



Name _____ Class _____

Applying Scientific Information

Directions: Read the following description of Issac Newton's three laws of motion. Then read the examples of motion below and classify each as following the first, second, or third law.

- First Law:** A moving object will keep going in the same direction and at the same speed unless a force acts on it. An object at rest will remain still unless a force acts on it.
- Second Law:** An object will change speed and direction when a force acts on it. The greater the force, the greater the change in speed. The heavier the object, the greater the force needed to change its motion. The direction of the object's motion will be the same as the direction in which the force is moving.
- Third Law:** For every action, there is an equal and opposite reaction.

1. The side of an ice rink is the force that stops a hockey puck when the puck slides into it. This example follows which of Newton's laws?

2. As a car moves forward, the air it meets is forced to flow toward the back of the car. This example follows which of Newton's laws?

3. A spacecraft that escapes Earth's atmosphere will keep moving in the same direction and at the same speed because there is no air resistance or gravity to slow it. This example follows which of Newton's laws?

4. You need to push twice as hard to move a shopping cart with 20 pounds of food in it as one with 10 pounds. This example follows which of Newton's laws?

5. A pile of leaves remains still on a calm, windless fall day. This example follows which of Newton's laws?

6. A man doing push-ups lifts himself up by pushing down on the floor. This example follows which of Newton's laws.



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Fact vs. Opinion

Directions: Read the following article and then mark each statement that follows as a fact or an opinion.

Scientists are always looking for better ways to prevent the tremendous loss of life and property each year due to fire. One problem is that many fire codes were developed before today's synthetic materials—and the poisonous fumes they emit when burning—were even heard of. Another problem is the seemingly unstoppable habit of smoking when in bed or when tired to the point of falling asleep.

Each year about 12,000 people die in fires or from the burns or smoke inhalation suffered during a fire. Of those 12,000, about 2,300 deaths can be attributed to carelessly dropped cigarettes. Many fire researchers, therefore, urge the development of a "fire-safe" cigarette. Like a cigar, such a cigarette would stay lit

only if smoked. The cigarette would extinguish itself if untouched.

According to one advocate, "There are hundreds and hundreds of children lying in burn hospitals today who don't know what a cigarette is, but they're there as a result of a carelessly discarded cigarette." Yet the tobacco industry has fought congressional attempts to require that fire-safe cigarettes be produced. According to the director of the Burn Council, the tobacco companies "enjoy having the cigarettes left unattended burn up. It is, I think, the ideal in planned obsolescence . . . to put out a product that will consume itself whether you're using it or not."

Now write *fact* or *opinion* before each statement.

1. _____ Many fire codes were developed before modern synthetic materials were even heard of.
2. _____ Some synthetic materials produce poisonous gases when they burn.
3. _____ It's impossible to stop people from smoking in bed.
4. _____ Each year about 12,000 people die as a result of fires.
5. _____ About 2,300 people die because a cigarette dropped and continued to burn.
6. _____ A cigar stays lit only if someone is smoking it.
7. _____ There are hundreds and hundreds of children lying in burn hospitals as a result of a carelessly discarded cigarette.
8. _____ Tobacco companies enjoy having the cigarettes left unattended burn up.



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Causes and Effects

Directions: Read the following passage and complete the chart below with the causes and effects of the greenhouse effect.

The greenhouse effect has been a topic in the news for the last decade. Scientists still argue about whether this dramatic altering of the environment is now a reality, but they do not argue about the cause if such a phenomenon does eventually occur or about the possible secondary effects the greenhouse effect would have.

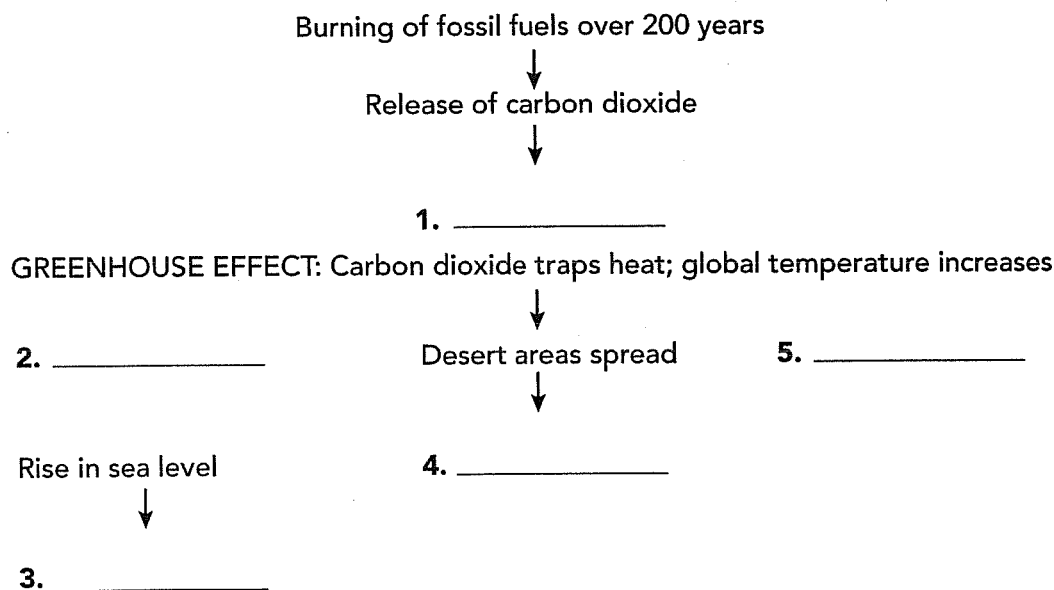
Beginning in the late 1700s with the rise of industrialization, humans found more and more uses for fossil fuels. The burning of oil, gas, or coal releases gases, among them carbon dioxide. In the last 200 years with widespread burning of these fuels, an increasing amount of carbon dioxide has been released into the air. The gas has accumulated in Earth's atmosphere.

At some point much of the solar heat that now reflects off Earth and back into space will be blocked by carbon dioxide in the way the roof of a greenhouse for plants allows solar light and heat in but not as much of the heat out. Indeed, this trapping of heat near Earth

and the increase in global temperature that would result are what is meant by "the greenhouse effect."

What would be the effects of this Earth-sized greenhouse? A temperature increase of just 2–3°F worldwide could lead to melting at the polar ice caps. A rise in sea level would result. What are now coastal cities and lands would be under water. Dry desert areas would increase in size as climates became warmer and the warm atmosphere could retain more moisture. Available farmland would therefore shrink. Countless species of animals and plants, if not destroyed, would be altered as natural selection favored those which could adapt to warmer, drier weather.

Even if the claims that the greenhouse effect now exists proves premature, many scientists believe that such a situation is likely if our excessive use of fossil fuels continues.





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Assessing Data

Directions: Read the each of the following passages and then answer the questions that follow.

One spring morning in New Hampshire in the early 1980s, a state fish and wildlife worker was busy stocking streams and lakes with trout for that summer's fishers. As he released a batch into one pond, an astonishing thing happened. The young fish tried to

swim back to shore. To the man, the trout writhed and squirmed the way a fish on land does as it desperately gasps for oxygen. Later, tests revealed a high acid content in the pond. Acid rain, it seems, had made the pond unfit for fish.

1. What conclusion did the author reach about the pond?

2. What two pieces of evidence did the author include to support that conclusion?

Plants became quite different from green algae when they became adapted to living on land. Land offered plants many advantages, such as abundant sunlight and space. But living on land also had disadvantages. Plants were in danger of drying out on land. Water was not immediately available as it was to algae that lived in water. But plants adapted to a land environment. Their

roots can reach water below ground, and a waxy coating on their leaves helps prevent water loss. Stiff cell walls support plants, enabling them to grow upright toward sunlight. Also, a layer around the reproductive structures protects the spores and gametes from drying out. These adaptations helped plants to become very successful.

3. What conclusion does the author draw about plants' ability to adapt?

4. What four pieces of evidence does the author include to support that conclusion?



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Drawing Conclusions

Directions: Use the information in each item below to draw your own conclusion.

1. Archaeologists have found the fossil remains of shellfish at high altitudes in the Andes Mountains of South America. What does the presence of such fossils suggest about that location?

2. When gas is heated to very high temperatures, its structure changes. The intense heat causes the gas atoms to split into negatively and positively charged particles. This gas of very hot charged particles is plasma. Plasmas exist in only a few places on Earth. One place is inside a neon or fluorescent lightbulb. Electricity provides the heat in these bulbs. In space, plasmas are very common. What must be true about certain areas of outer space for plasmas to exist there?

3. When a woman turned her microwave oven on, the microwave, dishwasher, television set, and lights all went out. She immediately turned the oven off and went to check the circuit breakers. One was off, and as she turned it on, all the other electrical appliances came on. What can you conclude was the reason the power went off?

4. THE PLANETS' ORBITS AND PERIODS OF REVOLUTION

Planet	Length of Orbit Compared to Earth's	Period of Revolution
Earth	1.0	1.0 year
Mercury	0.4	0.2 year (88 days)
Venus	0.7	0.7 year (243 days)

What conclusion can you draw about the speed of Mercury's orbit compared to Earth's?



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Testing Hypotheses

Directions: Read each situation described below, and then answer the questions that follow.

For years many people have complained about feeling depressed during the winter months but happy, or at least content, during summer. Researchers now believe that the limited amount of sunlight in the winter may be the cause of the depression. They call such low feelings “seasonal affective disorder,” or SAD.

1. What is the hypothesis concerning SAD?

2. What could be done to test whether the hypothesis is true?

A man bought a new flashlight for his truck and inserted a 6-volt battery he had at home. The flashlight did not work. The man felt the cause was most likely that the battery was dead.

3. What is the man’s hypothesis?

4. What could he do to test his hypothesis?

A woman planted tomatoes in an 18-inch planter on her balcony in the city but was disappointed when the plants yielded little. When she dug the plants up in the fall, she saw that the roots of each plant were short and confined. She concluded that she must have planted the tomatoes too close together.

5. What is the woman’s hypothesis?

6. What could she do next summer to test her hypothesis?
