

Differentiated Instruction in Science

- **Multiple Intelligences**
- **Learning Centers**
- **Flexible Grouping**
- **Learning Contracts**
- **Tiering**
- **Compacting**
- **Independent Investigations**

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Introduction to Differentiated Instruction

As teachers, we recognize that students are not all alike and that instruction must be designed to meet the needs of the diverse learners in our classrooms. Differentiating instruction is a way to utilize the strengths and interests of all our students as we plan lessons for them. By providing varied educational opportunities, we can increase the chances for their academic success and make learning a rewarding and challenging experience.

According to Carol Ann Tomlinson, an associate professor at the University of Virginia and an authority on differentiating instruction, teachers can differentiate the following classroom elements based on student readiness, interest, or learning profile:

Classroom Elements

- **Content**
Content is what the student needs to learn. It is usually based on school-district curriculum or national standards.
- **Process**
Process is the method the teacher uses to plan and teach the lessons.
- **Product**
Products require students to demonstrate and apply what they have learned.
- **Learning Environment**
Learning environment is the way the classroom looks—the arrangement of furniture and types of displays—and the types of instructional materials available to students.

Differentiation Strategies

- **Multiple Intelligences**
- **Learning Centers**
- **Flexible Grouping**
- **Learning Contracts**
- **Tiering**
- **Compacting**
- **Independent Investigations**

Learning Contracts

About Learning Contracts

Learning contracts are an effective way to differentiate a unit or a portion of a unit of study. Usually, background or introductory information is provided before the contract begins. In a learning-contract situation all students complete a set of activities. When these activities are completed, students complete another set of activities with different levels of complexity.

In some cases, there will be an actual contract that describes the responsibilities of the student; the contract is signed by the teacher, the student, and the student's parent or guardian. In this way, the parent or guardian is aware of the expectations. The first time you use learning contracts with your students, go over the directions, expectations, and activities carefully. Provide plenty of opportunities to stop student work and discuss the progress and any problems the students may have.

The Teacher's Role

- Allow plenty of time to get to know your students before beginning learning contracts.
- Gather resource materials on several different reading levels. The teacher will identify the academic objectives or outcomes of the contract activities as well as the affective-learning objectives.
- In a learning contract the teacher's role is one of support, encouragement, and facilitation.
- The teacher must also develop a schedule and evaluation methods for monitoring students' progress.

The Students' Role

- All students will have a deadline for completion of activities and projects.
- Students may work on the assignments at their own pace and in any order. Their most important responsibility is to work constructively.
- Students must keep a log of their daily work time and progress.
- Work must be kept in a folder in a central location and be accessible to the teacher.
- Students must ask for help when needed and not rely on the teacher to identify that they need assistance.

Science Lessons

In this section of the book, five units are presented.

Units

- **Unit 1: Stormy Weather**
Strategies: Tiering and Learning Centers
- **Unit 2: A Voyage around the Solar System**
Strategies: Multiple Intelligences and Learning Contracts
- **Unit 3: Using Energy**
Strategies: Tiering and Learning Centers
- **Unit 4: Habitats**
Strategies: Multiple Intelligences and Learning Contracts
- **Unit 5: The Amazing Human Body**
Strategies: Multiple Intelligences and Learning Centers

Tiered strategies are labeled according to readiness levels: A (Introductory), B (Intermediate), and C (Advanced).

Multiple-Intelligence strategies are labeled according to various learning styles.

Learning Centers are labeled according to interest. Materials are listed.

Learning Contracts are labeled according to level of difficulty: A (Basic) and B (More Challenging).

These are self-directed activities. Students may work independently or cooperatively to complete them. The lessons provided are samples. You may increase or decrease the complexity of each. Some activities require more than one class period to complete. Consider adding other types of differentiating strategies—compacting, independent investigations, or flexible grouping—that meet the needs of your students and enhance the skill lesson. Special resource materials, writing materials, and art supplies may be needed for some lessons. Suggested resources are provided at the end of the book. Please check websites before using them.

Stormy Weather

Hurricanes and tornadoes are very powerful storms that affect the lives of many people every year. It's important for students to understand the dangers associated with these storms and to learn the safety skills needed in order to survive one. In this unit, differentiation strategies for the study of Stormy Weather are modeled. The strategies are Tiering and Learning Centers. The tiering strategies support the lessons on hurricanes and are labeled according to readiness levels: A (Introductory Level), B (Intermediate Level), and C (Advanced Level). The learning-center activities support the lessons on tornadoes and are labeled according to interest. Materials are listed when appropriate.

The activities used with both strategies are self-directing and may follow a whole-class lesson. Students may work independently or cooperatively to complete them. The lessons that are provided are samples. The complexity of each lesson can be decreased or increased. Some activities require more than one class period to complete. In your classroom, consider adding other types of differentiating strategies to create activities that meet the needs of your students during the unit on Stormy Weather.



Unit 1: Stormy Weather

Topic: Hurricanes

Hurricane Activity

Through the years, people in the Americas have experienced deadly and costly hurricanes. The hurricane season of 2005 was the most active season in recorded history. Research the internet and books and use the information to make a list of some of the most dangerous storms. Choose three storms and tell three facts about each. Some suggestions follow: What was the name of the hurricane? What was the location of the storm? How large was the hurricane? How did the hurricane form? What damage did the hurricane cause?

Write your information in the space below.

Selected Storms	
Hurricane:	
Fact:	
Fact:	
Fact:	
Hurricane:	
Fact:	
Fact:	
Fact:	
Hurricane:	
Fact:	
Fact:	
Fact:	