

Variation Within Species: Tracking Traits Across Generations

30 minutes, 3 stages

Biological diversity exists not just between different species, but within a single species. When you understand how variation helps species survive and why no two individuals are exactly alike, you grasp why that matters([Outcome](#), [Outcome](#)).

Stage 1: Observe and Sort Variation (8 min)

Look around your home or think about people in your year level at school. You will find variation everywhere.

Task 1: List five traits you can observe in humans. For each one, decide whether it is discrete variation (a trait you either have or do not have, with no in-between) or continuous variation (a trait that falls somewhere on a range or spectrum).

Example: Hand span (the distance from thumb to pinky when your hand is spread) is continuous variation because it ranges from small to large. Attached or unattached earlobes is discrete variation because you have one or the other.

Your five traits:

1. Trait: Type (discrete or continuous):
2. Trait: Type (discrete or continuous):
3. Trait: Type (discrete or continuous):
4. Trait: Type (discrete or continuous):
5. Trait: Type (discrete or continuous):

Task 2: Choose one trait from your list. Write down whether you think this trait is heritable (passed down from parents to offspring through genes), non-heritable (caused only by your environment or choices), or both ([Outcome](#)).

Trait: _____

Is it heritable, non-heritable, or both? _____

Explain your reasoning in one or two sentences.

Stage 2: Trace a Characteristic Through Generations (12 min)

You inherit characteristics from both parents. Some traits match one parent, some match the other, some are intermediate, and some are different from both ([Outcome](#)).

Task 3: Think of a family you know (your own, a friend's, or a fictional family). Choose one observable characteristic such as eye colour, hair texture, height range, or ability in sport or music. Fill in the table below.

Parent 1	Parent 2	Child 1	Child 2	Child 3

Write the characteristic you chose: _____

Now write one sentence explaining how the children's versions of this trait compare to their parents' versions. Do any children show a trait that is intermediate between their parents? Does any child show something unexpected?

Task 4: Dominant and recessive characteristics provide a partial explanation for why offspring vary ([Outcome](#)). Tongue rolling is often used as an example of a dominant/recessive trait, though twin studies show it is influenced by more than one gene and possibly environmental factors, so treat it as a rough illustration rather than a strict rule. Hand clasping preference is an example of discrete variation, where characteristics differ distinctly among individuals.

If you can roll your tongue, write: "I can roll my tongue (often linked to a dominant form)."

If you cannot, write: "I cannot roll my tongue (often linked to a recessive form)."

Now ask someone else in your household or a friend the same question. Write their answer.

Stage 3: Connect Variation to Survival (10 min)

Variation within a species is not random decoration. It affects whether individuals and populations survive when their environment changes ([Outcome](#), [Outcome](#)).

Task 5: Read this scenario.

A population of beetles lives in a forest. Most beetles have brown shells that match the tree bark. A few beetles have green shells. A disease kills many of the brown trees, leaving mostly green plants and lighter-coloured soil. Predators (birds) hunt the beetles.

Which beetles are more likely to survive in this new environment? Write one sentence explaining why variation in shell colour matters to the population's survival.

Task 6: Identify one example of variation in a real organism that you know about (from your own observations, from class, or from research). This could be variation in size, colour, behaviour, or any other trait.

Organism: _____

Trait that varies: _____

How might this variation help the organism survive in its environment? Write two or three sentences.

Self-check

Answer these questions to confirm your understanding.

1. What is the difference between discrete and continuous variation? Give one example of each.
2. Name one characteristic that is heritable and one that is not heritable. Explain why you sorted them that way.
3. Why is variation within a species important for the species' survival when the environment changes?