



WORKSHEET: THE MATTER AND ITS PROPERTIES

NAME: _____ CLASS: _____ DATE: _____

1. Find eight properties of matter in the wordsearch. Then, write them in the correct box.

T	S	P	Q	P	A	F
G	I	O	M	W	S	G
B	Z	I	A	E	D	H
D	E	N	S	I	T	Y
S	I	U	S	G	E	J
H	J	H	G	H	X	L
A	N	J	F	T	T	O
P	C	O	L	O	U	R
E	F	D	D	Z	R	Y
V	O	L	U	M	E	R

GENERAL PROPERTIES	SPECIFIC PROPERTIES

2. Put the words in order and write correct sentences.

- are properties matter to General common all
- properties differentiate from matter another Specific kind of one
- used properties describe Specific matter are to identify and
- are units base Derived of combinations units
- in amount of a Mass the body is matter
- of space Volume occupies amount the matter is

3. True or false? Write T or F. Circle the mistakes.

- There are four general properties.
- Specific properties differentiate a solid from a liquid or a gas.
- Weight and density are specific properties.
- The kilogram is used to measure mass.



- 5. The square metre is used to measure length.
- 6. Temperature is measured in kelvins

Prefixes of common measures

Remember! Prefixes are added at the start of a word to change its meaning.

4. Match each prefix to its English meaning.

- | | |
|-----------|----------------------------------|
| 1. kilo- | a. one hundredth |
| 2. hecto- | b. one hundred |
| 3. deca- | c. very small; one millionth |
| 4. deci- | d. one tenth |
| 5. centi- | e. one thousandth |
| 6. milli- | f. ten |
| 7. micro- | g. dwarf; one thousand millionth |
| 8. nano- | h. one thousand |

5. Express the following measures as multiples of a metre.

Examples:

1 hectometre = 100

1 decimetre = 0.1 metre

- | | |
|--------------------|---------------------|
| 1 kilometre _____ | 5 decametres _____ |
| 1 millimetre _____ | 5 centimetres _____ |
| 1 nanometre _____ | 8 micrometres _____ |

5. Read the instructions, then solve the problems below.

- To **multiply** whole numbers ending in zero, multiply the base numbers; then add the total number of zeros that end both numbers.

Example: 300 x 1500

Multiply the base numbers: 3 x 15 = 45

There are 4 zeros in total, so: 300 x 1500 = 450,000

- To **divide** whole numbers ending in zero, cross out all the zeros in the divisor and the same number of zeros in the dividend. Divide what is left in the normal way.

Example: 20,000,000 ÷ 500

There are 2 zeros in the divisor 500, so: 20,000,000 ÷ 500

200,000 ÷ 5 = 40,000

- | | |
|------------------------|----------------------------|
| a. 80 X 100 = _____ | d. 20,000 ÷ 500 = _____ |
| b. 5000 x 10 = _____ | e. 4000 ÷ 20 = _____ |
| c. 1200 x 4000 = _____ | f. 9,000,000 ÷ 300 = _____ |

7. Match the words to their definitions.

1. length	a. the amount of matter in a body	
2. mass	b. the measure of passing events	
3. temperature	c. the relationship between the mass and the volume of a body	
4. time	d. the extension of a body in two dimensions	
5. derived units	e. the distance between two points	
6. surface area	f. mathematical combinations of base units	
7. volume	g. the thermal state of a body	
8. density	h. the space occupied by a body	

8. Complete the chart with the missing information about properties and units.

Property	Unit
Length	..... (m)



Surface area	Square metre (.....)
.....	..... (m ³)
Capacity (.....)
.....	kilogram (.....)
.....	kg/m ³

9. Complete the facts file about the properties of matter.

Facts file: properties of matter		
Length <i>Length is the distance between two points. It is measured in metres.</i>	Surface area	Volume
Capacity	Mass	Density

10. Complete the sentences.

1. All matter has mass ...	a. one thousand litres.	
2. Derived units are ...	b. in cubic metres.	
3. Air is matter because ...	c. than gases.	
4. Surface area is a ...	d. the mass and the volume of a body.	
5. Liquids are measured in ...	e. volume, weight and density.	
6. Capacity is measured ...	f. a measuring cylinder.	
7. One cubic metre is equal to ...	g. relationship between two variables.	
8. Mass is measured using ...	h. derived unit from length.	
9. Density is the relationship between ...	i. combinations of base units.	
10. Liquids have a higher density ...	j. scales.	
11. Temperature measures the amount...	k. of heat that a body emits or absorbs.	
12. A graph can show the ...	l. it occupies space.	

11. Describe how you would measure the following.

- the volume of a pile of coins:
- the surface area of a shoeprint:
- the volume of air in a measuring cylinder half full of water:



The English system of measurement

The metric system is an elegant decimal system in which units are defined by the power of ten, and named with prefixes indicating the order of magnitude of the units.

In contrast to this, the English System is based on the human body or on people's immediate environment. An inch is the length of three barleycorns placed end to end.

A hand, the width of a man's hand, is 4 inches. Today, hands are only used to measure the height of horses. A foot is the length of a man's foot and represents 12 inches. A yard, which was the length from the king's nose to his outstretched hand, is now 36 inches.

If you look at liquid measures (for example, in recipe books), you will find terms like teaspoon (the approximate volume of a small spoon used for stirring tea), tablespoon (the amount contained in a large spoon), cup (the amount held in a normal-sized cup), and pint. The word 'pint', by the way, came to English from the Spanish word pinta (3 spot or a mark).

As you can see, the two systems are completely opposed. The metric system is based on the cold logic of Science while the English system is 'organic' in the sense that it developed because of people's needs to measure very concrete things.

12. Match the words and the definitions.

1. power (of)	a. a cereal used to make beer, feed animals, etc.	
2. magnitude	b. the number of times that a number can be multiplied by itself	
3. barley	c. completely extended	
4. barleycorn	d. a grain of barley	
5. outstretched	e. size	

13. Think and answer.

1. What is the English system based on?
2. Why did scientists need to adopt a standard international system of measurements?

14. Draw and label three objects that represent English measurements. Add their equivalents in metric units.

.....

15. Circle the correct answer.

1. The general properties of matter include mass, volume, (a) capacity and density (b) weight and density (c) size and density.
2. The formula used to measure the surface area of irregular objects is called (a) πr^2 (b) base x height (c) estimation.
3. Capacity is measured in (a) litres (b) litre/dm³ (c) dm³/litre.
4. Density is the relationship between (a) capacity and volume (b) mass and capacity (c) mass and volume.
5. Solids have (a) a lower density than gases (b) a higher density than gases (c) an equal density to gases.



6. In the International System of Units, the unit for temperature is the (a) Kelvin. (b) °Celsius. (c) °Fahrenheit.
7. Temperature is (a) dependent on (b) independent of (c) somehow related to mass and volume.
8. Time is (a) the difference between the rising and the setting of the Sun (b) the length of the Earth's rotation (c) the measure of passing events.
9. Graphs show (a) the results of an experiment (b) the relationship between two variables (c) coordinate axes.
10. On a graph, the horizontal and vertical axes are called (a) x and y (b) y and x (c) scales.

16. Read the text and answer the questions.

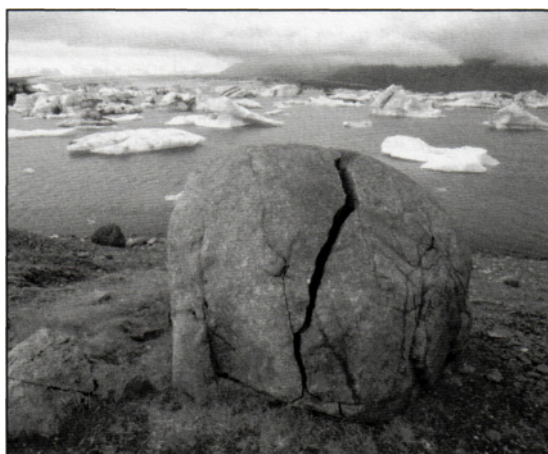
Matter

Everything that takes up space and has mass is matter. Therefore, everything around us is matter. Matter has general properties which are common to all things. Specific properties, on the other hand, help us tell one kind of matter apart from another. Colour, texture, hardness, shape, etc. are used to identify, differentiate and describe matter. Although it may appear that air is not matter, it does have mass and it does occupy space, therefore it is matter. What we can say is that its density is smaller than the density of solids because it has little mass for the volume of space it occupies.

1. What is matter?
2. What properties enable us to distinguish between different types of matter?
3. Why is air considered to be matter?
4. Find words or expressions which mean the following.
 - a. occupies:
 - b. general::
 - c. distinguish between:

17. Find eight words related to the states of matter. Then complete the text with the words.

c	O	M	P	R	E	S	S	L
O	C	Y	A	U	X	H	O	1
N	V	T	R	H	P	A	L	Q
T	B	R	T	G	A	T	1	U
R	N	E	1	D	N	H	D	1
A	M	W	C	S	D	D	S	D
C	T	F	L	O	W	S	G	S
T	S	D	E	N	S	1	T	Y
E	B	A	S	G	L	O	K	U



- (1) hold their shape, but liquids and gases adapt their shape to the container. Solids (2) when heated and (3) when cooled, as do (4) Solids cannot (5) but liquids and gases can. The (6) of solids is high, and that of gases quite low: they have few (7) in a large volume. For this reason, gases are easy to (8) while solids are not.



18. Match the words and their definitions.

1. Forces	..... is made up of tiny particles.
2. Attraction	..... affects the speed of particles.
3. Matter	..... attract particles.
4. Fluidity	..... holds particles close together.
5. Compressibility	..... is the number of particles in a given volume.
6. Solid, liquid and gas	..... is the ability of matter to flow.
7. Temperature	..... is the degree to which volume is reduced as pressure is applied.
8. Density	..... are the physical states in which matter can exist.

19. Correct the incorrect words in the following sentences.

1. When a solid is heated, the particles move more slowly.	
2. As a result of heating, the force of attraction between particles increases.	
3. The process of melting is also called cooling.	
4. The temperature of a substance at fusion and solidification varies.	
5. The change of a solid to a gas is called regressive sublimation.	
6. The change of a liquid to a gas is called condensation.	

20. Unscramble the letters and find the Names of the different combinations of matter.

TURMIXE
ILOSUTON
PERU STANBUCES
POUNCOND
METELEN

21. Put the following information in the correct place in the facts file.

can be chemical compounds or elements / only one component / a subgroup of mixtures / made up of a solvent and a solute / cannot be broken down / are chemical in nature / homogeneous ones are called solutions / have a fixed composition / contain two or more elements / classified in the Periodic Table / made up of more than one substance /

Facts file: matter	
Pure substances	<i>can be chemical compounds or elements</i>
Compounds	
Elements	
Mixtures	
Solutions	

22. Complete the following definitions.

- _____ is the liquid part of a solution.
- _____ change does not alter the composition of a substance.
- _____ change transforms the substance into a new substance.
- _____ is a method used to separate insoluble solids from liquids.
- _____ is a homogeneous mixture of two metals or a metal and another substance.



23. Using the information on page 146 of your Student's Book, write sentences to compare and contrast synthetic materials and their uses.

Example: Plastic-Glass: Both plastic and glass are impermeable but plastic is flexible and glass is not.

Plastic-Carbon fibre:

Glass-Carbon fibre:

Fibreglass-Plastic:

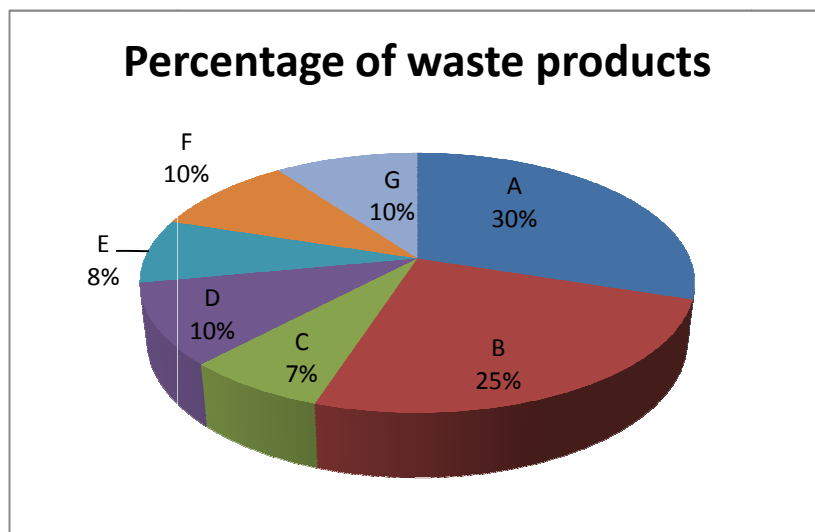
Glass-Carbon fibre:

Fibreglass-Fibre optics:

24. Think of an object or product made with synthetic materials. Explain why the materials used are the right ones for the product:

25. Read the text and then label the chart.

Distribution of solid waste
Textiles represent ten percent of solid waste, the same amount as glass and waste labelled other. Plastic and metal add up to fifteen percent, with one percent more metal than plastic. Paper and organic matter make up the rest. Paper is a quarter of total waste and organic matter is even more!



A:; B:; C:; D:
.....; E:; F:; G:



26. Relate the concepts of the column "A" with column "B".

COLUMN A	COLUMN B	COLUMN C
1. What products can be recycled?	a) They are distributed to the shops to be sold for domestic consumption.	
2. What happens to toxic waste?	b) Bottles, cans, newspapers, fruit and vegetables.	
3. What materials can be recycled?	c) It is taken to a centre where it is sorted.	
4. What first happens to waste when it has been collected	d) Raw and recycled materials	
5. What are manufactured products made from	e) It is buried in special containers.	
6. What happens to products when that cannot be recycled?	f) They are incinerated or put in a rubbish dump.	
7. What happens to products when they have been manufactured?	g) Plastic, glass, organic matter, paper and metal.	

27. Find words or expressions in the following text which mean the concepts indicated.

Recycling facts and figures

Why recycle? Because recycling saves energy and helps to preserve the environment. Although the 50% of waste is recycled in some European countries, in others, the percentage is much lower.

Over half of the rubbish that ends up in the dustbin could be recycled. Just think of all the plastics, paper, cans, and glass we throw straight into the bin, when they could be recycled.

Glass, for example, is 100% recyclable and can be reused time and time again. If it is not recycled and ends up in landfill, it will never decompose.

Aluminium cans, like the ones which contain drinks, can be recycled and ready to use in just six weeks.

We can save money by buying products which do not have a lot of packaging. At the moment, about 16% of the money we spend on a product pays for the packaging, which we just throw away later.

Plastic is another material that can easily be recycled. It really is a good idea to throw plastic articles into the right dustbin for recycling, because plastic can take up to 500 years to decompose.

We can also help to conserve the environment by recycling paper. It takes twenty-four trees to make one ton of newspaper, and the production of paper made from wood causes 27% more air pollution than recycled paper. In addition, 70% less energy is needed to recycle paper than to produce it from raw materials.

a) a garbage can:	b) in the end:	c) waste:	d) rubbish dump:	e) separate into basic components:

28. Answer the questions:

- a) Why should glass be recycled?:
-
-
- b) Why should we avoid buying products with a lot of packaging?:
-
-



29. Circle the correct answer.

- a) According to particle theory, the particles within matter are (a) static (b) in constant attraction and repulsion (c) in constant motion.
- b) Above its boiling point, a substance is (a) a gas (b) a liquid (c) a solid.
- c) Solutions are usually (a) solid mixtures (b) liquid mixtures (c) gaseous mixtures.
- d) Chemical changes involves (a) a chemical reaction (b) a physical change (c) a breakdown into simpler substances.
- e) Rocks are usually (a) homogeneous mixtures (b) heterogeneous mixtures (c) chemical compounds.
- f) In a solution, the dissolved substance is called the (a) solvent (b) solute (c) dissolution.
- g) Chemical elements are (a) solutions (b) compounds (c) pure substances.
- h) Synthetic materials are obtained from natural substances which are transformed by (a) chemical processes (b) chemical reactions (c) chemical changes.
- i) Fibre optic is a fibre made from (a) carbon (b) petroleum (c) glass or plastic.
- j) Batteries, old medicines and pints must be disposed of in (a) a rubbish dump (b) a waste collection area (c) a collection dump.

30. Read the text and answer the questions.

Particles

Particles of matter do not change from one state to another. They only change their arrangement or their energy. When matter changes state, no mass is lost and no mass is created. When a solid is heated, the particles gain energy and move more and more rapidly. The forces of attraction between the particles are weakened, and at a certain temperature, they have enough energy to break free from their positions. Then, the solid changes into a liquid in a process called fusion.

- a) Find the opposite of the following words in the text.

a.1. Gained:	a.2. Destroyed:	a.3. Cooled:
a.4. Slowly:	a.5. Strengthened:	a.6. Solidification:

- b) What two changes can occur in particles of matter?:
-
-
- c) What happens when a solid is heated?:
-
-
- d) What is fusion?:
-
-

NOTE: This document has been prepared from: Redal, Brandi & Guerrini (2008): **Essential Natural Science. Teacher's Resource Pack, 1st Secondary.** Santilana Educación S.L.-Richmond Publishing, 136 p.