UNIT 10

Properties of matter

CD I-50

Section 1 *Vocabulary*

A. Read the text and look at the pictures.


smoke


glass


shaving foam


rubber


oil


ceramic


plastic


emulsion paint


aluminium


copper

Matter can only exist in three states: solid, liquid or gas. But matter in each of those states can have a range of **properties**.

Solids can be **ductile**, which means they can be drawn into wire, or **malleable**, which means they can be beaten into shapes or into thin sheets. Most **metals** are ductile and malleable. Copper and aluminum, for example, are ductile and malleable. We can make these metals into wire and sheets. Some solids are **elastic**, which means they can be stretched. **Rubber**, for example, is elastic.

Some solids are metals, like iron, copper and gold. All metals are good **conductors** of heat and electricity, which means that heat or electricity can pass

easily through them. Some solids, like **plastic**, rubber and **glass**, are good **insulators**, which means that heat and electricity cannot pass easily through them. Some solids, like glass and **ceramic**, are **brittle,** which means that they **shatter** into pieces when they are bent, struck or dropped.

Liquids can be **viscous**, like oil, or they can **flow** freely, like water. Some liquids comprise two liquids of different viscosity. Milk, for example, is an **emulsion**, which means that one liquid is dispersed in another. In this case, droplets of viscous oil are dispersed in free-flowing water.

Sometimes matter in one state is contained in matter in another state. Shaving **foam** is bubbles of gas **suspended** in a liquid. **Smoke** is solid **particles** suspended in a gas, air.

B. **Look at Table 1. Choose one or more materials from Table 1 for each of the uses in Table 2. Write the material in the correct column in Table 2.**

Material	Ductile	Malleable	Elastic	Brittle	Light	Conductor	Insulator
aluminum		✓			✓	✓	
copper	✓	✓				✓	
rubber	✓		✓				✓
glass	✓	✓	✓	✓			✓
plastic	✓	✓	✓		✓		✓
ceramic				✓			✓

Table 1: Properties of some common materials

Uses	Material	Reason
balloons	rubber	3
children's toys		
containers for hot drinks		
car tires		
electrical plugs		
sheets of metal for airplanes		
windows of emergency exits		
wire for electrical appliances		

Table 2

C. **Write the number of a reason (below) next to each of your choices in Exercise B (on page 46). You can use some reasons more than once.**

1. because the material can be made into many shapes and bends without breaking
2. because the material is a good insulator
3. because the material is elastic
4. because the material is malleable and light
5. because you can break the material easily if you need to
6. because you can draw the material out and it is a good conductor

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Section 2 *Reading*

When you have finished with something, you throw it away. But what do you do when there is nowhere left to throw it? Perhaps it is hard to believe but many places in the Western world are running out of places to throw their garbage. Landfill sites, the big holes in the ground where garbage is stored, are filling up, and nobody wants a new landfill in their backyard.

At one time, there was no problem because all garbage was biodegradable. Eventually, the natural materials rotted away and became part of the soil. An apple core, for example, biodegrades in about 20 days. This is natural recycling, where the matter is broken down into its component parts and can be used again.

However, as civilizations developed, man started to make things which do not degrade quickly. Ceramics, for example, take at least 25,000 years. Archeologists have found animal statues of that age in Moravia, and ceramic pots in Japan dating from 5500 BC. Asian peoples made beads of glass over 3,000 years ago. We know this because glass takes over 4,000 years to break down.

Many different types of plastic were developed in the twentieth century and many of these take around 100 years to degrade. We are now using plastic to make thousands of products which add to the garbage pile, but the most serious problem about plastic is its use in packaging. Almost everything nowadays comes in layers of plastic packaging which is immediately disposed of. We are recycling some plastic – melting it down and using it again – but unfortunately most plastic packaging ends up in a landfill.

Many people believe that materials in a landfill are biodegrading. They think that landfills are huge natural factories. In fact, landfills are designed to keep garbage *away* from contact with the air and water which is required to break it down. This is because biodegradation results in the release of dangerous gases and liquids which could get into the air or the natural water supplies.

We do not need more landfills; we need a new solution to the problem of garbage.

A. Choose the best answer in each case.

1. Something *degrades* when:
   a. it is put in a landfill site
   b. it is made of apple
   c. it is left for 20 days
   d. it rots away and becomes part of the soil
2. Natural recycling means:
   a. breaking down
   b. using something again
   c. breaking down to use the parts again
   d. using again in 20 days
3. How much longer does it take ceramics to degrade than glass?
   a. twice as much time
   b. over four times
   c. over six times
   d. 10 times
4. The main problem with plastic is:
   a. it is used in so many products
   b. it is impossible to recycle
   c. it is disposed of immediately
   d. it is used as packaging
5. Landfills:
   a. are places where things biodegrade
   b. are filled with garbage and water
   c. are filled with garbage and air
   d. keep garbage away from water and air

B. Study the following example sentences.

Using the present continuous

We **are using** plastic to make thousands of products.
We **are recycling** some plastic.
We **are using** it again.
We **are running out of** places to throw our plastic.
Landfill sites **are filling up**.

Using the present simple

Ceramics **take** at least 25,000 years to biodegrade.
People **throw away** plastic products.
Most packaging **ends up** in a landfill.
Biodegradation **results in** the release of dangerous gases and liquids.

C. Put the verbs in parentheses into the present continuous or present simple tense.

Landfill sites _____ (*become*) full. We _____ (*reach*) the point where a solution must be found. Many people _____ (*believe*) that materials in a landfill _____ (*biodegrade*). They _____

(*think*) that garbage in landfills _____ (*break down*) into its component parts. In fact, landfills _____ (*keep*) garbage *away* from the air and water which they _____ (*need*) to break down, because biodegradation _____ (*result*) in the release of dangerous gases and liquids. We _____ (*need*) a new solution to the problem of garbage.

Section 3 Listening

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A. Listen and complete the summary of the reading text in Section 2. Write one word in each space.

Many countries are _____ out of places to put their garbage. Thousands of years ago, garbage was not a problem because it was made up of natural _____ which were biodegradable. The problem developed when people started to make things which do not _____ quickly. The worst problem today is _____ which is used to make thousands of products and which can take about 100 years to degrade. Landfills are designed to stop garbage _____ down, so more landfills are not the answer to the problem.

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B. Listen to the description and complete the summary. Write one word in each space.

There is a new _____ material which has the same properties as normal plastic but breaks down easily when it is thrown away. The packaging material is based on starch from _____. If you put it in hot water, it _____. The _____ were tested at the 2000 Sydney Summer Olympics. The games produced more than 600,000 kilos of _____ each day. More than three-quarters of that did not go to a landfill but was biodegraded or _____.

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