

Reading a family tree

60 minutes • D3.2.13 • Chapter 10

Using a pedigree chart to deduce whether a condition is dominant or recessive and autosomal or sex-linked, and reasoning from some cases to a general pattern

BY THE END, STUDENTS CAN

☐ Use pedigree charts to deduce patterns of inheritance of genetic disorders D3.2.13

TIMING

0-5	5 min	Do now: the symbols	
5-17	12 min	The rules of thumb	
17-25	8 min	Test your hunch	
25-45	20 min	Pedigree puzzles	
45-55	10 min	Why close relatives?	
55-60	5 min	Exit	
	60 min	One lesson	

STARTER

5 Do now: the symbols

min Draw squares, circles, shading and the lines for mating and children on the board for a made-up family of three generations. Students write what each symbol means, then the carrier status you can be sure of.

ON THE BOARD, FROM THE GUIDE

Open the guide on the projector at each chapter (the links work in this PDF). Every figure plays from its own buttons, and the lesson's slides have the same figures, step by step, in the order of this plan.

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CHAPTER 10 IN THE SLIDES

Step through the figure (3 steps, the arrow keys on a projector). Stop on each caption and ask what changed before you go on.

1. The key: **squares** are males, **circles** are females, filled symbols are affected. A line across joins a couple, and lines down lead to their children.
2. Two unaffected parents (generation I) have an affected daughter (generation II). The condition was **hidden** in both parents.
3. **Deducing** the genotypes: a recessive condition needs **nn** in the daughter and one **n** from each parent, so both parents are **Nn**.

Step through the figure (2 steps, the arrow keys on a projector). Stop on each caption and ask what changed before you go on.

1. A condition no one in the family had heard of appears in a daughter. Her parents are first cousins. Squares are men, circles women; a filled symbol is **affected**. Roman numerals number the generations.
2. Look first at I-1, I-2 and II-4, ringed: they rule out at least one way of inheriting. Which patterns could give this tree, and which are **ruled out**?

Predict box: In a pedigree, two unaffected parents have an affected daughter. Which statement is correct? Hands up or mini whiteboards first.

Answer C: It is recessive and autosomal, so both parents carry it

Remember it: Quiet Loud Dad Boys (Unaffected parents, affected child, Affected parents, unaffected child, Affected daughter, unaffected father, Mostly sons, skipping generations).

THE LESSON

12

min

The rules of thumb

Chapter 10's figure and the Remember it tiles. Ask students to say each rule aloud as a sentence ("two parents without it have a child with it, so it is recessive").

8

min

Test your hunch

The pedigree tool in chapter 10, the first two families. Students choose a pattern, then see which are ruled out and why. Do not move on until each pair can say the reason.

20

min

Pedigree puzzles

The puzzles below in pairs, then the card sort of inductive and deductive steps. Walk round for the common slip: calling a recessive condition dominant because the family is large.

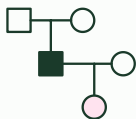
10

min

Why close relatives?

The genetic basis only: relatives are more likely to carry the same rare recessive allele, so a child of cousins has a higher chance of two copies. Return to the PKU cross. Keep the discussion on the genetics and treat the social reasons as outside the course.

ACTIVITIES



PUZZLE

Pedigree puzzles

Five invented pedigrees of increasing difficulty, each with a condition and a question: which patterns of inheritance are possible, and which can you rule out? Start with one where two unaffected parents have an affected child (recessive for certain, but autosomal or X-linked?), and finish with one that supports only one pattern. Students must give the line of reasoning in a sentence. Add a version with a deliberately ambiguous pedigree, and ask what extra information would settle it.

Needs: printed pedigrees, coloured pencils.

CARD SORT

Inductive or deductive?

Eight statements from a pedigree investigation, for pairs to sort. Inductive, from particular cases to a general rule: "Every affected child so far has unaffected parents, so the condition is probably recessive." Deductive, from the rule to a particular case: "The condition is recessive, so the unaffected mother of an affected child must be a carrier." Ask which kind is more certain and why a rule reached by induction is only a theory until tested.

Needs: printed cards, one set per pair.

PLENARY

5

min

Exit

The one pedigree rule that is most useful to you, and a pedigree on which it works. Collect.

WHAT STUDENTS GET WRONG

"A carrier shows the condition." A carrier of a recessive allele has the normal phenotype. Ask what a pedigree can and cannot tell you about the carriers.

"A big family with a condition means it is dominant." Check the rule of thumb about unaffected parents with an affected child first.

STRETCH AND SUPPORT

Support: a pedigree with the rules of thumb already ticked against it, to be copied for the next.

Stretch: why can a pedigree never prove that a condition is X-linked, though it can rule it out? Ask for an example.

IN THE GUIDE

- 10** [Reading a family tree](#)
- A11** [The whole guide, with the figures that play](#)
- PPTX** [This lesson's slides, in the order of this plan](#)

EXAM PRACTICE

Check yourself

Set it for homework: a fresh paper of exam-bank questions on D3.2 at standard level each time, marked as students go and saved to their Exam practice when they are signed in.

biologybybradford.com/exam-maker/sit?topics=D3.2&level=SL&paper=quiz&marks=15&src=ep



PRACTISE AND REVISE

BUILD FOR YOUR CLASS

- [Tarsia puzzle, dominoes and picture reveal](#) on D3.2, built from its key terms and ready to print
- A [pub quiz](#) with rounds on D3.2, to present or run with no projector
- An [escape room built from the question bank](#) on D3.2

ALREADY ON THE SITE FOR D3.2

- Lesson: [Linked Genes & Chi-Squared](#)
- Lesson: [Dihybrid Crosses & Test Crosses](#)
- Lesson: [Inheritance](#)
- Summary doodle: [Inheritance](#)
- Quiz: [Inheritance \(HL\)](#)
- Quiz: [Inheritance](#)
- Revision map: [D3.2 Inheritance](#), to fill in
- Exam questions: [D3.2 in the exam maker](#), a paper with its markscheme

CARD SETS ON SPLYCR

Open a set to host it as a class game, or make a copy to edit.

- [D3.2 Inheritance](#)

How this was made. The course structure, the activities and the teaching choices come from my own classroom, my presentations and my years of teaching IB and AP Biology. I use Claude, an AI, to help write and build the interactive guides, lesson plans, slides and practice questions, and to draw the diagrams and code the interactives. I direct the work and review it against the IB and AP specifications before it goes live.