

Animals Including Humans

Nutrition, skeletons, muscles & growth



1. Why can't humans make their own food, unlike plants?

Humans get **nutrition** from food, taking in nutrients our bodies can't make ourselves.

- Different food groups give us different nutrients our bodies need.
- A balanced diet means eating the right amount from each group.

A BALANCED DIET

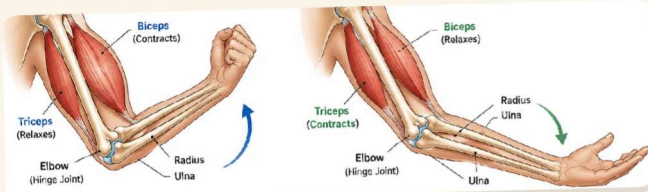
Eat a variety of foods in the right amounts to stay healthy!



3. How do joints and muscles work together to move us?

A **joint** is where two bones meet; **muscles** pull on bones across joints to create movement.

- Muscles work in pairs — one contracts (shortens) while the other relaxes.
- Bones cannot move by themselves; they need muscles to pull them.



2. What does our skeleton do for us?

Our **skeleton** supports the body, protects our organs, and lets us move.

- The skull protects the brain; the ribcage protects the heart and lungs.
- Without a skeleton to hold us up, we couldn't stand or move.

4. What's the difference between a vertebrate and an invertebrate skeleton?

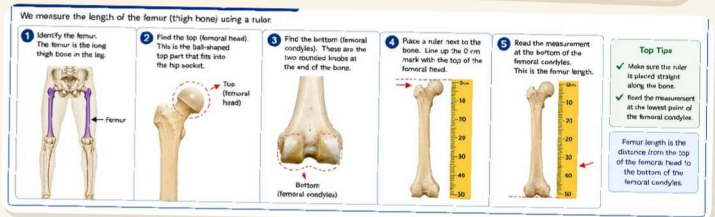
A **vertebrate** has a backbone (an **endoskeleton**); some invertebrates have a hard outer **exoskeleton** instead.

- Fish, amphibians, reptiles, birds and mammals are all vertebrates.
- Insects and crabs have an exoskeleton, which they must shed to grow.

5. Our Big Question: do taller people have longer femurs?

The **femur** (thigh bone) is the longest bone in the body — we investigate if it scales with height.

- This is a **pattern-seeking** enquiry — we look for a pattern across the class, not one fair test.
- We measure everyone's height and femur length, then plot the data.



6. Greater Depth: is there always an exact pattern between height and femur length?

Real data often shows a general trend, but not every single person fits it exactly.

- A point that doesn't fit the pattern is called an **anomaly**.
- Scientists still describe the overall pattern, even with anomalies present.

Measuring Height Against Femur Length
The table shows the relationship between a person's height and the length of their femur.

Person ID	Height (cm)	Femur Length (cm)	Height / Femur Length Ratio
1	150.2	39.6	3.79
2	158.7	42.1	3.77
3	165.4	44.0	3.76
4	172.1	45.2	3.72
5	178.3	48.1	3.71
6	185.6	50.0	3.71
Average (Mean)	168.4	45.0	3.74

How Femur Length is Measured
Femur length is measured from the top of the femoral head to the bottom of the femoral condyles.

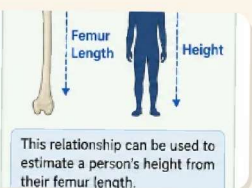
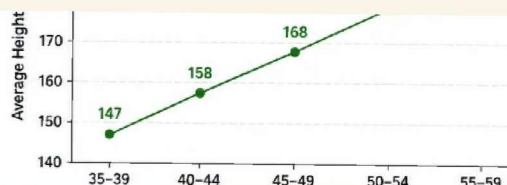
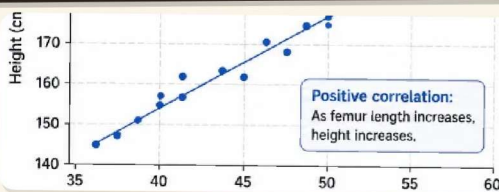
Conclusion: There is a consistent relationship between height and femur length. On average, height is about 3.74 times the length of the femur in this sample.

7. TAPS: How do we write up our height & femur investigation?

PATTERN SEEKING

Our TAPS task: **do taller people have longer femurs?** It's **pattern seeking** — we collect height and femur data across the whole class and look for a trend.

- Question → **prediction** → what we'll measure & how.
- Method → collect class data → plot our **results** → **conclusion**.



KEY VOCABULARY

nutrition skeleton muscle joint vertebrate invertebrate femur pattern anomaly predict conclusion

SKILLS I'LL USE

- Measure height & length accurately
- Collect & record whole-class data
- Plot data & spot a pattern
- Classify vertebrates & invertebrates
- GD: identify anomalies in a data pattern