EXPERIMENTAL METHODOLOGY ON THE BASICS OF MULTIMEDIA IN A SCHOOL PHYSICS COURSE

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Abstract.*The main task of demonstration experiments is to develop students' deep and independent knowledge of physics, independent thinking, cognition, intellectual and practical skills and competencies, including the ability to perform simple observations, measurements and experiments, use tools and materials, helps to develop the skills of analyzing the results of demonstrations, calculating measurement errors, summarizing and drawing conclusions, as well as preparing students for work. This article describes demonstration experiments based on multimedia applications for some topics in the physics course in a general secondary schools.*

Key words: *demonstration experience, multimedia processing, simulation, magnetic field, light diffraction, Java Scrit, HTML5*

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Maktab fizika kursida multimedia asoslari bo‘yicha eksperimental metodolikani o’rganish

Annotatsiya. *Ushbu ishda ko‘rgazmali eksperimentlarning asosiy vazifasi o‘quvchilarda fizika fanidan chuqur va mustaqil bilimlarni shakllantirish, mustaqil fikrlash, idrok etish, intellektual va amaliy ko‘nikma va malakalarni, jumladan, oddiy kuzatishlar, o‘lchovlar va tajribalar o‘tkazish, asbob va materiallardan foydalanish ko‘nikmasini shakllantirishdan iborat bo‘lib, o‘quvchilarning fizika fanidan bilimlarini rivojlantirishga yordam beradi. ko'rgazmalilik natijalarini tahlil qilish, o'lchash xatolarini hisoblash, umumlashtirish va xulosalar chiqarish, shuningdek, o'quvchilarni mehnatga tayyorlash masalasi muhokama etilgan. Umumiy o‘rta ta’lim maktablarida fizika kursining ba’zi mavzulari bo‘yicha multimedia ilovalariga asoslangan ko‘rgazmali tajribalar bayon etilgan.*

Kalit so'zlar: *namoyish tajribasi, multimedia ishlovi, simulyatsiya, magnit maydon, yorug'lik diffraktsiyasi, Java Scrit, HTML5*

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Экспериментальная методика на основа мультимедии в школьном курсе физики

Аннотация.*В данной статье описаны демонстрационные эксперименты на основе мультимедийных приложений по некоторым темам курса физики в общеобразовательной школе. Основная задача демонстрационных экспериментов заключается в развитии у учащихся глубоких и самостоятельных знаний по физике, самостоятельного мышления, познания, интеллектуальных и практических навыков и компетенций, в том числе умения производить несложные наблюдения, измерения и опыты, пользоваться инструментами и материалами, способствует развитию навыки анализа результатов демонстраций, расчета погрешностей измерений, подведения итогов и формирования выводов, а также подготовки учащихся к работе.*

Ключевые слова: *демонстрационный опыт, обработка мультимедиа, моделирование, магнитное поле, дифракция света, Java Scrit, HTML5.*

INTRODUCTION

Multimedia is an interactive system that allows us to work with still images, motion video, computer graphics and text animations, speech and high quality sound, in other words, computer information such as text, graphics, animation, sound, video, speech is a set of technologies that allow memory to be entered, processed, stored, transmitted, and displayed .

The practice shows that teaching students based on multimedia developments can be doubly effective and time-saving. Multimedia-based learning can save up to 30% of time, and the knowledge gained will be stored in memory for a long time. If students receive the given materials on the basis of visibility, the retention of information will increase by 25-30%. In addition, when learning materials are presented in an audio, video, and graphical format, the retention of materials increases by 75%.

Teaching students based on multimedia developments has the following advantages:

a) Given materials deeper and more perfect assimilation opportunity;

b) Education takes new areas with closely communication to do passion more increases:

c) Education get of time contraction as a result, time save opportunity is achieved;

g) Obtained knowledge person in memory long should be preserved when in practice apply opportunity is achieved.

The following demonstration simulates the experiments processes Multimedia developments using Java Scrit and HTML5 web applications:

Table 1

Section	The name of the demonstration experience	Class
Mechanics	Study of Newton's second law	7th grade
	Study of Hooke's law	7th grade
Electricity	Magnetic field. Study of the magnitudes that characterize the magnetic field	8th grade
Optics	Study of light diffraction	9th grade

Multimedia without processing use instructions

Simulation processes Java Scrit and HTML5, created in web applications, play an important role in teaching physics, explaining the occurrence of mechanical processes and the effects of these processes on other bodies. The

program consists of separate windows depending on the direction of the process. Below is a multimedia created to explain Newton's second law. To do this, we will first describe the relationship between acceleration and force. If the body is not affected by a force or the vector sum of the forces acting is zero, the body moves at a constant speed. In order for it to change its speed, that is, to gain acceleration, some force must act on the body. Body acceleration take for this power to its how effect will primary without speed a acceleration with right linear flat variable movement doing of the body t at the time printing past way $s = \frac{at^2}{2}$ apparently represented formula

$$a = \frac{2s}{t^2}. \quad (1)$$

Impact provocative power and acceleration between attitudes learn for following experience transfer possible. Let us put such a load on the cart hold when standing dynamometer. We release the wheelchair; let it cover the distance s at time t. In that case, the acceleration obtained by the cart from formula (1) is a we find acceleration. We can find the acceleration by the formula F = ma , that is, we can also find the force from Newton's second law. We will now describe the above experience through multimedia development.

The program main window looks like this:

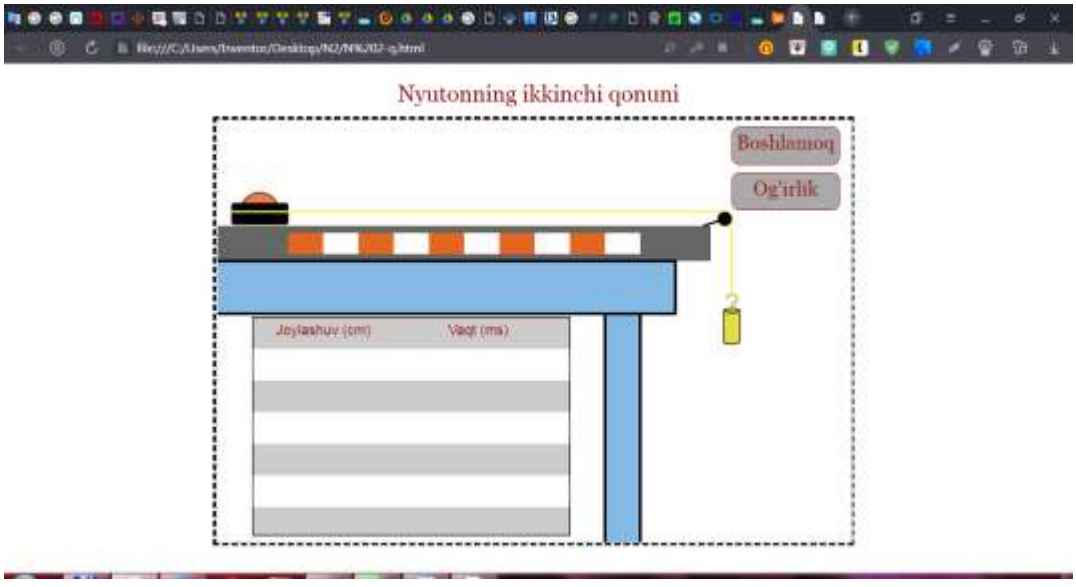

Figure 1. View of the program

In the main window there are buttons "Start" and "Weight", and when you press the button "Weight", you can change the weight values of reptiles and

hanging objects, that is, reduce and increase the current weights. A window will appear.

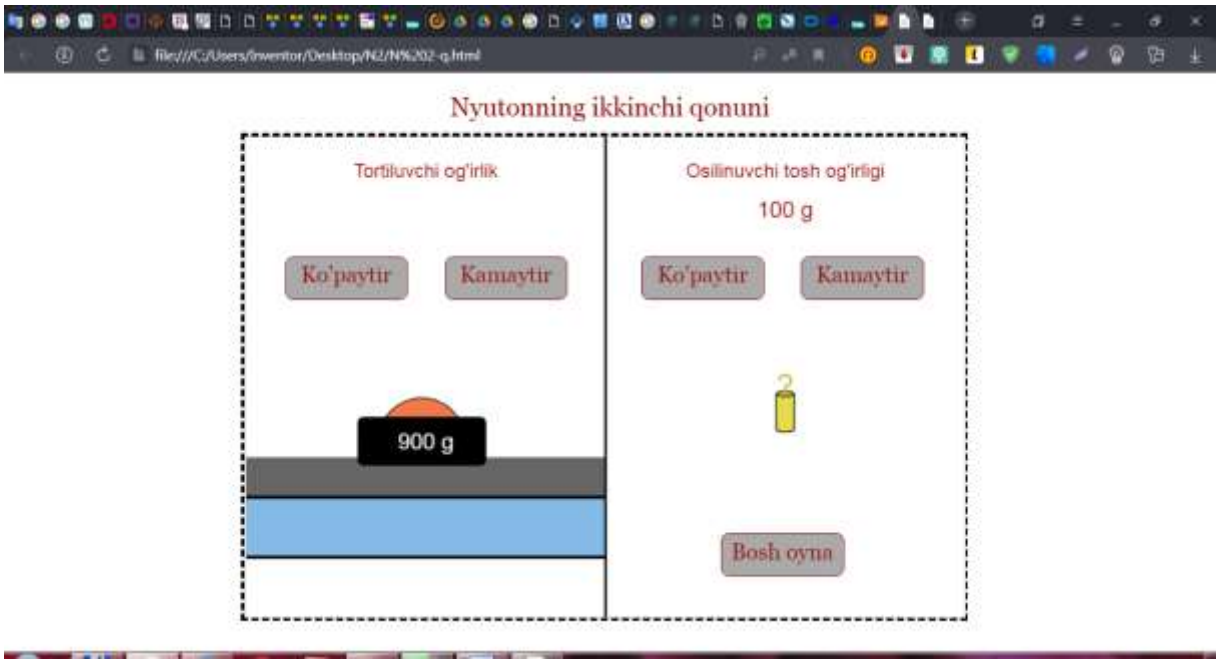

Figure 2. Body weight changer.

Changing the weights of reptiles and hanging objects is done in separate windows. There are restrictions on changing the weights of reptiles and hanging objects.

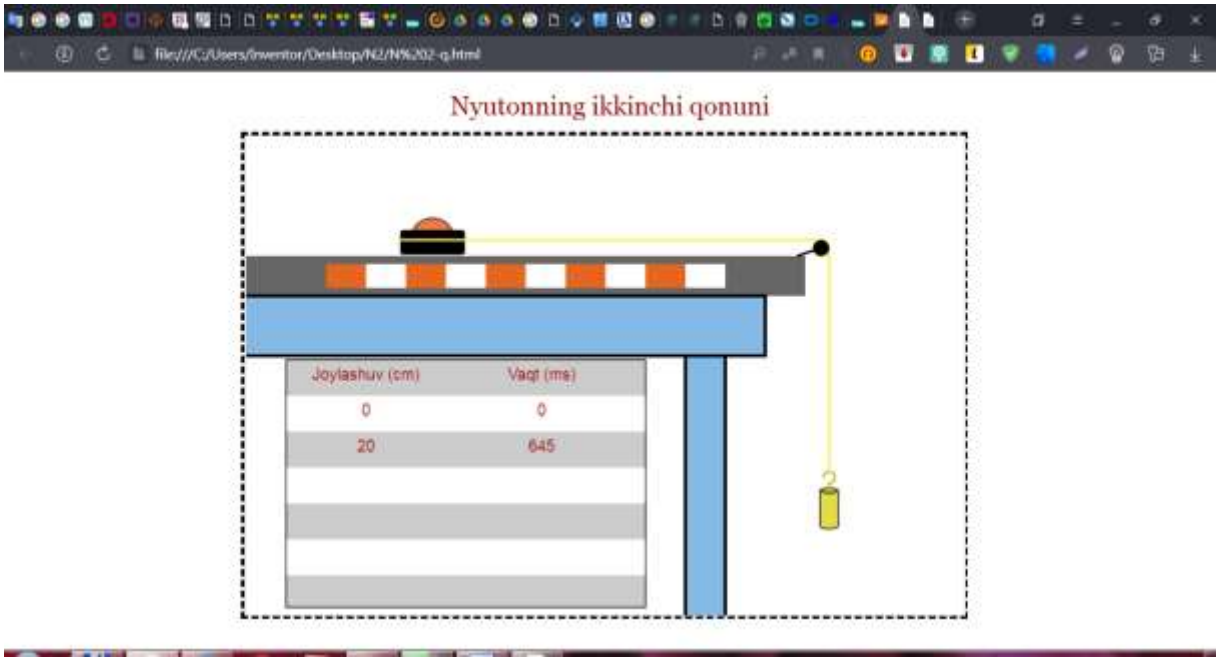

Figure 3. The process of movement

For example, the maximum value of the weight of the hanging body is 1000 grams and the minimum value is 10 grams. The maximum value of the weight of a reptile is 4000 grams and the minimum value is 100 grams. One of the main achievements of the program is the display of values on the screen according to the formula of Newton's second law in motion.

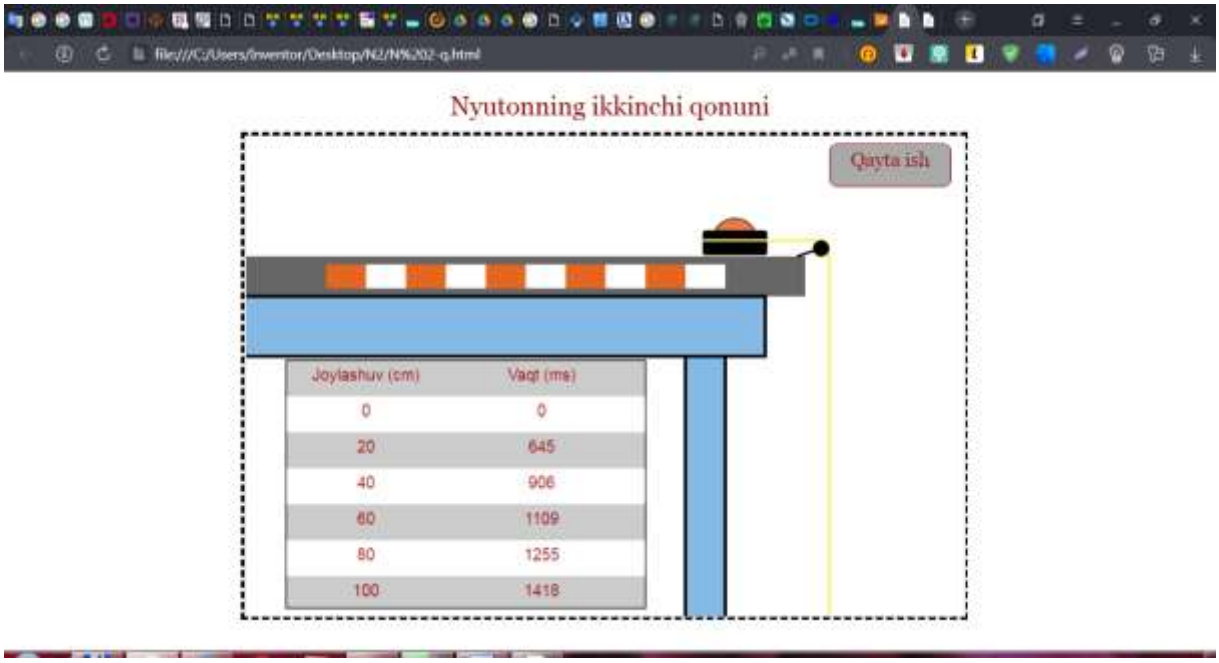

Figure 4. Value Formation Window

The values shown in the figure above, formed as a result of motion, change when the suspended and creeping objects change their weight values. These virtual laboratory values prove that Newton's second law is correct. In addition, the current 7th grade syllabus is devoted to the study of Hooke's law, and the 8th grade is entitled "Magnetic field. Multimedia developments of demonstration experiments on "Study of magnitudes describing the magnetic field" and "Study of light diffraction" for 9th grade were prepared.

CONCLUSION

The conclusion is that conducting physics lessons in general secondary schools through multimedia developments will increase the effectiveness of lessons based on the above considerations. We believe that this in turn will help the development of physics education in school and demonstrate the practical importance of physics as well as help students think creatively.

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