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SUBJECT AREAS:

Natural sciences, Math

ACTIVITY DESCRIPTION:

Area, square meter

OBJECTIVES:

Identification of elementary geometric notions and units of measurement in different contexts.

Determining perimeters, areas (square, rectangle) and volumes (cube, rectangular, parallelepiped) and expressing them in appropriate measurement units. Analysis of practical problems that include studied elements of geometry, with reference to units of measurement and interpretation of results.

MATERIALS:

Tablets with the game Areas

Worksheet, Students' notebooks

GRADE/LEVEL:

Upper Elementary School (12-14)

DURATION:

Time required to complete the lesson

Preparation time: 30 min

Activity time: 50 min

PLACE:

Classroom, Laboratory, ect.

AUTOR:

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Units of Area. Area of the square area the rectangle. Unit conversions

INTRODUCTION

In this knowledge acquisition lesson from the GEOMETRY unit, UNITS OF MEASUREMENT, students will learn about units of measurement for area, how to calculate the area of a square and a rectangle, and conversions between units of measurement. Students will work individually and in teams, sharing their experience with the whole class.

Essential questions:

• What is the area of a surface?

• What units of measurement are used for area?

• How to calculate the area of a square or a rectangle?

• How are the transformations from one unit to another done?

Capturing attention and introducing the title of the lesson

Goal: Students enter the atmosphere of the lesson with maximum attention and curiosity

BACKGROUND:

Procedure:

Conducting the lesson 1.
Capturing attention and introducing the title of the lesson
Goal: Students enter the atmosphere of the lesson with maximum attention and curiosity
Time: 8 minutes
Methods: Conversation, play Concepts:
Units of measure, area, perimeter
The students are grouped in fours and have notebooks and tablets with the Areas game on the benches. The teacher checks the previously taught knowledge head-on, completing the length measurement units scale on the blackboard and with the help of some exercises proposed in Worksheet 1.
The teacher introduces the new lesson with the question related to exercise 3 in the handout, namely: How can we find out how many square meters of grass are needed to cover the field?
Thus, the title of the lesson is announced: Units of measurement for area. Area of the square. Area of the rectangle. Unit conversions. Students write the title in their notebooks.

2. Directing learning

Purpose: Students to acquire new knowledge of units of measurement for area, area of square, area of rectangle and how to convert between units

Time: 17 minutes

Materials: Notebooks, blackboard, worksheet

Methods: Discovery learning, conversation

Concepts: Area, square meter Stage 1 What is area? (7 min.)

To measure an area is to see how many times a certain unit of measure is contained in that area. The number that represents the surface area depends on the unit of measurement used.

Definition: The square meter (m^2) is the main unit of measurement for surfaces. It is, in fact, a square with a side of 1m.

Submultiples of it are used to measure areas smaller than $1m^2$.

Their order decreases from 100 to 100.

Submultiples of the square meter are: - square millimeter (mm^2) = 0.000001 m^2;

- square centimeter (cm^2) = 0.0001 m^2;

- square decimeter (dm^2) = 0.01 m^2;

- $1m^2 = 102\ dm^2 = 104\ cm^2 = 106\ mm^2$

Multiples of it are used to measure areas larger than $1m^2$. Their order increases from 100 to 100. The multiples of the square meter are: square decameter (dam^2) or ar = 100 m^2; square hectometer (hm^2) or hectare=10000 m^2; square kilometer (km^2) = 1000000 m^2;

Examples: 1) 1.25 m^2=125dm^2=12500cm^2=1250000mm^2

2) 183.5 m^2 = 1.835 dam^2 = 0.01835 hm^2 = 0.0001835 km^2.

3) $1m^2$ = 1:102 dam^2 = 1:104 hm^2 = 1:106 km^2

Other often used multiples of the square meter are agrarian units:

1 hectare = 1 ha = 1 hm^2 = 10,000 m^2	1 ar = 1 dam^2 = 100 m^2	1 plant = 0.5 ha = 0.5 hm^2 = 5,000 m^2

Students receive Worksheet 2 and solve the first two exercises together with the group.

The check is done frontally.

Stage 2: How do we calculate the area of a square or a rectangle? (10 min.) Students are given 15 identical small squares, one large, and one large rectangle. They have to find the area of the large square and the rectangle using the small squares and notice that:

A of the rectangle = L • l and A of the square = l • l

Students solve exercises 3 and 4 from the worksheet individually.

Observations are made orally.

3. Fixation of knowledge

Aim: Students to fix their new knowledge about area, area of square, area of rectangle

Time: 25 minutes

Materials: Notebooks, board, tablets with the Areas game, worksheets Methods: Game, conversation, exercise

Concept: area Stage 1

Stage 1: Using tablets with the game Areas (15 min.)

Tablets with the Areas application will be used to consolidate knowledge.

Areas is an application that allows practicing the calculation of areas. It contains 10 stages with 20 exercises each containing geometric figures for which the area must be found. The unit of measurement is a small square. The teacher will ask the students to open the application and work the first stage, using the calculation formulas for the area of the square and the area of the rectangle. The geometric shapes become more complicated as you progress through the levels. Each student must complete as many levels as possible. Completing these levels aims to train the ability to calculate the area of a geometric figure as quickly as possible.

Stage 2: Solving the exercises in the worksheet (10 min.)

FUN FACTS:

Did you know?

- *Carl Friedrich Richard Foresters invented Perimeter, and Hippocrates of Chios invented Area.*
- *Later in 287 BC, the great mathematician Archimedes from Greece discovered the area and the perimeter of the circle and the relationship between spheres.*

ASSESSMENT:

The teacher will ask the students to solve exercises 5 and 6 from the worksheet in groups. Students will write the solutions in their notebooks. After they finish solving the exercises, the teacher will check. After the students finish the activity in groups, the teacher asks them reflection questions:

• How did you find the workload? What did you have to do during the activity?

• How did you do in the application to solve the given exercises?

• Do you think the AREAS app helped you better understand how to calculate the area of a square or rectangle?

• What did you enjoy doing the most?

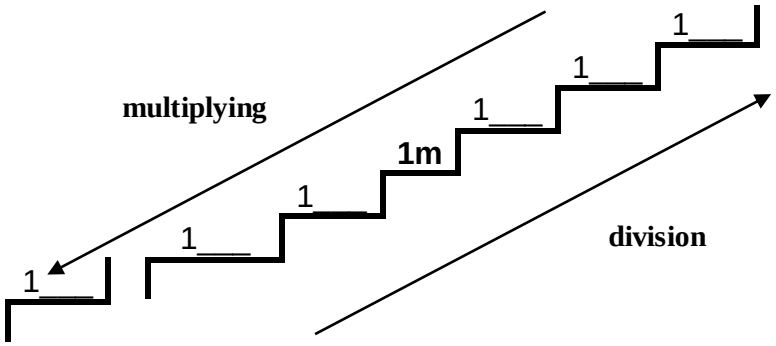
• What did you remember most easily from this activity? Students who stood out will be graded.

EVALUATION:

The students will have as homework the remaining unsolved exercises from the handout, but also exercises from the textbook.

WORKSHEET 1

Complete the steps:



1. The main unit of measurement for length is...

2. Units of measurement for length increase and decrease from ... to ...

3. To enclose a square-shaped land with a side of 25 m we need ... m of fence.

4. Fill in the dotted blanks so that the following equalities are true:

1) 2 m = ...cm;	6) 7,3 m = 73 .....;
2) 35dm = ...m;	7) 5,9 hm = 5900 .....;
3) 1700 m = ...km;	8) 15,9m = 0,159 .....;
4) 1,086dam = ...dm;	9) 67 mm = 0,067 .....;
5) $8 \bullet 10^4$ m = ... hm;	10) 568 dam = 56,8 ..... .

WORKSHEET 2

1. Convert to m^2:

a) 104dam^2

b) 12, 46 hm^2

c) 10 km^2

d) 72586.43 dm^2

e) 954785 cm^2

2. Convert to hectares:

a) 2564 acres

b) 740000 m^2

3. Calculate the area of a rectangle with a length of 52 cm and a width of 20 cm.

4. Find the area of the square with side 3m.

5. A bathroom is 3.5 m long and 2.5 m wide. How many 25 cm square tiles are needed to cover the floor?

6. How many times does the area of a rectangle increase if: a) The length increases three times; b) The width is increased 5 times; c) The length increases twice and the width three times.

7. A playground has a rectangular shape; its width is equal to 1/6 of the perimeter, and the difference between the length and the width is 24 cm. How big is the playground?

8. The yard of a school has a rectangular shape, with dimensions of 42m and 12m, respectively. The land was paved with square-shaped tiles with a perimeter of 4m. How many tiles were needed?