**Тема «Свойства и применение кирпича и керамики»**

**План**

1. Пополнение словарного запаса (30) по теме: «Кирпич. Свойства и применение», выполнение лексико-грамматических упражнений.
2. Подготовка монологического высказывания «Виды кирпича».
3. Работа с текстом «Керамика». Выполнение тренировочных упражнений

**1.Изучите профессиональную лексику**

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| Свойства материалов **Properties** |
| a coefficient of linear expansion  | коэффициент линейного теплового расширения  |
| a coefficient of thermal expansion  | коэффициент термического расширения  |
| a thermal insulator  | теплоизоляционный материал  |
| compressive strength  | предел прочности на сжатие  |
| corrosion  | коррозия  |
| deformation  | деформация  |
| ductility  | эластичность, податливость  |
| durability  | срок службы, износостойкость  |
| elasticity  | эластичность, упругость  |
| elongation  | растяжение  |
| extension  | расширение  |
| fatigue  | износ  |
| fracture toughness  | изломостойкость  |
| hardening  | затвердевание  |
| hardness: scratch hardness  indentation hardness  | прочность: твердость на сопротивление царапанию индентометрическая твердость, твердость на вдавливание  |
| material properties  | свойства материалов  |
| plasticity  | пластичность  |
| resistance  | сопротивление  |
| stiff  | твердый, неэластичный  |
| tensile strength  | предел прочности на разрыв  |
| thermal conductivity  | теплопроводность  |
| thermal properties  | термические свойства  |
| brittle  | хрупкий, непрочный  |
| ductile  | тягучий  |
| malleable  | ковкий  |
| to conduct  | проводить, пропускать  |
| to fracture  | треснуть, лопнуть  |
| to resist wear  | отличаться устойчивостью к износу  |

**2.Прочитайте и переведите текст Brick. Ceramics. Properties and applications**

**A brick**is best described as a "building unit". It may be made of clay by moulding and baking in kilns, of concrete, of mortar or of a composition of sawdust and other materials. In shape it is a rectangular solid and its weight is from 6 V2 to 9 lb.There exists variety of bricks for different purposes: ordinary,hollow or porous, lightweight, multicolor bricks for decorative purposes,etc.

Bricks are usually laid in place with the help of mortar.The shape and convenient size of brick enables a man to grip it with an easy confidence and, because of this, brick building has been popular for many hundreds of years. The hand of the average man is large enough to take a brick and he is able to handle more than 500 bricks in an eight-hour working day. It is necessary, therefore, for the "would be" bricklayer to practice handling a brick until he can control it with complete mastery and until he is able to place it into any desired position.

The brick may be securely handled by placing the hand over the surface of the upper part of a brick and by placing the thumb centrally down the face of the brick with \*the first joints of the fingers1 on the opposite face. It is better to protect the thumb and the fingers with leather pads, which also prevent the skin from rough bricks. Sometimes natural stones such as marble, granite, basalt, limestone and sandstone are used for the construction of dams and foundations. Marble, granite and sandstone are widely used for decorative purposes as well, especially with the public buildings

**Ceramics** include such everyday materials as brick, cement, glass, and porcelain. These materials are made from mineral compounds called silicates, including clay, feldspar, silica, and talc.

**3. Прочитайте и переведите текст. The Nature of Ceramics**

One of the first solid materials, if not the very first, that man learned to use was ceramic natural stone. It was used in a variety of applications because of its characteristic properties such as hardness, strength to chemical attack which make it comparatively easy to shape. Thus natural ceramics provided man with tools, durable containers and even a roof. It is not surprising that man got greatly interested in ceramics and tried to create ceramics such as: pottery, bricks, concrete, glass. These products are spoken of as main industrial products to this day.

Ceramic material have been extended greatly. They range from dull clay to lustrous ruby, from the refractory linings to electronic control devices.

What is ceramics? Can this question be answered? Essentially it is defined as a combination of one or more definite metals with a non-metallic element, usually oxygen. The comparatively large oxygen atoms serve as a matrix with the small metal atoms. The main characteristic of the construction of ceramic crystals is that the atoms are linked by bonds that are primarily ionic but also to a significant extend covalent. These bonds are responsible for the stability and strength of ceramic materials. In the combination of oxygen atoms with metal atoms the ionic bonds are particularly strong. It should be noted that each oxygen atom with two electronic vacancies in its outer shell borrows two electrons from its metal neighbors, thus both kinds of atom become highly ionized – one negatively, the other positively.

As highly oxidized compounds the ceramics are strongly resistant to attack by nearly all chemicals. This accounts for many of their uses, even the making of steel depends on the use of ceramics.

A lot of analyses have been made by chemists. They found that the principal elements, for instance, in natural clays were oxygen, silicon and aluminium. They form the compounds known as aluminosilicates.

But a giant step forward in ceramic science came when crystal structures were analysed by means of X-ray diffraction. It has been found out that in the construction of ceramic materials much depends on how the atoms are stacked.

Many scientists both in Soviet Union and abroad work at the investigation of the properties of ceramic products. Many ceramic materials are being mass-produced now. They can be drawn into rods, cast or pressed. These ceramics are light in weight, but very strong. Some of tem are so hard that they can cut steel. You can hardly find any branch of industry where ceramic products are not used.

**Изучите лексику Vocabulary**

if not the very first – если не самый первый

it should be noted – необходимо отметить

to account for – объяснять

mass-produced materials – изделия массового производства

solid – твердый

variety – разнообразие

hardness - твердость

to provide – обеспечивать

durable - прочный

pottery – гончарное изделие

dull – тусклый

bond – связь

outer – внешний

to cast – отливать

to cut – резать

oven – печь

shell – оболочка

to borrow – заимствовать

device – прибор

tо serve - служить

**4. Выполните** **тренировочные упражнения**

**1. Ответьте на вопросы.**

1. What was the very first solid material that man began to use?

2. What did natural ceramics provide man with?

3. Why was ceramics used in a variety of applications?

4. Why did man get interested in ceramics so much?

5. What is ceramics?

6. What is a main characteristic of the construction of ceramics crystals?

7. Why are the ceramic materials so strongly resistant?

8. What are the principal elements in natural clays?

9. What does the construction of ceramic materials depend on?

10. Why are ceramic materials mass produced?

11. Why is the ceramic industry so important?

**2. Откройте скобки, использую правильную форму глагола и переведите предложения.**

1. Last year our plant (produced, produces) many ceramic goods which (are used, were used) widely. 2. At first man (baked, has baked) vessels of clay in the sun. 3. Recently ceramic compounds (are used, have been used) even in making steel. 4. Numerous analyses (have been carried out, had been carried out) before they stated the exact composition of this compound. 5. Now many scientists (are working, work) at the investigation of the new properties of ceramics. 6. Many new discoveries (took place, have taken place) since the last century. 7. Last week they (analysed, analyse) crystal structure of those new materials by means of X-ray diffraction. 8. For many years considerable work (has been carried out, was carried out) to convert ethylene into motor fuel. 9. Many beautiful articles made of ceramics (provided, provides) man with tools even in ancient time.