Why Do We Yawn?

Supplementary Biology · Human body and the nervous system
🎬 **Video explanation (PrayogX reel):** https://www.instagram.com/reel/DfCu8puEy6S/

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1. The question

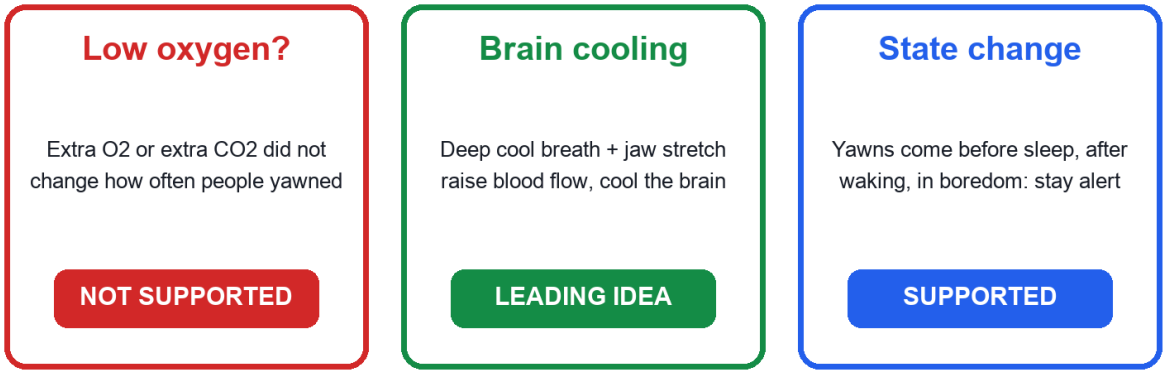
Everybody yawns: babies, adults, even dogs, cats and fish. You may even yawn while reading this! But **why** do we yawn? Scientists have tested several ideas. One popular idea turned out to be wrong; the leading idea today is **brain cooling**, and research is still going on.

2. Key definitions

Term	Meaning
Yawn	An involuntary reflex: the mouth opens wide, a long deep breath is taken in, the jaw and face muscles stretch, then a shorter breath goes out.
Reflex action	A quick, automatic response to a stimulus, not under conscious control.
Hypothesis	A possible explanation that can be tested by experiments.
Contagious yawning	Yawning triggered by seeing, hearing, reading or even thinking about someone else's yawn.
Thermoregulation	The body's control of its temperature (including the brain's temperature).

3. Three explanations compared

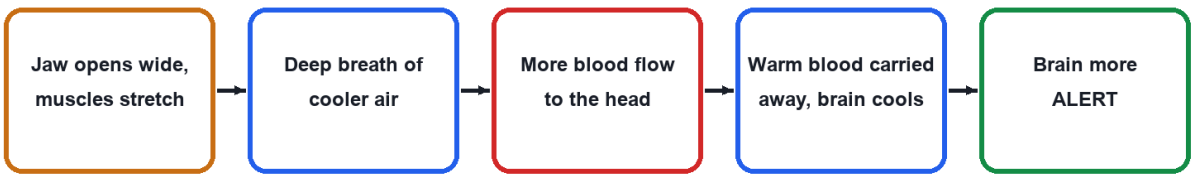
Why do we yawn? Comparing the explanations



Hypothesis	Idea	What experiments show
Low oxygen / high CO_2	We yawn to take in more oxygen	**Not supported.** In experiments (Provine and co-workers, 1987), breathing pure oxygen or air with extra CO_2 did **not** change how often people yawned.
Brain cooling	A yawn helps cool the brain	**Leading idea.** People yawn less when the forehead is cooled or when breathing through the nose, and yawning frequency depends on air temperature.
State change / alertness	Yawns help the brain shift between states	Yawns cluster before sleep, after waking and in boredom.

4. Brain cooling: step by step

Brain-cooling idea: the chain of events in a yawn



A leading hypothesis supported by many studies; research is still going on.

1. The **jaw opens wide** and the face and neck muscles stretch.
2. A **deep breath of cooler air** is drawn in through the mouth.
3. The stretching increases **blood flow** to and from the head.
4. Warmer blood is carried away and cooler blood arrives, so the **brain cools** slightly.
5. A cooler brain is thought to work more efficiently, helping us stay **alert**.

Like a computer fan: when a computer works hard it heats up and the fan switches on; a yawn may be the brain's way of switching on a cooling fan.

5. When do we yawn?

- **Before sleep** and **after waking up**: the brain is changing its state.
- When **bored** or tired: the brain may be trying to stay alert.
- When the surroundings are moderately warm (not very hot, not very cold).

6. Contagious yawning

- Seeing, hearing or reading about a yawn can make you yawn.
- It spreads **more among family and close friends** than among strangers (Norscia and Palagi, 2011), so it may be linked to social bonding.
- Contagious yawning usually develops in childhood (around 4–5 years), while ordinary yawning is present from before birth.

7. Amazing fact: yawning in the womb

Ultrasound scans show that a baby yawns even in the **mother's womb**, from about 11 weeks of pregnancy. A baby in the womb does not breathe air (it gets oxygen through the placenta), which is another strong reason why yawning cannot be simply about getting oxygen.

8. Examples and quick facts

- A typical yawn lasts about 6 seconds.
- Animals yawn too: dogs, cats, lions, birds and even fish.
- Dogs can "catch" yawns from their owners.

9. Thinking like a scientist (solved examples)

Solved example 1. A student claims, "We yawn because our blood needs more oxygen." Design a simple test and predict the result from real experiments.
Solution: Let one group breathe normal air and another breathe extra oxygen, and count yawns per hour. If yawning were for oxygen, the extra-oxygen group should yawn less. Real experiments found **no difference**, so the claim is not supported.
Solved example 2. In a study, people holding a cold pack on the forehead yawned less while watching yawning videos than people holding a warm pack. Which hypothesis does this support?
Solution: The **brain-cooling** hypothesis: if the brain is already being cooled, there is less need

to yawn.

10. Key takeaways

- Yawning is an involuntary reflex: wide mouth, deep breath, muscle stretch.
- The "low oxygen" idea is **not supported** by experiments.
- **Brain cooling** is the leading explanation; yawning helps keep the brain cool and alert.
- Yawns come with state changes: before sleep, after waking, in boredom.
- Yawning is **contagious**, more among close ones; babies yawn even in the womb.

Practice questions (CBSE style)

Q1 (MCQ). Experiments in which people breathed extra oxygen showed that their yawning:
(a) stopped (b) increased a lot (c) did not change (d) became contagious
Q2 (MCQ). The leading hypothesis for why we yawn is:
(a) lack of oxygen (b) brain cooling (c) hunger (d) excess carbon dioxide
Q3 (Short answer, 2 marks). What is contagious yawning? With whom does it spread more?
Q4 (Short answer, 2 marks). Give two situations in which people commonly yawn and explain why.
Q5 (Application, 3 marks). How does the fact that babies yawn in the womb argue against the "low oxygen" explanation?
Q6 (Flowchart based, 3 marks). Complete the flowchart for the brain-cooling idea: jaw opens → _____ → more blood flow to the head → _____ → brain more alert.
Q7 (Numerical / data, 3 marks). In a class of 40 students, 28 yawned within 5 minutes of watching a yawning video. What percentage yawned? What does this show?
Q8 (Case based, 4 marks). Two groups watched a yawning video. Group A held cold packs on their foreheads; Group B held warm packs. Group A yawned much less.
(a) What is the independent variable? (1)
(b) Which hypothesis does the result support? (1)
(c) Why was a video of yawning used? (1)
(d) Suggest one way to make the experiment fairer. (1)

Answer key with worked solutions

A1. (c) did not change.
A2. (b) brain cooling.
A3. Yawning triggered by seeing, hearing, reading or thinking about another person's yawn. It spreads more among family and close friends than among strangers.
A4. Before sleeping and after waking up (the brain is changing its state), and when bored or tired (yawning may help the brain stay alert). Any two with reasons.
A5. A baby in the womb does not breathe air; it gets oxygen through the placenta. Yet it yawns, so yawning cannot simply be a way to take in more oxygen.
A6. jaw opens → **deep breath of cooler air** → more blood flow to the head → **brain cools**

slightly → brain more alert.
A7. (28 ÷ 40) × 100 **= 70 %**. It shows that yawning is highly contagious: seeing others yawn triggers yawns.
A8. (a) The temperature of the pack on the forehead (cold vs warm). (b) The brain-cooling hypothesis. (c) To trigger contagious yawning so that yawns could be counted and compared. (d) Same video, same time and room, similar groups (age, sleep), equal group sizes, or counting yawns without telling people the aim (any one).