Teacher's Guide for the lesson: Friction Force

Presented by: Osama Abu Al-Shawareb

Dhahran National Schools - Kingdom of Saudi Arabia

Location: classroom ... Dialog is directed to the camera.

"Dear, physics teacher. Peace, mercy and blessings of Allah ... I would like to add some key points that you may need to gain more benefits from this lesson.

First: Lesson Objectives

1 - Clarify the misconception among students about friction force and the concept of friction at rest and during motion, and identify two types of friction force.

2 – Perform experiments and activities that allow students to explore by themselves the values of static and kinetic friction forces and coefficients.

3 - Analyze the results related to static and kinetic friction forces.

Second: prior knowledge

Before starting this lesson, students should be familiar to the following:

1 – Draw Free Body Diagram.

2 - Newton's laws of motion.

3 - Understand the following terms (shown on the screen as a PowerPoint presentation): Force, pull, and the vertical reaction force.

4 - Identify the symbols for the following scientific terms in English and their units of measurement (shown on the screen as a PowerPoint presentation): force (F), mass (m), and coefficient of friction μ.

Third, classroom discussions during the video (i.e., when stopping between the scenes)

1 - After scene# 1: Ask the students to discuss the questions that were introduced at the end of the scene and to write their answers using pencils on a paper so that they can remember and modify.

2 - After scene # 2: The students should write the concept of friction force by connecting to their prior knowledge or by writing what they know about it; you can also use the KWL table to explore prior knowledge about this concept and what they want to know about it.

3 - After scene # 3: You can use the internet to show them video clips or demonstrations about the origin of the friction force and relate it to the composition of matter as it is made up of small particles, and then ask them to write the factors affecting the value of friction force after a discussion with their colleagues.

4 - After scene # 4 : It is very important-dear teacher- to relate what the students have learned to every-day life, so after viewing coefficients of friction for different surfaces ,you can make the students try moving the objects on different surfaces and discover the difference in each case, and it is also very useful to extend their understanding of friction force and its impact on our daily life by interviewing a specialist mechanical engineer to talk about the effects of this force on the work of car engine and the reasons for using oil to reduce friction, and you can arrange a field visit to an oil engine factory and observe the viscosity tests conducted to guarantee a good performance.

5 - After scene # 5: Conduct experiment no. (2) according to the procedure included in the experiment report and fill in the table, observe the results and discuss them with your students. Note the use of international SI units of measurement during the calculations.

6 - After scene # 6: Start a discussion with the students to answer the question at the end of the display and that may serve as an introduction to Newton's second law and the forces in two dimensions and free body diagrams. It is very helpful to use drawings to represent the directions of different forces while explanation.

Finally, I hope that this lesson has been useful for our students and full of energy and activities.

In case you have any inquiry, please do not hesitate to contact me by the e-mail that will appear on the screen (e-mail appears on the screen), oasad@yahoo.com

Thank you for your cooperation ... Peace, mercy and blessings of Allah