey*	Eye Color
BB	GG	**Brown**
BB	Gb	**Brown**
BB	bb	**Brown**
Bb	GG	**Brown**
Bb	Gb	**Brown**
Bb	bb	**Brown**
bb	GG	**Green**
bb	Gb	**Green**
bb	bb	**Blue**

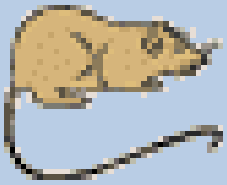
	B/G	B/g	b/G	b/g
B/G	BB/GG	BB/Gg	Bb/GG	Bb/Gg
B/g	BB/Gg	BB/gg	Bb/Gg	Bb/gg
b/G	Bb/GG	Bb/Gg	bb/GG	bb/Gg
b/g	Bb/Gg	Bb/gg	bb/Gg	bb/gg


AaBb
AaBb
AB
Ab
eggs
aB
ab
sperm
AB
Ab
aB
ab
AABB
AABb
AaBB
AaBb
AABb
AAbb
AaBb
Aabb
AaBB
AaBb
aaBB
aaBb
AaBb
Aabb
aaBb
aabb
light blue
deep blue or green
light brown
medium brown
dark brown/black

Epistasis

AaBb X AaBb





	AB	Ab	aB	ab
AB	AABB	AABb	AaBB	AaBb
Ab	AABb	AAbb	AaBb	Aabb
aB	AaBB	AaBb	aaBB	aaBb
ab	AaBb	Aabb	aaBb	aabb

9 agouti

3 black

4 albino

Epistasis

Epistasis

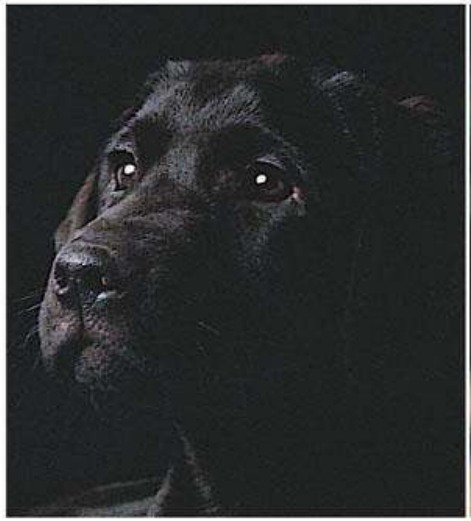
B_E_

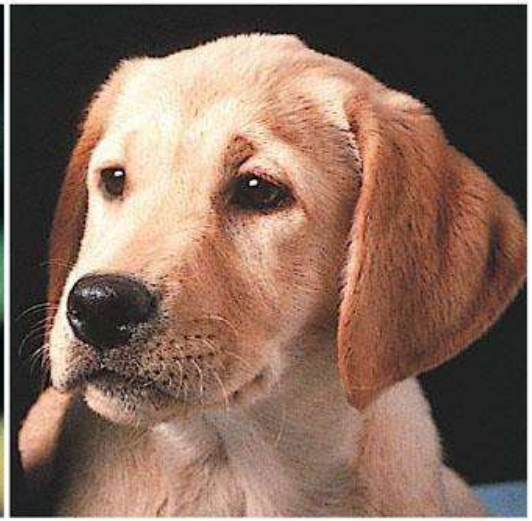
bb_E_

_ _ ee

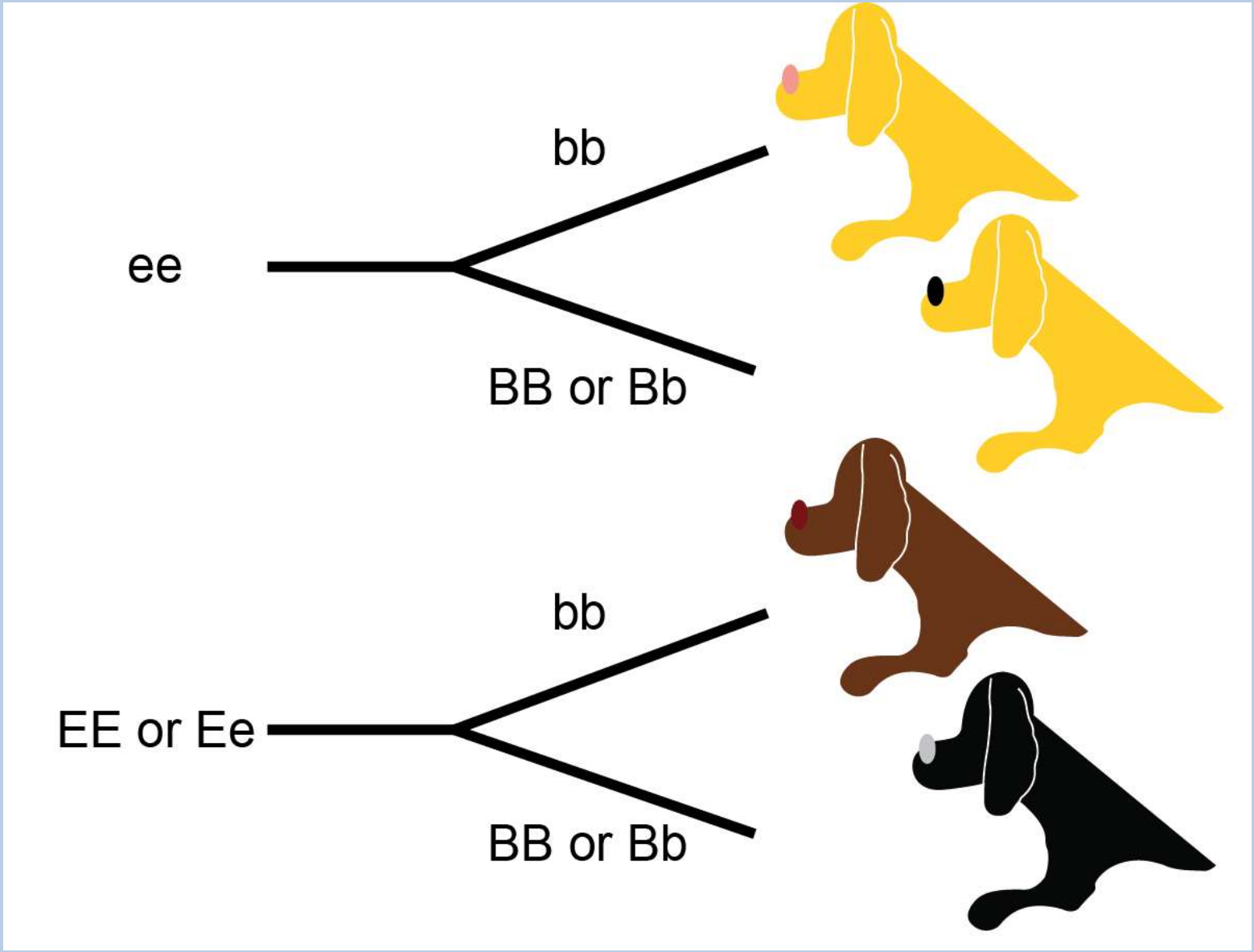
Epistasis

	EB	Eb	eB	eb
EB	EEBB black	EEBb black	EeBB black	EeBb black
Eb	EEBb black	EEbb chocolate	EeBb black	Eebb chocolate
eB	EeBB black	EeBb black	eeBB yellow	eeBb yellow
eb	EeBb black	Eebb chocolate	eeBb yellow	eebb yellow





Epistasis



Epistasis

- https://www.youtube.com/watch?v=M5IveTJRYyI

Epistasis

- **30 seconds; in your table groups *compare and contrast* polygenic traits and epistasis.**

Demonstration

- **Please watch the demonstration; predict what you think will happen… and think about *WHY*?**

Incomplete Dominance

FIGURE 7.5 Incomplete Dominance

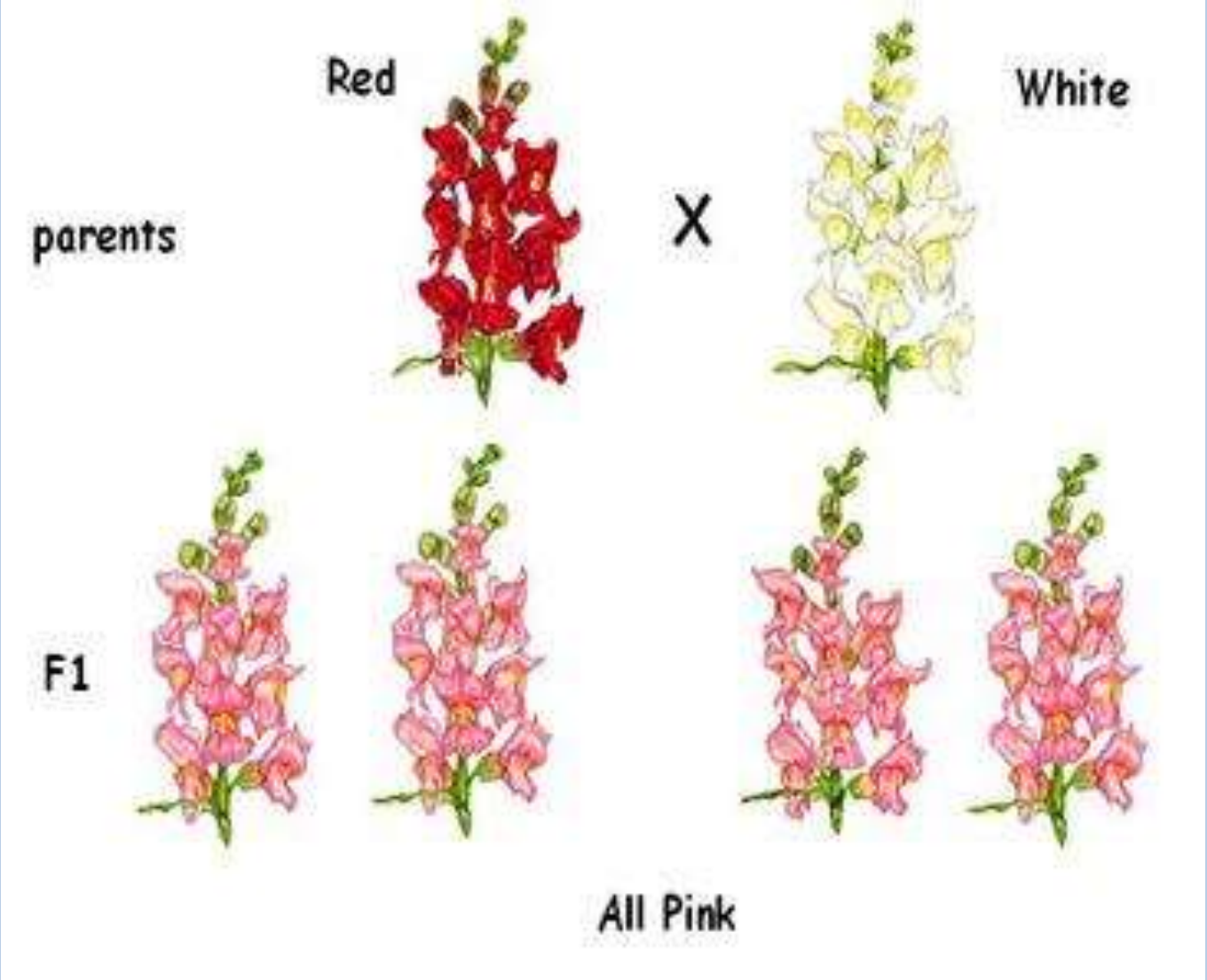
PHENOTYPE	GENOTYPE	PHENOTYPE	GENOTYPE	PHENOTYPE	GENOTYPE
green	B_1B_1	steel blue	B_2B_2	royal blue	B_1B_2

The green betta fish is homozygous for the green color allele.

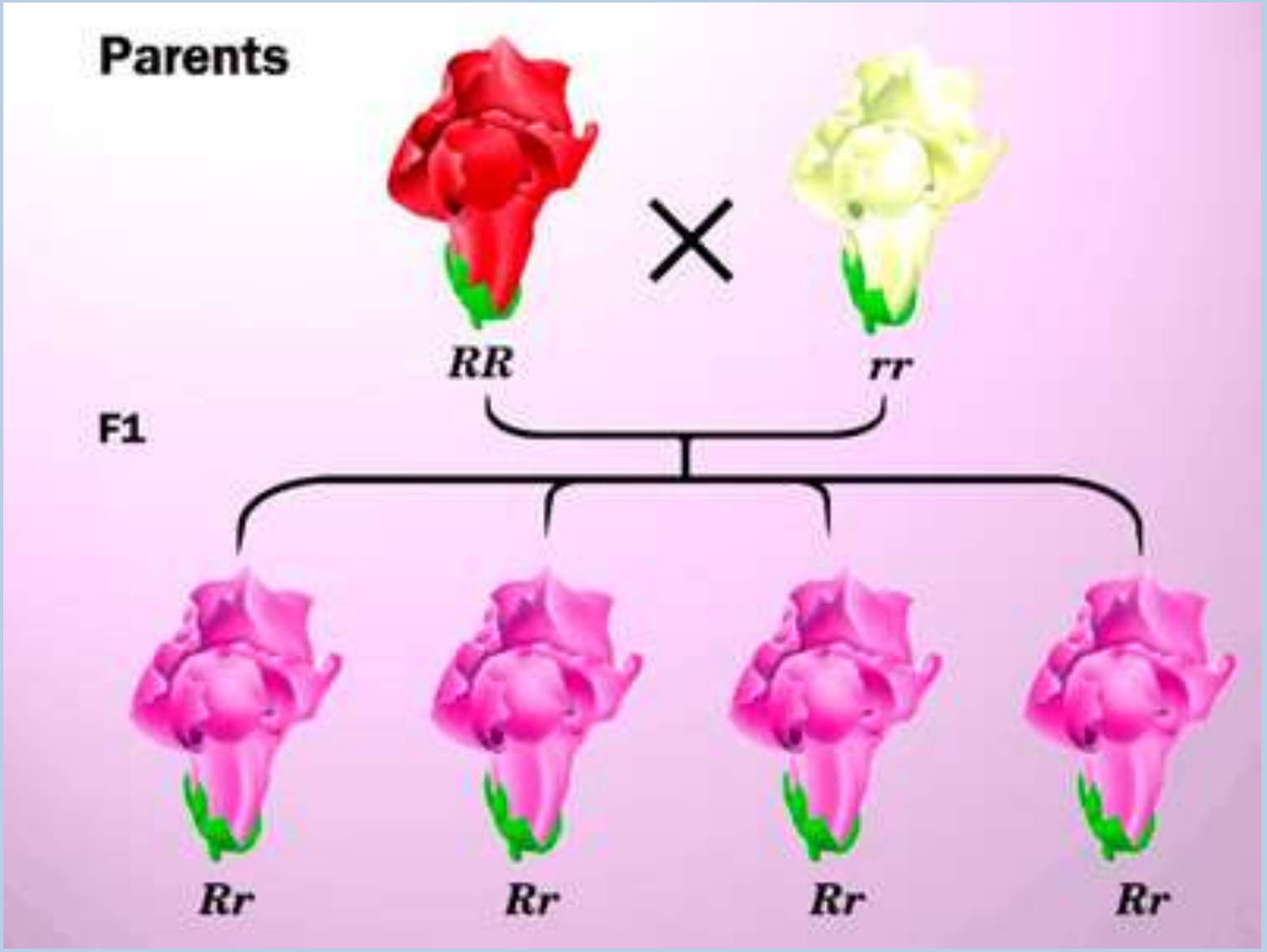
The steel blue betta fish is homozygous for the blue color allele.

The royal blue betta fish is heterozygous for the two color alleles.

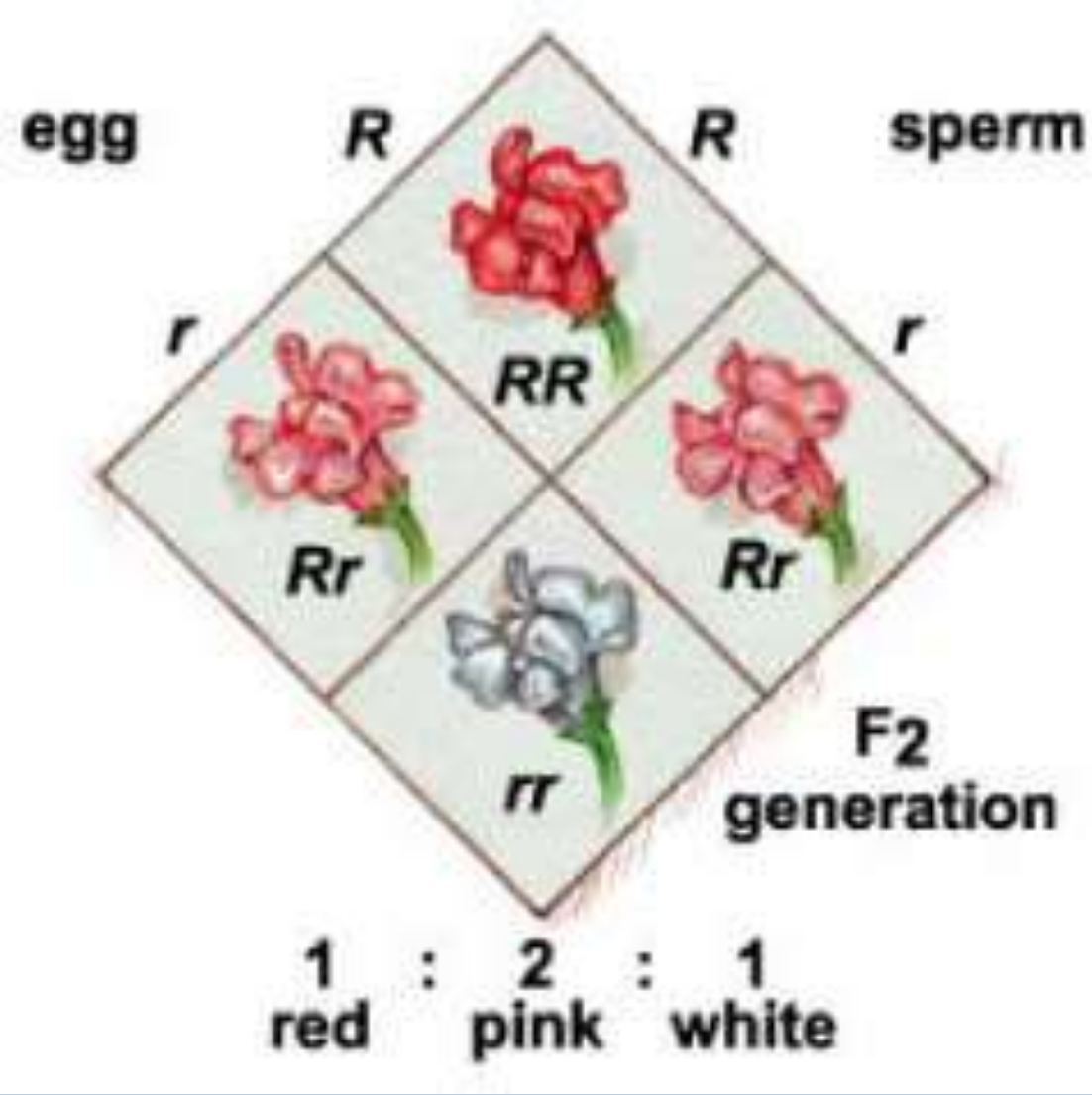
Incomplete Dominance



Incomplete Dominance



Incomplete Dominance



Incomplete Dominance

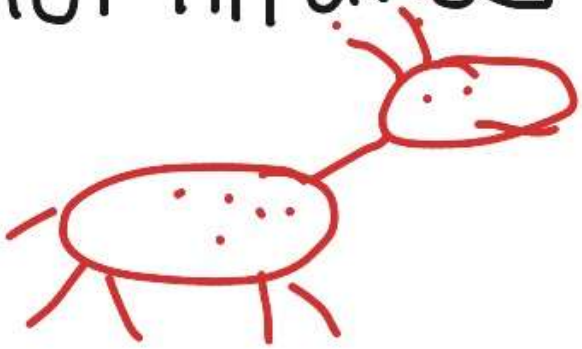
- 1 min; make a sketch in your notes to help you remember what incomplete dominance looks like
- 1 min; when everyone at your table group is done:
  - Share your sketch
  - Explain *WHY* it is <u>incomplete dominance</u>

Codominance

both equally present

mixing

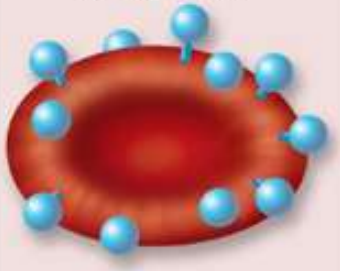
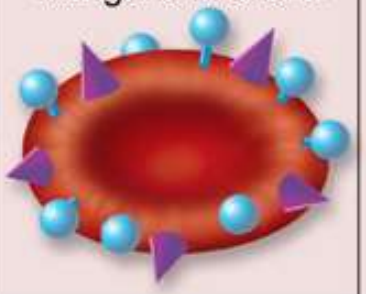
Codominance - two traits show



Incomplete Dominance - two traits blend

Blood Type

ABO Blood Types

	Antigen A	Antigen B	Antigens A and B	Neither antigen A nor B
Erythrocytes				
Plasma	Anti-B antibodies 	Anti-A antibodies 	Neither anti-A nor anti-B antibodies	Both anti-A and anti-B antibodies 
Blood type	**Type A** Erythrocytes with type A surface antigens and plasma with anti-B antibodies	**Type B** Erythrocytes with type B surface antigens and plasma with anti-A antibodies	**Type AB** Erythrocytes with both type A and type B surface antigens, and plasma with neither anti-A nor anti-B antibodies	**Type O** Erythrocytes with neither type A nor type B surface antigens, but plasma with both anti-A and anti-B antibodies

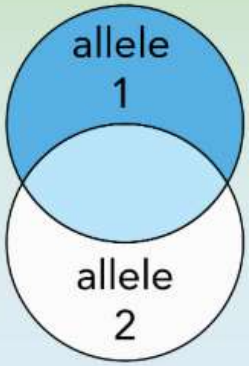
(a)

Blood Type

Phenotype (Blood type)	Genotype
Type A	I^AI^A or I^Ai
Type B	I^BI^B or I^Bi
Type AB	I^AI^B
Type O	ii

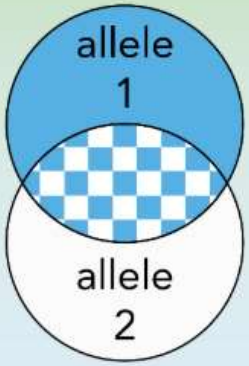
Picture Quiz

INCOMPLETE DOMINANCE



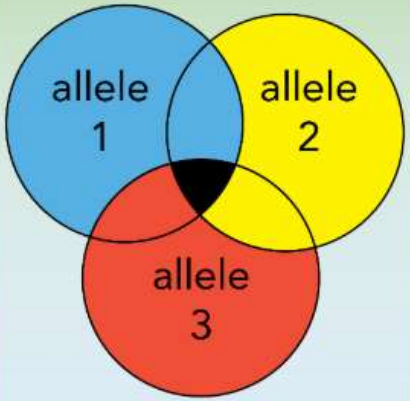
Neither allele is dominant or recessive

CODOMINANCE



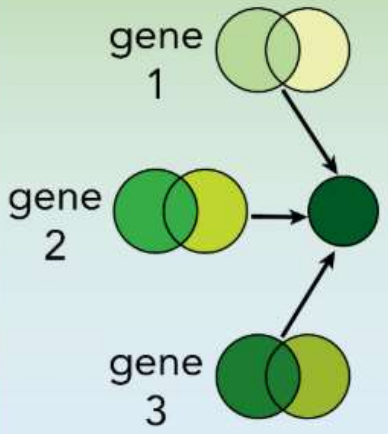
Both alleles are clearly expressed

MULTIPLE ALLELES



One gene has more than two alleles

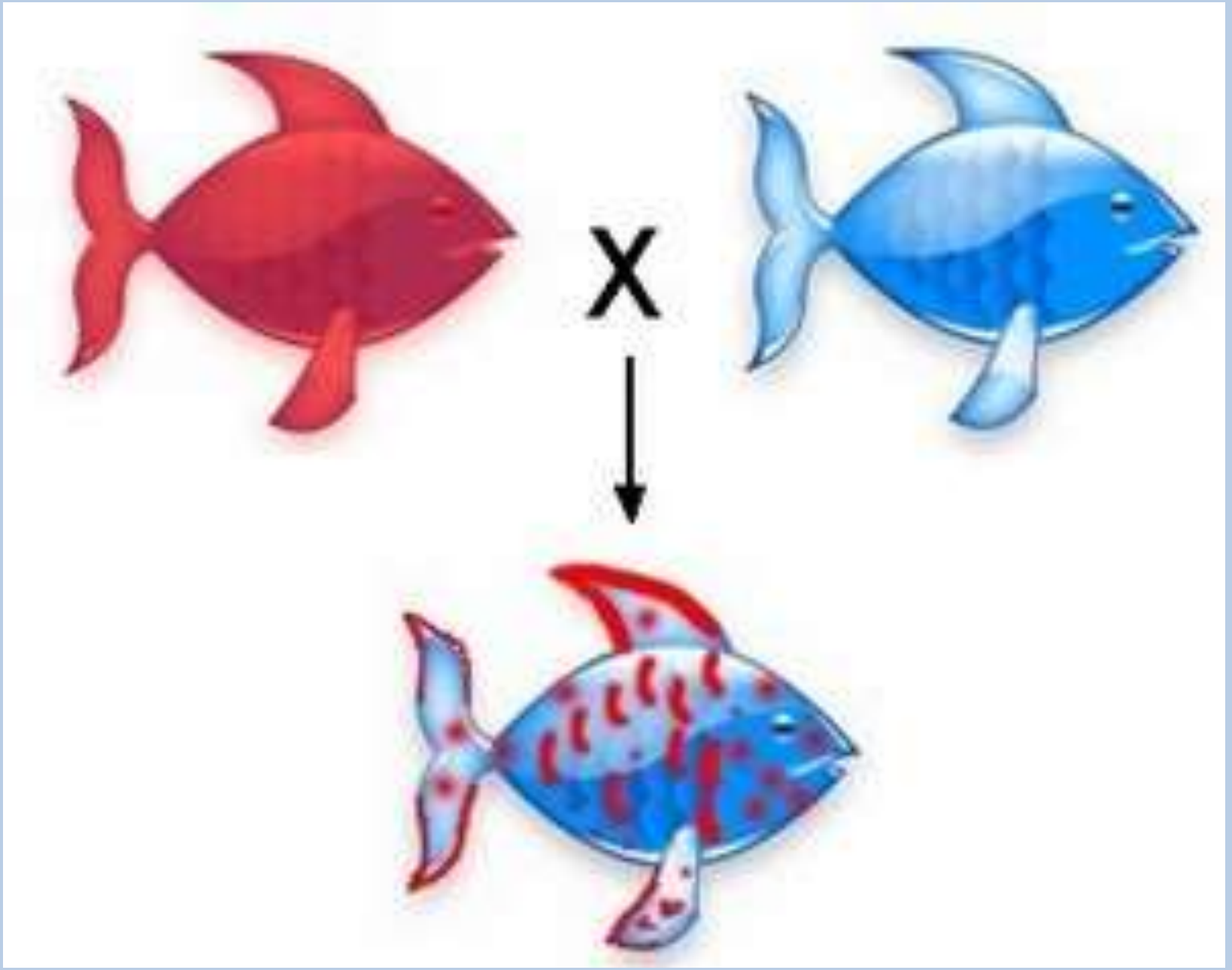
POLYGENIC TRAITS



More than one gene controls a trait

Identify the following pictures using these words:

- Polygenic trait
- Incomplete dominance
- Codominance
- Epistasis
- Multiple alleles


X

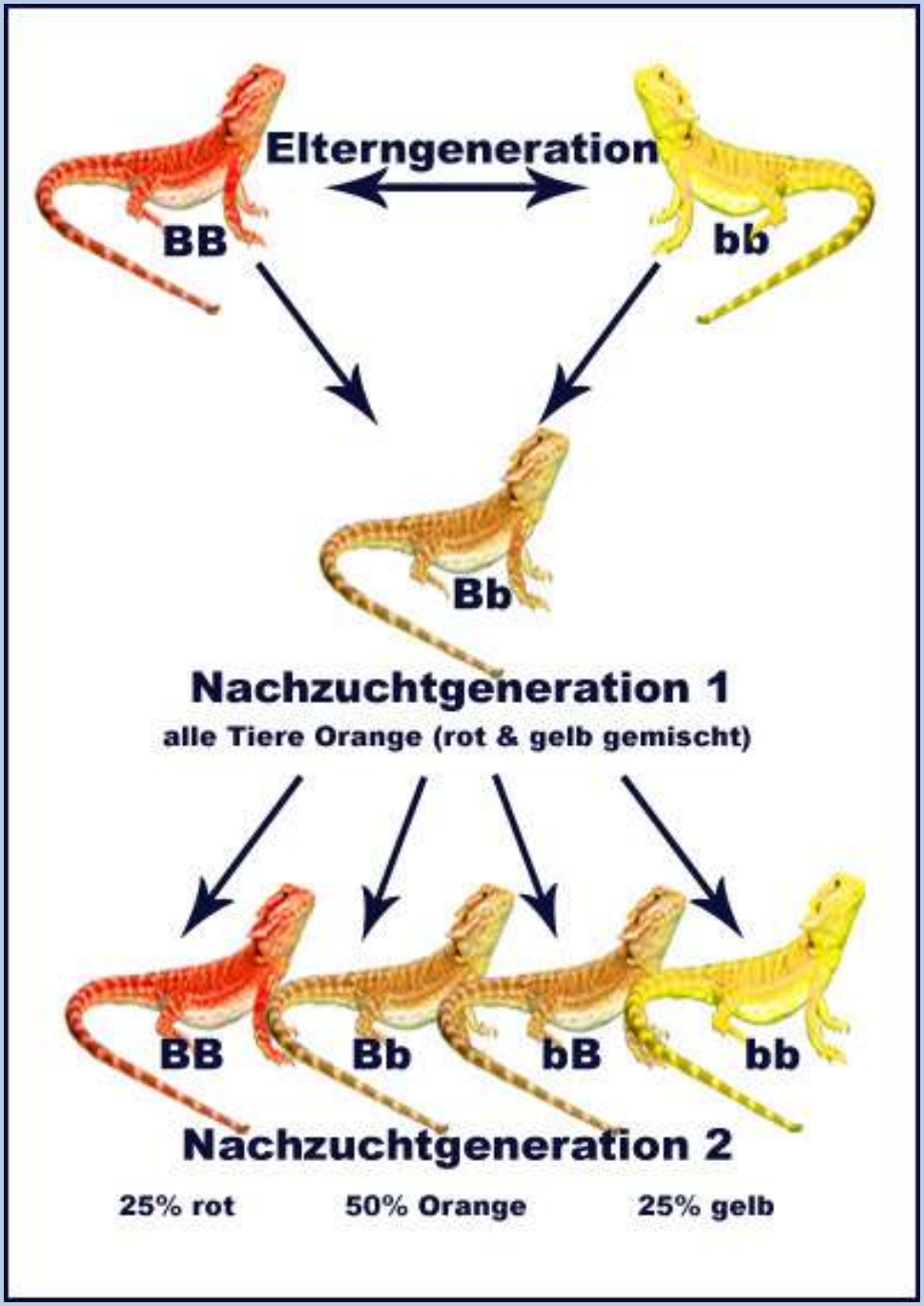
Genotype

CC	$c^{ch}c^{ch}$	$c^{h}c^{h}$	cc

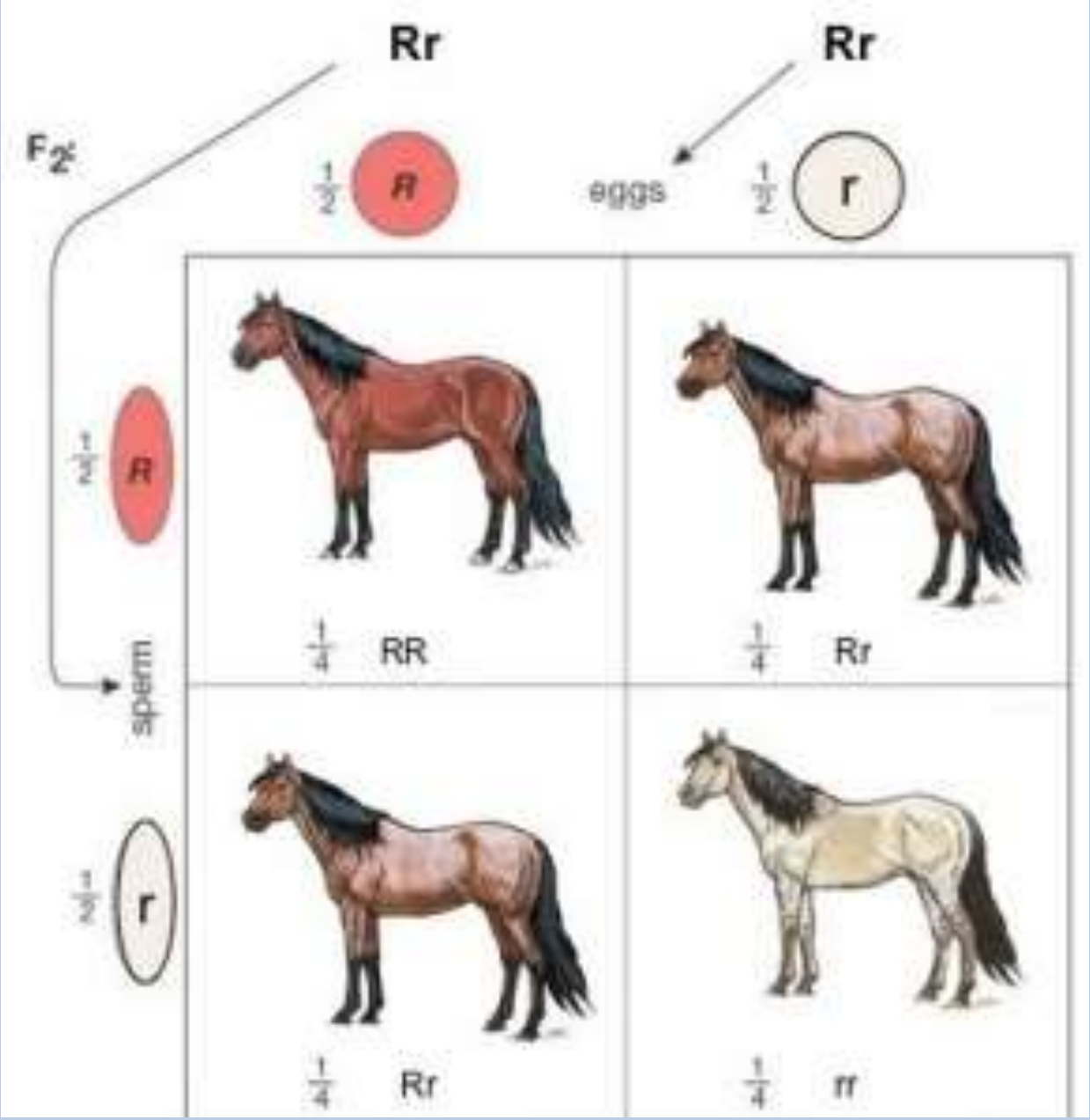
Phenotype

BLACK	CHINCHILLA	HIMALAYAN	ALBINO





Elterngeneration
BB
bb
Bb
Nachzuchtgeneration 1
alle Tiere Orange (rot & gelb gemischt)
BB
Bb
bB
bb
Nachzuchtgeneration 2
25% rot
50% Orange
25% gelb


© Parag.chandgadkar


Rr
Rr
F2:
eggs
1/2 R
1/2 r
1/2 R
1/2 r
sperm
1/4 RR
1/4 Rr
1/4 Rr
1/4 rr

Blood Types

- 30 sec; in your groups discuss *WHY* it is important that people do not get the wrong blood type during a transfusion

  (IF YOU DON'T KNOW MAKE YOUR BEST EDUCATED GUESS)

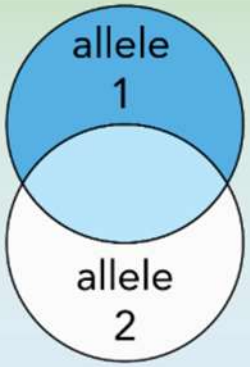
*a transfusion is when extra blood is given to a patient

Complex Inheritance

- Use a computer to complete the interactivity portion
- TAKE YOUR TIME
- Answer the questions carefully
- Be THOROUGH in your explanations

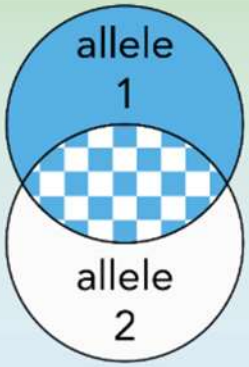
Complex Inheritance

INCOMPLETE DOMINANCE



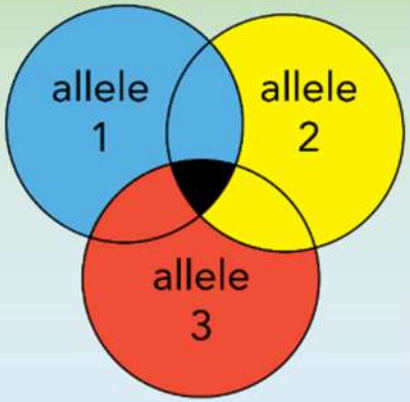
Neither allele is dominant or recessive

CODOMINANCE



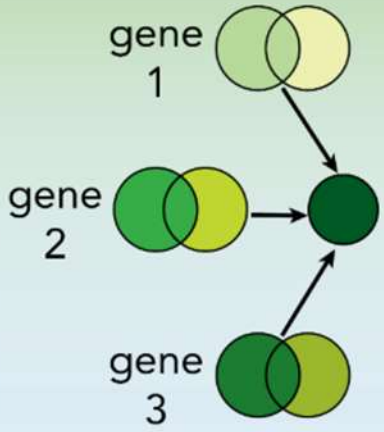
Both alleles are clearly expressed

MULTIPLE ALLELES



One gene has more than two alleles

POLYGENIC TRAITS



More than one gene controls a trait

Blood Type

Phenotype (Blood type)	Genotype
Type A	I^AI^A or I^Ai
Type B	I^BI^B or I^Bi
Type AB	I^AI^B
Type O	ii

Blood Type

- http://www.redcrossblood.org/donating-blood/donor-zone/games/blood-type
- http://www.nobelprize.org/educational/medicine/bloodtypinggame/gamev2/index.html
- http://www.nobelprize.org/educational/medicine/landsteiner/landsteiner.html