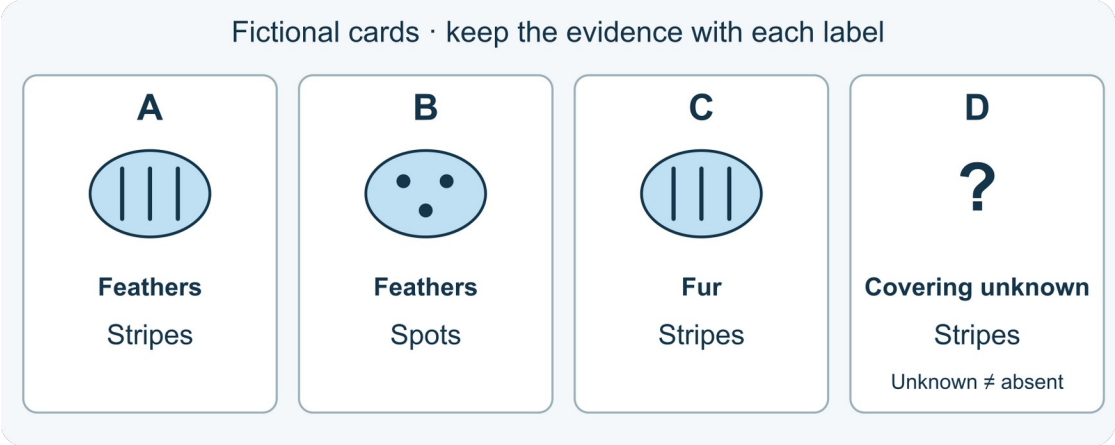
Sort animal clues without guessing

What happens when a grouping rule meets a missing detail?

Group four fictional animal cards by stated features, change the rule and keep unknown information visible.

Explore | 10-20 minutes, or one grouping | Paper and a pen or pencil, The four complete fictional card descriptions below; no wildlife observation needed

Start here Copy four labels, or use the supplied cards: A has feathers and stripes; B has feathers and spots; C has fur and stripes; D has stripes but its covering is hidden.



A known pattern can have an unknown covering

1 Keep the evidence attached

These are invented creatures described for a sorting model, not real species records. Record only what each description supplies. For D, ‘covering hidden’ means unknown, not ‘no covering’.

2 Choose one rule

First group by the stated covering: feathers, fur or unknown. Put A with B, C in fur and D in unknown. You can draw boxes, point or say the groups instead of making cards.

3 Change the question

Now group by stated pattern: stripes or spots. A, C and D go together for stripes; B has spots. This grouping answers a different question, so changing groups is not a contradiction.

4 Name a limit

Write one conclusion supported by the descriptions and one question they cannot answer, such as how the animals move. Do not fill a missing detail with a guess. You may design an additional fictional card if you want.

Four fictional cards two sensible groupings

The supplied model descriptions are complete: A = feathers, stripes; B = feathers, spots; C = fur, stripes; D = stripes, covering hidden. These labels are invented, not observations of actual animals.

• Covering rule: feathers A/B; fur C; unknown D.

• Pattern rule: stripes A/C/D; spots B.

• D can join the striped group while its covering remains unknown. One known feature does not supply a missing one.

What this example can show These convenient groups do not identify a species, establish evolutionary relationships or prove a feature's function. No animal contact or collection is part of this activity.

A different way

Use only A and D, have the labels read aloud, or direct another person to draw the groups. You can use the model without identifying a real animal.

If you want to go further

Create a fifth fictional card with a clearly labelled feature. Test whether both rules can place it, adding 'unknown' or 'another pattern' where needed instead of forcing a match.

Something to notice

Did I keep 'unknown' different from 'absent'?

Read or explore more

Horizon topic Zoology

https://launchhorizonhq.com/learn/zoology/

Horizon topic Animal Coverings

https://launchhorizonhq.com/learn/animal-coverings/

Horizon topic Classification Keys

https://launchhorizonhq.com/learn/classification-keys/

Australian Museum What is classification?

https://australian.museum/learn/species-identification/ask-an-expert/what-is-classification/

Science Learning Hub, University of Waikato Develop a classification system

https://www.sciencelearn.org.nz/resources/158-develop-a-classification-system

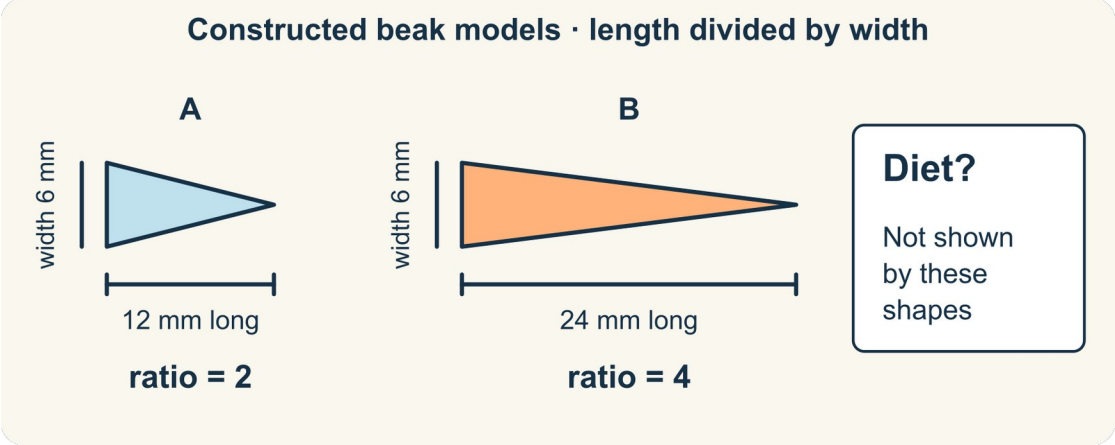
A beak drawing and a function question

What can shape alone suggest, and what needs a checked reference?

Compare two original beak models numerically, then separate a visible feature from a claim about how a bird lives.

Investigate | 15–25 minutes, or one comparison | Paper and a pen or pencil, The supplied model; no purchase, account or internet connection needed

Start here Use two fictional beak models measured by the same drawing convention: A is 12 mm long and 6 mm wide; B is 24 mm long and 6 mm wide. These are model labels, not measurements of real birds.



Shape measurements do not name a diet

1 Compare like measurements

Keep units and measurement points consistent. Length-to-width ratio is length divided by width: A = 12 / 6 = 2; B = 24 / 6 = 4.

2 State what the drawing supports

B is twice as long in this model and has twice A's length-to-width ratio. Both have the same stated width. This is a shape comparison, not an identification.

3 Question a function claim

The silhouette might suggest a question about reach or handling food, but it does not establish a diet. Real beaks serve several functions, and similar shapes need not be used in exactly the same way.

4 Name better evidence

For a real species question, seek a checked species reference and observations of what that species does. You can finish by stating what evidence is missing; do not catch, feed or test a bird.

Two ratios no invented diet

Both outlines and all dimensions are original constructed models.

• A: 12 mm/6 mm = 2. B: 24 mm/6 mm = 4. These ratios have no unit because the same units cancel.

• B's model length is 2 × A's. The figures alone do not prove B eats a particular food or has greater feeding success.

• A useful question is "What evidence would connect this feature with a function in a named species?" It is more precise than assigning a diet to an unnamed drawing.

What this example can show Model dimensions do not reveal material properties, movement, ancestry, behaviour or ecological context. The reference research does not validate these fictional beaks.

A different way

Use the supplied calculations and compare "what is labelled" with "what is unknown", or have someone describe the two outlines. A calculator is optional, not required.

If you want to go further

Scale A to 24 mm long and 12 mm wide. Its ratio remains 2: explain why size and proportion are different comparisons.

Something to notice

Which part of my account came from the model, and which would require evidence about a real species?

Read or explore more

Horizon topic Bird Beaks

https://launchhorizonhq.com/learn/bird-beaks/

Horizon topic Animal Classification

https://launchhorizonhq.com/learn/animal-classification/

Horizon topic Zoology

https://launchhorizonhq.com/learn/zoology/

University of Bristol Bird beaks did not adapt to food types as previously thought

https://www.bristol.ac.uk/news/2019/january/adaptation-of-bird-beaks-.html

Okinawa Institute of Science and Technology Birds have beaks that are a compromise of many functions

https://www.oist.jp/news-center/news/bbu/2022/1/27/birds-have-beaks-are-compromise-many-functions

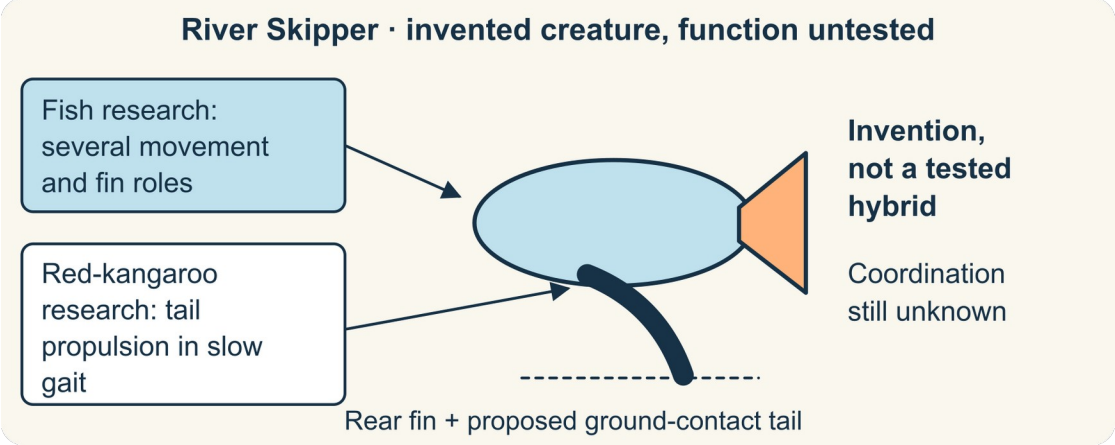
Invent a creature with a labelled inspiration

Which movement idea is researched and which part belongs to invention?

Design an imaginary creature while labelling what came from research and what is only an untested invention.

Make | 15–25 minutes, or one comparison | Paper and a pen or pencil, The supplied model; no purchase, account or internet connection needed

Start here Sketch an invented "River Skipper": an oval body, a side-to-side rear fin and a muscular tail that might contact the ground. Label the whole creature "invented; function untested".



Research is an inspiration, not a hybrid test

1 Read the two supplied research notes

The Florida Museum describes different ways fish propel and stabilise themselves, including body/tail motion. A red-kangaroo study measured a propulsive role for the tail during its slow five-part gait. These are different real cases.

2 Mark the borrowed ideas

Label rear-fin movement "inspired by fish locomotion" and proposed ground-contacting tail "inspired by the red-kangaroo study". These labels identify an inspiration, not evidence that a hybrid would work.

3 Add one invented feature

For example, give the creature broad folding fins. Explain their proposed purpose with "might". Write one unanswered question about support, movement or coordination; do not describe the proposal as an observed adaptation.

4 Keep the categories separate

Use three headings: researched statement, design invention, evidence still needed. The paper creature is complete as a labelled idea, even when its physical feasibility remains unknown.

A research inspired drawing with honest labels

The River Skipper is original fiction; no animal was made, measured or observed for this activity.

• Research: some fish use body/tail movement in swimming. The museum also describes fins helping with stability and manoeuvring, so “all fins do the same job” would be inaccurate.

• Research: the cited red-kangaroo work concerns slow pentapedal locomotion; it does not establish a universal function for every animal’s tail.

• Invention: one creature combines a rear fin with a proposed ground-contact tail. Unknown: whether its structures, materials and movement could work together.

What this example can show A useful biological analogy is not proof of engineering feasibility, evolutionary history or real animal behaviour. Keep the inspiration’s species and movement context visible.

A different way

Annotate the supplied creature with R for research and I for invention, or dictate labels to a scribe. There is no need for artistic skill, outdoor observation or animal handling.

If you want to go further

Remove one proposed structure and explain which movement question changes. A paper redesign can test consistency of your explanation, not physical performance.

Something to notice

Can a reader tell exactly which statement is researched and which part I invented?

Read or explore more

Horizon topic Animal Movement

https://launchhorizonhq.com/learn/animal-movement/

Horizon topic Aquatic Movement

https://launchhorizonhq.com/learn/aquatic-movement/

Horizon topic Zoology

https://launchhorizonhq.com/learn/zoology/

Florida Museum of Natural History, University of Florida How Fish Swim

https://www.floridamuseum.ufl.edu/discover-fish/fish/how-fish-swim/

O’Connor and colleagues, Biology Letters; PubMed record The kangaroo’s tail propels and powers pentapedal locomotion

https://pubmed.ncbi.nlm.nih.gov/24990111/