Pathways Reading, Writing, and Critical Thinking 2e: Level 4 Unit 1 Test

Name: _____ **Class:** _____ **Date:** _____

VOCABULARY PRACTICE 1

Write a word from the box next to its synonyms or definition.

eliminated	**consequences**	**transformed**	**profound**
criteria	**current**	**perspective**	**concept**

1. deep; significant _____
2. standards; information used to make a decision _____
3. contemporary; modern; present _____
4. removed; abolished; got rid of _____
5. results; outcomes; effects _____
6. idea; notion; thought _____
7. viewpoint; a way of looking at something _____
8. changed from one thing into another; altered _____

VOCABULARY PRACTICE 2

Complete each sentence with a word or phrase from the box.

erosion	**atmosphere**	**dramatic**	**devoted to**
satisfy	**fertilizers**	**essentially**	

9. Water, wind, and glacial ice are examples of natural forces that cause _____.
10. To be considered "organic," fruits and vegetables must be grown without the use of pesticides or chemical _____.
11. Carbon dioxide emissions are _____ invisible to us, but their effect on the planet is clear.
12. In recent years, a lot of research has been _____ studying the effects of climate change on the oceans.
13. In order to participate in this program, you must _____ certain requirements.
14. Astronauts would not be able to breathe on Mars without special equipment because the _____ is too thin.

LIVEWORKSHEETS

15. There is a _____ difference between the types of plants that grow in tropical rain forests and the types of plants seen in temperate forests.

READING REVIEW

Read the passage and answer the questions.

THE HUMAN AGE
by Elizabeth Kolbert

Human beings have altered the planet so much in just the past century or two that we now have a new name for a new epoch: the Anthropocene.

A The word *Anthropocene* was coined by Dutch chemist Paul Crutzen in 2002. Crutzen, who shared a Nobel Prize for discovering the effects of ozone-depleting compounds, was sitting at a scientific conference one day. The conference chairman kept referring to the Holocene, the epoch that began 11,500 years ago, at the end of the last ice age, and that - officially, at least - continues to this day.

B "Let's stop it," Crutzen recalls blurting out. "We are no longer in the Holocene. We are in the Anthropocene." It was quiet in the room for a while. When the group took a coffee break, the Anthropocene was the main topic of conversation.

C Way back in the 1870s, an Italian geologist named Antonio Stoppani proposed that people had introduced a new era, which he labeled the Anthropozoic. Stoppani's proposal was ignored; other scientists found it unscientific. The Anthropocene, by contrast, struck a chord. The human impact on the world has become a lot more obvious since Stoppani's day, in part because the size of the population has roughly quadrupled, to nearly seven billion.

D When Crutzen wrote up the Anthropocene idea in the journal *Nature*, the concept was immediately picked up by researchers working in a wide range of disciplines. Soon, it began to appear regularly in the scientific press. At first, most of the scientists using the new geologic term were not geologists. Jan Zalasiewicz, a British geologist, found the discussions intriguing. "I noticed that Crutzen's term was appearing in the serious literature, without quotation marks and without a sense of irony," he says.

E In 2007, Zalasiewicz was serving as chairman of the Geological Society of London's Stratigraphy Commission. At a meeting, he decided to ask his fellow stratigraphers what they thought of the Anthropocene. Twenty-one of twenty-two thought the concept had merit. The group agreed to look at it as a formal problem in geology. Would the Anthropocene satisfy the criteria used for naming a new epoch?

F The rock record of the present doesn't exist yet, of course. So the question was: When it does, will human impacts show up as "stratigraphically significant"? The answer, Zalasiewicz's group decided, is yes - though not necessarily for the reasons you would expect.

LIVEWORKSHEETS

G Probably the most obvious way humans are altering the planet is by building cities, which are essentially vast stretches of man-made materials - steel, glass, concrete, and brick. But it turns out most cities are not good candidates for long-term preservation: they're built on land, and on land the forces of erosion tend to win out over those of sedimentation. From a geologic perspective, the most plainly visible human effects on the landscape today "may in some ways be the most transient," Zalasiewicz observes.

H Humans have also transformed the world through farming; something like 38 percent of the planet's ice-free land is now devoted to agriculture. Here again, some of the effects that seem most significant today - runoff from the use of fertilizers on fields, for example - will leave behind only subtle traces at best. Future geologists are most likely to grasp the scale of 21st-century industrial agriculture from the pollen record - from the monochrome stretches of corn, wheat, and soy pollen that will have replaced the varied record left behind by rain forests or prairies.

I The leveling of the world's forests will send at least two coded signals to future stratigraphers, though deciphering the first may be tricky. Massive soil erosion is causing increasing sedimentation in some parts of the world - but at the same time, the dams we've built on most of the world's major rivers are holding back sediment that would otherwise be washed to sea. The second signal of deforestation should come through clearer. Loss of forest habitat is a major cause of extinctions, which are now happening at a rate hundreds or even thousands of times higher than during most of the past half billion years. If current trends continue, the rate may soon be tens of thousands of times higher.

J Probably the most significant change, from a geologic perspective, is one that's invisible to us - the change in the composition of the atmosphere. Carbon dioxide emissions are colorless, odorless, and - in an immediate sense - harmless. But their warming effects could easily push global temperatures to levels that have not been seen for millions of years. Some plants and animals are already shifting their ranges toward the Poles, and those shifts will leave traces in the fossil record. Some species will not survive the warming at all. Meanwhile, rising temperatures could eventually raise sea levels 20 feet or more.

K Long after our cars, cities, and factories have turned to dust, the consequences of burning billions of tons' worth of coal and oil are likely to be clearly discernible. As carbon dioxide warms the planet, it also seeps into the oceans and acidifies them. Sometime this century, they may become acidified to the point that corals can no longer construct reefs, which would register in the geologic record as a "reef gap." Reef gaps have marked each of the past five major mass extinctions. The most recent one - which is believed to have been caused by the impact of an asteroid - took place 65 million years ago, at the end of the Cretaceous period; it eliminated not just the dinosaurs but also the plesiosaurs, pterosaurs, and ammonites. Since then, there has been nothing to match the scale of the changes that we are now seeing in our oceans. To future geologists, Zalasiewicz says, our impact may look as sudden and profound as that of an asteroid.

L If we have indeed entered a new epoch, then when exactly did it begin? When did human impacts rise to the level of geologic significance?

M William Ruddiman, a paleoclimatologist at the university of Virginia, has proposed that the invention of agriculture some 8,000 years ago - and the deforestation that resulted - led to an increase in atmospheric CO_2 just large enough to stave off what otherwise would have been the start of a new ice age. In his view, humans have been the dominant force on the

LIVEWORKSHEETS

planet practically since the start of the Holocene. Crutzen has suggested that the Anthropocene began in the late 18th century, when, ice cores show, carbon dioxide levels began what has since proved to be an uninterrupted rise. Other scientists put the beginning of the new epoch in the middle of the 20th century, when the rates of both population growth and consumption accelerated rapidly.

Zalasiewicz now heads a working group of the International Commission on Stratigraphy (ICS) that is tasked with officially determining whether the Anthropocene deserves to be incorporated into the geologic timescale. A final decision will require votes by both the ICS and its parent organization, the International union of Geological Sciences. The process is likely to take years. As it drags on, the decision may well become easier. Some scientists
N argue that we've not yet reached the start of the Anthropocene - not because we haven't had a dramatic impact on the planet, but because the next several decades are likely to prove even more stratigraphically significant than the past few centuries. "Do we decide the Anthropocene's here, or do we wait 20 years and things will be even worse?" says Mark Williams, a geologist and colleague of Zalasiewicz's at the University of Leicester in England.

Crutzen, who started the debate, thinks its real value won't lie in revisions to geology textbooks. His purpose is broader: He wants to focus our attention on the consequences of
O our collective action - and on how we might still avert the worst. "What I hope," he says, "is that the term *Anthropocene* will be a warning to the world."

____ 16. How did people at the conference react when Crutzen suggested that the Earth was no longer in the Holocene Epoch?

a. They were shocked and angry.
b. They thought his theory was unscientific.
c. They were surprised but interested.
d. They chose to ignore his suggestion.

____ 17. Which of the following scientists first proposed the idea that the Earth was in an epoch shaped by humans?

a. Paul Crutzen
b. Jan Zalasciewicz
c. William Raddiman
d. Antonio Stoppani

____ 18. It can be inferred from the quotation in paragraph D that Zalasciewicz believed that the term "Anthropocene" _____.

a. should be used by geologists as well as other scientists
b. was becoming accepted by the scientific community
c. is not really an accurate term
d. should always appear in quotation marks

LIVEWORKSHEETS

____ 19. In the second sentence of paragraph F, the word *it* refers to _____.

a. a formal problem
b. geological evidence
c. a new epoch
d. human impact

____ 20. The purpose of paragraph G is to _____.

a. indicate that cities may not have a long-term impact on the planet
b. explain why erosion is a more powerful force than sedimentation
c. show how man-made materials will be preserved over time
d. point out that erosion is changing the face of the earth

____ 21. The author identifies what she feels is the most serious effect of humans' impact on the planet in _____.

a. paragraph F
b. paragraph H
c. paragraph J
d. paragraph N

____ 22. The word *discernible* in paragraph K is closest in meaning to _____.

a. noticeable
b. invisible
c. problematic
d. believable

____ 23. Which of the following statements would the author probably NOT agree with?

a. Large parts of the Earth's coastlines may eventually be under water.
b. Some animals are relocating their habitats to cooler regions.
c. If the level of acidity in the oceans continues to rise, corals may stop building reefs,
d. There has never been a period in the earth's history in which plants and animals have gone extinct so quickly.

____ 24. With which of the following statements would William Ruddiman most likely agree?

a. Humans have not yet had a significant impact on the planet.
b. A new epoch began with the invention of agriculture.
c. The Anthropocene epoch began in the late 18th century.
d. A new epoch will not be evident until the end of this century.

____ 25. What does Crutzen believe is the main benefit of the debate about the Anthropocene?

a. It will help improve geology textbooks.
b. More people will learn about Stoppani's original idea.
c. It will raise awareness of the human impact on Earth.
d. It will lead to important new discoveries in geology.

LIVEWORKSHEETS

READING PRACTICE

Read the passage. Then answer the questions.

HUMAN INGENUITY CAN FIX PAST MISTAKES AND SHAPE THE FUTURE: AN INTERVIEW WITH AUTHOR DIANE ACKERMAN

by Simon Worrall

In her new book, *The Human Age*, Diane Ackerman, best-selling author of *The Zookeeper's Wife* and *A Natural History of the Senses*, takes us on a journey into the Anthropocene: the epoch in which humans have both mastered and degraded the natural world. Ranging across the globe, she shows how our unique talent for self-awareness and our technological prowess can help us overcome today's global challenges.

***You call our epoch the Anthropocene age. Can you explain*?**

Human beings have been on the planet for about 200,000 years, most of the wonders we identify with contemporary life came about in the past 200 years. And in the past 20 years, they've been advancing at an amazing pace.

We've now changed the course of rivers, we've changed the outline of continents, created giant megacities, and even played golf on the moon. We've so dominated our landscape that many scientists believe we have started a new epoch.

We're in the Holocene, a geologic timeframe like the Jurassic. But some scientists believe the Holocene is over and we should start a new epoch with a name that conveys more of our imprint on the planet, the Anthropocene, which translates as "the human age." And I think it's a very good idea.

***This is not a depressing book - in fact, it's largely positive and heartening - but you do face squarely the issue of global climate change. Tell us about the Yup'ik*.**

The Yup'ik Eskimos are going to be our very first climate refugees. They're being swept away by the seas that keep encroaching into Alaska. Soon they're going to have to move to higher ground.

And this is happening all over the planet in lots of low-lying island nations where people are applying for status as climate refugees. We don't really have that status, though. You can be a refugee for political reasons, but climate? We haven't kept up with that. However, we're going to see more of it.

***You elaborate on a number of amazing new technological developments and scientific discoveries that are helping us to cope with change*.**

We don't have to have renewable energy in the old-fashioned way. In some parts of the world people are collecting wind from passing subway trains. In other places they're collecting heat from human commuters at train stations. Each person gives off a hundred watts, and that can be gathered and pumped underground, where it heats water. Then that water is used to help heat apartments.

We're starting to do that in the U.S. - but not enough. We really need to focus more on as many

LIVEWORKSHEETS

renewables as we possibly can at the same time that we are imposing a tax on carbon and insisting that the power plants reduce their emissions. Forty percent of our greenhouse gas emissions come from the power plants. By working to get those reduced, we will be doing a great deal.

One of the paradoxes you explore is that Homo sapiens is both destroying and attempting to save the planet. Which side of our nature will win?

I'm an optimist, so I predict that the good side will win. We're doing things like trying to create new species at the same time that we're causing some species to go extinct. The one thing that is our greatest achievement - bigger than any of our scientific discoveries - is our self-awareness, our ability to stand and look at ourselves and see what we're doing and decide if this is who and what we want to be. What kind of species do we want to be? What kind of planet do we want?

One of the intriguing examples of human ingenuity you give is in a chapter called "Printing a Rocking Horse on Mars." Will we really be able to do that one day?

I visited a scientist who is printing out 3D ears with a device that is about the size of a toaster oven. It's actually a 3D printer, whose ink is living cells, and it works just like an ink jet printer. It goes back and forth, but instead of ink it lays down minute layers of living cells till it has built the thing up in three dimensions. So yes, in theory we could print a rocking horse on Mars.

The 3D printers can also mix and provide drugs to areas that desperately need them but are very remote. All of these things are right on the edge of coming about. They'll be happening in the next 50 years.

You say at the end of the book, "We are at a great turning point, our own momentous fork in the crossroads, behind us eons of geological history, ahead a mist-laden future." Are you excited about the future?

I'm very excited about the future. I think this is a very exciting time to be alive. We have lots of challenges. But we also have many opportunities to use our intelligence and creativity to find solutions to very complicated but fascinating problems.

I think it's a time of great adventure, and I'm happy to be alive at this time. It's a time of exploration in many, many fields. I just wish I could come back in a hundred years and see what had happened!

____ 26. Which of the following does Diane Ackerman NOT mention in her answer to the first question?

a. Some scientists believe the Holocene has ended, and we have entered a new epoch.
b. Our daily lives are dominated by technology that arose in the last two centuries.
c. Conditions in the Holocene epoch were similar to those in the Jurassic period.
d. The Anthropocene is a suitable name for the current epoch.

____ 27. The interviewer feels that Ackerman's book is quite _____.

a. sad
b. optimistic
c. negative
d. humorous

LIVEWORKSHEETS

____ 28. Which of the following is NOT true about the Yup'ik people?

a. Their home is threatened by rising sea levels.
b. The problems they face are also threatening others around the world.
c. The political problems in their country mean that they need to find new homes.
d. They may be the first group of people to be called "climate refugees."

____ 29. Which of the following is the most accurate description of a new source of renewable energy that Ackerman mentions?

a. Body heat from commuters can heat water, which in turn heats apartments.
b. Wind energy created by trains can help cool apartments in summer.
c. Train stations are using heat energy from trains to keep commuters warm.
d. Wind energy from trains is used to power heaters at train stations.

____ 30. Which of the following does Ackerman NOT mention as something that should happen in the U.S.?

a. increases in taxes on carbon
b. the reduction of tax on companies producing renewable energy
c. using as many types of renewable energy as possible
d. making sure power plants cut down their greenhouse gas emissions

____ 31. What is the "paradox" that the interviewer refers to in his fourth question?

a. The human population is growing while other animals are becoming extinct.
b. Humans are creating amazing new technology, but this technology is harmful to the planet.
c. Humans are harming the planet, but are also trying to protect it.
d. Humans are causing other species to become extinct, but these animals are key to our survival.

____ 32. What does Diane Ackerman refer to as humans' "greatest achievement"?

a. The scientific discoveries that have been made in the last 100 years.
b. Our capability to recognize our own character and feelings.
c. The current efforts being made to help protect the planet.
d. Our ability to create new species of animals.

____ 33. In Diane Ackerman's book, what can we infer the chapter "Printing a Rocking Horse on Mars" is mostly about?

a. The need for humans to find a new home once Earth has been destroyed.
b. How future civilizations will need to develop new forms of entertainment.
c. The possibilities that 3D printing technology could bring about.
d. The likelihood that humans will leave the Earth and colonize Mars.

LIVEWORKSHEETS

____ 34. In the final question, what does the interviewer mean by "mist-laden"?

a. unclear
b. polluted
c. dangerous
d. positive

____ 35. How does Diane Ackerman feel about the future?

a. positive
b. unsure
c. pessimistic
d. worried

LIVEWORKSHEETS