Teacher's Key

The Female Brain Through Puberty, Pregnancy, Menopause (Level C1)

Vocabulary Matching

1 counterintuitive = **N**
2 receptors = **A**
3 pruning = **H**
4 surge = **L**
5 longitudinal = **G**
6 baseline = **M**
7 cohort = **I**
8 accelerated = **E**
9 adaptive = **D**
10 transient = **O**
11 compensatory = **J**
12 discrepancy = **K**
13 causal = **B**
14 overlooked = **C**
15 preliminary = **F**

Fill in the Blank

1 receptors
2 pruning
3 surge
4 longitudinal
5 baseline
6 cohort
7 accelerated
8 adaptive
9 transient
10 compensatory
11 discrepancy
12 causal
13 overlooked
14 preliminary

True or False

1 **True.** Paragraph 1 says this directly.
2 **False.** Paragraph 2: both girls and boys lose gray matter.
3 **True.** Paragraph 3 says the losses were still visible two years after birth.
4 **False.** Paragraph 3: white matter returned to its baseline after birth.
5 **True.** Paragraph 4: one cohort for each transition, 1,095 women in total.
6 **False.** Paragraph 4: she describes it as a hypothesis.
7 **True.** Paragraph 5 gives this rate for the stable groups.
8 **False.** Paragraph 5: gray matter in the precuneus recovered after menopause.
9 **False.** Paragraph 6: every study described is observational.
10 **True.** Paragraph 7 says more than 3,000 neuroscience and psychiatry papers.

Language Focus: Reduced relative clauses (participle phrases after nouns)

Example answer: The hormones **produced during pregnancy** affect many organs. Researchers **studying menopause** want larger samples.

Comprehension Questions: Model Answers

1 The assumption that losing gray matter always means damage or decline. The writer points out that gray matter shrinks during two healthy stages of life, puberty and pregnancy.

2 Pruning is the removal of connections the brain rarely uses. It is thought to help the connections it uses often work more efficiently.

3 First-time mothers lost gray matter in regions linked to social cognition, and the changes were still visible two years after birth.

4 White matter briefly became more robust during pregnancy and then returned to its baseline after birth.

5 It compared all three hormonal transitions with a single method, following the same women over time, with one cohort for each transition and 1,095 women in total.

6 Puberty and pregnancy showed accelerated gray matter loss, while women passing through menopause showed no detectable loss. The stable groups lost about 0.03 percent a month, the rate expected with age.

7 Differences in design: Mosconi's team examined specific regions and compared women at different stages, while the Amsterdam team tracked total gray matter within the same women. The writer presents this only as a possible reason.

8 The Amsterdam team lacked directly measured hormone data for every group. Other limits: menopause status was self-reported, the groups were scanned on different machines, and all the studies were observational.

9 Open answer. A strong answer notes that the evidence comes from small, single-person, or observational studies, so a firm conclusion would overclaim. Ending with the next test shows what larger samples could settle: whether the changes predict memory or mood.

10 False. Paragraph 6 says the team lacked directly measured hormone data for every group.

11 No. In paragraph 1 the writer says the evidence points to something more counterintuitive: gray matter shrinks during healthy stages of life, so a smaller brain is not always a worse one.

12 To explain why these questions are still open: female biology has long been overlooked in brain research, so there is little earlier work to compare against. It gives context for why the findings are preliminary rather than criticizing any one team.

Notes on the Evidence

- Main study: van 't Hof, Bos, Straathof, Crone, Hoekzema and colleagues, “Puberty, pregnancy, and menopause show shared and distinct structural changes across the lifespan,” Nature Communications 17, 9360, published September 8, 2026 (doi:10.1038/s41467-026-76755-2). Checked against the Nature Portfolio press release (September 9, 2026), Live Science (September 2026), PsyPost (September 19, 2026), ScienceAlert (September 2026), and Spain's Science Media Centre expert reactions. Groups: puberty 142 (34 transitioning), pregnancy 110 (70 transitioning: 40 first, 30 second pregnancy; 40 never pregnant), menopause 843 from UK Biobank (120 transitioning). Rates: about 0.16 and 0.12 percent a month (puberty, pregnancy); about 0.025 to 0.033 percent a month in stable menopause groups. Limits named by the authors: self-reported menopause status and no directly measured hormone data in all cohorts; different scanners per cohort (PsyPost).
- Pregnancy studies: Hoekzema et al., Nature Neuroscience 20, 287 to 296 (2017; online December 2016): 25 first-time mothers; gray matter reductions in social cognition regions; all women correctly classified; changes predicted a postpartum attachment measure; reductions present at least 2 years after birth (11 women followed up). Pritschet et al., Nature Neuroscience 27, 2253 to 2260 (2024): one participant (Elizabeth Chrastil), 26 scans from before conception to 2 years postpartum; about 4 percent average gray matter reduction in roughly 80 percent of regions; white matter microstructural integrity rose about 10 percent, then returned to pre-pregnancy levels. Single-case design.
- Menopause comparison: Mosconi et al., Scientific Reports 11, 10867 (June 9, 2021), Weill Cornell Medicine. Mostly cross-sectional across stages with 2-year follow-ups for some participants, compared with age-matched men. Gray matter in the precuneus dipped and recovered post-menopause; other regions (for example the inferior temporal gyrus) stayed lower. The reading's explanation of the discrepancy with the 2026 study (regional versus whole-brain measures, different designs) is the writer's suggestion, not a claim from either paper. The 2018 PLOS ONE hippocampus study and the 2026 Cambridge cross-sectional study (Psychological Medicine) cited in the previous version are no longer in the reading; both also differ in design from the 2026 study.
- Sex in neuroscience research: Rechlin, Splinter, Hodges, Albert and Galea, Nature Communications 13 (2022), University of British Columbia: more than 3,000 papers from 2009 and 2019 in six journals; in 2019, 5 percent analyzed sex as a discovery variable. Puberty pruning: the pruning account is the widely held interpretation of adolescent gray matter loss, supported mainly by imaging and animal work, and is presented as such. Maternal Brain Project: described by the Pritschet and Chrastil team in September 2024 as aiming to scan hundreds of women; its current status was not checked.
- Revision (September 2026, rebuild mode): reframed from a report on one September 2026 study to the durable question of whether gray matter loss means decline, using that study as one piece of evidence alongside Hoekzema 2017, Pritschet 2024, and Mosconi 2021. Corrections: the previous IELTS True/False/Not Given item (hormones proven to cause the changes) was keyed Not Given but the reading addressed the point, so the answer was False; the Yes/No/Not Given model answer cited the researchers' view, not the writer's. The unsourced claim that only two to six percent of neuroscience studies are female-only was replaced with the named Rechlin et al. (2022) figure. Details from the previous version no longer used (deep brain structures, the 34-region comparison) were cut for length, not because they were wrong. Language Focus changed from nominalization to reduced relative clauses. Vocabulary dropped: remodeling, nulliparous, plasticity, attenuation, harmonized, underrepresented (the last also overlapped with accelerated in fill-ins). Added: counterintuitive, surge, baseline, compensatory, discrepancy, overlooked. Resources: replaced the PsyPost and ScienceAlert links and the 2026 Cambridge study with sources for the studies now in the reading.
- Hindi and Arabic translations are unchecked by a native speaker, as with every EnglishBridges unit.