

## Introduction

Students with special educational needs attend both mainstream and special schools. One of the dilemmas that we face as teachers on a daily basis is how to adapt the learning outcomes set out in the science syllabus so that they are accessible to a broader range of students. This resource pack outlines general strategies that can be used to adapt activities for all students and provides specific examples of modified activities.

Science education is in a strong position to meet the needs of students with special educational needs because curriculum adaptations can easily be made part of the regular variation within classroom instruction. Active learning, cooperative groups and whole-class discussion, which figure prominently in the research literature on effective science teaching, also provide opportunities for meeting the requirements of students with special educational needs.

In an era of rapid scientific change, the aim of 'scientific literacy for all' has become a main objective of a general education. Science, reading and mathematics form the three literacy domains that are included in measures of educational achievement by the OECD (see [www.pisa.oecd.org](http://www.pisa.oecd.org) for more information on the Programme for International Student Assessment). Although few people could disagree with the goal of achieving scientific literacy for all students, taking the practical steps to implement a scientific education for students can be a complex and challenging task.

The revised syllabus in Junior Certificate Science is predicated on a hands-on investigative approach to science learning and teaching. Students attain learning outcomes through a variety of investigations and experiments. This investigative approach enhances student motivation by encouraging students to make their own decisions and take some

responsibility for their own learning. It also provides valuable opportunities for collaborative learning.

We can and do provide safe programmes for students with special educational needs. In mainstream schools, communicating with resource teachers and learning support teachers can be a first step in adapting content and methodologies for a diverse range of students. Varying learning strategies, planning activities and minimising safety risks form crucial elements in the inclusion of all students in the science classroom or school laboratory. A list of practical *Strategies to Support Students with Special Educational Needs in the Mainstream Classroom* is located in the *Toolkit* section of this resource pack.

Differentiation is a process by which we can enable **all students** to engage in the curriculum by providing learning tasks and activities that are tailored to their needs and abilities.

### **We can differentiate the**

- **content** being learned by a student, e.g. some students might learn five functions while others learn three;
- **process** or way in which a student accesses material, e.g. by using the Internet, a computer programme or a textbook;
- **outcome** or way in which a student shows what he or she has learned, e.g. by writing a paragraph, drawing a diagram etc.

We differentiate in response to a student's

- readiness, skills and background knowledge;
- interests relevant to the content;
- learning profile, which includes how the student likes to learn (i.e. a visual, auditory, or kinaesthetic learner), the student's grouping preferences (i.e. individual, small group, or large group) and the student's preferences for space (e.g. a quiet space in the classroom).

When we differentiate learning and teaching activities to meet the needs and abilities of students, we are making learning more personal and relevant. This personalised approach provides every student with opportunities to reach their potential, whatever their ability level, need or background. Therefore, it does not lower standards, but rather it raises standards for all students through enabling them to access the curriculum at a level appropriate to their needs and abilities.

This resource pack contains differentiated lesson plans and resources for the science classroom. It is not intended that individual lesson plans form part of your subject planning. These plans are included to inform your use of the resources and ideas included in this resource pack. Many of the lesson plans include interactive PowerPoint presentations, which can be used to review lessons quickly with pictures and instructionally sound feedback. These presentations also reduce the need for lengthy descriptions with the instant display of a resource. A picture may instantly promote discussion or remind students of a key concept. This allows us more time to engage meaningfully with students, which can foster student-centred learning. Finally, interactive PowerPoint presentations can present material in a variety of ways and cater for the needs of different learners: verbal, kinaesthetic and/or visual. In short, such presentations encourage interactive student-centred learning and teaching.

This resource pack includes worksheets, activities and ideas that you can use directly in your own classrooms, but the main aim of this pack is to further stimulate your creativity as a teacher in order to enhance the learning opportunities for students within your science classroom. This pack should be used in conjunction with the syllabus documents (Junior Certificate Science Syllabus Revised) and relevant teacher guidelines available from the National Council for Curriculum and Assessment (NCCA). It should also be used in conjunction with *Inclusion of Students with Special Educational Needs: Post-Primary Guidelines (2007)* published by the Inspectorate of the Department of Education and Science.

**The material in this resource pack is exemplar material only and does not purport to describe the content of the syllabus.** Other teachers may also find many of the activities useful in their particular subject areas. **While these materials have been piloted and used successfully with second-level students, it is emphasised that these resources do not purport to meet the individual needs of all students. It is envisaged that teachers will further adapt these resources, as required, in accordance with the needs and abilities of individual students in their classes.** An electronic version of these resources, such as worksheets is provided on the CD that accompanies this pack. Teachers can further adapt these resources by using the electronic version. Font, picture and diagram sizes can be adjusted to facilitate students' access to the materials. Other adaptations might include inserting additional images, removing sections of text and/or adding additional information. Worksheets in particular should be further differentiated as appropriate.

It is important to note that differentiation is an ever-evolving process that depends not only on our students but also on us as teachers. Just as our students change and develop our approach to differentiation changes. In order to optimise students' learning and teaching, attention should consistently be directed to the assessment of students' progress and achievements. Advice on assessment is provided in the *Toolkit* section of the pack.

The greatest skills that we need as teachers are flexibility and open-mindedness so that we can develop our competence and confidence to meet our students' needs. Differentiation is not just about facilitating different curriculum content, learning styles and student work, but more importantly, it is about valuing each student by establishing a classroom and school environment where everybody belongs.

Sean O'Leary

*Assistant National Co-ordinator*

*Special Education Support Service*