

Teacher Guide for  
Wind and Sand  
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The goal of this study is to relate physics principles to natural phenomena while simultaneously incorporating the context of global and environmental issues.

This blossom module aims at informing high school students of physics applications far beyond pure theoretical physics principles which are related to school taught mechanics.

Students will apply their knowledge about Newton's laws, and the basics of fluid dynamics in order to understand some natural phenomena such as erosion, desertification, and sand dunes.

This module will take about 45 min; it is divided into six segments with class activities and discussion

**Materials needed:**

- A rectangular glass box (120cm× 88cm× 20cm )
- Hair dryer with three speeds to use as wind source
- Sand from the desert or from K.G. playgrounds (any substitute )
- Small plants with wide leaves
- Pieces of wood with different shapes
- Data show and a computer with PowerPoint software

**Segment one: Introduction**

In this segment you may ask the students to describe some of the main physical forces. To understand the content of the blossoms students should have the knowledge of the following main physics concepts: Newton's laws, pressure, the dynamics of fluids .after finishing the discussion the students are expected to be able to answer most of the questions raised through this segment.

**Segments two – Wind Dynamics**

This segment discusses thoroughly the role of all the forces related with wind. And it gives the student the chance to understand the forces related to wind before performing any experiment. The teacher can motivate students by describing more forces related to wind in addition to those mentioned in the modules for simplifying the topic

### **Segment three: Erosion**

In this part, an elaboration strategy was adopted to elaborate on erosion. Students may work in groups. The teacher should motivate students to observe the factors affecting erosion and the sand different movements. Ask the students if possible to change the erosion factors to decrease erosion, after completion of this activity the students are expected to be able to answer almost all the questions that was raised in the module.

### **Segment four: Desertification**

To elaborate this phenomena we will be using a modified form of the box that was used in the previous experiment K where we will be planting some plants in the box K the students then will repeat the same steps using the same amount of sand. You have to make the students themselves observe the effect of plants and slope inclination of sand and the wind direction on desertification severity. Compare the results of the force inclination with the results from segment two and discuss desertification as a global issue. You may arrange for a field trip to a close by desert.

### **Segment five: Sand Dunes**

In this segment there are some artistic issues in addition to scientific views, the beauty and the mysterious of sand dunes will motivate students, ask students to work in groups to get different shapes of sand dunes, then ask them to draw what they got or what they wanted to see. Then ask them to compare what they have drawn with what they really got. Discuss the obstacles faced through this module.

### **Segment six: Challenges**

The teacher should give this segment great attention since understanding this segment will give this blossoms module a meaningful view. The kinds of questions raised in this module were higher than a to challenge the students. The skills the teacher has will play a critical role in this stage. Give the student the chance to use their knowledge in mathematics and computer. Discuss with the students how to apply their skills in solving the global environmental issues.