

30-minute Lesson Plan — Biology (Year 6): DNA and Heredity

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Lesson Overview

- Topic: DNA and heredity (introducing DNA, genes, inherited traits, and variation)
- Grade: Year 6 (UK)
- Duration: 30 minutes
- Approach: Blend — peer workshops, collaborative micro-projects, and short multimedia elements
- Materials (low): one device to show a short clip (tablet/laptop), plain paper and pens per student, optional classroom whiteboard or projector

Learning Objectives (measurable)

By the end of the lesson, learners will be able to:

1. Identify DNA as the basic unit that carries genetic instructions (define “DNA” and “gene” in simple terms).
2. Give at least two examples of traits that can be inherited and explain why siblings can look different (role of genes + variation).
3. Communicate an explanation of one inherited trait to peers in a collaborative micro-podcast or short presentation.

Success criteria:

- Accurately label DNA/gene in a one-sentence definition (objective 1).
- Provide two correct examples of inherited traits and one clear reason for sibling differences (objective 2).
- Deliver a 30–60 second explanation that uses the terms “gene,” “inherited,” or “DNA” correctly (objective 3).

Standards Alignment (general UK KS2 progression)

- Recognise that living things produce offspring of the same kind, but offspring vary and are not identical to their parents.
- Introduce simple terms for inheritance and variation (DNA, gene, trait).
- Use discussion and presentation to communicate scientific ideas.

Timing and Lesson Flow

0:00–02:30 – Hook (multimedia)

- Show a short clip (90–120 seconds) or animated slide: quick visuals of family photos showing similar and different features (eye/hair colour, dimples), ending with a simple animation of a DNA double helix labelled “DNA – instructions for traits.”
- Teacher role: facilitator – play clip, set the task for groups.

02:30–03:30 – Group setup and role assignment (60 seconds)

- Groups of 3–4. Assign roles: Speaker, Scribe, Fact-checker (rotating roles if time allows).
- Quick instructions: groups will investigate visible traits and make a short micro-podcast/explanation.

03:30–12:30 – Peer Workshop 1: Trait Survey & Hypothesis (9 minutes)

- Task: In groups, list 6 visible traits found in family photos or common classroom examples (e.g., eye colour, hair curl, attached earlobes, tongue-rolling). For each trait choose whether it is likely inherited or influenced by environment.
- Use peer talk to decide for each trait: inherited / environmental / both. Scribe records group choices and one reason per trait.
- Pulse Check 1 (end of activity – see below).

12:30–14:30 – Short teacher-led multimedia mini-clarify (2 minutes)

- Play a 60–90 second clip or show a two-slide animation that gives a simple definition:
 - DNA: molecule that stores information
 - Gene: small section of DNA that codes for a trait
 - Variation: offspring differ because genes combine differently and environment can change how traits appear
- Teacher role: facilitator who prompts groups to reflect on whether their choices fit the definitions.

14:30–22:30 – Peer Workshop 2: Micro-podcast / Mini-presentation (8 minutes)

- Task: Each group creates a 30–60 second micro-podcast or short scripted explanation about one inherited trait (choose one trait from workshop 1). Include:
 - A clear statement naming the trait
 - Use the words “DNA” or “gene” or “inherited”
 - A simple reason why siblings might be different for this trait
- Practice for one minute, then present to a neighbouring group (peer feedback: one positive, one

suggestion).

- Pulse Check 2 (after presentations – see below).

22:30–29:30 – Individual Quick Quiz Exit Ticket (7 minutes)

- Each pupil completes 10 short quiz-style checkpoints (multiple-choice / short answer) to assess individual understanding and give teacher evidence for next steps.
- Collect or quickly self-mark as appropriate.

29:30–30:00 – Metacognition & Close (30 seconds)

- Quick written reflection (on exit ticket or sticker): one sentence answering the metacognition prompt (see prompts below).

Pulse Checks (embedded formative checks with success criteria)

Pulse Check 1 (at 12:30 – group level)

- Prompt: Present your group's list of 6 traits and classify each as inherited, environmental, or both. For two traits explain the reason.
- Success criteria:
 - Correctly classify at least 4 of 6 traits ($\geq 67\%$ correct).
 - Provide clear reasoning for 2 traits using "gene/DNA" or "environment" language (both explanations present).

Pulse Check 2 (at ~22:30 – peer feedback)

- Prompt: Deliver your group's 30–60 second explanation to another group and record one peer feedback note: one strength + one improvement.
- Success criteria:
 - Explanation includes at least one correct use of the words "DNA" or "gene" and one clear statement that the trait can be inherited.
 - Peer feedback contains one accurate strength (e.g., correct term used) and one actionable suggestion (e.g., clarify why siblings differ).

Optional Pulse Check 3 (teacher observational; continuous)

- Prompt: Teacher listens during presentations for correct use of vocabulary and conceptual accuracy.
- Success criteria:
 - At least 80% of groups use "DNA" or "gene" correctly in their explanations.

Quiz-style Checkpoints (10 quick items for exit ticket)

Each item includes the question, expected correct answer, and explicit success criteria for marking.

1. Question: What is DNA?

- Correct answer: Molecule that stores genetic information/instructions for traits.
- Success criteria: Uses phrase “stores information” or “instructions for traits” (full credit).

2. Question: What is a gene?

- Correct answer: A small section of DNA that codes for a trait.
- Success criteria: Mentions “section of DNA” and “trait” (full credit); partial credit if one element correct.

3. Question (MCQ): Which of these is usually inherited?

- Options: A) Eye colour B) Language spoken C) Left-handedness due to injury D) Shoe size last year
- Correct answer: A) Eye colour.
- Success criteria: Selects A for full credit.

4. Question: Explain in one sentence why brothers and sisters who have the same parents can look different.

- Correct answer: Because different combinations of parental genes and environmental factors cause variation.
- Success criteria: Mentions “different gene combinations” or “genes mix differently” (full credit); adding environment is correct but not required for full credit.

5. Question (T/F): All traits are only determined by genes.

- Correct answer: False.
- Success criteria: Correctly choose False and optionally give brief reason.

6. Question: Give one example of a trait that is usually influenced by the environment (not only genes).

- Correct answer examples: Tan from sun exposure, accent, muscle size from training, scars.

- Success criteria: Example clearly linked to environment; full credit if reasonable.
7. Question (MCQ): Which word best completes the sentence: "A _____ is a visible characteristic, like hair colour."
- Options: A) Gene B) Trait C) Chromosome D) Cell
 - Correct answer: B) Trait.
 - Success criteria: Selects B.
8. Question: Circle the best short description: Chromosomes are...
- Correct answer: Structures that hold DNA (long DNA molecules).
 - Success criteria: Mentions "hold DNA" or "made of DNA" for full credit.
9. Question (Short): Name one thing scientists use to study heredity (example).
- Correct answer examples: Family trees/pedigrees, experiments with plants/animals, DNA tests.
 - Success criteria: Any reasonable scientific method named; full credit if appropriate.
10. Question: Use one sentence to explain why knowing about heredity is useful in real life.
- Correct answer examples: Helps understand family traits, medical risks, plant/animal breeding, conservation.
 - Success criteria: Gives one correct real-world application in one clear sentence.

Scoring guidance:

- Each item = 1 mark; 8–10 marks = Secure understanding, 5–7 = Developing, <5 = Needs further support.
- Teacher may adapt to quick self-marking where pupils compare to an answer sheet.

Metacognition Prompts (use during close or on exit ticket)

- Write one sentence: How does understanding DNA or heredity help you make sense of family similarities or real-life choices? (e.g., pet breeding, health, gardening)
- OPTIONAL extension prompt for higher achievers: Describe one real-world job where knowledge of heredity is useful and say why.

Expected responses:

- Simple connection to family traits, health screening, conservation, agriculture, or pet breeding.
- One sentence is sufficient; teachers collect to inform future planning.

Differentiation and Inclusion

- Lower support: Provide a printed list of example traits and short clue phrases linking to “gene” or “environment.” Allow role of scribe for learners who prefer writing.
- Higher support/extension: Ask learners to include the term “chromosome” correctly in their micro-podcast and give an extra reason for variation (meiosis/alleles simplified).
- Language support: Provide sentence starters (“This trait is inherited because...”, “DNA tells cells how to...”).
- SEN access: Use paired work where a peer supports communication; allow oral answers instead of written for the exit ticket.

Assessment & Evidence for Next Steps

- Formative evidence: group posters/notes, recorded micro-podcasts, peer feedback notes, and exit ticket scores.
- Use exit ticket banding (8–10 secure, 5–7 developing, <5 needs support) to plan follow-up: reteach variation concepts, run a small lab/observation in subsequent lessons, or introduce simple genetics activities.

Low-materials Logistics & Teacher Facilitation Notes

- Multimedia: Use a short, teacher-selected animation (≤ 2 min) or a 1–2 slide sequence with images and labels. If no device, teacher narrates equivalent visuals using drawings.
- Keep group timings strict using a visible timer.
- Teacher role is facilitator: circulate, listen for correct vocabulary, prompt deeper thinking, and scaffold when groups struggle.
- Timing tolerance: ± 1 minute per segment if transitions are fast or slower.

Safety and Ethical Guidance

- Avoid asking for sensitive personal genetic information. Use hypothetical or public examples (photos provided by teacher or stock images), not pupils’ family medical details.
- Emphasise respect when discussing family traits and avoid value judgments about appearance.