

Waking Up in the Future

Hibernation, Time, and the Cost of Survival

Name _____ Class _____ Date _____

PART 1: SLEEPING THROUGH THE STORM



Ice crystals under magnification. Ice forming inside cells is what destroys frozen tissue, and it is the first problem any kind of human cold storage has to solve.

Imagine falling asleep tonight and waking up two hundred years from now. The language has changed. The people you loved are long dead. The city outside your window is unrecognizable. Your money is worthless, your skills are obsolete, and the world has no memory of you. This is the reality of hibernation: not just a long sleep, but a form of time travel that moves in only one direction.

In Liu Cixin's *Remembrance of Earth's Past* trilogy, hibernation technology allows characters to skip forward through centuries. Some go to sleep hoping to wake in an age that can cure them, or simply to see how the story ends. Others are sent forward strategically, so that their knowledge will be available in a later era of the struggle against the coming alien invasion. The character Luo Ji is put into hibernation in the early years of the crisis and wakes almost two centuries later, in a future where humanity has built a fleet of starships and feels confident of victory. The future, however, is never what the sleeper expects.

The experience of waking up is always disorienting. The hibernator's body is the same age, but the world has aged by centuries. Language has evolved, social norms have shifted, technology is incomprehensible, and close relationships have been replaced by historical records. The hibernator is, in a very real sense, a living relic: a person from a vanished world trying to function in a new one.

PART 2: THE SCIENCE OF SUSPENDED ANIMATION

Nothing like the trilogy's hibernation exists, but several real lines of research point in its direction. The most famous is cryonics: preserving human bodies at extremely low temperatures after legal death, in the hope that future medicine will be able to revive and cure them. The Alcor Life Extension Foundation in Arizona stores more than 250 patients in liquid nitrogen at -196°C . In 2026 the price was about \$80,000 to preserve the brain alone and about \$220,000 for the whole body. No one has ever been revived, and most scientists doubt that anyone preserved with today's methods ever will be.

A more practical idea is torpor, a state of reduced metabolism and body temperature like the one bears enter in winter. In 2013, NASA funded an engineering study of how astronauts might spend the long journey to Mars in torpor, which would mean carrying far less food, water and living space. The biology, however, is harder than the engineering. In a study published at the end of 2022, scientists at the Chinese Academy of Sciences lowered the body temperature of monkeys by switching on a small group of neurons in the brain. It was the first time this had been done reliably in a primate. The animals cooled by only about one degree, however, and their bodies fought back by shivering and raising their heart rate. Primates, it seems, are built to resist the cold, and humans are primates.

Real-World Hibernation Timeline

1967	James Bedford becomes the first person to be cryopreserved. He is still in storage at Alcor.
2006	Mitsutaka Uchikoshi is found alive on Japan's Mount Rokko 24 days after a fall, with a body temperature of 22°C . His doctors say he entered a state similar to hibernation.
2013	NASA funds a study of torpor for crewed Mars missions.
2022	Chinese researchers trigger a controlled drop in body temperature in monkeys by activating neurons in the hypothalamus.
2030s	European Space Agency researchers have suggested that the first torpor studies in humans could be possible.

PART 3: THE PSYCHOLOGY OF DISPLACEMENT

The physical challenges of hibernation are small compared with the psychological ones. Psychologists who study displacement, the experience of being removed from your familiar environment, note that immigrants and refugees can feel profoundly disoriented when they move to a new culture. Now multiply that by centuries.

In the trilogy, characters who wake from hibernation experience what could be called temporal culture shock. They struggle with a world that has moved on without them. Their values feel outdated, their language sounds archaic, and they lack the shared experiences (the jokes, the history, the collective memories) that bind a society together. They are physically present but socially invisible. The world did not wait for them or miss them; it simply continued and left them standing in a place that no longer exists.



NASA astronaut Frank Rubio is carried from his capsule in Kazakhstan on September 27, 2023, after 371 days in orbit, the longest single spaceflight by an American.

Photo: NASA/Bill Ingalls (public domain)

This mirrors a real phenomenon called re-entry shock, sometimes known as reverse culture shock. It is reported by soldiers returning from long deployments, by astronauts coming back from the International Space Station, and even by exchange students returning home. The world changed while you were gone, and you changed too. The gap between expectation and reality can create a deep sense of alienation. For a hibernator waking after centuries, this gap would be an abyss.

PART 4: WOULD YOU GO?

If you were offered hibernation today, would you take it? The question is more complex than it seems. Sleeping through decades means abandoning everyone you know: your family ages and dies while you remain frozen, and your friendships dissolve. The person who wakes up will be biologically the same but socially reborn: a stranger in a strange land with no connections, no context and no community.

Yet the appeal is powerful. Hibernation offers an escape from terminal illness (sleep until a cure exists), from persecution, or even from the collapse of a civilization. In the trilogy, many characters choose hibernation not out of hope but out of desperation; the present is so terrible that any future seems preferable. Others choose it as a bet that their skills will be needed in a later era.

There is also the question of identity. Are you the same person after hibernation? The philosopher John Locke argued that personal identity depends on continuity of consciousness and memory, not on the body. By that standard, the sleeper is still the same person, because the one who wakes remembers being the one who lay down. Even so, the world that shaped those memories is gone, and nobody else alive shares them. Are you still you? Or are you something closer to a messenger from someone who lived centuries ago, carrying their memories like borrowed luggage?

KEY VOCABULARY

Term	Meaning	Term	Meaning
<i>hibernation</i>	a state of deep sleep or suspended animation lasting months or, in fiction, centuries	<i>cryonics</i>	preserving bodies at very low temperatures in the hope of future revival
<i>torpor</i>	a state of reduced metabolic activity and body temperature	<i>metabolism</i>	the chemical processes that keep a body alive (energy, growth, repair)
<i>obsolete</i>	no longer useful or relevant; outdated	<i>displacement</i>	being removed from your familiar environment or position
<i>disorienting</i>	causing confusion about where or when you are	<i>norms</i>	accepted standards of behavior in a society
<i>relic</i>	something that survives from an earlier time	<i>persecution</i>	hostile treatment, especially because of beliefs or identity
<i>re-entry shock</i>	difficulty readjusting to home after a long absence	<i>terminal</i>	(of an illness) leading to death; not curable
<i>continuity</i>	an unbroken connection between past and present	<i>alienation</i>	a feeling of being disconnected from other people or the world around you

Discussion & Analysis

Waking Up in the Future · Lesson Activities

A. COMPREHENSION

1. In the trilogy, why do different characters enter hibernation?

2. What is cryonics, and what does the reading say about its chances of success?

3. What is torpor, and why is NASA interested in it?

4. What did the 2022 monkey study achieve, and what problem did it reveal?

5. What is temporal culture shock, and how does it differ from ordinary culture shock?

6. What is re-entry shock, and who experiences it in the real world?

7. Why might someone choose hibernation out of desperation rather than hope?

8. According to Locke's view of identity, is a person who wakes after 200 years the same person? Explain.

B. VOCABULARY IN CONTEXT

Complete each sentence with a term from the vocabulary list. Use each term once.

alienation · continuity · displacement · metabolism · norms · obsolete · persecution · re-entry
shock · relic · terminal · torpor

1. After three years abroad she experienced _____; home felt foreign to her.
2. Bears enter a state of _____ in winter, lowering their heart rate and body temperature.
3. His grandfather's typewriter was a _____ from the age before computers.
4. The patient's illness was _____, so she agreed to try an experimental treatment.
5. Social _____ change over time: what was acceptable in the 1950s may be offensive today.
6. Many refugees experience _____ when they are forced to leave their homeland.
7. The rapid pace of technology makes some skills _____ within a few years.
8. A slower _____ means the body needs less food and oxygen.
9. The family fled the country to escape religious _____.
10. Surrounded by people who shared none of his memories, he felt a deep sense of _____.

11. For Locke, personal identity depends on the _____ of memory.

C. CRITICAL THINKING

1. If you could hibernate for exactly 100 years and wake up in 2126, would you? What would you hope to find, and what would you fear?

2. The reading calls hibernation a form of time travel that moves in only one direction. How is this different from time travel in most films, and why does the one-way nature matter?

3. Compare a hibernator waking in the future with an immigrant arriving in a new country. What is similar, what is different, and which adjustment would be harder?

4. More than 250 people have paid to be cryopreserved after death, although nobody has ever been revived. Is this rational? What would you need to believe to make that decision?

5. Locke said identity comes from continuity of consciousness and memory. Do you agree? How would you define personal identity?

D. DEBATE: THE HIBERNATION OFFER

Scenario: A reliable hibernation technology now exists. The government is selecting 1,000 people to hibernate for 300 years as cultural ambassadors who will carry knowledge of our era into the future. You have been selected. Do you accept?

Position A: Accept

This is a once-in-history opportunity. You will witness the future of humanity, and your knowledge of the past will be invaluable. Life in the present is temporary anyway. This way you serve a purpose beyond your normal lifespan.

Position B: Decline

Relationships matter more than historical significance. You would be abandoning everyone who loves you. The future does not need you; it has its own people. Living fully in one era is better than being a tourist in two.

Position C: Negotiate

Accept, but only if family members can join you, or only with a guaranteed support system on waking. The offer as stated is too risky, but the idea has merit with the right safeguards.

After the debate, write your own position in three or four sentences.

E. CREATIVE WRITING: FIRST DAY IN THE NEW WORLD

Write a journal entry from the point of view of someone who has just woken from 200 years of hibernation. It is your first day in the new world. Aim for 150 to 250 words; continue on the back if you need to. Include:

- What do you see, hear and feel?
- What is the first thing you notice that is different?
- What do you miss most from your old life?
- How do people in the new era treat you?
- One thing that is better, and one thing that is worse.

F. REAL-WORLD CONNECTIONS

Choose one of these cases and explain how it connects to the reading.

Rip Van Winkle (1819)

Washington Irving's story of a man who sleeps for 20 years and wakes after the American Revolution. What does he get wrong when he wakes, and why does it matter?

Hiroo Onoda

A Japanese officer who kept fighting in the Philippine jungle for 29 years because he did not believe the Second World War had ended. He surrendered in 1974. What parallels exist with hibernation?

Coming Home After Decades

People released after very long prison sentences return to a world of unfamiliar prices, technology and manners. How does their experience compare with a hibernator's?

Time Capsules

Many cities bury time capsules to be opened in 50 or 100 years. If you could leave one object for someone in the year 2226, what would it be?



Earth seen through the Cupola of the International Space Station. Astronauts who spend months here often report that coming home is the hard part.

Photo: NASA (public domain)

Teacher's Notes & Answer Key

Waking Up in the Future · Instructor Guide

LESSON OVERVIEW

LEVEL

Advanced (CEFR B2 to C1)

DURATION

60 to 90 minutes

FOCUS

Reading, discussion, creative writing

Source material: Remembrance of Earth's Past trilogy by Liu Cixin; cryonics and torpor research; Locke on personal identity

Series: Humans & The Universe, Lesson 3 of 8. Works as a standalone lesson.

SUGGESTED LESSON FLOW

Warm-up (5 min)	Ask: if you could skip ahead 100 years, would you? What about 1,000? Take quick, instinctive answers before reading.
Pre-reading (5 min)	Review vocabulary. Prioritize hibernation, cryonics, torpor, displacement and obsolete.
Reading (15 to 20 min)	Parts 1 to 4. Part 1 sets up the idea; Part 3 is the emotional core.
Comprehension (10 min)	Section A. Can be done orally with stronger groups.
Vocabulary (10 min)	Section B. Eleven gaps, word bank supplied.
Discussion (15 to 20 min)	Section C. Questions 1 and 3 produce the most conversation; question 5 suits philosophical students.
Debate (15 min)	Section D, three positions. Push students to argue a position they do not naturally hold.
Writing (15 to 20 min)	Section E, in class or as homework. Encourage sensory detail. Use one Section F card as a cool-down.

ANSWER KEY: SECTION A (COMPREHENSION)

1. For different reasons: to wait for a cure or simply to see the future, or because they are sent forward strategically so their knowledge is available later in the crisis. Luo Ji is put into hibernation early in the crisis and wakes almost two centuries later.
2. Preserving human bodies at extremely low temperatures (-196°C in liquid nitrogen) after legal death, hoping future technology can revive them. Alcor stores more than 250 patients. Nobody has ever been revived, and most scientists doubt that current methods will ever allow it.
3. A state of reduced metabolism and body temperature, like a bear's in winter. NASA is interested because astronauts in torpor on the way to Mars would need far less food, water and living space.

4. Researchers lowered the body temperature of monkeys by activating a group of neurons in the brain, the first reliable result of this kind in a primate. However, the animals cooled by only about one degree and their bodies resisted by shivering and raising their heart rate, which suggests primates, including humans, are built to fight cooling.
5. The disorientation of waking in a future that has changed beyond recognition. Ordinary culture shock involves moving between two cultures that both still exist. With temporal culture shock the sleeper's original culture is gone, so there is no home to return to.
6. Difficulty readjusting after a long absence, also called reverse culture shock. It is reported by soldiers returning from deployment, astronauts returning from the ISS, and exchange students coming home.
7. When the present is unbearable (terminal illness, persecution, the collapse of a civilization), any future can seem better than staying. It is choosing the unknown over the certainly terrible.
8. On Locke's view, yes: identity depends on continuity of consciousness and memory rather than the body, and the person who wakes remembers being the person who went to sleep. The reading adds a doubt: the world that formed those memories no longer exists and nobody else shares them.

ANSWER KEY: SECTION B (VOCABULARY)

1. re-entry shock 2. torpor 3. relic 4. terminal 5. norms 6. displacement 7. obsolete
8. metabolism 9. persecution 10. alienation 11. continuity

DISCUSSION EXTENSIONS

Identity: The Ship of Theseus: if every plank of a ship is replaced over time, is it the same ship? Much of the material in a human body is also replaced over the years. Does hibernation make this question sharper, or is it no different from ordinary sleep?

Ethics of cryonics: Is it ethical to preserve someone who cannot consent, such as a child with a terminal illness? Who decides when to attempt a revival?

Link to Lesson 1: Luo Ji sleeps through nearly two centuries of the crisis and wakes when he is needed. Is that a privilege or a sacrifice?

Film connection: In *Interstellar* (2014), one hour on Miller's planet equals seven years on Earth. Compare the astronaut who returns to find decades of messages with the hibernator in this lesson.

Section E: Mark for concrete sensory detail and for at least one moment where the writer misreads the new world because of an old assumption. Strong entries show the gap rather than explaining it.

Section F: Onoda is the richest case: he was not asleep, but his information was frozen in 1945. Ask whether being wrong about the world for 29 years is different in kind from sleeping through it.

KEY DISCUSSION LANGUAGE

Imagining

"If I woke up in 2226, the first thing I'd..."

Philosophical

"That depends on how you define..."

Comparing

"This is similar to... but different because..."

Trade-offs

"On one hand... on the other..."

Empathizing

"I can understand why someone would..."

Reflecting

"What scares me most about this is..."

Sources & Further Reading

Alcor Life Extension Foundation: patient numbers and 2026 pricing as reported by Alcor and in press coverage. James Bedford was cryopreserved on January 12, 1967.

Torpor in primates: Shenzhen Institute of Advanced Technology, Chinese Academy of Sciences, published in The Innovation, December 2022.

NASA Innovative Advanced Concepts award to SpaceWorks Engineering, "Torpor Inducing Transfer Habitat for Human Stasis to Mars" (2013).

Mitsutaka Uchikoshi: reported by his doctors at Kobe City Medical Center General Hospital, December 2006.

John Locke, An Essay Concerning Human Understanding, Book II, chapter 27. Liu Cixin, The Dark Forest (2008) and Death's End (2010).

Humans & The Universe

An eight-lesson advanced reading and discussion series

This lesson is part of a connected series for advanced learners. Each lesson pairs a science fiction premise with the real science, history and ethics behind it, and each works as a standalone class or as part of the full sequence.

1	The Dark Forest: game theory, deterrence and the fate of civilizations	
2	Should We Answer? SETI, the Fermi Paradox and the risk of saying hello	
3	Waking Up in the Future: hibernation, time and the cost of survival	<i>you are here</i>
4	Living in Space: survival, adaptation and leaving Earth behind	
5	Scarcity and Survival: resources, rationing and who gets to live	
6	First Contact Protocols: diplomacy, danger and speaking for humanity	
7	The Ethics of Technology: power, responsibility and dangerous tools	
8	Endings and Legacy: extinction, memory and what we leave behind	

Lesson 1, The Dark Forest, is a free download from Tahric Teaches on Teachers Pay Teachers.