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| **TOPIC 2.11:** | **Acids and Bases** (Learning outcomes by syllabus reference: OC18, OC20, OC35) |
| **HOW MANY LESSONS?** | 4 – 5 lessons |

| **KEYWORDS / TERMS TO BE TAUGHT** | | | |
|---|---|---|---|
| Acid | Corrosive | Hydrochloric acid (HCl) | Sulfuric acid ($H_2SO_4$) |
| Carbonic acid | Citric acid | Bases | Alkalis |
| Sodium hydroxide | Calcium hydroxide | Caustic soda | Limewater |
| Universal indicator | Indicator | pH scale | |

| **KEY CONCEPTS IN THE LESSON (OBJECTIVES)** | | |
|---|---|---|
| *What students **must** know or be able to do* | *What students **should** know or be able to do* | *What students **could** know or be able to do* |
| To be able to identify common acids and bases and ways of testing them | To be able to state the formulas of common acids and bases<br>To know that alkalis are bases soluble in water | To be able to conduct and write up independently the experiment to investigate the pH of a variety of substances |

| **SEQUENCE OF LESSON** |
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| 1. Introduce the concept of acids and bases. Allow students to relate |

personal knowledge of acids and bases This could be facilitated by using the *Acids and Bases Introduction* PowerPoint and encouraging student input during the presentation.

2. Carry out experiments in groups. Discussion of key vocabulary, results and conclusions. Students record results and write up experiments as they are doing the practical work through the use of text and/or pictures.

3. Review – whole class discussion. Possibility of using *Acids and Bases Quiz* PowerPoint to facilitate student understanding

4. Further class work/ homework – see *Acids and Bases Worksheet*.

| **1. DIFFERENTIATE BY CONTENT (In what ways can I vary the content of what I am teaching?)** | | |
|---|---|---|
| *(A) Complexity of content: (concrete, symbolic, abstract)* | | |
| *Concrete* | *Symbolic* | *Abstract* |
| Real materials associated with acids and bases (e.g. lemons, toothpaste, soap, litmus, indicator etc.) | Diagrams of colour charts to read pH | How indicators work |
| *(B) Variety of resources* | | |
| As listed above | | |
| *(C) Variety of learning environments* | | |
| Classroom, school laboratory, computer room, outdoor trip to test pH of rainwater, soil etc | | |

| **2. DIFFERENTIATE BY PROCESS (How will I teach the lesson?)** |
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Sequence of lesson as laid out above

- Introduction – using concrete or symbolic material or a general class discussion
- Divide class into groups. Assist students, as required, in completing the experiments to test acids and bases. For resources, guidance and support related to facilitating student experiments and investigations, see **www.juniorscience.ie**
- Possible use of the *What am I?* activity in the *Classroom Activities* section of this resource pack, to facilitate discussion.

**3. DIFFERENTIATE BY OUTCOME / PRODUCT**

**(How will the student demonstrate understanding?)**

See *Worksheets*, *Classroom Activities* and *Experiments* sections of this resource pack.

- Whole class review work completed at end of class.
- Homework: *Acids and Bases Worksheet* if not used for class work. Specify time to be allocated to this work at home.

**FINALLY - ANY OTHER POSSIBILITIES FOR THIS LESSON?**

- Sorting game using pictures of common acids and bases
- Collage of scenes showing acids and bases with their approximate pH
- Extension exercise: How do indicators work?
- Suggested Internet links include **www.juniorscience.ie**, www.bbc.co.uk/schools, **www.scoilnet.ie**, **www.skoool.ie** and **http://classroom.jc-schools.net/sci-units/matter.htm**