شرح هيكل امتحان سيناريو 2 - Biology Inspire

تم تحميل هذا الملف من موقع المناهج الإماراتية
موقع المناهج ⇦ المناهج الإماراتية ⇦ الصف الثاني عشر المتقدم ⇦ أحياء ⇦ الفصل الأول ⇦ الامتحان النهائي ⇦ الملف
تاريخ إضافة الملف على موقع المناهج: 2026-11-21 08:42:26
المزيد من مادة أحياء: ملفات ا كتب للمعلم ا كتب للطالب ا اختبارات الكترونية ا اختبارات ا حلول ا عروض بوربوينت ا أوراق عمل منهج انجليزي ا ملخصات وتقارير ا مذكرات وبنوك ا الامتحان النهائي ا للمدرس
إعداد: Elhady Islam Dr

التواصل الاجتماعي بحسب الصف الثاني عشر المتقدم					
صفحة المناهج الإماراتية على فيسبوك					
المواد على تلغرام	التربية الاسلامية	اللغة العربية	اللغة الانجليزية	الرياضيات	

المزيد من الملفات بحسب الصف الثاني عشر المتقدم والمادة أحياء في الفصل الأول	
1	شرح هيكل امتحان سيناريو 2 - Biology Inspire
2	مراجعة شاملة لاختبار نهاية الفصل - السيناريو M (بريدج)
3	المراجعة الشاملة لاختبار نهاية الفصل
4	امتحانات سابقة أحياء
5	تجميعية أسئلة وزارية سابقة

تحميل تطبيق المناهج للهواتف الذكية	
تطبيق المناهج على Store App (آبل)	تطبيق المناهج على Play Google (أندرويد)

INSPIRE BIOLOGY / GRADE 12 ADVANCED

شرح الهيكل

صف ثاني عشر متقدم سيناريو (2)

Dr Islam Elhady

EXAM COVERAGE | TERM 1

Coverage map

Each numbered section corresponds to the official end-of-term coverage item Q1-Q30. Explanations follow the supplied Inspire student book. The matching past-paper images and/or new multiple-choice questions come **after** the explanation, with all answers collected at the back.

Official sheet: Grade 12 Advanced Biology - M, 2026-2027. 30 multiple-choice questions, 120 minutes. Scientific calculator permitted. The official coverage sheet cites the General Edition; the attached book excerpt is used for every explanation and figure. Printed page numbering may differ.

Topics, in official order

01 Mendel's pea crosses: genotype and phenotype

02 Law of segregation

03 Law of independent assortment

04 Monohybrid Punnett squares

05 Dominant traits: freckles

06 Dihybrid Punnett squares

07 Genetic recombination: the maths

08 Gene linkage

09 Crossing over and inherited variation

10 Chromosome maps and recombination frequency

11 Polyploidy and genetic variation

12 Selective breeding (artificial selection)

13 Hybridization and inbreeding

14 Test crosses

15 Homozygous, heterozygous, genotype

16 Pedigree charts and symbols

17 Dominant traits in pedigrees

18 Recessive genetic disorders

19 Incomplete dominance: snapdragons

20 Codominance and sickle-cell disease

21 Multiple alleles and ABO blood groups

22 Epistasis and Labrador retriever coat colour

23 Dosage compensation and X-chromosome inactivation

24 Barr bodies: evidence of the inactive X

25 X-linked inheritance and colour-blindness Punnett squares

26 Haemophilia and family-pedigree interpretation

27 Polygenic traits and variation in skin colour

28 Environmental influences on expressed traits

29 Temperature-dependent coat colour in Siamese cats

30 Twin studies: genetic and environmental contributions

Q01 Mendel's pea crosses: genotype and phenotype

Official exam reference: Page 5 - Figure 2 / text | Book figure on actual page 4

EXPLANATION FROM THE UPLOADED INSPIRE BOOK

- A genotype is the allele combination (for example, YY, Yy or yy); a phenotype is the visible seed colour.
- A dominant yellow allele (Y) masks a recessive green allele (y) in a heterozygote. Green seeds appear only with yy.
- Pure-breeding yellow (YY) crossed with pure-breeding green (yy) gives all-yellow F1 (Yy). Self-fertilising the F1 gives an F2 phenotypic ratio of about 3 yellow : 1 green.

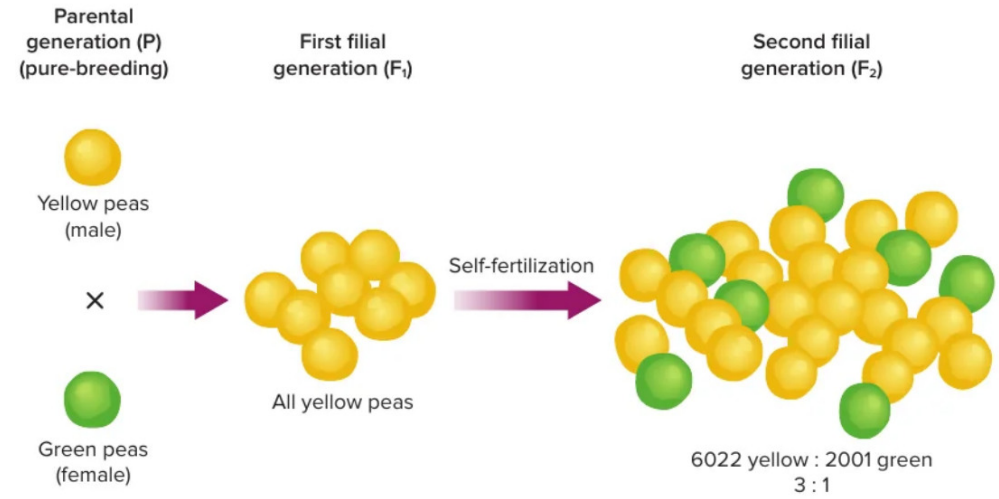


Figure 2 The results of Mendel's cross involving true-breeding pea plants with yellow seeds and green seeds are shown here.

Explain *why the seeds in the F_1 generation were all yellow.*

Figure 2: P, F1 and F2 pea generations · Source: uploaded Inspire student book, p. 4

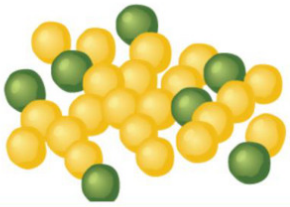
Exam focus: Keep the genotype ratio (1 YY : 2 Yy : 1 yy) separate from the phenotype ratio (3 yellow : 1 green).

Questions for coverage point Q01

01-P1 · PREVIOUS EXAM · COMPILATION PDF PAGE 49

The figure below represents the offspring of two pea plants.
Which is the ratio of pea plant offspring with recessive green seeds if both parents are hybrids?

يمثل الشكل أدناه نسل اثنين من نباتات البازلاء.
إذا كانت الآباء نباتات هجينة بالنسبة لصفة لون البذور،
ما نسبة نباتات البازلاء الناتجة ذات سمة البذور الخضراء المتنحية؟



Question-stem image from previous exams; choices are typeset neutrally below to avoid revealing response feedback embedded in the source screenshot.

A. 25%
B. 50%
C. 75%
D. 100%

01-N1 · NEW PRACTICE QUESTION

YY x yy produces which F1 genotype?

A. All YY
B. All Yy
C. All yy
D. 1 YY : 1 yy

01-N2 · NEW PRACTICE QUESTION

In the Yy x Yy cross, what fraction is green?

A. 3/4
B. 1/4
C. 1/2
D. All

Q02 Law of segregation

Official exam reference: Page 7 - Figure 3 | Book figure on actual page 6

EXPLANATION FROM THE UPLOADED INSPIRE BOOK

- A diploid organism has two alleles of a gene, one inherited from each parent.
- During gamete formation the two alleles segregate, so every gamete carries only one allele for the gene.
- For Yy, half of the gametes carry Y and half carry y; fertilisation restores the pair of alleles in the zygote.

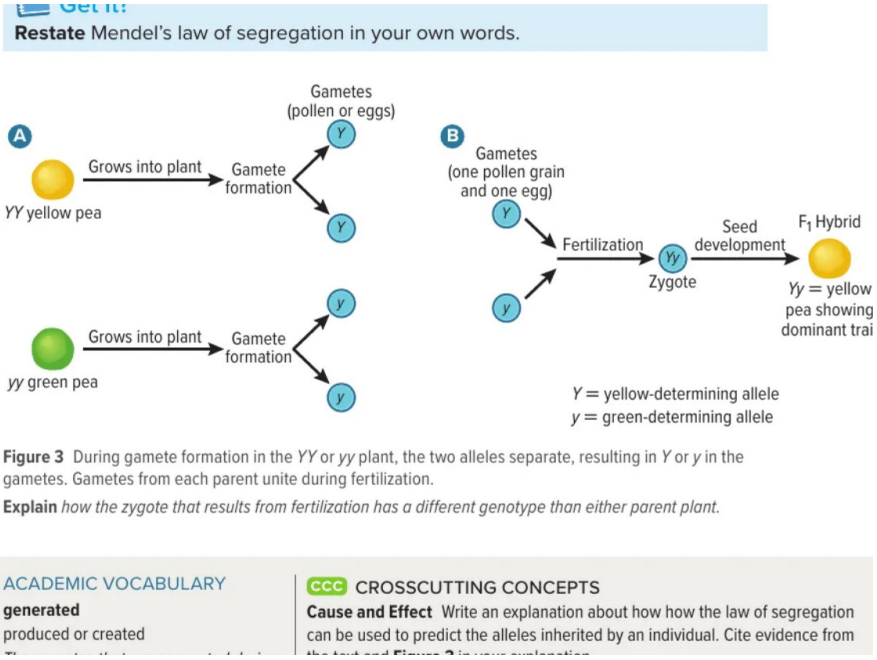


Figure 3 During gamete formation in the *YY* or *yy* plant, the two alleles separate, resulting in *Y* or *y* in the gametes. Gametes from each parent unite during fertilization.

Explain *how the zygote that results from fertilization has a different genotype than either parent plant.*

Figure 3: alleles separate as gametes form · Source: uploaded Inspire student book, p. 6

Exam focus: The alleles of one gene separate; gametes do not receive an intact Yy pair.

Questions for coverage point Q02

02-N1 · NEW PRACTICE QUESTION

Which gametes are produced by an individual with genotype Yy?

A. Only Y

B. Only y

C. Y and y

D. Yy

02-N2 · NEW PRACTICE QUESTION

Which offspring genotype is recessive green?

A. YY

B. Yy

C. yy

D. YY and Yy

Q03 Law of independent assortment

Official exam reference: Page 8 - Figure 4 | Book figure on actual page 7

EXPLANATION FROM THE UPLOADED INSPIRE BOOK

- Different gene pairs assort independently into gametes when they are unlinked (for example on different chromosomes).
- A YyRr parent can form the gametes YR, Yr, yR and yr, each at an expected frequency of 25%.
- Random fertilisation of two YyRr parents gives the classical 9 : 3 : 3 : 1 phenotypic ratio if both traits have complete dominance.

Set It?
ate How can the random distribution of alleles result in a predictable ratio?

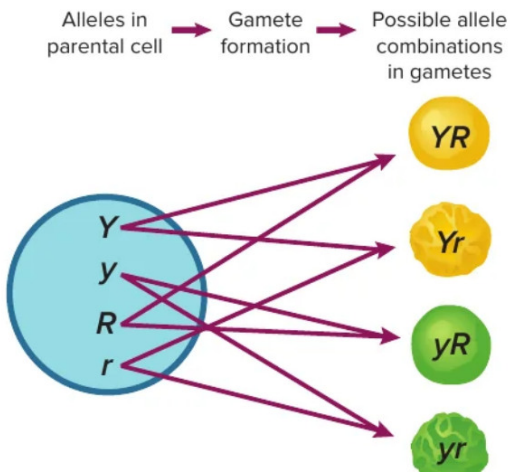


Figure 4: four combinations of Y/y and R/r · Source: uploaded Inspire student book, p. 7

Exam focus: Independent assortment concerns different genes; segregation concerns the two alleles of one gene.

Questions for coverage point Q03

03-N1 · NEW PRACTICE QUESTION

Which set gives all gamete types from unlinked YyRr?

A. YR only

B. YR, Yr, yR, yr

C. Yy and Rr

D. YR and yr only

03-N2 · NEW PRACTICE QUESTION

The usual dihybrid F2 phenotypic ratio is:

A. 3 : 1	**B.** 1 : 2 : 1
C. 9 : 3 : 3 : 1	**D.** 1 : 1

Q04 Monohybrid Punnett squares

Official exam reference: Page 9 - Figure 5 | Book figure on actual page 8

EXPLANATION FROM THE UPLOADED INSPIRE BOOK

- A Punnett square lists the alleles that each parent can supply in its gametes and combines them into possible offspring genotypes.
- A Yy x Yy cross gives YY, Yy, Yy and yy. Genotypes occur in a 1 : 2 : 1 ratio.
- Yellow appears in three of four combinations because both YY and Yy have the dominant phenotype.

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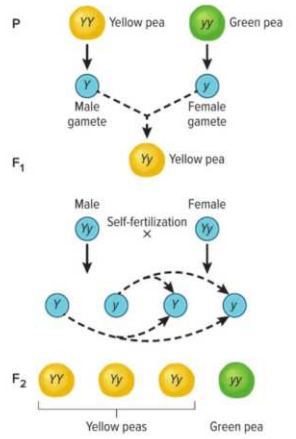


Figure 5 During the F_2 generation self-fertilization, the male gametes randomly fertilize the female gametes.

re 6? The appearance of freckles is a dominant
ose both of your parents have freckles and are
ible phenotypes could you or your siblings

Figure 5: yellow and green pea alleles · Source: uploaded Inspire student book, p. 8

Exam focus: Write the parents' genotypes first; put one gamete allele beside each row and column.

Questions for coverage point Q04

04-N1 · NEW PRACTICE QUESTION

For Yy x yy, what percentage of offspring are green?

A. 0%
B. 25%
C. 50%
D. 75%

04-N2 · NEW PRACTICE QUESTION

In Yy x Yy, which genotype has a probability of 1/2?

A. YY
B. Yy
C. yy
D. All are equally likely

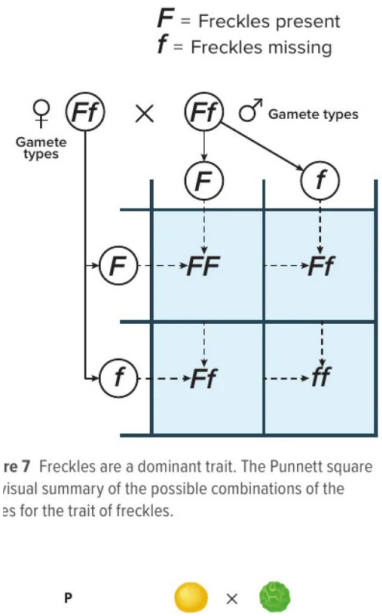
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Q05 Dominant traits: freckles

Official exam reference: Page 10 - Figure 7 | Book figure on actual page 9

EXPLANATION FROM THE UPLOADED INSPIRE BOOK

- In the book's example, the presence of freckles is dominant (F) and absence of freckles is recessive (f).
- A person with freckles could have FF or Ff; a person without freckles must have ff.
- For Ff x Ff, the genotypes are 1 FF : 2 Ff : 1 ff, giving 3 with freckles : 1 without.



re 7 Freckles are a dominant trait. The Punnett square isual summary of the possible combinations of the es for the trait of freckles.

P

Figure 7: Punnett square for freckles · Source: uploaded Inspire student book, p. 9

Exam focus: A dominant phenotype alone does not tell you whether the genotype is FF or Ff.

Questions for coverage point Q05

05-N1 · NEW PRACTICE QUESTION

Two heterozygous freckled parents have what probability of a child without freckles?

A. 0%

B. 50%

C. 75%

D. 25%

05-N2 · NEW PRACTICE QUESTION

A person without freckles has genotype:

A. FF

B. ff

C. Ff

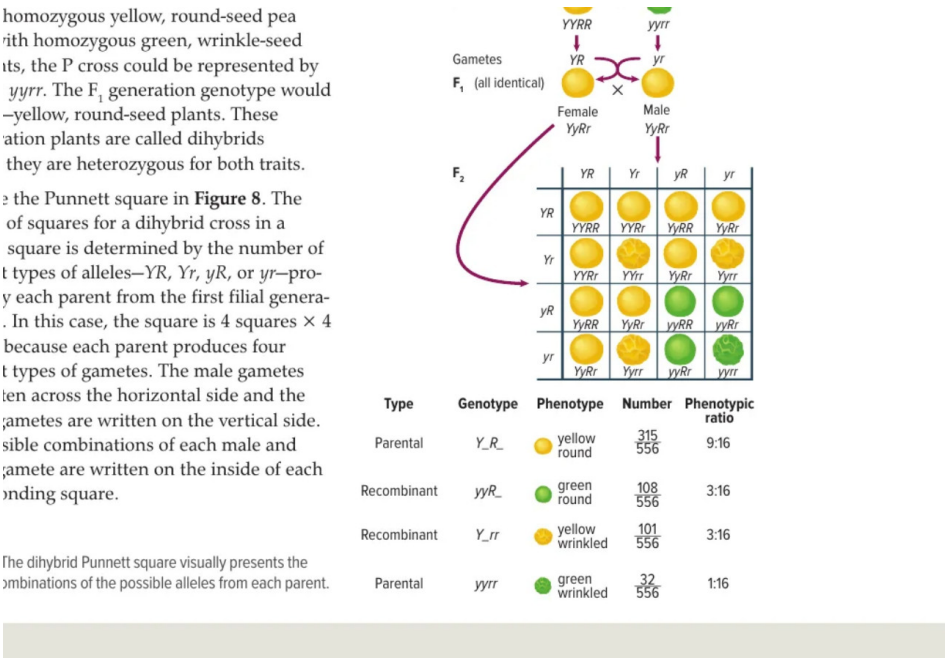
D. FF or Ff

Q06 Dihybrid Punnett squares

Official exam reference: Page 10 - Figure 8 | Book figure on actual page 9

EXPLANATION FROM THE UPLOADED INSPIRE BOOK

- A dihybrid cross follows two genes at the same time (for example, seed colour Y/y and texture R/r).
- YyRr produces four gamete combinations: YR, Yr, yR and yr. Place these along each side of a 4 x 4 Punnett square.
- Under independent assortment, YyRr x YyRr gives 9 yellow-round : 3 yellow-wrinkled : 3 green-round : 1 green-wrinkled.



homozygous yellow, round-seed pea
ith homozygous green, wrinkle-seed
its, the P cross could be represented by
yyrr. The F_1 generation genotype would
–yellow, round-seed plants. These
ation plants are called dihybrids
they are heterozygous for both traits.

e the Punnett square in **Figure 8**. The
of squares for a dihybrid cross in a
square is determined by the number of
t types of alleles—*YR*, *Yr*, *yR*, or *yr*—pro-
y each parent from the first filial genera-
. In this case, the square is 4 squares × 4
because each parent produces four
t types of gametes. The male gametes
ten across the horizontal side and the
gametes are written on the vertical side.
sible combinations of each male and
gamete are written on the inside of each
onding square.

The dihybrid Punnett square visually presents the
ombinations of the possible alleles from each parent.

Type	Genotype	Phenotype	Number	Phenotypic ratio
Parental	Y_R_	yellow round	315/556	9:16
Recombinant	yyR_	green round	108/556	3:16
Recombinant	Y_rr	yellow wrinkled	101/556	3:16
Parental	yyrr	green wrinkled	32/556	1:16

Figure 8: dihybrid seed cross · Source: uploaded Inspire student book, p. 9

Exam focus: The double-recessive genotype yyrr is expected in 1 out of 16 offspring.

Questions for coverage point Q06

06-N1 · NEW PRACTICE QUESTION

What is the probability of yyrr from YyRr x YyRr (unlinked genes)?

A. 1/4

B. 3/16

C. 1/16

D. 9/16

06-N2 · NEW PRACTICE QUESTION

How many boxes are in a standard YyRr x YyRr Punnett square?

A. 4	**B.** 8
C. 12	**D.** 16