

Conserving Fresh Water

Fill in the circle by the correct answer. Then write the answers to numbers 3, 4, and 5.

1. According to the pie chart, _____.
 (A) leaks cause the heaviest use of water in typical homes
 (B) very few American homes use water for flushing the toilet
 (C) we know how more than 90% of water is used every day
 (D) we get most of our household water from precipitation
2. How can the information in the pie chart help us to conserve water?
 (A) The chart can make people aware of how much water they use or overuse.
 (B) We can see that clothes washers should be banned.
 (C) The chart shows specific houses that overuse water.
 (D) We can use the information to increase the supply of fresh water.
3. What steps would you recommend to people who want to conserve water?

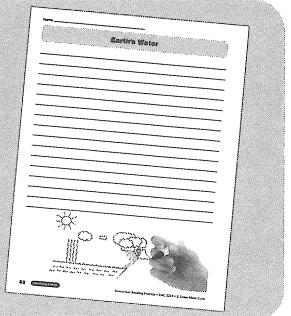
4. Explain how the author uses each paragraph to support each bold-text main idea.

5. Why can't we rely on the water cycle alone to have enough fresh water?

Write About the Topic

Use the Writing Form to write about what you read.

Did the author succeed at proving that water conservation is necessary? Write an argument for why or why not. Use examples.



Matter and Mass

Level 1

Words to Know list, Reading Selection, and Reading Comprehension questions

The Basics of Matter

Matter is Different Forms

Everything in the universe, including Earth and everything else, is matter. Matter can exist in three states: solid, liquid, and gas. Matter can change from one state to another. Heat energy, wind, and dirt can make things shift into a new state. Some people say "matter" doesn't change much when it's moving. Others say objects with more mass move faster.

The Law of Conservation of Mass

Mass is the amount of matter that has been created or destroyed. It applies to any chemical reaction, physical change, or process that breaks apart. Physical and chemical changes are not the same. In a chemical change, the atoms of matter change. In a physical change, only a person's eye sees a difference. The room contains the same amount of air, but the person feels the change and thinks it's different. This is because the places individually and interactively with each other.

Chemical reactions are a chemical change because the reactants change into the products. In the person's body, the mass contained in the person's atoms change. But the mass contained in the person's atoms have simply been rearranged. The person's atoms started out as one atom and ended up as a rapid, though tiny, mix of atoms.

Mass is a System

Large systems contain smaller systems. The water cycle, for example, is the system that includes water, continents, rivers with the hydrologic cycle, clouds, clouds, and hills. Small systems include jumping clouds, the clouds that precipitate rain, the clouds that form over a city, or the weather in a single room. The water cycle is a good example of the role of the law of conservation of mass on Earth.

Worlds to Know

The Basics of Matter

compound
conservation
chemical
reaction
rearranged
substance
versible
hydrosphere

Matter and Mass

Unacademy Faculty Practice Test 100

Level 2 ■ ■

Words to Know list, Reading Selection, and Reading Comprehension questions

Law of Conservation of Mass

Fill in the circle by the correct answer.

Law of Conservation of Mass

How Matter Changes and Moves

Matter is any object or substance that has mass and takes up space. Particles are composed of atoms and molecules that make up everything in the world. The kinds of atoms and molecules that make up determine the matter's state. Matter has three phases: solid, liquid, or gas.

Particles can move and change when matter goes through an irreversible change, called a chemical reaction. This can cause matter's state to change. Chemical reactions occur constantly, even though we don't notice them every time a living thing breathes or grows. For example, a chemical reaction that occurs in our bodies changes our energy for processes such as growth and movement.

The Law of Conservation of Mass

The law of conservation of mass states that mass is neither created nor destroyed. The law of conservation of mass is also known as the law of恒量 (Keisō). It means that mass in matter cannot change shape and color can change only temporarily. When a chemical reaction occurs, mass is lost and mass is converted into energy. When a chemical reaction does not change, that means that a chemical reaction is a physical change.

States of Matter and Natural Cycles

If matter is a material created out of atoms, how do living things grow? How do mountains form? How do the seasons change? Earth's water cycle is one way that matter moves around. Matter moves from the land to the sea through the life cycle, rock cycle, and water cycle. In matter's water cycle, there are four main stages: precipitation, runoff, infiltration, and evaporation. When living things live, they produce carbon dioxide. The carbon dioxide enters the air and enters the atmosphere. From there, it enters the ocean. When the ocean water reaches the surface, it breaks down limestone into calcium ions, which are then absorbed by marine life. Marine life uses calcium and water, combining them to create shells. These shells eventually become rocks. And water gets recycled, concentrated, and precipitated in the water cycle.

Acids and Bases

Acids + bases = water

Nucleic Acid Function

phosphate group
nitrogenous base
deoxyribose sugar

Nucleic Acid Function

Matter and Mass

Law of Conservation of Mass

Words to Know

- particle
- compound
- molecule
- atom
- arrangement
- irreversible
- chemical
- microorganisms
- decomposing
- organic
- nutrients
- erotion
- sediment

Mass and Matter

Level 3 ■ ■ ■

Words to Know list, Reading Selection, and Reading Comprehension questions

Matter in Natural Cycles

III In the circle by the correct answer.

Matter in Natural Cycles

Everything in the world is composed of matter, and is, therefore, subject to the law of conservation of mass.

The Law of Conservation of Mass

Matter can't be created or destroyed. That's why the law of conservation of mass exists. Matter can move from one place to another, but its properties don't change. The amount of matter in the universe remains constant.

Matter in the Rock Cycle

Molecules were once part of the air that made up the atmosphere. They dispersed. When they did, the matter, wind, heat, and water broke the molecules down into smaller, organic particles. These pieces come together to form other substances, like sedimentary rock.

The diagram illustrates the Rock Cycle with arrows indicating the flow of matter:

- Atmosphere:** Shows a large sphere labeled "Atmosphere". Arrows point from it to the "Hydrosphere" and "Lithosphere".
- Hydrosphere:** Shows a large sphere labeled "Hydrosphere". Arrows point from it to the "Atmosphere" and "Lithosphere".
- Lithosphere:** Shows a large sphere labeled "Lithosphere". Arrows point from it to the "Atmosphere" and "Hydrosphere".
- Processes:** Labels include "Volcanoes", "Wind", "Water", "Heat", and "Organisms". Arrows show how these processes move matter between the spheres.
- Products:** Labels include "Sediment", "Organic particles", "Minerals", and "Sedimentary rock". Arrows show how these products are formed at the end of the cycle.

Matter in the Life Cycle

Organisms are part of the energy cycle. They get energy from the sun for processes such as photosynthesis. Organisms also get energy from other organisms. This is called the energy pathway. The body's digestive system takes in food. It breaks the food down into smaller pieces. The first thing the body does with the energy from the food is to keep itself alive. The body uses energy to move, breathe, and think. Afterward, the body may eventually break the energy down into another energy source. This is called metabolism. The body then releases energy through excretion. It becomes energy that can be used by other organisms. Microorganisms feed on dead organisms. They break down the dead organisms, sending nutrients that can be used by other organisms.

Matter in the Water Cycle

Clouds form when water vapor reaches condensation points. The water droplets in clouds are tiny water particles suspended in air. They form droplets or ice crystals when the air is cool enough. They then deposit to the earth as precipitation. When precipitation occurs, the water particles will return to the bodies of water they evaporated from.

Words to Know

Matter in Natural Cycles

composed
conserved
properties
weathering
reaction
minerals
organic
particles
sediment
organisms
decomposition
microorganisms
decomposing
nutrients
hydrosphere

Assemble the Unit

Reproduce and distribute one copy for each student:

- Visual Literacy page: Matter Moves Through Cycles, page 61
 - Level 1, 2, or 3 Reading Selection and Reading Comprehension page and the corresponding Words to Know list
 - Graphic Organizer of your choosing, provided on pages 180–186
 - Writing Form: Matter and Mass, page 62

Introduce the Topic

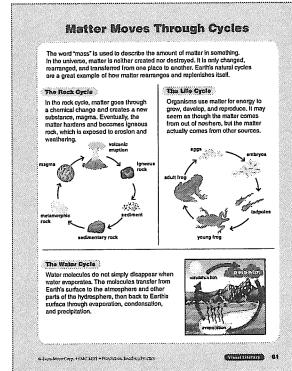
Read aloud and discuss the Matter Moves Through Cycles diagram. Explain that the total mass of the universe never changes, but its matter can rearrange. Point out that matter can go through chemical changes and new substances can be created, but mass remains constant even when matter looks different.

Read and Respond

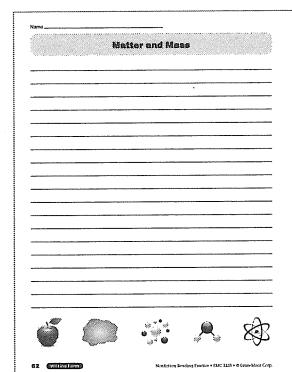
Form leveled groups and review the Words to Know lists with each group of students. Instruct each group to read their selection individually, in pairs, or as a group. Have students complete the Reading Comprehension page for their selection.

Write About the Topic

Read aloud the leveled writing prompt for each group. Tell students to use the Graphic Organizer to plan their writing. Direct students to use their Writing Form to respond to their prompt.



Visual Literacy



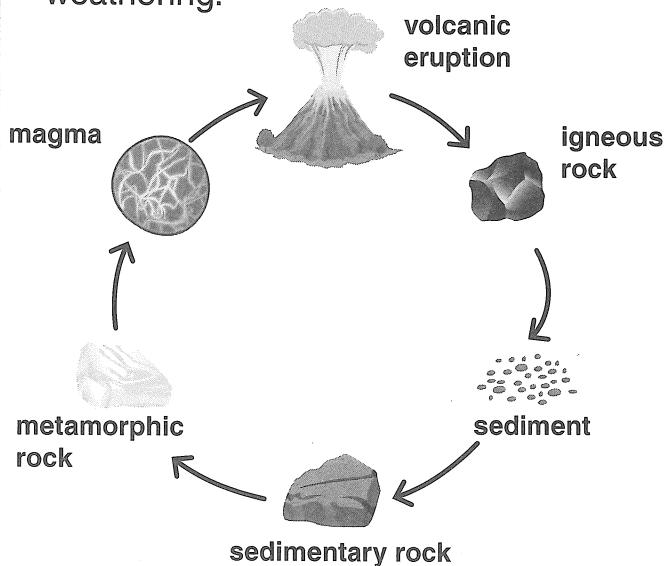
Writing Form

Matter Moves Through Cycles

The word “mass” is used to describe the amount of matter in something. In the universe, matter is neither created nor destroyed. It is only changed, rearranged, and transferred from one place to another. Earth’s natural cycles are a great example of how matter rearranges and replenishes itself.

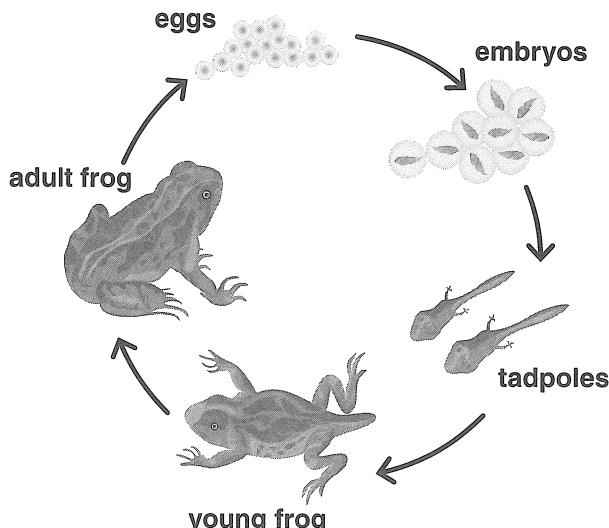
The Rock Cycle

In the rock cycle, matter goes through a chemical change and creates a new substance, magma. Eventually, the matter hardens and becomes igneous rock, which is exposed to erosion and weathering.



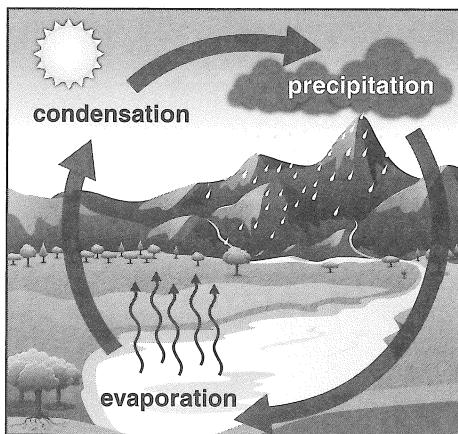
The Life Cycle

Organisms use matter for energy to grow, develop, and reproduce. It may seem as though the matter comes from out of nowhere, but the matter actually comes from other sources.



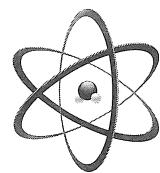
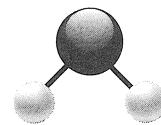
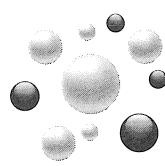
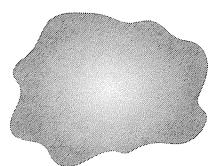
The Water Cycle

Water molecules do not simply disappear when water evaporates. The molecules transfer from Earth’s surface to the atmosphere and other parts of the hydrosphere, then back to Earth’s surface through evaporation, condensation, and precipitation.



Name _____

Matter and Mass



Words to Know

The Basics of Matter

composed

organisms

conservation

chemical

reaction

rearranged

substances

reversible

hydrosphere

Words to Know

Law of Conservation of Mass

particles

composed

molecules

atoms

arrangement

irreversible

chemical

microorganisms

decomposing

organic

nutrients

erosion

sediment

Words to Know

Matter in Natural Cycles

composed

rearranged

properties

weathering

erosion

mineral

organic

particles

sediment

organisms

digestive

microorganisms

decomposing

nutrients

hydrosphere

Matter and Mass ■

Matter and Mass ■ ■

Matter and Mass ■ ■ ■



The Basics of Matter

Matter in Different Forms

Everything in the universe, including Earth and everything on it, is composed of matter. Matter can exist in three states: solid, liquid, and gas. Even invisible things such as air are composed of matter. Planets, stars, and all organisms are composed of matter. The word “mass” describes how much matter there is in something; therefore, an object with more mass has more matter.

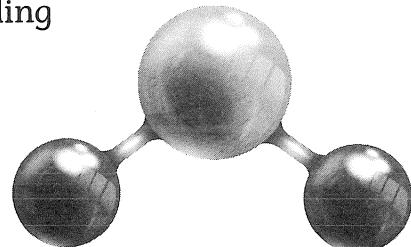
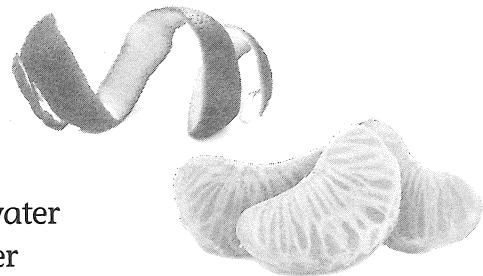
The Law of Conservation of Mass

The law of conservation of mass has been accepted by scientists for centuries. It states that in any chemical reaction, mass is neither created nor destroyed. It can, however, be rearranged. Chemical reactions may cause substances to combine or break apart. Physical and chemical changes are happening around us all the time. While physical changes are reversible, chemical changes are not. Imagine a room with only one person and one orange inside of it. The room contains a specific amount of matter.

Next, imagine that the person peels the orange and breaks it into pieces. Then he chews the pieces individually and swallows them. The process of chewing and digesting is a chemical change because it is irreversible. Now, the orange peel lies beside the person in the room, and the orange is in the person’s body. Has the mass contained in the room changed? The answer is no. The orange’s atoms have simply been rearranged. And the orange started out as a solid but ends up as a liquid; therefore, the state of the matter has also changed.

Mass in a System

Earth has many systems and environments. The water cycle, for example, is the system that has refreshed water continuously for billions of years. Water in the oceans evaporates, moves within the hydrosphere, condenses, forms clouds, and falls to Earth’s surface as precipitation. Depending on the climate, the precipitation can take the form of ice, water, or snow. Or, the water could hang in the air as fog. The water cycle is just one example of the role of the law of conservation of mass on Earth.



A water molecule is composed of two hydrogen atoms and one oxygen atom.

The Basics of Matter

Fill in the circle by the correct answer. Then write the answers to numbers 3, 4, and 5.

1. Earth has the same amount of water as it did billions of years ago because _____.
 A water only moves within the ocean
 B water does not have a mass, so it's not as heavy
 C even invisible things such as air are made of matter
 D of the law of conservation of mass
 2. _____ is an example of a chemical reaction.
 A Water changing into ice
 B An egg becoming hard-boiled
 C A frying pan heating up
 D Folding a dollar bill
 3. If the person had eaten the orange peel, too, would the mass in the room have changed? Explain why or why not.
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-

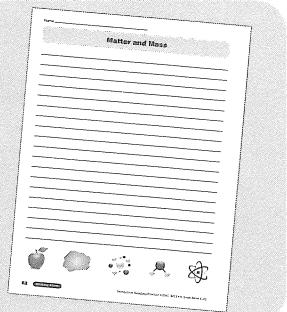
4. Does the state of matter in an object affect the mass? Explain why or why not.
-
-

5. When substances combine or break apart, what is happening to the matter?
-
-

Write About the Topic

Use the Writing Form to write about what you read.

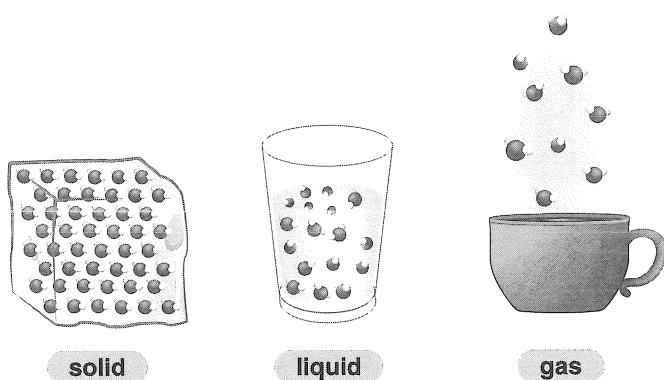
Explain how the law of conservation of mass relates to matter as it moves through the water cycle. Use details and examples.



Law of Conservation of Mass

How Matter Changes and Moves

Matter is any object or substance in the form of particles that takes up space. Particles are composed of molecules and atoms, and they make up everything in the world. The kinds of atoms and their arrangement determine the matter's state. Matter has three possible states: solid, liquid, or gas.



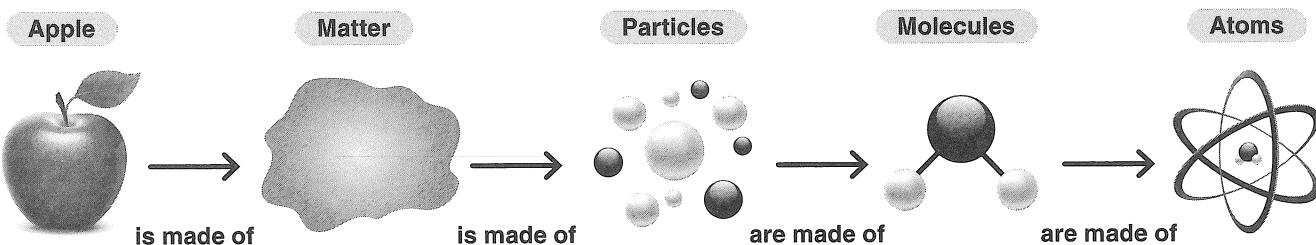
Particles can move and rearrange when matter goes through an irreversible change, or a chemical reaction. This can cause the matter's state to change. Chemical reactions occur constantly, everywhere on the planet. Every time a living thing digests food and converts it to energy, for example, a chemical reaction takes place. All living things use energy for processes such as growth and reproduction.

The Law of Conservation of Mass

Mass is the amount of matter in something. The law of conservation of mass states that mass is neither created nor destroyed. In chemical reactions, matter is only rearranged. The properties of matter (such as shape and color) can change, and can be converted into energy. When a person eats a celery stick, it's a solid that becomes a liquid in the stomach. Its mass does not change.

Matter in Earth's Natural Cycles

If matter is neither created nor destroyed, how do living things grow? How do mountains change over time? Why do streams run dry? Earth's natural cycles (including the life cycle, rock cycle, and water cycle) are also subject to the law of conservation of mass. When one thing grows, it's because matter was taken from another source. When a living thing dies, microorganisms feed on it, decomposing its body. Then it becomes organic matter that gets absorbed into the earth, adding nutrients that living things feed on. In the rock cycle, erosion breaks down landforms into small pieces of mineral and organic matter. The matter gets carried away by wind and water, combining with sand and sediment that will eventually harden. And water gets evaporated, condensed, and precipitated in the water cycle.



Law of Conservation of Mass

Fill in the circle by the correct answer. Then write the answers to numbers 3, 4, and 5.

1. When a living thing digests food, the _____.
 A chemical reaction does not occur
 B food's matter is rearranged
 C living thing's matter is rearranged
 D law of conservation of mass doesn't apply
2. When a landform or a living thing gets smaller, it's because _____.
 A new matter formed in another place
 B Earth's mass decreased
 C matter was used up and disappeared
 D matter was transferred from it to another place
3. What do microorganisms have in common with erosion?

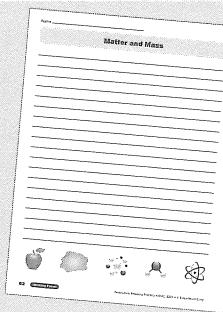
4. Explain how the law of conservation of mass allows Earth's cycles to continue.

5. How are humans and their belongings subject to the law of conservation of mass?

Write About the Topic

Use the Writing Form to write about what you read.

Elaborate on why Earth's total mass will never change.
 Use details from the text, and provide your own examples.



Matter in Natural Cycles

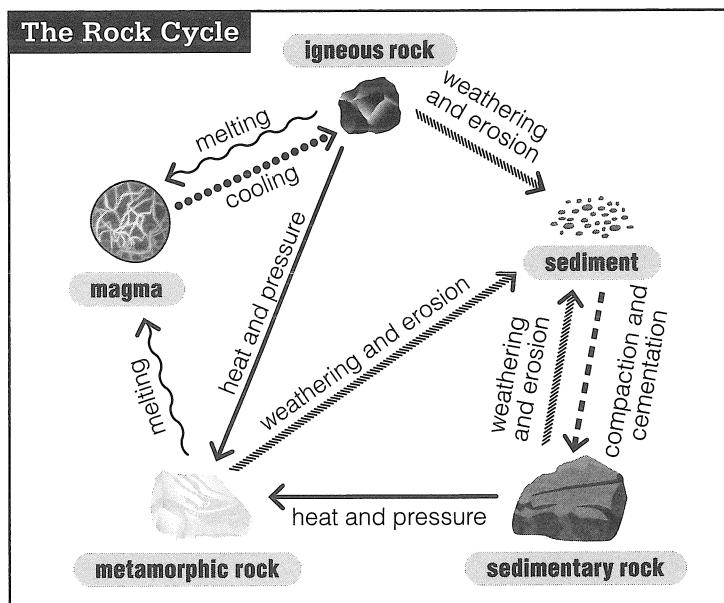
Everything in the world is composed of matter, and is, therefore, subject to the law of conservation of mass.

The Law of Conservation of Mass

Mass refers to the amount of matter that exists. The law of conservation of mass states that new mass is neither created nor destroyed, but it can be rearranged. Matter can transfer from one place or thing to another, and its properties can change. But the total amount of mass on Earth remains constant.

Matter in the Rock Cycle

Mountains wear down and change shape over time. Does that tough mountain material simply disappear? Weathering and erosion break down the rock material. Wind, water, and ice transfer the small rock, mineral, and organic particles to other places, where the matter combines with sand and other sediment. These pieces come together to form a tough mass of sedimentary rock.



Matter in the Life Cycle

All organisms use energy for processes such as growth and reproduction. But where does the energy come from? An ecosystem and its food web can provide answers. Say a frog eats a grasshopper. The frog's digestive system breaks down the matter in the grasshopper's body, and the energy transfers to the frog. The frog uses the energy to form offspring and more mass. The frog may eventually be eaten, or it may expire another way. Either way, the matter and energy in the frog will transfer to other organisms. After an organism dies, microorganisms feed on it, decomposing its body. It becomes organic matter that gets absorbed into the earth, adding nutrients that living things feed on.

Matter in the Water Cycle

Does Earth lose mass when water evaporates? Bodies of water are broken down gradually as water particles evaporate. In the form of vapor, the particles transfer to other parts of the hydrosphere and condense. They form clouds that are visible and become heavy. Precipitation occurs, and the water particles find their way back to the bodies of water they evaporated from.