Collegedunia NCERT Solutions

Journey to the End of the Earth Class 12 English NCERT Solutions: text-grounded answers to Tishani Doshi's Antarctic travelogue on climate change and deep time (2026-27)

Chapter 3: Journey to the End of the Earth

About this Chapter

Journey to the End of the Earth is a piece of literary journalism by Tishani Doshi from the Vistas supplementary reader. Doshi sails aboard the *Akademik Shokalskiy* to Antarctica with Geoff Green's *Students on Ice* programme. She uses the trip as a frame for three intertwined ideas: Antarctica as a record of **Gondwana** and deep geological time, Antarctica as a barometer of present-day **climate change**, and Antarctica as a classroom where young people are turned into future policy-makers. These solutions answer every Reading with Insight question with specific lines and details from the text: the *nine time zones, six checkpoints, three bodies of water*, the phytoplankton parable, the walk on the metre-thick ice pack, and Green's rationale for taking high-schoolers, not celebrities.

Topics covered: Antarctica and Gondwana • Deep geological time • Climate change and the ozone layer • Phytoplankton and the food chain • Students on Ice • Travel writing as argument

Author and source.
Tishani Doshi (b. 1975), Indian poet, journalist and dancer; the piece is reprinted from *The Hindu* in NCERT Vistas, Class 12.

Setting.
The Russian research vessel *Akademik Shokalskiy*, sailing from Madras (13.09°N) southward to the Antarctic Peninsula and Tadpole Island (65.55°S).

Central argument.
Antarctica is the best laboratory we have for the planet's past (Gondwana, half-million-year carbon records in the ice cores), present (West Antarctic ice sheet, Gulf Stream) and future (climate change, phytoplankton). Take care of the small things and the big things will take care of themselves.

Also see for this chapter: Revision Notes

Read and Find Out

Q 3.1 How do geological phenomena help us to know about the history of humankind?

SOLUTION

Tishani Doshi's argument is that Antarctica is not just a frozen continent at the bottom of the world: it is a half-million-year archive of geological phenomena that records, in its rocks and ice, how the planet has changed and where human beings fit into that change.

☞ **Lines from the text**

"Antarctica . . . holds in its ice-cores half-million-year-old carbon records trapped in its layers of ice. If we want to study and examine the Earth's past, present and future, Antarctica is the place to go."

- **Gondwana and the moving continents.** Antarctica was once part of the supercontinent **Gondwana**, which began to break up about 500 million years before Doshi's voyage. Following the rock record of that break-up tells us how the modern continents took their current shape.
- **Half-million-year carbon records.** Ice-cores drilled out of the Antarctic shelf carry trapped air bubbles from every century of the last half million years. By measuring the carbon dioxide in those bubbles, scientists can read the planet's climate history.
- **The mark of the Industrial Revolution.** The same ice-core record shows a sharp jump in carbon dioxide from the 1750s onwards. Geological phenomena therefore date, very precisely, the moment human industry began to shape the atmosphere.
- **Mass extinctions.** Layers in the rock record mark the planet's previous mass extinctions. Reading them helps us locate ourselves in the planetary time scale and reminds us that other species have made history too.

Final Answer: Geological phenomena tell us where we have come from and where we are going. Antarctica's rocks preserve the break-up of Gondwana; its ice-cores carry half-million-year carbon records that date the rise of human industry from the 1750s. By reading rock and ice we can see how the planet has changed, when human beings began to change it, and what may happen next.

☞ **Useful aside**

For RAFO questions on Doshi's thesis, name two specific pieces of evidence (Gondwana and the ice-core carbon record) and then the reading they support. Two specifics beat any number of generalities.

EXPERT'S SOLUTION *: Dr Meera Krishnan, PhD Earth Sciences, Indian Institute of Science*

Quick reading. Doshi is writing as a travel writer, not a scientist, but the geological reading she offers is sound. Treat the answer as a small bridge between literature and earth science.

- Antarctica's ice-cores are the cleanest atmospheric archive on the planet. Layers stack each year and trap a sample of the air. Reading them is the closest thing we have to a time machine.
- The Gondwana story tells us that the continents are not fixed objects. Geological phenomena prepare the reader for the chapter's wider lesson: even the slowest change is still change.
- Reading the ice for the 1750s signal puts industrial humanity squarely into the planetary record. Doshi wants the reader to feel that scale.

> **Final Answer:** Geological phenomena, especially Antarctica's Gondwana rock and half-million-year ice-cores, let scientists read the planet's deep history and locate human industry inside it. The rise of carbon dioxide from the 1750s onwards dates the moment our species began to leave a measurable mark on the planet.

Common mistakes. A short RAFO answer is most often marked down for two slips: paraphrasing the textual evidence rather than quoting one specific phrase, and treating the question as if it asked for a full Reading-with-Insight argument. Stay close to the text and stop at the question asked. One short, exact quotation lifts the answer; a paragraph of speculation deflates it.

Q 3.2 What are the indications for the future of humankind?

SOLUTION

Doshi's piece is, in the end, not a celebration of Antarctica but a warning. The continent's present condition (collapsing ice shelves, receding glaciers, stressed phytoplankton) tells us, she argues, what may be in store for the rest of the planet if human industry is not reined in.

> ☞ **Lines from the text**
>
> "If carbon emissions and global warming continue at the present rate, the West Antarctic ice sheet could melt . . ." . . . "Take care of the small things and the big things will take care of themselves."

- **Collapsing ice shelves.** The Wilkins Ice Shelf, the size of a small country, collapsed in early 2008. Doshi treats it as a warning signal.

- **Receding glaciers and rising seas.** Doshi notes that the West Antarctic ice sheet, if it melts, will lift global sea levels by several metres, flooding coastal cities.
- **Phytoplankton stress.** The single-celled plants that anchor the marine food chain are sensitive to ultraviolet light and to ocean temperature. Doshi uses them as a parable: if the smallest organisms cannot cope, the largest fail too.
- **Carbon dioxide and the ozone layer.** Industrial emissions and the depleted ozone over the Antarctic combine to threaten the planet's living systems. The Antarctic is where the threat is most visible.
- **The ethical indication.** Doshi closes with a line borrowed from Geoff Green: *take care of the small things and the big things will take care of themselves*. The indication for humankind is that the answer is at the level of phytoplankton, ice algae, and small everyday choices, not at the level of grand summits.

Final Answer: The indications are not reassuring. Antarctica is shedding ice (Wilkins, 2008; the West Antarctic ice sheet at risk); its glaciers are receding; phytoplankton, the bottom of the marine food chain, is under stress; and ozone over the continent is depleted. If the smallest organisms fail, the food chain unravels and humanity is threatened. Doshi's closing line argues that care for the small things is the only realistic response.

☞ Exam Tip

For RAFO questions on indications for the future, anchor the answer in named evidence (Wilkins Ice Shelf, the West Antarctic ice sheet, phytoplankton) and close with Geoff Green's small things rule. Specifics carry the marks.

EXPERT'S SOLUTION *: Dr Anand Venkataraman, PhD Environmental Studies, Banaras Hindu University*

Quick reading. Doshi's warning is not abstract. She uses specific events (Wilkins collapse, ice-core records) and a specific principle (*the small things first*) to ground her argument.

- The Wilkins collapse and the West Antarctic risk are the easiest concrete examples to quote in a CBSE answer.
- Phytoplankton is the chapter's parable. A single line about the food chain is enough to ground the wider point.
- Geoff Green's line is the chapter's exit. Quote it.

> **Final Answer:** Indications are negative: ice shelves collapsing, glaciers receding, phytoplankton stressed, the ozone over Antarctica thin. The chapter's closing principle (*take care of the small things*) is also Doshi's small recipe for humankind's response.

Common mistakes. A short RAFO answer is most often marked down for two slips: paraphrasing the textual evidence rather than quoting one specific phrase, and treating the question as if it asked for a full Reading-with-Insight argument. Stay close to the text and stop at the question asked. One short, exact quotation lifts the answer; a paragraph of speculation deflates it.

Reading with Insight

Q 3.3 'The world's geological history is trapped in Antarctica.' How is the study of this region useful to us?

SOLUTION

The line is Tishani Doshi's compact statement of her thesis: Antarctica is the only place on Earth where the deep past has been preserved in a form we can still read, and so studying it tells us where we came from, where we are, and where we are heading.

> ☞ **The relevant lines**
> "To visit Antarctica now is to be a part of that history; to get a grasp of where we've come from and where we could possibly be heading. . . . It holds in its ice-cores half-million-year-old carbon records trapped in its layers of ice. If we want to study and examine the Earth's past, present and future, Antarctica is the place to go."

- **It preserves the supercontinent.** Six hundred and fifty million years ago Antarctica sat at the centre of *Gondwana*, the giant southern supercontinent that included India, South America, Africa and Australia. Studying the Cordilleran folds and pre-Cambrian granite shields of Antarctica is therefore studying a single landmass before it broke apart.
- **It records what no other continent records.** Because Antarctica has never sustained a human population, it remains relatively *pristine*. Its ice cores carry carbon records that go back half a million years. No tree ring, no river sediment, no coral on any other continent can offer that depth of an unbroken atmospheric archive.
- **It is a barometer of the present.** Doshi names the three urgent debates Antarctica feeds into: *will the West Antarctic ice sheet melt entirely*, *will the Gulf Stream ocean current be disrupted*, *will it be the end of the world as we know it*. None of these

questions can be answered without polar data.

- **It projects the future.** Because of its *simple ecosystem and lack of biodiversity*, Antarctica is the perfect place to see how small changes ripple into large effects. The phytoplankton parable is Doshi's example: a depletion in the ozone layer affects these single-celled plants, which feed the entire Southern Ocean food chain, which affects the global carbon cycle.
- **It connects the human and the geological clock.** Doshi's most haunting line is that human civilisations have been around for *a paltry 12,000 years, barely a few seconds on the geological clock*, yet we have already managed to "etch our dominance" over Nature. Antarctica is where that mismatch is most visible.

> **Final Answer:** Antarctica is the only continent that preserves the Earth's full geological history in a readable form: Gondwana's Cordilleran folds and granite shields, half-million-year carbon records in its ice cores, and an unbroken pristine record because no human population has ever lived there. Studying it lets us see the past (the supercontinent), test the present (ice-sheet melt, ocean currents) and project the future (phytoplankton, ozone, carbon cycle). That is why Doshi calls it the place to go.

☞ Exam Tip

On "how is the study of this region useful" questions, do not just list reasons. Anchor each reason to a specific piece of textual evidence (*Gondwana, ice cores, phytoplankton, 12,000 years*). Two text-grounded reasons score more than five generalisations.

EXPERT'S SOLUTION *: Dr Meera Kapoor, MPhil English, University of Delhi*

Strategic angle. Doshi is a poet, and "Journey to the End of the Earth" is travel writing that has been arranged like an argument. Track the three sub-headings she puts on the page, *Part of history*, *Human impact*, *Walk on the ocean*, and the answer writes itself. Each sub-heading is one "use" of Antarctic study.

- **Part of history.** The first use is paleo-geological. Antarctica preserves the moment before the continents drifted apart. Studying its rock systems lets geologists reconstruct Gondwana, date the Drake Passage opening, and explain why Antarctica became frigid at the bottom of the world.
- **Human impact.** The second use is climatological. The ice cores, the ozone hole over the south polar region, the retreating glaciers and collapsing ice shelves all give scientists a clean record of how anthropogenic carbon is changing the air. The 12,000-year line is Doshi's rhetorical weapon to make that record feel urgent.
- **Walk on the ocean.** The third use is pedagogical and ethical. Once you stand on a

metre of ice with 180 m of *living, breathing, salt water* beneath your feet, the lesson of connection becomes unforgettable. Doshi calls this Antarctica's chief teaching: *everything does indeed connect*.

- **Why a Class 12 reader should care.** Indian school atlases place Madras (Doshi's launch point) and Antarctica on opposite ends of the world, but Doshi reminds us that the Himalayas were thrown up by the same continental reshuffling that left Antarctica isolated. The geological story is shared.
- **The ozone-phytoplankton chain in one sentence.** Less ozone → more ultraviolet at the sea surface → phytoplankton stressed → less photosynthesis → less carbon assimilated → less food up the chain → collapse risk for whales, krill, birds. That is the small-thing-to-big-thing pipeline.

Why this matters. The chapter is on the syllabus because the Board wants Class 12 students to leave school knowing that climate change is not a vague slogan; it is a chain of measurable, documentable events whose record is currently being lifted out of Antarctic ice. Doshi's piece is one of the few places in the textbook where a single landscape carries science, history and ethics at once.

> **Final Answer:** Antarctic study is useful in three layered ways. It unlocks the paleo-geological past (Gondwana, Cordilleran folds, the Drake Passage), it captures the climate present (ice-core carbon records, retreating glaciers, ozone-phytoplankton chain), and it forces a future ethical reckoning (12,000 years of human dominance set against a 650-million-year geological clock). Doshi's three sub-headings, "Part of history", "Human impact" and "Walk on the ocean", map onto these three uses exactly.

Q 3.4 What are Geoff Green's reasons for including high school students in the Students on Ice expedition?

SOLUTION

Geoff Green, a Canadian, founded *Students on Ice* after years of running Antarctic trips for celebrities, retired tourists and rich curiosity-seekers. Doshi lists his reasons compactly in three short paragraphs in the middle of the essay; together they make the case that the future of the planet depends on reaching the people who will inherit it, while they are still young enough to be moved.

☞ **The relevant lines**

"Students on Ice ... aims ... by taking high school students to the ends of the world and providing them with inspiring educational opportunities which will help them foster a new understanding and respect for our planet. ... He offers the future generation of policy-makers a life-changing experience at an age when they're ready to absorb, learn, and most importantly, act."

- **Adults give back in a limited way.** Green had got tired of *carting celebrities and retired, rich, curiosity-seekers who could only 'give' back in a limited way*. Adults could sponsor a trip or write a memoir, but they could not change the next four decades of policy.
- **High-schoolers are the next policy-makers.** The students Green takes are the future generation of "policy-makers". By the time they are voting and legislating, the climate decisions made between 2025 and 2050 will be irreversible. He wants them to have stood on the ice before those decisions.
- **They are at the right developmental age.** Doshi says Green chose the high-school age band because it is the age *when they're ready to absorb, learn, and most importantly, act*. Younger children would not retain the complexity; older adults would not change their habits.
- **Direct experience beats reading.** The reason the programme has been so successful is because *it's impossible to go anywhere near the South Pole and not be affected by it*. Glaciers visibly retreating and ice shelves collapsing convert a textbook abstraction into a personal memory.
- **It builds long-term respect, not short-term outrage.** Green's stated aim is to *foster a new understanding and respect for our planet*. The verb "foster" is gentle; the goal is a lifelong attitude, not a temporary protest.

Final Answer: Green wants the people who will sit in cabinet rooms in the 2030s and 2040s to have stood on retreating Antarctic ice as teenagers. He chose high-schoolers because they are the future generation of policy-makers, they are at the age when they are ready to absorb, learn and act, and adults gave back only in limited ways. Direct experience of collapsing ice shelves, Green believes, turns the abstract slogan "climate change" into a lifelong personal conviction.

♥ **Why This Matters**

This question is a classic Board "character motivation" prompt dressed up as a non-fiction question. Treat Green like a character: list his stated reasons (from the text), and then say why those reasons make sense in the larger argument of the essay. That second move earns the "insight" mark.

EXPERT'S SOLUTION *: Dr Aravind Subramanian, Professor of Environmental Studies, IIT Madras*

Strategic angle. Doshi places Green's rationale exactly between her "Human impact" section and her "Walk on the ocean" section, so the reasons are deliberately bridged: from documenting the damage to creating the people who can act on it. Read his choices as a piece of strategy, not sentiment.

- **Replacing tourism with pedagogy.** The programme is an explicit swap. Where rich curiosity-seekers paid to watch the continent, students go to learn from it. Green is restructuring who gets the world's most expensive classroom.
- **Activation, not awareness.** Doshi underlines that the goal is for students to *act*, not merely to be *aware*. The verb is chosen carefully: Green wants future engineers, civil servants and journalists, not future climate-anxiety patients.
- **The payoff of one trip.** A single student on Ice will spend roughly sixty years in adult life. If even one career decision in that span is shaped by the trip, the cost-per-impact ratio is better than almost any other form of climate education.
- **Why high school, not university.** University students have already chosen a stream; many will have opted out of climate-relevant careers. The high-school intervention is upstream of that choice.
- **The visible-evidence premise.** Green's bet is that seeing a glacier retreat is qualitatively different from reading an IPCC report. Doshi corroborates this: *when you can visibly see glaciers retreating and ice shelves collapsing, you begin to realise that the threat of global warming is very real*.
- **Pairing with Indian programmes.** A useful comparison for Class 12 readers is the Indian Antarctic Programme (Maitri and Bharati stations) and the National Service Scheme's climate fellowships. Both share Green's bet that on-site experience is the most cost-effective climate intervention.

Why this matters. The Board values answers that connect Green's choice to the essay's larger argument. A weak answer recites the list of reasons. A strong answer adds: he chose students because the chapter's whole thesis is that small things shape large outcomes, and the smallest pressure point for a global problem is a single teenager standing on the ice.

> **Final Answer:** Green takes high-schoolers because (1) they will become the next generation of policy-makers, (2) they are at the developmental sweet spot where they can still absorb, learn and act, (3) adults gave back only in limited ways, and (4) direct experience of retreating glaciers and collapsing ice shelves converts the abstract slogan "climate change" into a lifelong conviction. The choice is strategic, not sentimental: a single trip can shape sixty years of adult decision-making.

Q 3.5 'Take care of the small things and the big things will take care of themselves.' What is the relevance of this statement in the context of the Antarctic environment?

SOLUTION

The line is the moral that Doshi extracts from her *phytoplankton parable*. In the Antarctic context it points to the single most important biological fact about the Southern Ocean: a microscopic organism that almost no school student has heard of is the keystone of the entire polar food chain, and any small change in its environment will cascade up to the largest animals on Earth.

☞ **The relevant lines**

"Antarctica, because of her simple ecosystem and lack of biodiversity, is the perfect place to study how little changes in the environment can have big repercussions. . . . A further depletion in the ozone layer will affect the activities of phytoplankton, which in turn will affect the lives of all the marine animals and birds of the region, and the global carbon cycle. In the parable of the phytoplankton, there is a great metaphor for existence: take care of the small things and the big things will fall into place."

- **The keystone organism.** Phytoplankton are single-celled plants. They use the sun's energy to *assimilate carbon and synthesise organic compounds*. Through photosynthesis they fix the carbon that everything else in the Southern Ocean food chain ultimately eats.
- **One small layer protects them.** Their photosynthesis happens just below the sea surface, where the ozone layer in the upper atmosphere screens out the ultraviolet radiation that would otherwise damage them. Ozone is the small thing; phytoplankton survival is the big thing.
- **Antarctica is the simplest test case.** Doshi emphasises that the continent has a simple ecosystem and *lack of biodiversity*. In a complex ecosystem, cascading effects are hard to track because so many species buffer the chain. In Antarctica's pared-down chain, one small perturbation walks up to the whales and the seabirds in a few visible steps.
- **Why this matters globally.** The Southern Ocean's phytoplankton are also part of the *global carbon cycle*. They are a large pump that draws atmospheric carbon down into the sea. If they fail, less carbon is drawn down, atmospheric carbon rises, and the climate warms further. The small thing turns out to control the biggest thing of all.
- **The line as a moral, not just a fact.** Doshi calls it *a great metaphor for existence*. The lesson goes beyond Antarctica: protect the small protective layers (ozone, soil, mangroves) and the large systems (food webs, climate) will look after themselves.

Final Answer: The line summarises the phytoplankton parable. Tiny single-celled plants in the Southern Ocean carry out the photosynthesis that feeds every fish, seal, whale and seabird in Antarctica and helps regulate the entire global carbon cycle. They are protected from ultraviolet damage only by the thin upper ozone layer. Protect ozone (the small thing) and the food chain and climate (the big things) look after themselves. The whole moral of the essay rests on this chain.

✗ Common Mistake

Do not write that "take care of small things" means saving animals like seals or penguins. The "small things" in the parable are the microscopic, often-invisible mechanisms: ozone, phytoplankton, photosynthesis. The big things are the visible animals. Reversing the two reads the parable backwards.

EXPERT'S SOLUTION *: Dr Latha Iyer, PhD Marine Biology, National Institute of Oceanography*

Strategic angle. The line is recycled from the older "take care of the pence and the pounds will take care of themselves" English proverb, but Doshi has reframed it for ecology. Read her recasting as a deliberate piece of rhetoric, and your answer can pull double duty: a literary point and a science point.

- **Why phytoplankton, not krill or seals?** A naive reader might pick krill as the keystone. Doshi chooses phytoplankton because krill eat them; collapse the producers and the consumers go with them. The hierarchy of cause is producer → primary consumer → secondary consumer.
- **Antarctic exceptionalism.** The Southern Ocean has relatively few primary-producer species. In tropical oceans, a hit on one species of phytoplankton is buffered by hundreds of others. In Antarctic waters, the buffering is weak. That is exactly why "little changes" have "big repercussions" there.
- **The cascade in slow motion.** The chain in detail: ozone hole → more ultraviolet at sea surface → phytoplankton photosynthesis impaired → less carbon fixed, less biomass produced → krill populations decline → baleen whales, Adelie penguins, crabeater seals decline → Antarctic carbon pump weakens → atmospheric carbon rises further. Six steps; each individually small.
- **What "taking care" looks like.** The Montreal Protocol of 1987, which phased out chlorofluorocarbons, is the policy translation of Doshi's moral. It targeted a small upstream cause (ozone-depleting chemicals) and now protects the entire downstream chain.
- **The Indian reader's bridge.** The same logic works for the Western Ghats, the Sundarbans and the Himalayan glaciers. Each is a small upstream layer that protects a much larger downstream economy and ecology. Doshi's Antarctic example is

portable.

Why this matters. Climate education usually starts with the big picture (temperature curves, sea-level charts) and loses the student in numbers. Doshi's parable inverts the direction. Start with a single-celled plant; show that it controls the largest food chain on Earth; the rest follows. That is why this line is on the syllabus.

> **Final Answer:** In the Antarctic context, the small things are the microscopic mechanisms: the ozone layer, phytoplankton photosynthesis, the carbon pump. The big things are the visible animals (whales, seals, penguins) and the global climate. Because Antarctica's simple food chain has weak buffering, a small ozone loss cascades through phytoplankton failure into a food-chain collapse and a weaker carbon pump. The Montreal Protocol is the working policy version of Doshi's moral. Care for the upstream small thing, and the downstream big things keep themselves intact.

Q 3.6 Why is Antarctica the place to go to, to understand the earth's present, past and future?

SOLUTION

The question echoes Doshi's closing thesis. Each of the three tenses she lists (past, present, future) has a specific Antarctic answer in the essay, and a complete response works through all three in turn rather than treating them as a single blur.

> ☞ **The relevant lines**
>
> "If we want to study and examine the Earth's past, present and future, Antarctica is the place to go."

- **The past.** Antarctica was once the centre of *Gondwana*, the giant southern supercontinent. Its Cordilleran folds and pre-Cambrian granite shields preserve the rock systems of a 500-million-year era. From them, geologists can trace how India drifted north and rammed Asia to lift the Himalayas, how South America broke away to join the north, and how the Drake Passage opened to chill the continent.
- **The present.** Antarctica is the only continent that has never sustained a human population, so its record is *pristine*. Its ice cores carry half-million-year-old carbon records. Its ice sheets are already responding to the modern climate (glaciers retreating, ice shelves collapsing), and the West Antarctic ice sheet is the central object of debate over sea-level rise.
- **The future.** The simple Antarctic food chain offers the cleanest projection of what climate damage will look like. The ozone-phytoplankton chain shows how small

atmospheric changes cascade into food-web collapse. The 24-hour austral summer, the ubiquitous silence and the visual scale (from *midges and mites to blue whales and icebergs as big as countries*) force you to place yourself in the context of the Earth's geological history. Doshi adds that *for humans, the prognosis isn't good*.

- **The single landscape that joins all three.** Most places on Earth carry one of these records strongly: the Himalayas show tectonic past, the Maldives show present sea-level threat, monsoon Asia projects future food risk. Antarctica is unique in carrying all three at the same time.
- **The classroom dimension.** Doshi makes a fourth, understated point. Antarctica is also the place to go because the experience is transformative: *it's impossible to go anywhere near the South Pole and not be affected by it*. The cognitive consequence is itself a reason to go.

> **Final Answer:** Antarctica is the place to go for all three tenses because it carries them in one landscape. Past: as the centre of Gondwana, it preserves the Cordilleran folds and granite shields of a 500-million-year supercontinent. Present: its pristine ice cores hold half-million-year carbon records, and its ice sheets are responding to current climate change. Future: its simple ecosystem and ozone-phytoplankton chain offer the cleanest projection of cascading damage. No other landscape carries all three records at once.

☞ **Useful aside**

A good structural trick for this answer is to label your three paragraphs "Past", "Present", "Future" in your margin or mind. The Board prompt gives you the structure for free; use it.

EXPERT'S SOLUTION *: Dr Sanjay Mehrotra, PhD Geology, University of Cambridge*

Strategic angle. Doshi closes the essay with a deliberate echo of her opening, and the closing line is in fact the prompt for this question. Notice that her three sub-headings, *Part of history*, *Human impact*, *Walk on the ocean*, already map onto past, present and future. The expert answer is the one that names that structural design.

- **Past read through rock.** The pre-Cambrian granite shields of East Antarctica are some of the oldest continental crust on Earth (older than 3 billion years in parts). They lock in evidence of the supercontinent cycle that geology calls the Wilson Cycle.
- **Past read through ice.** The European Project for Ice Coring in Antarctica (EPICA) has produced a continuous atmospheric record going back about 800,000 years. Doshi's "half-million" figure is a conservative rounding. No other continent has anything comparable.
- **Present read through retreat.** Larsen B ice shelf collapsed in 2002 over the course of

about six weeks; the Pine Island and Thwaites glaciers in West Antarctica are responsible for a sizeable fraction of current sea-level rise. Doshi's mention of "collapsing ice shelves" is not rhetoric; it is the literal headline from her trip's years.

- **Future read through chain.** The 1980s discovery of the Antarctic ozone hole and its connection to chlorofluorocarbons (the work that won Rowland, Molina and Crutzen the 1995 chemistry Nobel) is the empirical backbone of Doshi's phytoplankton concern. Take the link in her chapter and the science she alludes to becomes precise.
- **Why a single landscape can carry three tenses.** Three conditions had to coincide for this to be possible: Antarctica had to have once been at the heart of a supercontinent (so it preserves the past), it had to be cold enough to keep ice for half a million years (so it preserves the present-as-archive), and it had to have a food chain simple enough to project (so it predicts the future). The Drake Passage opening 35 million years ago produced the second condition; the isolation produced the third.
- **A useful Indian parallel.** The Himalayas carry a comparable triple record (tectonic past, snowmelt present, glacier-retreat future), but on a much smaller time scale. Reading Doshi alongside Class 12 Geography's Himalaya chapter is a productive exercise.

Why this matters. The Board asks this exact question because the chapter's argument can be tested in one shot. A student who treats the three tenses separately, with one textual fact per tense, has both demonstrated comprehension and engaged with the science. That is the highest band.

> **Final Answer:** Antarctica is the only landscape that carries all three tenses of Earth's record at once. Its pre-Cambrian rocks and Gondwana history give us the past; its half-million-year ice-core carbon archive and current ice-shelf collapse give us the present; its simple, projectable ozone-phytoplankton-food-chain links give us the future. Three independent records converge in one place, a geological accident produced by Drake Passage isolation 35 million years ago. That accident is also what makes Antarctica irreplaceable to climate science.

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Key Takeaways

- Tishani Doshi's *Journey to the End of the Earth* is literary journalism shaped like an

argument. Its three sub-headings, "Part of history", "Human impact" and "Walk on the ocean", map onto past, present and future.

- Antarctica was once at the centre of *Gondwana*, the 650-million-year-old southern supercontinent. Its Cordilleran folds and pre-Cambrian granite shields are the readable record of that vanished landmass.
- Half-million-year carbon records preserved in Antarctic ice cores give scientists their cleanest archive of the Earth's atmosphere. No other continent offers anything comparable.
- The phytoplankton parable is the chapter's moral engine: microscopic single-celled plants in the Southern Ocean carry the entire food chain and contribute to the global carbon cycle. Ozone protects them; CFCs threatened that protection until the Montreal Protocol intervened.
- Geoff Green's *Students on Ice* programme is the chapter's ethical centre. Green takes high-schoolers, not celebrities, because they are the future policy-makers and because direct experience of retreating glaciers builds lifelong conviction.

End of Journey to the End of the Earth NCERT Solutions