

THE FUTURES CHANNEL  
DYNAMIC WATER - LESSONS



**Subject:**  
Chemistry

**Grade Level:** 9th Grade, 10th grade, 11th Grade, 12th Grade  
([HS-PS1-1](#), [HS-PS1-2](#), [HS-PS1-6](#), [HS-PS1-7](#) )

**Topics:** Stoichiometry, chemical equations

**Concepts:**  
- simple balancing of chemical formulas

**Knowledge and Skills Needed for the Project:**

- Conservation of matter and energy
- Basics of chemical formula notation
- Knowledge of molecular ball and stick models

**Materials:**  
Paper and pencil

**Lesson:**

Procedure: This project should be done by students individually or in teams of two or three.

Remind students of our world's natural resources. Ask them to give you some examples (water should be one of them). Discuss with students situations in which natural resources can be consumed in ways that do not replenish them. Introduce the idea that new technologies can change the way we live and extend the life of our natural resources.

Watch The Futures Channel Dynamic Water video. Discuss what effect their new water treatment technology might have on the world. What does it mean for crops, waste water management, drinking water, etc? Explain to students that there are many job opportunities in fields which bring about new technologies through the use of science and more specifically, chemistry.

If students have not studied chemical formula balancing in stoichiometry in a while, review the steps and notations as well as ball and stick molecular modeling before having them do the hand-out below.

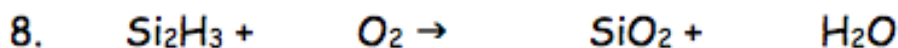
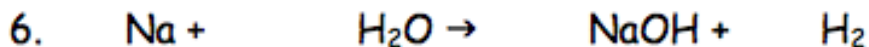
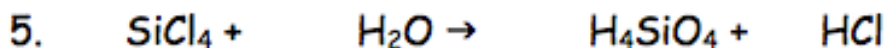
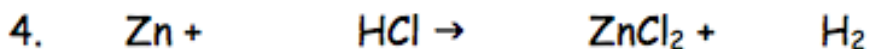
Give students the hand-out.

Tell students that for this project, they will be using their knowledge of chemical formulas to see if they qualify for a new job opportunity!

## NOW HIRING!!

Imagine the day has finally come. You've graduated high school and completed the first leg on the road to a lifetime opportunity to work at a water treatment company like Dynamic Water where they are working to conserve the world's water and solve real-world problems. But first you must fill out the employment application, part of which is a quick examination to see if you are able to quickly balance chemical equations.

1. The formulas below are in need of some tweaking. Can you balance the equations to stabilize the chemical reactions?



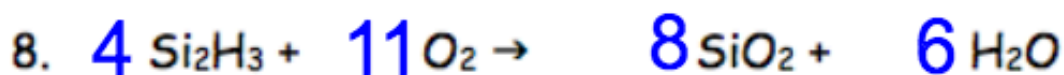
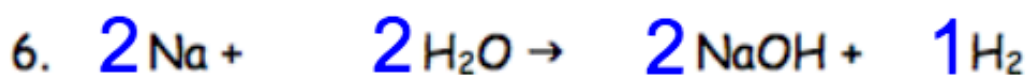
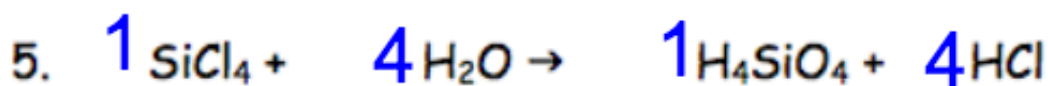
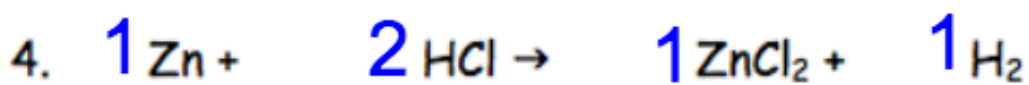
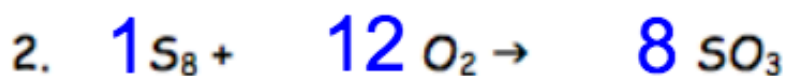
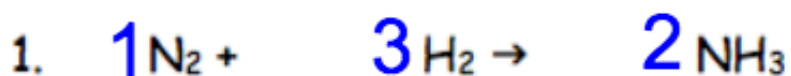
2. After balancing the equations above, pick 3 of them. Use displayed (a.k.a. Ball and Stick) modeling to provide proof that your numbers are correct.

Chemical equation #1 \_\_\_\_\_

Chemical equation #2 \_\_\_\_\_

Chemical equation #3 \_\_\_\_\_

ANSWER KEY - TEACHER ONLY



PART 2: (EXAMPLE OF POSSIBLE STUDENT ANSWER FOR PART 2.)

