SCIENCE FOUNDATIONS

# Incomplete dominance and codominance

### Difficulty level: Advanced

### Science Foundations

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## *Overview of the concept*

This is how you explain why crossing a red flower with a white one can give pink flowers, while a roan cow shows both red and white hairs at once. In the pink flower, neither version wins outright, so the result lands in between. In the roan cow, both versions show up side by side in the same coat. Knowing incomplete dominance and codominance tells you why inheritance is not always a winner-takes-all contest, and why some traits blend while others share the stage.



## *Rule*

**Incomplete dominance and codominance: in incomplete dominance the heterozygote looks in between the two parents, like a pink flower from red and white parents.**

In codominance both alleles show fully in the heterozygote, like blood type AB.

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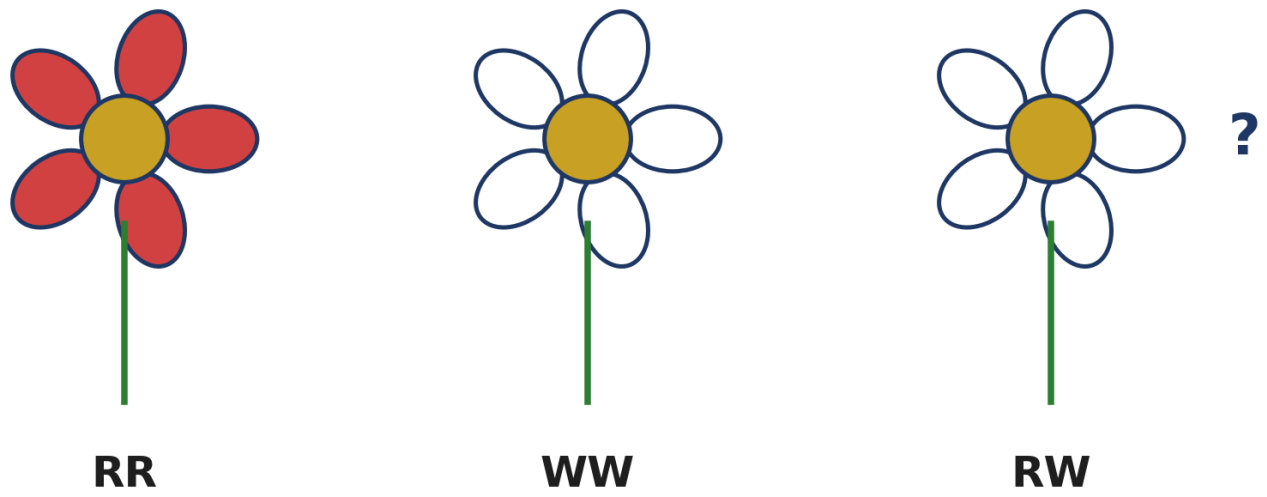
## Worked examples

EXAMPLE 1

**Q** Cross red (RR) and white (WW) snapdragons. Heterozygote colour?




### SOLUTION

Read the cross: all children are RW.

Apply incomplete dominance: heterozygote is intermediate.

State the colour: pink, between red and white.

The result is pink flowers.

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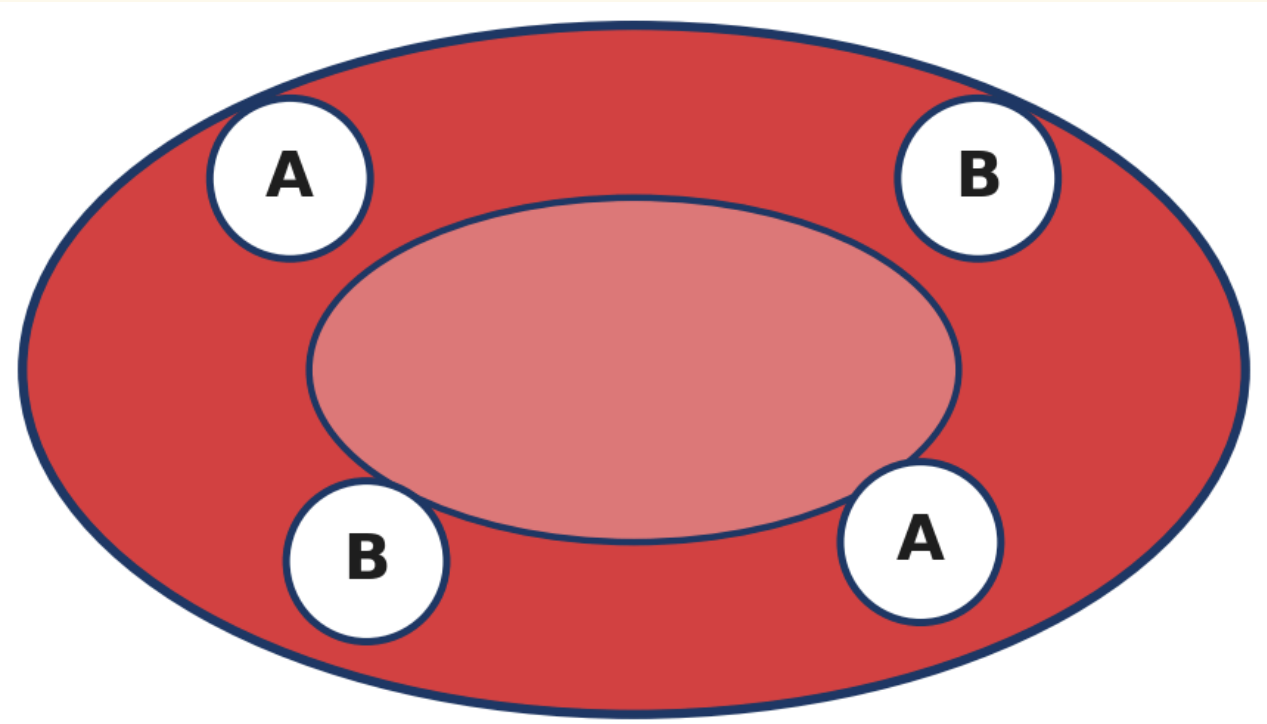
EXAMPLE 2

## Q A person has blood type AB. Which pattern is this?




### SOLUTION

Read the genotype: one A allele, one B allele, both present.

Check the heterozygote: both A and B traits show fully.

Label it codominance, not blending.

The result is codominance.

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## Practice questions

**1** Cross red (RR) and white (WW) four o'clock flowers. What colour are the heterozygote children?

- **A** Pink
- **B** Red
- **C** White
- **D** Red and white patches

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## 2 A snapdragon has genotype RW. What colour is it, and why?

- **A** Pink, because the heterozygote is intermediate between red and white
- **B** Red, because R is dominant
- **C** White, because W is dominant
- **D** Pink, because both colours show fully

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## 3 A roan cow has both red hairs and white hairs showing in its coat. Which pattern is this, incomplete dominance or codominance?

- **A** Incomplete dominance
- **B** Codominance
- **C** Complete dominance
- **D** Polygenic inheritance

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## 4 Incomplete or codominance: a pink four o'clock flower?

- A Codominance
- B Incomplete dominance
- C Complete dominance
- D Multiple alleles

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## 5 Incomplete dominance: heterozygote looks like?

- A Both traits fully
- B Intermediate
- C One parent only
- D Neither parent

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## 6 Codominance: heterozygote looks like?

- A Intermediate
- B One parent only
- C Both traits fully
- D Neither parent

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## 7 Pink snapdragon genotype?

- A RR
- B RW
- C WW
- D R

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## 8 Is pink a blend or both colours showing?

- A A blend
- B Both colours showing
- C One parent only
- D Neither parent

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## 9 Type AB: do both traits show?

- A Yes
- B No

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## A person has blood type AB. Which alleles does this person carry?

A One A allele and one B allele

B Two A alleles

C Two B alleles

D One A allele only

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## ANSWER KEY

**1.** Pink

**2.** Pink, because the heterozygote is intermediate between red and white

**3.** Codominance

**4.** Incomplete dominance

**5.** Intermediate

**6.** Both traits fully

**7.** RW

**8.** A blend

**9.** Yes

**10.** One A allele and one B allele

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