



DEVELOPING THEIR EXPERIMENTAL COMPETENCE BY TEACHING STUDENTS HOW TO MAKE OBJECTS OF ALL THREE DIMENSIONS IN A 3D PEN

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Annotation:

A 3D pen is a tool used to draw different three-dimensional shapes. Its main raw materials are polymer materials. "D" is derived from the English word doodler, which means "voluntarily dealing with something else." For example, when you're talking on a phone or watching TV, you're voluntarily drawing different shapes and pictures.

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This tool helps students create three-dimensional shapes. It serves to further develop the student's creative abilities. It also makes it possible to produce ugly images in the air.

With the help of a 3D pen, bulk parts, various products and models are created. The world's first 3D pen, called the 3Doodler, was developed by the American company Wobble-Works. The main reason for the production of the 3D pen was to correct the shortcomings of various products and models made using a 3D printer. The idea was coined by the founders of the company, Max Boug and Peter Dilworth. After the success of "3Doodler", 3D pens were also started to be produced by other companies. The production of 3D pens resulted in the emergence of a new type of art "3D pen art" (art created using a 3D pen).

The 3D pens used today are divided into two types, depending on the principle of operation:

The principle of working a hot 3D pen is very simple, the pen heats up plastic, it cools quickly and can create any three-dimensional shape in it. It doesn't take any software or computers for the pen to work, its capabilities depend only on your imagination. For a hot 3D pen to work, you need a power source with a power of 12 volts. The temperature of the 3D pen is between 160 and 210 degrees Fahrenheit [-160 and 210°C]. The advantages of hot 3D pens include the lack of high temperatures if they include lightweight weight, compactness, ease of use, and affordability of materials to be consumed



Structure of a hot 3D pen: 1 - power source; 2 - plastic wire hole; 3 - plastic symbol rotation button; 4 - plastic symbol forward button; 5 - working part; 6-7 – temperature fixing "+", "-" buttons; 8 - LED screen, 9 - speed fix button.



Usage order: 1 – connect the power supply;

2 - Placement of plastic wire vertically;

3 – Adjust the required temperature and click the move forward button;

4 – After finishing work, disconnect the power source from the power grid and the 3D pen and extract the plastic wire.

The main raw materials used in a hot 3D pen include ABS and PLA plastics. ABS (acrylonitril butadien styrene, the plastic name derived from the heads of the names of these substances) is based on mixtures derived from plastic oil. It is unbreakable, very durable, at a temperature of between 100 and 110 degrees Fahrenheit [100 and 110 ° C], highly polished, has a recurrence cone, and is an easy-to-process plastic.

The main disadvantage of the material is that when heated, it emits an odor from itself. Therefore, when using it, it is necessary to wear a mask and often wind up the room. pLA (abbreviated form of polylactid name) is a naturally disintegrating plastic made on the basis of plastic sugar or make-up. It dissolves at a temperature of between 160 and 180 degrees Fahrenheit [160 and 180 ° C], cools quickly, closes well to the fabric, does not emit harmful substances from itself when heated, and is widely used because of



its smell of plastic. The main disadvantage of PLA plastic is the ability of items made of it. Products made of this plastic will gradually begin to decay after at least a year.



Basic types of raw materials used in a hot 3D pen



Cold 3D pen structure:

1 - power supply; 2 – enable and delete button; 3 - LED screen, 4 - speed levels; 5 - battery; 6 - liquid polymer cartridge capsule; 7 - The functionality control button; 8 – LED lamps.

Another difference between this pen and a hot 3D pen is that it can last up to 2 hours based on a battery and after the battery is finished, it can continue to work even by connecting to electricity through a USB connector. In this case, the pen itself automatically reports that the battery is running out and that it needs to be connected to a USB connector. LED spotlights at the tip of the pen ensure that plastic is stuck in the drawing process. The main material used in this pen is a cartridge capsule with liquid polymer. Advantages of a cold 3D pen include the lack of hot elements, the ability to operate using a battery without wires, the ability to use a large number of polymers with different characteristics, and the ability to operate without noise, as well as the high density of the pen and its material identification. Through hot and cold 3D pens, students will be able to create great creative examples. For example, jewelry, architectural models, parts for various engineering projects, real object layouts, household goods and fixing of their damaged parts, various accessories, flower shapes on items and toys, and so on.

Safety technique rules

Studying the instructions given before using 1.3D-type pens exit and follow it.

2.3D-type pens are used under the supervision of the teacher with the permission of the teacher.

3. Because a hot 3D pen has heat elements, when working, it is necessary to wear a mask and often wind up the room.

4. Ultraviolet radiation of eyes when using a cold 3D pen it is necessary to wear a special protective glasses.



In a nutshell, students will get acquainted with its structure and capabilities during the study of the 3D pen during this exercise. In addition, through hot and cold 3D pens, students will be able to create great creative examples.

References

1. M Muhabbat, B Aziza, GI Sayfullayeva Elements Of The Credit-Module System In Higher Education In The Republic Of Uzbekistan Web Of Scientists And Scholars: Journal Of Multidisciplinary Research 1 (8 ...
2. M Muhabbat, B Aziza, GI Sayfullayeva OPPORTUNITIES FOR THE USE OF INNOVATIVE TECHNOLOGIES IN THE ORGANIZATION OF INDEPENDENT EDUCATION IN THE CREDIT-MODULE SYSTEM Web Of Humanities: Journal Of Social Science And Humanitarian Research 1 (8 ...
3. M Muhabbat, B Aziza, GI Sayfullayeva FINAL CONTROL WORK DISTANT. TSUL. UZ DOWNLOAD INSTRUCTION TO THE DISTANCE LEARNING PLATFORM Web Of Teachers: Inderscience Research 1 (8), 82-86
4. M Muhabbat, B Aziza, GI Sayfullayeva THE USE OF INNOVATIVE TECHNOLOGIES IN THE ORGANIZATION OF INDEPENDENT EDUCATION Web Of Technology: Multidimensional Research Journal 1 (8), 9-11
5. M Muhabbat, B Aziza, GI Sayfullayeva ADVANTAGES OF INDEPENDENT EDUCATION IN THE CREDIT MODULE SYSTEM IN EDUCATION Web Of Discoveries: Journal Of Analysis And Inventions 1 (8), 9-13
6. R Nilufar, GI Sayfullayeva Principles Of The Credit-Module System Diversity Research: Journal Of Analysis And Trends 1 (8), 49-52
7. AM Bozorova INTRODUCES INNOVATIVE TECHNOLOGIES THAT ARE INTEGRATED IN TEACHING ASTRONOMY COURSES IN HIGHER EDUCATION INSTITUTIONS AND IMPROVING STUDENT COMPETENCE ...Journal of Science-Innovative Research in Uzbekistan 1 (8), 6-11
8. SH Rozikulovich, S Gulhayo METHODOLOGY FOR FINDING THE TOPIC OF THE EARTH IN DISTANCE EDUCATION ON THE BASIS OF AN INTEGRATIVE APPROACH Journal Of Academic Research And Trends In Educational Sciences 1 (10), 21-33 2022
9. GI Sayfullayeva, HR Shodiyev CREDIT MODULE SYSTEM ADVANTAGES OF TEACHING SUBJECTS BASED ON AN INTEGRATED APPROACH.