5th-Grade Preparation Packet for the Maryland Integrated Science Assessment (MISA) PART II School Year 2019-2020

Student’s First and Last Name:

Date

Teacher’s Name
The Ecosystem of the Forest

A student read the following information below about a pine forest.

Just like us, all other organisms take something from their environment while putting waste back into it. When several kinds of organisms interact with each other in one particular area, it's called an ecosystem. In the forest, living beings (plants, animals, insects, fungi, and bacteria) all interact with each other and with the soil and water to form the forest’s specific kind of ecosystem.

Producers are living things that can make their own energy out of non-living resources all around them like, oxygen and water. They're also known as autotrophs. Autotrophs do not need to kill anything in order to eat. Plants and algae, for example, are producers. In the forest’s ecosystem, the trees, shrubs, and moss are all producers. They turn water and sunlight into the energy they need to live and grow, through a process called photosynthesis. And remember that carbon dioxide you expelled as waste matter? Well, for plants, carbon dioxide is a vital gas. It is used to help aid with the process of photosynthesis.

Like producers, decomposers don’t need to kill another living being to obtain food. However, they differ from producers because they still need to get their nutrients from other organisms or from waste matter expelled by other organisms. Usually, they eat dead animals and plants. Bacteria and certain kinds of fungi are examples of decomposers. They're very important because by helping break down dead organisms, they actually provide energy to living ones.

Consumers are living beings that need to eat other organisms to survive. You may have heard about this group as being “at the top of the food chain.” They’re also known as heterotrophs. Humans are heterotrophs who eat both plants and animals to live. In the forest, a deer eating plants, a wolf hunting deer, a hawk eating rodents, and rodents eating both bugs and plants, are all examples of the ecosystem’s consumers. As you can see, carnivores, omnivores and herbivores are all different kinds of heterotrophs. It doesn't matter which kind of organism they eat; as long as they eat other organisms to survive, they’re consumers/heterotrophs.

So, now that you know each type of player, how does the ecosystem’s cycle work? Well, when an organism dies and its body decomposes, bacteria go to work. Let’s imagine the dead organism is a deer. Bacteria obtain energy from the deer’s body, while helping it decompose efficiently. When the deer’s body breaks down, because of the work done by the bacteria, it returns to the soil. This is important for the earth, because the carcass actually gives vital energy back to the environment. It makes the soil rich in nutrients for plants to grow there. Grasses, flowers and trees then grow in that soil and get the energy they need, along with energy from the sun and water. The water also filters through the soil, which is necessary for the forest’s flowers and trees to be able to take it up through their roots. Heterotrophs, like deer, eat those plants to get their energy, and other heterotrophs, like wolves, eat the deer for their energy. Adapted from Readworks.org

Food Web
1. An ecosystem only survives between the living and nonliving parts of the environment. How does the nonliving matter in an ecosystem provide for the environment? Provide evidence from the text when writing your answer. (5-LS2-1/PLD F)
2. Peacocks are male birds with long brightly colored tail feathers. Why might this characteristic stay in the peacock population? (3-LS3-1/PLD G)

A. Long tail feathers help peacocks find more food.
B. Males with the largest, brightest feathers attract more mates.
C. Brightly colored tail feathers prevent the peacock from flying.
D. Brightly colored feathers warn predators that peacocks are poisonous.

Use the information below to answer Items #3 and #4.
Layla is reading about inherited traits passed from animal parents to their offspring. She recorded in the table the traits from two sets of cows. She then described the offspring.

### Cow Data

<table>
<thead>
<tr>
<th>Traits</th>
<th>Set A</th>
<th>Set B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td>black and white</td>
<td>black</td>
</tr>
<tr>
<td>Tail color</td>
<td>black</td>
<td>black</td>
</tr>
<tr>
<td>Horns</td>
<td>no</td>
<td>yes</td>
</tr>
</tbody>
</table>

3. The offspring for the cows in Set A would likely inherit a _________ tail and black _________.

A. spots, black
B. black, horns
C. brown, spots
D. white, horns

4. The offspring for the cows in Set B would likely inherit a white fur with _________ spots.

A. black
B. white
C. brown
D. horns
5. What traits of a Eastern Bluebird helps it to survive? Select all that apply. (3-LS4-2/PLD H)

A. Female bluebirds like to chirp.
B. Bluebirds are common in backyards.
C. Bluebirds use the empty holes woodpeckers have left to build their nests, since they are safe and already made.
D. Young bluebirds born late in the year always stay with their parents longer throughout the winter.

6. A scientist finds many more light brown lizards in the desert compared to green lizards. What is the best reason the scientist saw light brown lizards? (3-LS4-3/PLD G)

A. Light brown lizards have trouble finding mates.
B. Green lizards are eaten more than brown lizards.
C. Green lizards are typically poisonous which helps them survive longer in the desert.
D. Light brown lizards are able to camouflage and survive in the desert, so they then can reproduce.
Read the passage below to answer Item #7.

**How Do Living Systems Cause Changes in Energy**

Plants are one living system that changes energy. In fact, plants do something you cannot do—they change the light energy from the sun into food. Using photosynthesis, plants’ leaves absorb light, a type of radiation, from the sun and use this energy to convert water and carbon dioxide into sugar. Sugar is a form of chemical energy, which the plants then use to grow or store for later use.

When other living things eat plants, they use the chemical energy stored in the plants as food. Animals’ digestive systems break down the sugar in the plants. Then animals use this chemical energy to grow, to keep warm, to move around, or to repair their bodies. The energy that was in the plants is either used or stored in the animal. Some animals eat other animals as food. These animals are called predators, and the animals they hunt are called prey. Predators use the energy stored in the bodies of their prey. Each living thing in the food chain uses some energy. *Adapted from Discovery Education Techbook*

7. **Energy within an ecosystem can come from consuming matter. Explain how an animal in an ecosystem uses energy to take and give back matter to the environment in which it lives.**

(5-LS1-1 and 5-LS2-1/PLD F)
Beavers are mammals that have an important role in nature. Beavers have two key characteristics: long, sharp teeth and a flat, wide tail. They use their teeth to gnaw down trees of all sizes for food and for building things. They use their tails to swim, but that's not all! If a beaver smells or sees danger nearby, it will warn the other beavers. It slaps its tail on the water surface as a loud warning. Beavers live in ponds and lakes in some parts of North America and in some parts of Europe and Asia. They are pretty hard to find today because they were nearly hunted to extinction. Beavers were prized for their pelts, which people used to make fur coats and hats. A pelt is the skin of a dead animal with hair or fur on it. Adapted from Readworks.org

8. Choose the statements below from the text that describe the characteristics a beaver has that helps it survive within its habitat? Select all that apply. (3-LS3-2/PLD G)
   A. "They use their tails to swim, but that's not all!"
   B. "Beavers live in ponds and lakes in some parts of North America and in some parts of Europe and Asia."
   C. "They use their teeth to gnaw down trees of all sizes for food and for building things."
   D. "A pelt is the skin of a dead animal with hair or fur on it."

9. Mary learned that wolves and deer are part of the same food chain. She wrote how matter is transferred in the ecosystem where the deer and wolves live. Not all of her statements are true. Which statement is false? (5-LS2-1/PLD F)
   A. Matter moves from the grass to the deer and then to the wolf.
   B. When these organisms die, decomposers break down and return it to the soil.
   C. Grass releases gases into the environment that the deer need to breathe.
   D. The deer release gases that the wolves need to survive.
Digging for Fossils

Layers of soil can build up over time and form layers of rock. Different layers of rock may have different kinds of fossils depending on what the area was like at the time when the rock layer formed. Jane is digging for fossils. The diagram shows the fossils she found in different rock layers.

10. Which type of organism did Jane find that was the oldest? (3-LS4-1/PLD H)

A.  
B.  
C.  
D.  

Read the passage below to answer Question #11.
How Are the Parts of an Ecosystem Interdependent?

Within an ecosystem, producers, consumers, and decomposers are all interacting with each other. A honeybee gets food from a flower. The flower is pollinated by the honeybee. A bear eats the honey from the beehive. The flower produces seeds. A bird eats the seeds. An oak tree grows in the forest. A squirrel eats acorns from the tree. The squirrel buries some acorns in the soil. Some acorns grow into new trees. A bird builds a nest in a young oak tree. Earthworms decompose the flower, oak tree, or squirrel once they die. These are just some of the many ways that living things interact. The nonliving parts of an ecosystem are also very important. For example, rocks and soil are nonliving things. Rocks provide shelter for some animals. Plants need soil to grow. Animals eat the plants that grow in the soil. Air and water are also nonliving things in an ecosystem. Animals breathe in air. Plants need carbon dioxide from the air. All living things need water. Adapted from Discovery Education Techbook

11. Plants are an important part of an ecosystem. Why are plants important and how do plants move matter within an ecosystem? Use evidence from the text to write your response. (5-LS2-1/PLD F)

12. Flowers of the same type look very similar, but some can have brighter colors than others.
Which of these statements best describes how this could help the flowers? (3-LS3-2/PLD G)

A. Brighter flowers help protect them from predators.
B. Lighter colored flowers help the plant spread its roots and absorb water.
C. Brighter flowers help the plant gather sunlight, which produces more food.
D. Brighter flowers attract more bees, helping the plant to pollinate and reproduce.

13. Sasha create a drawing of a food chain. The living things in her food chain were a cricket, a frog, a snake, and a hawk.

What is missing from Sasha’s food chain drawing? (5-LS2-1/PLD F)

A. more prey
B. more consumers
C. an energy source
D. a producer
As ice crystals form at the ocean surface, they expel salt, which increases the salinity of the underlying waters. This cold, salty water is dense and can sink to the ocean floor, where it flows back toward the equator. The sea ice layer also restricts wind and wave action near coastlines, lessening coastal erosion and protecting ice shelves. Sea ice also creates an insulating cap across the ocean surface, which reduces evaporation and heat loss to the atmosphere. As a result, weather over ice-covered areas tends to be colder and drier than it would be without the ice.

Sea ice also plays a fundamental role in polar ecosystems. When the ice melts in the summer, it releases nutrients into the water, stimulating the growth of phytoplankton, the center of the marine food web. As the ice melts, it exposes ocean water to sunlight, spurring photosynthesis in phytoplankton. When ice freezes, the underlying water gets saltier and sinks, mixing the water column and bringing nutrients to the surface. The ice itself is habitat for animals such as seals, Arctic foxes, polar bears, and penguins. Adapted from Discovery Education Techbook

14. The sea ice cycle is very important to the polar ecosystems. Each summer when it melts, the ecosystem's primary producers, phytoplankton, begin to grow and reproduce. How will this affect other aspects of the ecosystem, including non-living factors plant/animal life? Use details from the text to support your answer. (5-LS2-1/PLD F)
Reggie's Plants

Reggie has two identical plants. He plants one outside in the ground. The other is growing indoors without direct light. Reggie predicts the weight of the carbon dioxide and water taken in by the plant and the oxygen given off by the plant.

Reggie notices that several rabbits have been eating the outdoor plant and that small insects are eating the indoor plant. When Reggie went outside, he saw a fox hunting a rabbit, but he notices that nothing is eating the insects when he looks at his indoor plant.

The diagram shows Reggie's plants.

15. Think about the environment (outdoor and indoor) of each plant. Explain what factors will help with plant growth for each plant. Explain what factors would limit each plant's growth. (5-LS2-1/PLD F)
Use the diagram below to answer Question #16.

The diagram shows Reggie's plants.

![Diagram showing outdoor and indoor plants with the following components:]
- Outdoor Plant:
  - 2.64 grams carbon dioxide
  - 4.92 grams oxygen
  - 1.08 grams water
- Indoor Plant:
  - 1.06 grams water

16. Both plants are growing, but the outdoor plant seems to be growing faster. Which factor is most likely causing the outdoor plant to grow faster? (5-LS2-1/PLD F)

A. less soil  
B. more air  
C. less water  
D. more sunlight

Use the foodweb below to answer Question #17.

![Food web diagram showing various animals and plants interconnected]

17. Which role does the raven play in the pine forest food web? (5-LS2-1/PLD F)

A. a carnivore, eating only meat  
B. a scavenger, eating anything it finds  
C. an herbivore, eating plants and animals  
D. a decomposer, breaking down dead organisms

Use the picture below to answer Question #18.
18. Which nonliving factor **most likely** controls why the plants are only growing in water and not on the grass in this environment? (3-LS4-3/PLD G)

A. air  
B. birds  
C. shade  
D. soil  

19. Which of these best describes the diagram? (5-LS1-1/PLD F)

A. the different layers within leaves of plants  
B. the process of photosynthesis in plants  
C. how plants use the sun to stay warm  
D. how plants use energy to grow and move
A group of scientists are watching an orca called Dianna. Orcas are also known as Killer Whales. Dianna is also the name of a Roman goddess known as "the hunter". Dianna led her pod to work together to make a wave to wash seals off a shelf of ice so they could eat them. A pod is a group of orcas. Scientists think Dianna is about 40 years old and the daughter of an orca named Riptide. Dianna and the other orcas use echolocation to find food and communicate with each other during hunts. Boats and submarines can also "see" underwater in a similar way, using sonar, which also uses sound waves. Dianna is bigger than many females in her pod, which may help her travel long distances and protect her young. Dianna and her pod are often seen in the Pacific Ocean south and east of Alaska. Adapted from Discovery Education Techbook

20. How do traits (characteristics and behaviors) help orcas (killer whales) survive? Provide evidence from the text. (3-LS4-2/PLD H)
Use the chart below to answer Item #21.

A student was studying bears, and created a chart about the Florida black bear and Polar bear.

<table>
<thead>
<tr>
<th>Type of bear</th>
<th>Florida black bear</th>
<th>Polar bear</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat</td>
<td>forest with warm, humid climate</td>
<td>Arctic with snow and ice, cold sea water</td>
</tr>
<tr>
<td>Fur</td>
<td>black and smooth</td>
<td>white, thick, dense, water repellent</td>
</tr>
<tr>
<td>Special features</td>
<td>shed their underfur during the summer months</td>
<td>thick layer of fat to keep warm in the water strong, curved claws for gripping ice</td>
</tr>
</tbody>
</table>

21. Polar bears have a thick layer of ______ to keep them warm in their artic environment. Floride black bears ______ because of their environmental change, which polar bears do not. (3-LS4-2/PLD H)

A. repellent, underfur
B. polar, underfur
C. water, repellent
D. fur, hibernate

Use the diagram below to answer the question. A scientist studies the rock layers shown. Some of the layers have fossils.

<table>
<thead>
<tr>
<th>Rock Layers</th>
<th>Fossil Ages</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Rock Layers Diagram" /></td>
<td><img src="image" alt="Fossil Ages Table" /></td>
</tr>
<tr>
<td><strong>Fossil Ages</strong></td>
<td></td>
</tr>
<tr>
<td>Fossil type</td>
<td>Age of fossil</td>
</tr>
<tr>
<td>-------------</td>
<td>---------------</td>
</tr>
<tr>
<td>138–205 million years</td>
<td>435–500 million years</td>
</tr>
</tbody>
</table>

22. The scientist stated that layers G and H are both around 450 million years old. How does the scientist know that the rock layers ages are correct? (4-ESS1-1/PLD I)

A. The rock layers are near each other.
B. The rock layers are both made of the same rock.
C. The rock layers have the same types of fossil.
D. The rock layers have cracks in the rocks.
Read the passage below to answer Question #23.

Grand Canyon

The phenomenon of weathering and erosion of the Earth is shown dramatically with the Grand Canyon. The Grand Canyon is a large, deep river valley in Northeastern Arizona. The main cause of the erosion that formed the Grand Canyon was water; most scientists agree that it formed when the Colorado River started carving through layers of volcanic rock and sediment between five million and six million years ago. The Grand Canyon is approximately one-mile and it has been eroded by weathering over millions of years.

Adapted from Study.com

23. Explain the process weathering, erosion and the formation of the Grand Canyon. (4-ESS2-1/PLD J)
24. Provide evidence from the text to identify ways arctic hares and desert jackrabbits are be different based on their environment. (3-LS4-3/PLD G)
Peter looks at a diagram of rock layers. He says that layer M and layer L are the same age.

25. Which sentence correctly describes Peter's statement? (4-ESS1-1/PLD I)

A. This is true because layers M and L have a crack.
B. This is false because layer M was deposited after layer L.
C. This is false because erosion happened between layer M and layer L.
D. This is true because an earthquake happened after layers M and L were deposited.

26. A straight river has formed. Thinking about erosion, what could make that river begin to curve? (4-ESS2-1/PLD J)

A. Flowers are growing by the river.
B. The sun shining in the middle of the river.
C. Sediment traveling, building up, and resting on one side of the river.
D. Animals swimming from the beginning to the end of the river.
Bring in the Beavers

It was the fifth straight day of heavy rain in the town of Leith. If it kept on pouring for much longer, the river would swell with rainwater and flood the town. All the citizens of Leith would have to flee their homes and find safety on higher ground. Anna and her parents stayed glued to the television set, nervously listening to the weather reports.

For now, the weatherman said, the situation was still safe, but helicopters were ready to lift people away at any moment if the rain did not stop soon. Anna felt her palms grow sweaty as she saw the frightened expressions on her parents' faces. Her parents never looked scared. They were used to the rain, since Leith was located in the rainy country of Scotland, but it had never, ever poured like this before. The town had cancelled school in case of a sudden emergency, so all Anna could do was try to read her favorite detective stories and hope for the rain to stop. Luckily, it did. When she awoke the next morning the skies were sunny and clear. It was a miracle. They had been spared from a terrible natural disaster.

Everybody in Leith breathed a great sigh of relief, but they knew they had to take action. Nobody wanted to face this flooding danger again. The day after the downpour stopped, the Mayor of Leith called a town meeting. Anna went along with her parents to find out more. She really did not want all her books and toys, and her pet dog Noodles, to get washed away in a flood.

At the meeting, the Mayor presented three experts who had different ideas about solving the problem. One man suggested they build a concrete dam upstream to block the river's path. With such a big dam, the river would never overflow into Leith, even in heavy rain. Another lady suggested building a different structure, a high stone wall all around Leith to stop flood water from getting in. The last speaker, a small, slender man with a heavy Scottish accent, had what seemed to be the craziest idea of all.

"You see," he said, "if we just bring some beavers back into our landscape, we might be able to kiss our problem goodbye. About 400 years ago, there were thousands of beavers roaming around the Scottish countryside. Our ancestors killed most of them off because they enjoyed hunting them for their warm fur. What our ancestors didn't realize was that we need to keep beavers alive for our own safety. The beaver builds dams in the rivers out of sticks, mud, and leaves. These dams are strong enough to stop a river from flooding in heavy rain. If we bring the beavers back, we can solve our problem by working with nature."

After the three experts spoke, the Mayor asked the citizens of the town to think for a week and then vote for the best plan. Anna's father said, "That last guy is crazy. He thinks he can solve the flooding problem with beavers? Really, how silly."
Anna's mother looked very thoughtful. "You know, Fred," she said. "It's worth a try. What harm can it do? If workmen build just one concrete dam or a stone wall, it won't be as useful as several dams built by the beavers. And besides, beavers are very cute, and they build beautiful dams out of things they find in the forest. Concrete dams are not nearly as beautiful."

There was much whispering and discussing all over town until the final vote was cast. Anna secretly hoped that the beaver plan would win. She had always wanted to see a beaver in real life. Since Leith was in the countryside, and everyone in town loved nature and animals, Anna suspected that the rest of the town might be on her side. When the vote finally came in, Anna was proven right. They would bring in the beavers!

Over the next two years, scientists brought beavers in from other parts of Scotland, and set them free upstream and in the countryside around Leith. Everyone noticed a difference. It rained and rained, but the river did not even come close to overflowing because of three dams the busy beavers had already made. For her fourth grade field trip, Anna's teacher brought her class into the countryside to see the beavers at work. They watched in awe as the furry creatures hurried back and forth from the dam carrying twigs and bark in their claws.

Beavers almost seemed like furry, cute little people. Before they left, Anna and her classmates shouted out a loud "thank you" to their animal friends for saving their town. Adapted from Readworks.org

27. How was their problem solved and what impacts do you think it would have on the plants and animals that live in and around the river through the town of Leith? (3-LS4-4/PLD H)
28. Glaciers on the mountains start to melt when the air temperatures increases. This is an example of which two Earth systems interacting? (5-ESS2-1/PLD J)

A. atmosphere and biosphere  
B. atmosphere and atmosphere  
C. atmosphere and geosphere  
D. atmosphere and hydrosphere

Manda drew a diagram of the water cycle.

29. Which two Earth systems are interacting as the water evaporates from the ocean? (5-ESS2-1/PLD J)

A. atmosphere and biosphere  
B. geosphere and biosphere  
C. biosphere and hydrosphere  
D. hydrosphere and atmosphere
30. Which chart shows the pattern the student observed? (4-ESS2-2/PLD J)

A. Elevation (feet) | Rock Types
---|---
600–1,200 | metamorphic and sedimentary
1,201–3,000 | igneous

B. Elevation (feet) | Rock Types
---|---
600–1,200 | sedimentary
1,201–3,000 | igneous and metamorphic

C. Elevation (feet) | Rock Types
---|---
600–1,200 | igneous
1,201–3,000 | metamorphic and sedimentary

D. Elevation (feet) | Rock Types
---|---
600–1,200 | igneous and metamorphic
1,201–3,000 | sedimentary
Use the scenario below to answer Questions 31, 32 and 33.

Collision of Dimes
Science students are using dimes to learn about energy transfer. The students set up four dimes on a smooth table top. A student pushed one dime into another dime that was 5 centimeters away causing a collision.

In Trial 1, the push was gentle. In Trial 2, the push was stronger than in trial 1. The experimental setup and the results following the collision are shown below.

31. A student recommends that there were several ways to observe energy transfer during a collision. Which statement describes the best prediction about the results of this investigation if a student were collecting data about sound? (4-PS3-3/PLD B) Adapted from the Wisconsin Department of Public Instruction

A. The collision in trial 1 would produce a sound that lasts for a longer time than the sound produced by the collision in trial 2.
B. The collisions in trial 1 and trial 2 would produce sounds that cannot be heard by the human ear.
C. The collisions in trial 1 and trial 2 would produce identical sounds.
D. The collision in trial 2 would produce a louder sound than the sound produced by the collision in trial 1.
32. A student claims that the dime that was pushed in Trial 2 had more energy than the dime that was pushed in Trial 1. Which explanation provides the best evidence from this investigation to support the claim? (4-PS3-3/PLD B) Adapted from the Wisconsin Department of Public Instruction

Which explanation provides the best evidence from this investigation to support the claim?

A. The pushed dime in trial 2 had more energy because it moved forward in a straighter line than the pushed dime in trial 1.

B. The pushed dime in trial 2 had more energy because it received a gentler push than the dime in trial 1 did.

C. The pushed dime in trial 2 had more energy because it was pushed harder, and its faster motion caused the other dime to move farther after they collided than the pushed dime in trial 1 did.

D. The pushed dime in trial 2 had more energy because it moved more slowly than the pushed dime in trial 1 did, so it transferred more energy to the other dime when they collided.

After observing the dimes collide, a student considers how energy transfer occurs in other objects. The student learns about a bike that is being used to provide electricity. The diagram below shows the bike. Next, the student studies the flowchart below about how the bike works:

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pedal → freewheel system → generator → battery
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33. Which option identifies an input and output in this system? (4-PS3-3/PLD B) Adapted from the Wisconsin Department of Public Instruction

A. Input: stored energy in the battery  
   Output: motion energy in the body

B. Input: motion energy in the body  
   Output: stored energy in the battery

C. Input: stored energy in the battery  
   Output: sunlight energy

D. Input: sunlight energy  
   Output: motion energy in the body
There are lots of different kinds of ants: carpenter ants, leaf-cutter ants, sweet ants, fire ants, and many more. They are different colors, too. They can be red, or brown, or black. Some are very, very small, and some are rather big. Whatever their differences, though, all ants are social creatures. They live in large groups called colonies. Some ant colonies are big and have millions of ants. There are different types of ants in the colony, and they each have different jobs. The queen lays eggs. Soldier ants protect the queen and the colony. They also gather food and attack other colonies if they need new nesting space. Worker ants take care of babies, look for food, and build ant homes (anthills or mounds). Soldier and worker ants are female. Male ants' only job is to mate with the queen in order to produce eggs, which hatch into baby ants.

Ants are busy little insects. It's easy to see them moving quickly here and there. Sometimes you can see them carrying a small piece of something, or dragging part of a leaf somewhere. Sometimes you even see two ants helping each other carry the same crumb. But where are they going and what are they doing? Ants may seem to be just running around, but they are actually important parts of their ecosystem, their world under our feet.

One thing ants do to help their ecosystem is to keep soil healthy. By constantly digging through the soil, they create spaces in it. Soil needs space inside it for air and water. Without air and water in soil, the tiny creatures that live in soil would not survive.

Ants also help bring nutrients to soil. When they bring food particles to their nests, they add nutrients to soil because they don’t eat everything they bring. Their leftovers stay in the soil and break down into nutrients for other creatures living in the soil. Adapted from Readworks.org
34. Explain how ants help bring nutrients to the soil and worker ants help their ecosystem. Support your answer with evidence from the text. (3-LS2-1/PLD E)

35. Ari makes six cookies out of dough. Before putting the cookies in the oven, he puts all of the cookies on a balance and measures the total weight as 36 grams. He rolls the uncooked cookies into one big ball of dough, then he measures the weight. What is the weight of the entire cookie dough ball? (5-PS1-2/PLD J)

A. 6 grams  
B. 30 grams  
C. 36 grams  
D. 42 grams

36. Water can change from one state to another. What happens when water changes states? (5-PS1-2/PLD J)

A. Some matter is lost  
B. Some matter is gained  
C. Matter is both lost and gained  
D. Matter is neither lost nor gained.

Read the information below to answer Items #37 and #38.
Students add baking soda to a balloon. Next, they pour vinegar into a bottle. Then, the students attach the balloon to the bottle, as shown in Figure 1. The students lift the balloon and all of the baking soda falls into the vinegar. After the baking soda is added, the balloon becomes larger, pops off of the bottle, and travels upward into the sky.

![Figure 1. Balloon Rocket Investigation](image)

37. What causes the balloon to become larger? (5-PS1-4/PLD A)
   
   A. The vinegar is a liquid
   B. The bottle is full of air
   C. The balloon fills with gas
   D. The baking soda evaporates

38. What caused the change in volume of the balloon? (5-PS1-4/PLD A)
   
   A. A new substance is formed with the properties of baking soda, but not vinegar.
   B. A new substance is formed with properties different from those of baking soda and vinegar.
   C. No chemical reaction has occurred so the substance has the properties of vinegar, but not baking soda.
   D. No chemical reaction has occurred so the substance has the properties of both baking soda and vinegar.

39. A glass is filled with ice. The weight of the ice is 250 grams. Which sentence describes the weight of the water when the ice melts in the glass? (5-PS1-2/PLD A)
   
   A. It will weigh 250 grams.
   B. It will weigh a little less than 250 grams.
   C. It will weigh twice as much as 250 grams.
   D. It will weigh a little more than 250 grams.
Does Matter Move?

Danielle's teacher told the class that all matter is made of particles. She said these particles are smaller than human eyes can see. Danielle did an experiment to show that the tiny particles exist and move.

Procedures:
- Step 1. Measure 100 mL of cool water into a jar. Measure the weight of the water and jar.
- Step 2. Put four drops of food coloring into water. Do not shake or move the jar.
- Step 3. Observe the drops of color. Have any changes occurred? Record the results.
- Step 4. After one hour, check the jar and record the results.
- Step 5. Let stand overnight in the warm classroom.
- Step 6. Observe the jar. Measure the weight of the water and jar. Record the results.

After letting the jar sit out overnight, Danielle notices that the color is spread throughout the water inside the jar. She decides to repeat the experiment using two other liquids. She uses milk that weighs 1.03 grams per milliliter and vinegar that weighs 1.01 grams per milliliter.

40. Which measurement is the most likely weight of the water and food coloring mixed in the jar? (5-PS1-2/PLD A)
A. 100.4 liters
B. 100.4 grams
C. 100.4 milliliters
D. 100.4 kilograms

41. Danielle measured the weight of the filled jar in Step 6. She found its weight was less than it was in Step 2. Which step could Danielle add to her procedure to make sure that the weight does not change? (5-PS2-1/PLD B)
A. Measure the volume of water in the air.
B. Add a lid on top of the jar to keep it closed.
C. Add more water to the jar to keep it filled up
D. Measure the volume of the water and food coloring in the jar

42. Kelly launches her toy rocket straight up into the air on a day that is not windy. How will gravity affect the toy rocket? (5-PS2-1/PLD B)
A. Gravity will push the toy rocket up into space.
B. Gravity will make the toy rocket fly above the ground.
C. Gravity will have no effect on the movement of the toy rocket.
D. Gravity will pull the toy rocket down toward the center of Earth.
Use the image below to answer Item #43.

Jessica is riding a skateboard at a skateboard park. She goes up a ramp.

43. Explain what direction she will go next and identify the force that will change the direction of her motion. (5-PS2-1/PLD B)
A cliff is a vertical or very steep natural wall of rock. This means that instead of sloping like a hill, a cliff is almost straight up and down. The cliffs in these pictures below were shaped by weathering and erosion.

![Cliffs](image)

Calvert Cliffs Located in Lusby, Maryland

44. What will cause the cliffs to continue change? (4-ESS2-2/PLD J)

A. The holes in the cliffs will become smaller.
B. The sun will make the cliffs get taller and become rougher.
C. The cliffs will help grow more plants.
D. The rain and wind will break off pieces of rock on the cliffs.

Sheldon rolled a ball down three different ramps. Each ramp is a different height. He measured how far the ball rolled each time. His measurements are in the table.

<table>
<thead>
<tr>
<th>Height of ramp (inches)</th>
<th>Distance ball rolled (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
</tr>
</tbody>
</table>

45. What pattern do the measurements show? (3-PS2-2/PLD B)

A. The higher the ramp, the faster the ball rolls.
B. The higher the ramp, the farther the ball rolls.
C. The higher the ramp, the less distance the ball rolls.
D. The ramp height does not affect how far the ball rolls.
The pictures below show how a seesaw moves.

46. What is the pattern of movement of the seesaw? (3-PS2-2/PLD B)

A. Both sides stay at equal heights.
B. The left side goes up when the right goes up.
C. The left goes up when the right goes down.
D. The left goes down when the right goes down.
The picture below shows an adult and a child sitting in a swing.

47. Two boys are standing behind each person and they are about to use the same force to push the adult and the child. Which describes what will happen? (3-PS2-2/PLD B)

A. The child will move faster.
B. The parent will move faster.
C. The parent will swing backward.
D. The child will change directions.

48. Which of these is an example of group behavior (NEED STANDARD)

A. birds build nests
B. rabbits dig holes
C. squirrels collect nuts
D. swans fly to warmer areas in winter
Read the passage below and Figure 1. to answer Items #49 and #50.

A student is hiking and notices a small spring (a source of water coming up from the ground). The student sees that the water is coming up through rocks. The student wonders where the water comes from, and whether it is fresh or salty. The student finds a diagram of the area (Figure 1 below). The student realizes that much of what is pictured in the diagram can be explained by the interaction of the Earth’s four spheres: the geosphere, hydrosphere, biosphere, and atmosphere. The student wants to identify the parts of the map that show the relationship between only the hydrosphere and geosphere.

**Figure 1. Diagram of the Area**

- salt water 96%
- fresh water 4%
- 1% surface water
- 30% ground water
- 89% ice caps and glaciers
- spring—A source of water coming up from the ground.
- aquifer—A layer of rock or sand that can absorb and hold water.
- porous—Having small holes that allow air or liquid to pass through.

49. What interaction causes the fresh water to come above ground from the spring? (5-ESS2-1/PLD J)

A. Ocean water mixes with the aquifer water.
B. Dry air speeds up evaporation of ocean water.
C. Rain soaks through the soil and porous rock to fill the aquifer.
D. Rain soaks through the ocean and porous rock to make soil.

50. The student wants to identify a part of the map that show the relationship between only the hydrosphere and geosphere. Select the answer that states the relationship of the hydrosphere and geosphere based on the map. (5-ESS2-1/PLD J)

A. deer drinking water from the spring
B. trees absorbing water from the soil
C. water evaporating from the ocean and condensing to form clouds
D. porous rocks filtering groundwater as it passes through the layer