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METHODS FOR DEVELOPING STUDENTS' PRACTICAL TASK PERFORMANCE SKILLS USING METAL TOOLS AND EQUIPMENT

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Abstract

This article explains the implementation of practical tasks based on technologies for using various types of metals, modern sewing machines, machine tools, and other equipment in order to teach subjects of technological education to students in an engaging and high-quality manner. Furthermore, the article highlights the importance of intensively increasing students' interest in technological education subjects, developing their creative ideas, creative thinking, imagination in using metals and technical devices made from them during product manufacturing, and improving their skills in independent work and performing practical tasks using innovative teaching methods.

Keywords: Metal, lesson, practical, task, independent, education, tool, equipment, technique, technology.

Introduction

One of the leading directions in the higher education institutions of our country is creating a favorable, meaningful, and effective learning environment that ensures students acquire comprehensive knowledge. The processes associated with establishing an educational environment based on interactive methods and

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technologies in society develop alongside the advancement of science. Human activity in everyday life not only accelerates intellectual development across various needs but also creates new opportunities that enhance young people's creative potential, knowledge, and skills.

During the early stages of civilization — the Stone Age, Bronze Age, and finally the Iron Age — each historical period was characterized by specific materials that defined its development level. Initially, humans used stone and bone materials for shelter and tools. Stone processing enabled the creation of tools used for hunting and processing materials.

Gradually, the processing of wood, leather, and clay led to the emergence of ceramic production. The development of pottery created opportunities for producing various household and professional items. With the arrival of the Bronze Age, the importance of stone tools began to decline, and metallurgy started to develop. It became known that by changing the composition of metal alloys, their properties could be controlled, and this knowledge began to be applied in practice.

During the Iron Age, existing productive forces began to limit further development. The first metal-processing enterprises appeared in Asia, around the Mediterranean region, and in Chinese territories. The use of air blowing during iron smelting increased the temperature of molten metals, allowing metals to be purified from impurities and improving their quality. The replacement of charcoal with coke in metallurgy emerged due to the growing demands of production. The invention of coking technology significantly accelerated the development of the metallurgical industry.

New methods of steel production were discovered. Inventors such as G. Bessemer (England, 1856), S. Thomas (1878), and P. Martin (France, 1864) developed innovative steelmaking processes.

Modern scientific and technological progress requires the production of strong yet lightweight materials. Metals such as steel, cast iron, and aluminum are

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widely used in manufacturing light industry products. One of the new tasks assigned to technological education disciplines is the creation of scientific foundations for producing composite materials consisting of various components. This is because modern machine mechanisms require reduced material weight, increased operational speed, environmental safety of production processes, and extended service life of constructions.

Equipment made using metals — including sewing machines, machine tools, specialized equipment, irons, and hand tools such as scissors, needles, awls, as well as cutting, shaping, sawing, and finishing devices — are widely utilized in practice.

The study of metal types is closely connected not only with materials science but also with physics, chemistry, mathematics, engineering graphics, strength of materials, and machine elements. Properties such as density, color, electrical conductivity, thermal conductivity, and electrical resistance relate to physics. Fire resistance, corrosion resistance, composition, and resistance to moisture and chemical effects are associated with chemistry. Since parts and products made from metals operate under various loads, their strength, hardness, toughness, and resistance to deformation are studied within strength of materials.

It is well known that materials used in creating new technological equipment are selected based on the latest scientific achievements. Newly developed machines and equipment must operate under high pressure, withstand high speeds, and resist elevated temperatures.

In recent years, material purity has become highly important in certain technical fields. For example, chemically pure iron and zinc have demonstrated increased corrosion resistance. Material purity is also crucial in semiconductor technology. Increasing technical and economic demands, along with the limited availability of natural raw materials, have created the need to develop technologies for producing new high-strength materials. This includes modifying existing

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materials by adding new elements and synthesizing composite materials through reinforcement with strengthening components.

In conclusion, protecting materials from degradation, particularly corrosion damage, remains a major challenge. Studying the structural changes occurring during material operation and their consequences allows achieving stability of material properties. Consequently, it becomes possible to more accurately determine the service life of newly developed materials.

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