

## Map of the module: Elements from the Sea

This shows the relationship between the Chemical Storylines, the Activities and the Chemical Ideas. To aid planning, laboratory-based practical work is indicated by (P), activities involving IT skills are indicated by (IT) and those developing study skills by (S).

ACTIVITIES	CHEMICAL STORYLINE	CHEMICAL IDEAS
	<b>ES1</b> WHY IS THE SEA SO SALTY? A STORY OF SMOKERS AND SOLUTIONS	<b>5.1</b> Ions in solids in solution (section on precipitation and ionic equations) <b>1.5</b> Concentrations of solutions
<b>ES2.1</b> Writing the formulae of ionic compounds <b>ES2.2</b> Solutions of ions (P)	<b>ES2</b> THE LOWEST POINT ON EARTH	<b>2.5</b> Atoms and ions <b>3.1</b> Chemical bonding (section on using formulae) <b>5.1</b> Ions and solids in solution (section on dissolving) <b>9.1</b> Oxidation and reduction <b>11.4</b> The p block: Group 7 <b>2.4</b> Electronic structure: sub-shells and orbitals
	<b>ES3</b> AN INDUSTRIAL CASE STUDY – HOW BEST TO MANUFACTURE CHLORINE?	<b>15.1</b> The operation of a chemical manufacturing process <b>15.2</b> Raw materials <b>15.3</b> Costs and efficiency <b>15.4</b> Plant location <b>15.5</b> Health and safety <b>15.6</b> Waste disposal
<b>ES4.1</b> Which is the most cost-effective brand of bleach? (P) <b>ES4.2</b> What do the halogens look like? (P) <b>ES4.3</b> This liquid is dangerous <b>ES4.4</b> Reactions of halogens and halides (P) (IT) <b>ES4.5</b> Check your knowledge and understanding (Part 1) (S)	<b>ES4</b> FROM ATOMIC BOMBS TO SAFER DRINKING WATER	<b>3.1</b> Chemical bonding (section on bond polarity and electronegativity) <b>5.3</b> Forces between molecules: temporary and permanent dipoles <b>11.4</b> The p block: Group 7
<b>ES5.1</b> Finding the concentration of an acid solution (P) <b>ES5.2</b> Manufacturing halogens and their compounds (S)	<b>ES5</b> HYDROCHLORIC ACID – AN INDUSTRIAL SUCCESS	<b>1.5</b> Concentrations of solutions (section on titrations) <b>15.7</b> Percentage yield and atom economy (section on atom economy)
<b>ES6.1</b> Nucleophilic substitution reaction mechanism <b>ES6.2</b> How do halogenoalkanes differ in reactivity? (P) <b>ES6.3</b> Making a halogenoalkane (P)	<b>ES6</b> TREASURES OF THE SEA	<b>13.1</b> Halogenoalkanes <b>15.7</b> Percentage yield and atom economy (section on percentage yield)
<b>ES7</b> Check your knowledge and understanding (Part 2) (S)	<b>ES7</b> SUMMARY	