Name: _____ Group: _____ Date: _____

STUDENT BOOK:	**Chapter 2, pp. 50–58**
CONCEPTS:	CHEMICAL CHANGES
	SYNTHESIS
	DECOMPOSITION
	OXIDATION
METHOD:	MODELLING

OUT OF SIGHT

*Synthesis, decomposition and oxidation are ordinary chemical changes taking place all around us, but we can't see these processes at work. What can we do to make them visible in order to learn more about them? Modelling can help.**

*Modelling provides concrete representations of abstract or hard-to-see elements or phenomena.

IDENTIFYING THE PROCESS TO MODEL

Read pp. 50–58 in your student book for help in answering questions 1–4.

1. Modelling a phenomenon requires a clear understanding of all its constituents. Let's begin with an example of synthesis from the textbook: the synthesis of water.

$$2\ H_2 + O_2 \rightarrow 2\ H_2O + \text{energy}$$

Complete the following tables.

Before chemical reaction	
Reagents	**Number of atoms**

After chemical reaction	
Product	**Number of atoms**

2. What does the principle of conservation of matter say about chemical changes?

_____

_____

_____

_____

_____

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3. Do the answers you recorded in your table corroborate the principle of conservation of matter? Why?

4. Why is this chemical change a synthesis: $2\ H_2 + O_2 \rightarrow 2\ H_2O$?

5. Here are some other examples of chemical changes (synthesis, decomposition, oxidation) and their equations. Choose one that you will model.

Chemical change	Chemical equation
A. Synthesis of nitrogen dioxide	$N2 + 2\ O2 \rightarrow 2\ NO2$
B. Synthesis of ammonia	$N2 + 3\ H2 \rightarrow 2\ NH3$
C. Synthesis of carbon dioxide	$C + O2 \rightarrow CO2$
D. Decomposition of hydrogen chloride	$2\ HCl \rightarrow H2 + Cl2$
E. Decomposition of table salt	$2\ NaCl \rightarrow 2\ Na + Cl2$
F. Oxidation of magnesium	$2\ Mg + O2 \rightarrow 2\ MgO$
G. Oxidation of methane	$CH4 + 2\ O2 \rightarrow CO2 + 2\ H2O$
H. Oxidation of iron	$4\ Fe + 3\ O2 \rightarrow 2\ Fe2O3$

I chose: _____

6. Complete the following tables in light of the change you chose.

Before chemical reaction	
Reagents	**Number of atoms**

After chemical reaction	
Product	**Number of atoms**

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7. Are your results consistent with the principle of conservation of matter? Explain your answer.

_____

_____

8. Explain why this change is a synthesis, decomposition or oxidation.

_____

_____

PLANNING A MODEL

9. How will you model the process you have chosen?

_____

_____

_____

_____

10. Draw the process you intend to model.

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11. List the materials you will need, giving the number of each type of object (e.g. 2 balls, 2 sticks, etc.).

DESIGNING THE MODEL

12. Design your model.

VALIDATING THE MODEL

13. Does your model improve your understanding of the process under study? Explain your answer.

14. How could you improve your model?

15. Could you have modelled your equation using things other than objects? If so, what things?