LESSON PLAN

TEACHER: **Brânzea Mihaela Julieta**
SCHOOL:Liceul Tehnologic "Dimitrie Bolintineanu" , Bolintin Vale
GRADE: Xth E
CURRICULAR AREA: Matemathics and Science
SUBJECT: Matemathics
LESSON: Applied mathematics(Elements of financial calculation)
TYPE OF LESSON: Communication of new knowledge
AIM: Applying financial calculation algorithms in solving practical problems and raising awareness of the importance of this discipline in personal and social life.
CES: STUDENT WITH LEARNING DIFFICULTIES
SPECIFIC COMPETENCES : At the end of the lesson students will be able to:
C1.consolidate the notion of percentage and its importance;
C2.know how to calculate percentages, simple interest, VAT, amortization of investments and loans, rate;
C3.use financial calculation algorithms;
C5.analyze and interpret certain practical situations with the help of financial calculation;
Operational objectives
O1. To calculate percentages, simple interest, VAT. , amortization of investments and loans, rate;
O2. To use financial calculation algorithms
O3. To analyze and interpret certain practical situations with the help of financial calculation;
TEACHING TECHNIQUES: conversation, explanation, exercise, mosaic method using expert cards, differentiated teaching.
MATERIAL/RESOURCES: students'books, worksheets, calculator
INTERACTION: Teacher-student, student-teacher, individual work, group work.
EVALUATION: continuous –through observation and analysis of answers

STAGES OF THE LESSON:

(3min.) WARM-UP

- Getting students involved
- Checking attendance

CONTENT AND LEARNING TASKS	**TEACHING TECHNIQUES**	**INTERACTION**	**EVALUATION**
LEAD IN(10min) The teacher announces the students that today they will study a lesson that allows them to apply their knowledge	Conversation Explanation	T-Ss Ss-T	The ability to participate in discussions, to formulate correct statements and to solve

in practice. The teacher writes the title of the lesson and she asks a student to read the article from appendix 1. • They update knowledge about the percentage ratio and its calculation formula and the students will solve the problem on the sheet in appendix 2.	Conversation Explanation	T- Ss Ss-T Individual work	problems.
PRACTICE & PRODUCTION(27 min) • Expression as a percentage appears in many practical situations: interest calculation, VAT calculation, amortization, profit rate, compound interest, personal and family budget, loans and their repayment and in many other situations. In class, the students are organized in groups from A to E and 1 to 5 and they are announced to form the basic groups. • Students are announced that in each Student group A,...E, there is an expert who will explain to them what they will study in the expert groups with the	Conversation Explanation Differentiated teaching Mosaic method Mosaic method	T-Ss Group work Experts group work	The ability to cooperate with the teacher and to respect the given instructions The ability to understand information and apply it to solving a problem as an example, collaboration, communication.

same name and they are asked to group themselves. • Expert group A receives the sheet expert "simple interest per year", group C "calculation of VAT", group D "rate of profit", group E "simple interest" and group B "Depreciation", (appendix 3) . The students are informed that each group has 10 min to study the content of the sheet, after which they will return to the basic groups 1,2...5 to explain to their colleagues and they will learn what the experts tell them.		Group work	The ability to explain the acquired knowledge to colleagues
FEEDBACK (10 min) Students receive the test from appendix 4 (8 min.) (2 min) The lesson is evaluated and the teacher assigns homework.	Exercise	Individual work	The acquisition of knowledge through these active methods, the ability to appreciate an activity, to synthesize the application of mathematical knowledge in practice

Appendix 1

Romania has the second highest unemployment rate for people under 25 among the states in the European Union, at 23.6% in February, being exceeded only by Poland, with 25.5%, informs Eurostat The lowest levels of unemployment were recorded in February in Denmark (3.4%) and the Netherlands (3.5%), and the highest were in Poland (11.8%) and Slovakia (11%), also show the statistics developed by Eurostat.
A number of 21 member states registered a decrease in the unemployment rate within a year, two remained at the same level and four reported an increase. The largest relative decreases in the unemployment rate were observed in Slovenia, where unemployment decreased from 6.5% in February last year to 4.7% in the same month of 2007, in Slovakia (11% from 14, 4%) and in Poland (11.8% from 15.1%). The unemployment rate increased the most in Hungary, from 7.4% in February 2006 to 7.9% in February 2007
(Source WALL-STREET business website in real time from April 2, 2008)

Appendix 2

A television costs €120. On the occasion of the Easter holidays, a 15% discount is granted. How much will you have to pay for the TV?

Appendix 3

Expert sheet 1

Simple interest

The simplest investment that brings an income is depositing money in a bank for a certain period of time with a certain interest (which is a certain amount that the depositor receives after a period of time). This is simple interest.

If this amount is added to the initial one and the interest is calculated for it for the same period of time and this is added at the end of the period, etc. then we talk about compound interest.

We distinguish two types of interest: interest paid, that which banks pay to depositors, and interest collected, that which is collected by banks from borrowers for borrowed amounts.

Definition.

Simple interest is the interest calculated on the amount deposited for a certain period.

Notation: Simple interest is denoted by D.

The interest percentage represents the amount that is paid for the deposited amount of 100 manual units (u.m.) for a period of one year.

Notation. The percentage or interest rate is denoted by p.

The calculation formula for simple interest is:

$$D = \frac{S.p.n}{100}$$

where S is the amount deposited, n the number of years the amount was deposited, and p is the interest percentage.

The interest formula for m months is:

$D = \frac{S.p.m}{100.12}$

And for d days $D = \frac{S.p.d}{100 \cdot 36o.}$

Example: What simple interest does a capital of 6,000 lei produce over a period of 1 year, if the interest rate is 28%? What about 4 years after?
Solution:

After a year: $D = \frac{S.p.n}{100}$, **n=1** $\Rightarrow$ D=$6000 \cdot \frac{28}{100}$ =1680 lei

And after 4 years: $D = \frac{S.p.n}{100}$, **n=4, avem D=** $\frac{6000 \cdot 28 \cdot 4}{100}$ **=6720 lei**

Solve:

What is the annual profit of a bank, if it grants a loan of 200 million lei, charging an interest rate of 70%. Which is the profit for 5 years? Which is the profit for 30 days?

Expert sheet 2

Simple interest per year

The simplest investment that brings an income is depositing money in a bank for a certain period of time with a certain interest (which is a certain amount that the depositor receives after a period of time). This is simple interest.

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We distinguish two types of interest: interest paid, that which banks pay to depositors, and interest collected, that which is collected by banks from borrowers for borrowed amounts.

Definition.

The simple interest represents the interest calculated for the amount deposited for a certain period.

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Example: What simple interest does a capital of 6,000 lei produce over a period of 1 year, if the interest rate is 28%? What about 4 years after?
Solution:

After a year $D = \frac{S.p.n}{100}$, **n=1** $\Rightarrow$ D=$6000 \cdot \frac{28}{100}$ =1680 lei

And after 4 years **D=1680.4=6720 lei**

Solve:

What is the annual profit of a bank, if it grants a loan of 200 million lei, charging an interest rate of 70%. Which is the profit for 5 years?

Expert sheet 3

Value added tax VAT

Value added tax VAT is an indirect tax, expressed in percentages and levied by the state on the value added at each stage of the production and distribution of economic goods.

The increase of the value added tax depends on the basis of calculation and the tax rates.

The tax rate (VAT percentage) is fixed and unique for a certain period established by the state. For example, during the years 1992-1997 it was 18%, in 1998 it was 22% and starting with 1999 the quota was set at 19%.

The value added by economic agents participating in the production and circulation process of a product refers to the difference between the sale price and the purchase price.

Example:

Let's determine the value added tax for a coat. Thus, it is known that the amount of 250 lei was paid to the suppliers of raw materials for the making of the coat.

The tax is added to this amount $VAT=\frac{19}{100}\cdot 250=47{,}5$ lei.

The coat is for sale at a warehouse store for 350 lei.

The added value in the goods circulation process is:

350-250=100 (lei) to which the fee corresponds:

$VAT=\frac{19}{100}\cdot 100=19$ lei.

The product is bought from the store-warehouse by a retailer at the price of

370 .It can be seen that the amount of 370-350=20 (lei) was added for which the tax is charged

$VAT=.\frac{19}{100}\cdot 20\text{lei}=3{,}8$ lei..

The seller will sell the coat to a customer for the price of 400 lei, so adding to the previous value the amount of 30 lei for which the fee is charged:

$VAT=\frac{19}{100}.30$ lei $=5{,}7$ lei....

So, in total,

VAT=47,5+19+**3,8+5,7=76 lei.**

Observations

1. The value added tax for the "coat" product resulted from its calculation in several stages
2. It is paid to the state budget by the economic units that participate in the circulation of material goods or provide services and is borne by the buyer because it is included in the selling price.

So **,**

Selling price=Production price + VAT, where

VAT= $\frac{p}{100}\cdot$ **Production price, where** $\frac{p}{100}$ **= tax rate.**

Solve:

What is the selling price of a product that costs 44.5 lei without VAT, when the VAT percentage is 19%?

Expert sheet 4

Investment depreciation

In the production process, by fixed capital or fixed means we mean machines, equipment, installations, means of transport, buildings, etc. Over time, these fixed means are subject to the process of physical and moral wear and tear.

• Depreciation of the fixed capital represents the process of gradual recovery of the value of the fixed capital.
• The term required for the full recovery of the value of the fixed capital is called the amortization term.
• The part of the fixed capital value recovered in one year is called annual depreciation.

Denoting with A the annual amortization, with V the value of the fixed capital and with T the amortization term, the result is **A=** $\frac{V}{T}$

- The percentage ratio between the annual depreciation (A) and the value of the fixed capital (V) is called the annual depreciation rate denoted by r_A

So, $r_A = \frac{A}{V} \cdot 100\%$.

Solved problem

The value of a machine is 5,600 u.m., and the annual depreciation is 700 u.m. Determine the amortization term and the annual amortization rate.

Solution

The annual depreciation of the machine is A= $\frac{V}{T}$, and we obtain T= $\frac{V}{A}$. Replacing V=5600 u.m. , A=700 u.m. the amortization time T=8 years is obtained.

The annual depreciation rate is $r_A = \frac{A}{V} \cdot 100\% = \frac{700}{5600} \cdot 100 = 12,5$

Expert sheet 5

Profit , rate of profit

- Profit or benefit represents the gain achieved from the execution of an activity.
- Profit is characterized by the following indicators: profit mass and profit rate.
- The profit mass (P) represents the positive difference between the total income V_t and total expenses C_t

So, P=C_t-V_t

- The profit rate r_p is calculated either as the percentage ratio between the profit mass (P) and total expenses C_t, or as the percentage ratio betweenthe mass profit P and total incomeV_t.
- **So, $r_p = \frac{P}{C_t}$ 100(%) or $r_p = \frac{P}{V_t}$ 100(%)**

The higher r_p is, the higher the efficiency of the activity.

Solved problem

A tailor's company collected 41,000 u.m. for the crafted objects. Knowing that 25,000 u.m. were invested for raw materials, 3,000 u.m. for salaries, 700 u.m. for machinery maintenance and 400 u.m. for depreciation, determine:

a) Profit and profit rate;

b) Net profit, if the profit tax is 16%.

Solution

a) We have the relation $P=V_t-C_t=41000-(25000+3000+700+400)=11900$ (u.m..)

$r_P=\frac{P}{C_t}100=\frac{11900}{29100}.100=40,89(\%)$

b) P_{net} =P-tax= 11900- 16%11900=9996 (u.m..)

The proposed problem

An economic agent sold products worth 20 million lei. The rate of profit being 25%, determine the profit and net profit if the corporate tax is 16%.

Appendix 4

1) Complete the following grid regarding how much you enjoyed this maths lesson?

Very much	A lot	I don't care	A little	Very little

2) Argue in no more than 5 lines if this method is effective for you in learning mathematics.

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3) Mircea Ganga, Matematică-manual pentru clasa a-X-a trunchi comun şi curriculum diferenţiat, Editura Mathpress, Ploieşti 2006 ;

4) Marius Burtea, Georgeta Burtea, Matematică-manual trubchi comun , curriculum diferenţiat , Editura Carminis 2006