„Maths around us”
Bank of good lessons

Introduction

The key linking all five partners of our project „Maths around us" was Mathematics. Our main aim was to improve Maths skills of students by perceiving Maths issues in their closest surrounding world. Students were encouraged to do their best to solve Maths tasks and to find similarities and differences between the environments of five participated schools by using a wide range of different ICT applications with English language as language of communication between partners.

The project was divided into five parts:

- "Maths in kitchen" with Italian school responsible
- "Maths in vehicles" with Bulgarian school responsible
- "Maths in buildings" with Turkish school responsible
- "Maths in nature" with Polish school responsible
- "Maths in games" with Spanish school responsible

There are bank of good lessons where we combined maths tasks connected with our countries added elements of formative assessment and ICT applications.

Maths in kitchen

Temat lekcji: Matematyka w kuchni.

Lesson topic: Maths in kitchen

Cel główny: Dostrzeganie konieczności stosowania matematyki przy sporządzaniu potraw.

Main aim: Knowing the importance of Maths in preparing dishes.

Cel lekcji: Uczeń:

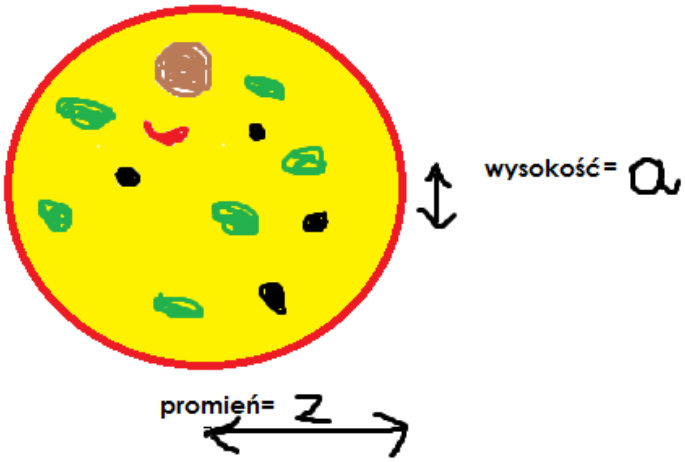
- oblicza pola i objętości potraw
- oblicza pola i objętości naczyń kuchennych
- oblicza czas gotowania, pieczenia
- przelicza jednostki masy, objętości, pola

Lesson aim: Student:

- can calculate the area and volume of dishes
- can calculate the area and volume of kitchenware
- can calculate the time of cooking and baking
- can change units of area and size

Zad.1 Oblicz objętość pizzy o promieniu 30 cm i wysokości 7 cm. Za π przyjmij $\frac{22}{7}$.

Task1 Count volume of pizza with radius 30 cm and height7 cm. taking π is $\frac{22}{7}$.

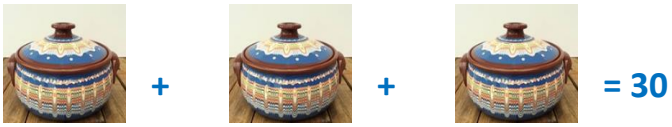


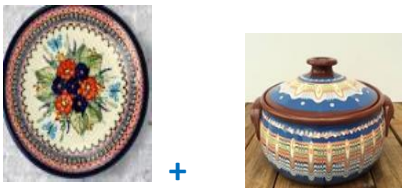
$$V = pi \cdot z \cdot z \cdot a$$

Zad.2 Garnek o średnicy 3dm i wysokości 2dm wypełniony jest PAELLĄ. PAELLA nakładana jest do misek w kształcie półkuli o promieni 5 cm. Ile porcji PAELII jest w garnku?

Task 2 The pot with 3dm radius and and height of 2dm is full of PAELLĄ. PAELLA is put into bowls in hemisphere shape and radius of 5 cm. How many portions of PAELII is in the pot.

Task 3





Comic life:

Moviemaker:

https://www.youtube.com/watch?v=ipiD63v4sgU&feature=youtu.be

MATHS IN KITCHEN

Argomento della lezione: Il Pancotto

Lessons Topic: Pancotto

Obiettivo: conoscere l'importanza della matematica nel calcolo delle calorie presenti in un piatto tipico del nostro paese.

Lesson aim: to know the importance of the Maths in counting calories in a typical dish of our town.

Main lesson aim: Students can change the calories of the same dish by changing the quantity of ingredients so that the dish will have less calories it you use more hypocaloric ingredients or it will have more calories by increasing the quantity of ingredients.

Obiettivo principale:

Lo studente può variare le calorie dello stesso piatto cambiando la quantità degli ingredienti, lo stesso piatto diventa meno calorico se si aumentano gli ingredienti ipocalorici o più calorico aumentando la quantità degli ingredienti più calorici.

Quesito n. 1

Problema

Calcola quante calorie sono presenti in un piatto di pancotto? (piatto tipico pugliese).
Gli ingredienti per 4 persone sono :
500 g di pane raffermo a tocchetti ;
800 g di patate ;
500 g di fagiolini ;
500 g di zucchine ;
200 g di pomodorini ;
100 g di cipolla ;
sale , aglio e menta fresca ;
400 ml di olio EVO.

Calorie per 100 g

Pane 271 Kcal x 5 …….
Patate 83 kcal x 8…….
Zucchine 13 Kcal x 5……
Pomodorini 20 Kcal x 5…….
Cipolla 25 kcal x 1……
Olio 901 Kcal x 4 ……
Totale……: 4

Task 1

Count how many calories there are in a dish of Pancotto (typical Apulian dish)
Ingredients for 4 people:
500 gr of steal bread in pieces
800 gr of potatoes
500 gr of green beans
500 gr of zucchini
200 gr of tomatoes
100 gr of union
Salt, garlic and fresh mint
400 ml of extra virgin oil (EVO)




Calories for 100 gr.

Bread :271 Kcal x 5
Potatoes:83 Kcal x 8
Zucchini:13 kcal x 5
Tomatoes: 20 kcal x 5
Onion: 25 kcal x1
Oil: 901 kcal x 4

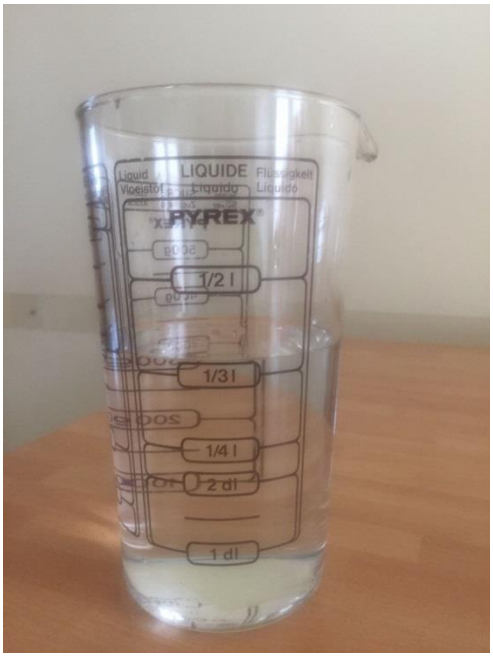
Total……:4

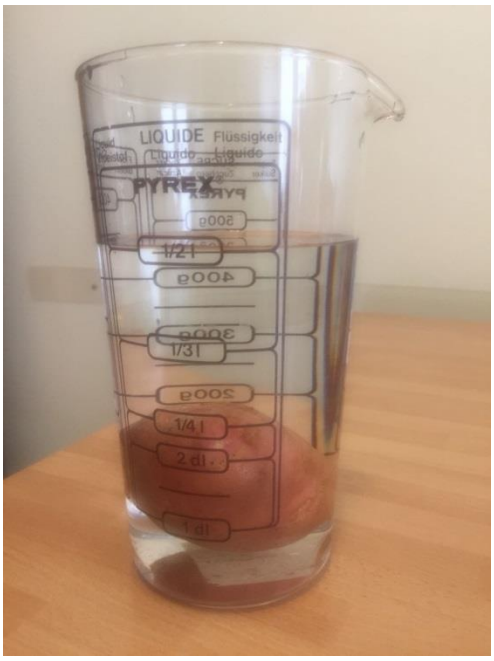
Esercitazione n.2

Proviamo a calcolare il volume di una patata o di una zucchina col metodo indiretto dal momento che non esistono formule matematiche per calcolarlo.

Task 2:

Let's try to calculate the volume of a potato or a courgette by the indirect method since there are no Maths formulas to calculate it.





500ml – 390ml = 110ml
110ml = 110cm^3
110cm^3= 0,110dm^3(volume of a potato)

In questo modo i ragazzi sono riusciti a calcolare il volume di una patata ed anche a fare le equivalenze in quanto il mezzo usato è l'acqua.
In this way the students were able to calculate the volume of a potato and also to make the equivalences because the means used is water.

1 ml = 1cm^3
1 $dm^3 = 1000cm^3$
1 $dm^3 = 1l = 1\ kg$
Con gli altri liquidi la situazione cambia.
With other liquids the situation chances.

Lesson resume

(Formative assesment elements)

Make connections to prior knowledge or experience and finish sentences

I changed my attitude about_____

I became more aware of_____

I was surprised about_____

I felt_____

https://twinspace.etwinning.net/11250/materials/videos

https://www.youtube.com/watch?v=6LIgxH1JxEw

MATHS IN KITCHEN

Lesson topic: The Food Pyramid

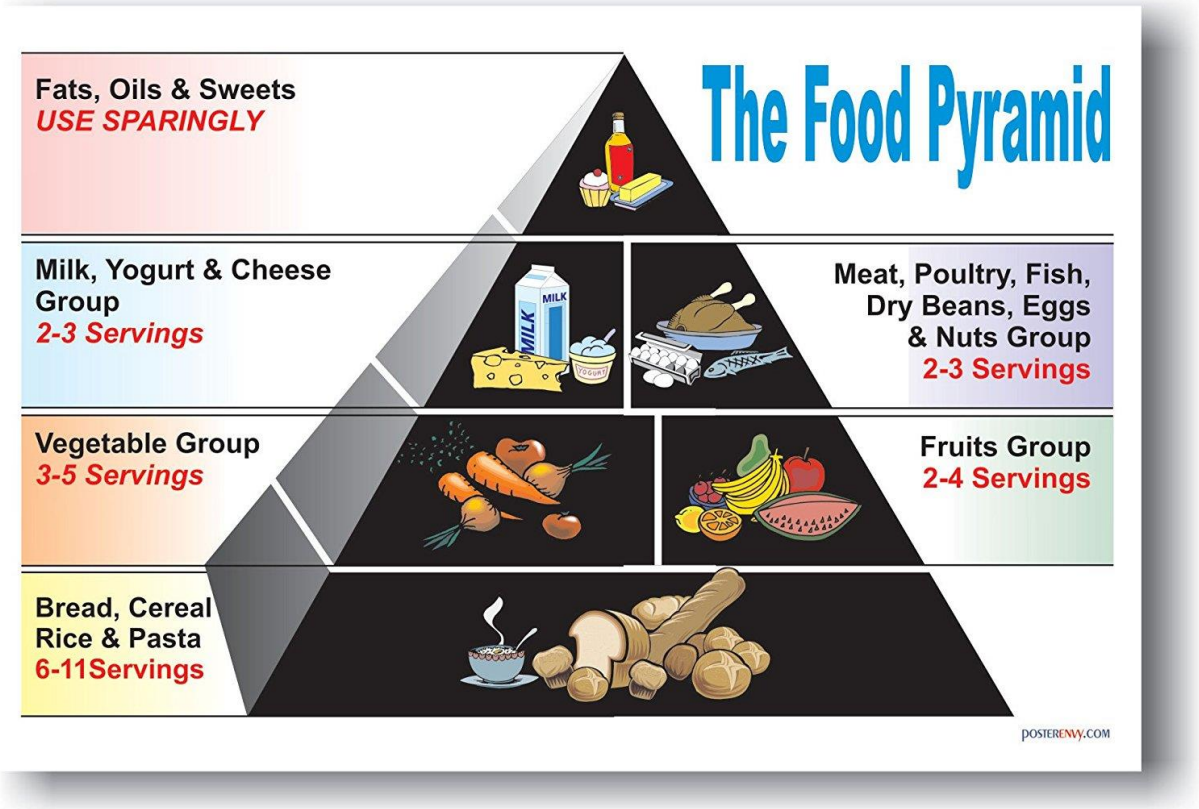
Main lesson aim: Using the food pyramid as a guide to learn more about healthy eating habits.

Lesson aim: Determining the number of calories needed to maintain a healthy diet, considering what might constitute healthy eating habits and learning what specific foods are in each food category, as well as the number of servings of each food item to eat each day.

What is the food pyramid?

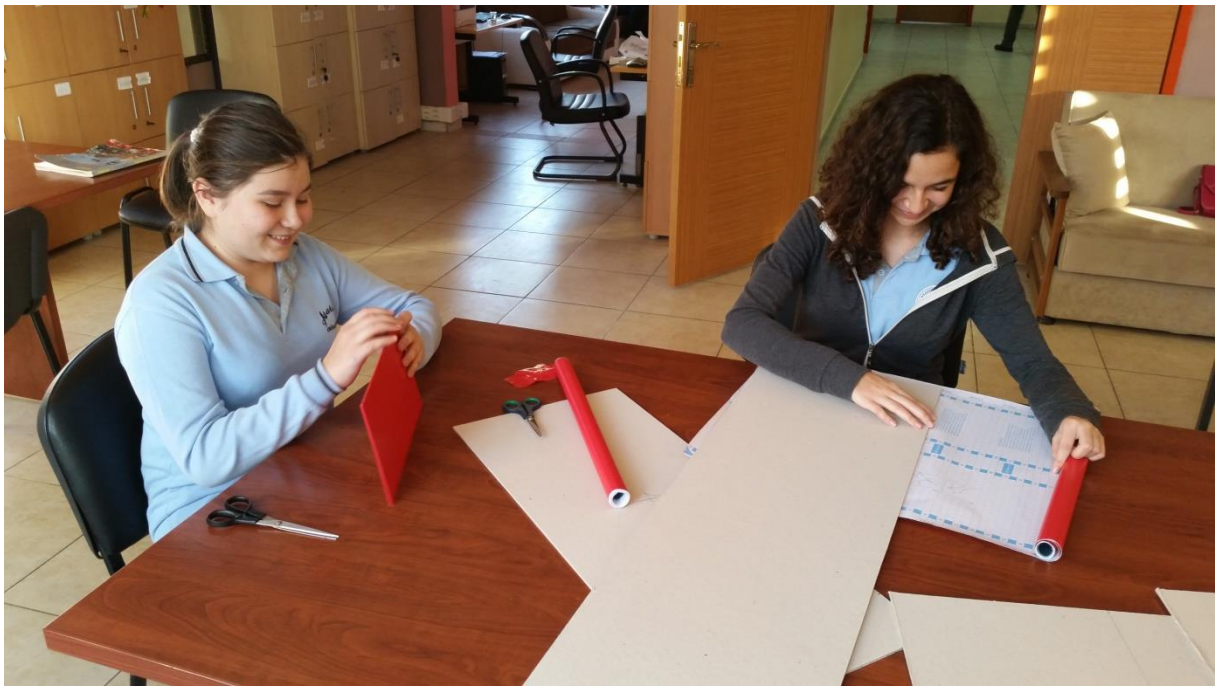
The Food Pyramid is designed to make healthy eating easier. Healthy eating is about getting the correct amount of nutrients – protein, fat, carbohydrates, vitamins and minerals you need to maintain good health.

Foods that contain the same type of nutrients are grouped together on each of the shelves of the Food Pyramid. This gives you a choice of different foods from which to choose a healthy diet. Following the Food Pyramid as a guide will help you get the right balance of nutritious foods within your calorie range. Studies show that we take in too many calories from foods and drinks high in fat, sugar and salt, on the top shelf of the Food Pyramid. They provide very little of the essential vitamins and minerals your body needs. Limiting these is essential for healthy eating.



Our students review the food pyramid and discussed the six groups of food types: fats, oils, and sweets; milk, yogurt, and cheese; meat, poultry, and fish; vegtables; fruit; and bread, cereal, rice, and pasta.

- They consider the following questions:
  1. What foods do I normally eat?
  2. How much of the food I eat every day is in each of the food categories?
  3. Should I consider changing my eating habits to improve my health?
  4. How can the food pyramid be used to promote healthy eating habits?



Lesson resume

(Formative assesment elements)

Make connections to prior knowledge or experience and finish sentences

I changed my attitude about_____

I became more aware of_____

I was surprised about_____

I felt_____

Maths in vehicles

Temat lekcji: Prędkość, droga, czas – zadania praktyczne.

Lesson topic: Speed, way, time – practical tasks.

Cel lekcji:

- Uczeń potrafi obliczyć prędkość, drogę i czas w ruchu jednostajnym.
- Uczeń rozumie potrzebę stosowania różnych jednostek prędkości.

Lesson topic:

- Students can calculate speed, way and time in uniform motion
- Students understand the need of using various units of speed

Zad.1 Oblicz w jakim czasie doleci samolot poruszający się z prędkością 800km/h

Task 1 Calculate the plane time with speed 800km/h

z **WARSZAWY** from **WARSAW**

do: **ANKARY** to **ANKARA**

droga w linii prostej to około 1600 km

the way in straight line is about 1600 km

- **do RZYMU to Rome**

droga w linii prostej około 1300 km

way in straight lin eis about 1300 km

- **do SOFII to Sofia**

droga w linii prostej około 1000 km

the way in straight line is 1000 km

- **do MADRYTU to Madrid**

droga w linii prostej około 2800 km

the way in straight line is about 2800 km

Zad.2 Zamień podane jednostki:

Task 2 Change given units:

a) 18 km/h = ...m/s

b) 10 m/min =.....km/h

c) 15 km/h = ... m/min

d) 150 cm/s .....km/min

e) 720 km/h = ... cm/s

f) 3,6 m/s = ... km/h

g) 80 m/s = ... cm/s

h) 1,8 m/min = ...cm/s

Zad.3 Jaką drogę pokona samochód poruszający się z prędkości $60\frac{km}{h}$ w ciągu 120 minut?
Zad.3 What is the way of the car with speed of $60\frac{km}{h}$ in 120 minutes?

Zad.4 Z jaką prędkością się poruszasz, jeśli w ciągu 20 sekund pokonasz 50 metrów?

Zad.4 What is your speed when you are go 50 meters in 20 seconds?

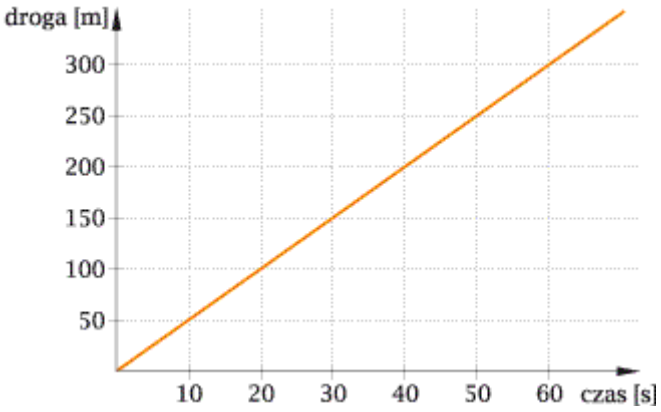
Zad.5 Ile czasu potrzeba, aby przejechać 180 kilometrów z prędkością $60\frac{km}{h}$?
Zad.5 How much time is needed to go 180 kilometres with speed of $60\frac{km}{h}$?

Zad.6 Jaką drogę pokona gołąb pocztowy lecący z prędkością 80 $\frac{km}{h}$ w ciągu 15 minut?

Zad.6 What is the way of post dove that flies at speed 80 $\frac{km}{h}$ in 15 minutes?

Zad.7 Rowerzysta przejechał pewien dystans ze stałą prędkością. Na podstawie poniższego wykresu oblicz prędkość tego rowerzysty.

Zad.7 A cyclist went some distance with constant speed. Using chart belowcalculate the speed of the cyclist.



Moja samoocena:

(element OK)

- dobrze umiem……
- robię błędy przy……..
- muszę popracować nad…….

My selfassessment:

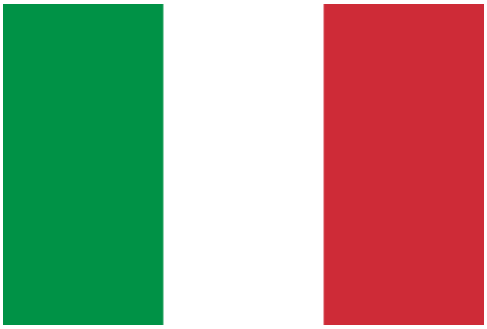
(elements of Formative assessment)

- **I can well ……..**
- **I make mistakes ……..**
- **I have to work at……..**

ICT apps:

Prezi: https://prezi.com/8ya3x2sy14bv/fsn-syrena-105-to/

Smilebox: http://play.smilebox.com/SpreadMoreHappy/4e4451324f5441314d6a6b3d0d0a



MATHS IN VEHICLES

Lesson topic: Maths in vehicles

Obiettivo principale : gli studenti mediante le formule possono calcolare la velocità , lo spazio e il tempo del moto rettilineo uniforme ; possono usare il piano cartesiano per rappresentare graficamente la relazione tra due grandezze direttamente proporzionali come spazio e tempo e inversamente proporzionali come velocità e tempo.

Main aim: using the formulas students can calculate the speed, space and time of uniform rectilinear motion; they can use the Cartesian plane to represent graphically the relationship between two sizes directly proportional as space and time and inversely proportional as speed and time.

Esercitazione N. 1

I nostri ragazzi partono da San Marco in Lamis diretti a Lovech , quante ore impiegano per coprire una distanza di 1849 km viaggiando a 100 km/h?

Task 1

Our students leave from San Marco in Lamis to go to Lovech, how many hours do they use to cover a distance of 1849 kms by travelling at 100 km/h?

https://www.youtube.com/watch?v=VXRC2hohrps

Esercitazione N.2

Una squadra di alunni deve percorrere in bicicletta 100 Km alla velocità di 20 km/h, quante ore impiegheranno?

Task 2

A team of students have to travel by bike 100 kms at a speed of 20 kms/h. How long will it take?

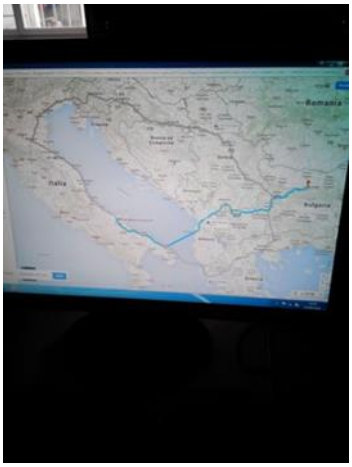
Esercitazione N.3

Quale sarà la velocità di un ciclista che si sposta con moto rettilineo uniforme percorrendo 75 km in 3 ore?

Task 3

What will be the speed of a cyclist who moves with a uniform rectilinear motion covering 75 km in 3 hours?





Esercitazione N.4

Rappresentazione cartesiana del moto rettilineo uniforme :

s= v x t

per v1= 1km/h

per v2=2km/h

per v3=4km/h

per 0,1,2,3,4 ore

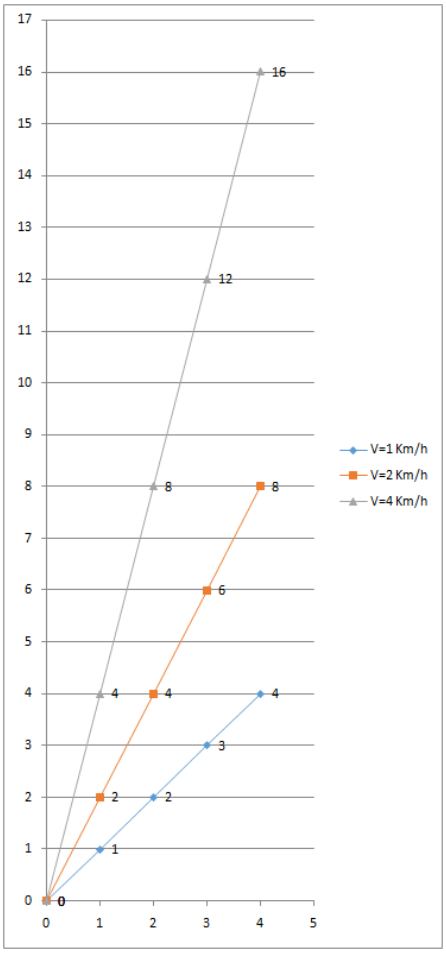
Le tre semirette che si otterranno presenteranno diverse pendenze a causa delle differenti velocità.

Task 4

Presentation of the uniform rectilinear motion

For 0,1,2,3,4 hours

The 3 half lines that will be obtained will present different slopes



Equivalenze :

30 km/h……m/sec

5m/sec……km/h

10m/sec……..km/sec

36 km/h……m/sec

Dopo aver fatto queste esercitazioni, i ragazzi affermano di aver capito ed esprimono un feedback positivo.

After doing these exercises pupils claim to have understood and express a positive feedback.

Successivamente si possono fare domande di valutazione formativa :

quanto avete capito ……..

dovete migliorare molto con i calcoli……

potete benissimo migliorare se…….

Oppure si può fare autovalutazione : come posso migliorare ……

Devo stare più attento nei…….devo lavorare con……ecc.

Finally we can ask questions of formative assessment :

How much have you understood?

Your should improve with the calculation

Or self assessment:

How can I improve?

I have to be more careful

I have to work at

ICT apps:
Paint

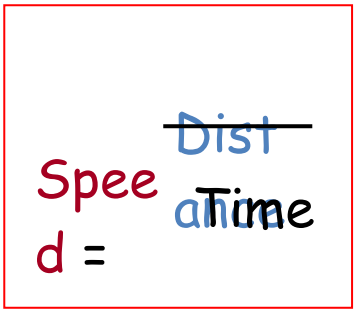
MATHS IN VEHICLES

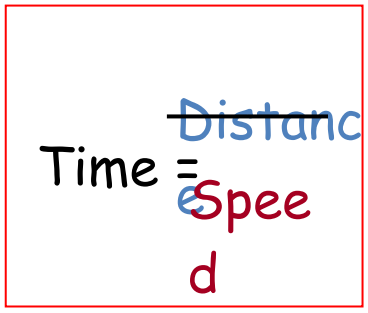
Lesson topic: Speed,time and distance problems

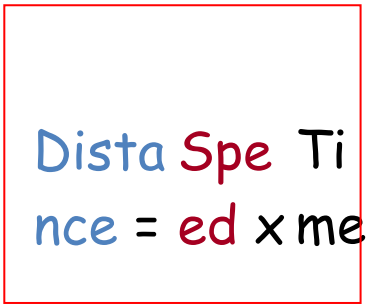
Main lesson aim: Using the correct formulas to calculate speed, distance or time

Lesson aim: Our students will prepare a roadmap route from Kocaeli to Lovech and calculate how long the route is and how many hours we need to get to Lovech.

The 3 formulas for Speed, Time & Distance:







Erasmus+

Solving for Speed **Solving for** Time **Solving for** Distance

Examples :

***A windsurfer travelled 28 km in 1 hour 45 mins. Calculate his speed.

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

$$= \frac{28}{1{\cdot}75}$$

→ 1 hour 45 mins = 16 km/h

Answer: His speed was 16 km / hour

***A salesman travelled at an average speed of 50 km/h for 2 hours 30 mins. How far did he travel?

Distance = Speed*Time

= **50 x 2.5** → **2 hour 30 mins**

= **125 km**

Answer: He travelled 125 km

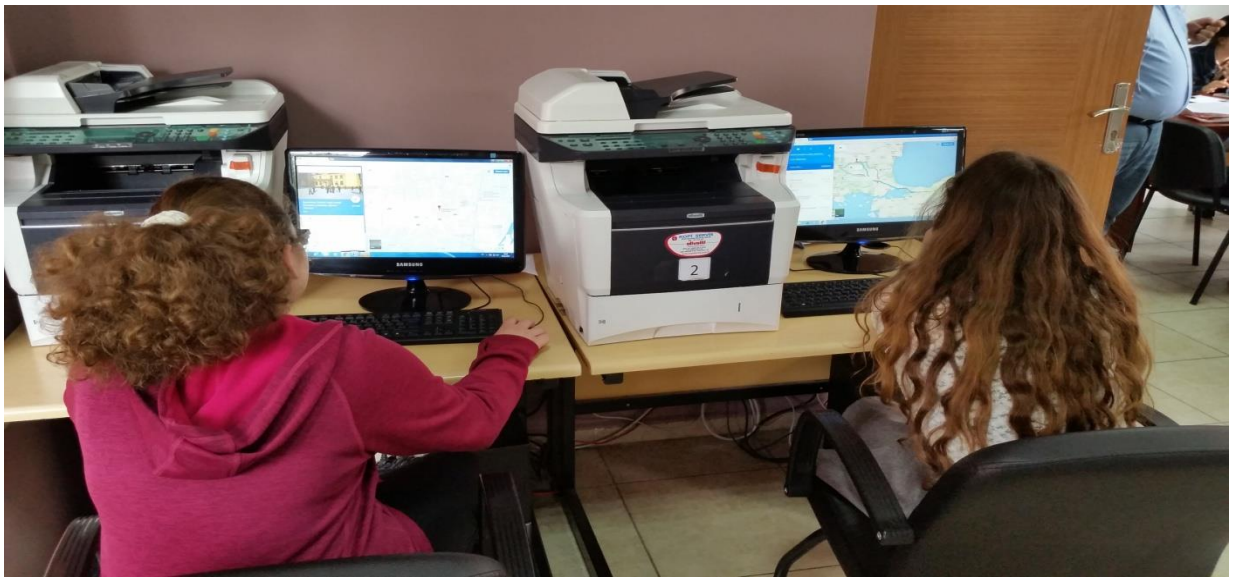
***A train travelled 555 miles at an average speed of 60 mph. How long did the journey take?

$$\text{Time} = \frac{\text{Distance}}{\text{Speed}}$$

$$= \frac{555}{60}$$

= 9.25 hours = 9 hours 15 mins

Answer: It took 9 hours 15 minutes



ICT applications:

Paint

Lesson resume

(Formative assesment elements)

Finish the

sentences

during lesson I found out that_____

during lesson I was interested in _____

I was wondering about _____

Maths in buildings

Temat lekcji: Praktyczne zastosowanie twierdzenia Talesa.

Lesson topic: Practical use of Thales theorem

Cel główny: Kształtowanie wyobraźni geometrycznej i logicznego myślenia.

Main lesson aim: Forming geometrical imagination and logical thinking.

Cel lekcji: Uczeń zrozumie potrzebę stosowania twierdzenia Talesa.

Lesson aim: Student understood the need of using Thales' theorem.

Odkrywcy matematyki i tajemnic świata przyrody.

Explorers of maths and world nature mysteries

Tales (ok. 635–543 p.n.e.) – grecki filozof, matematyk, astronom, inżynier, polityk, podróżnik i kupiec, zaliczany do siedmiu mędrców starożytnej Grecji.

Thales (about 635-543 BC) – a Greek philosopher, mathematician, astronomer, engineer, traveller, merchant, regarded as one of the seven wises of Greece.

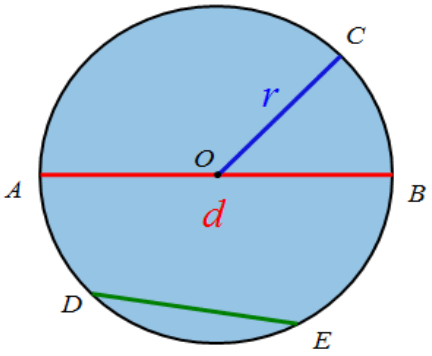
To on powiedział – „Kropla drąży skałę”, „Poznaj samego siebie”

He said - „Constant dropping wears away a stone”, “Know thyself”

Talesowi z Miletu przypisuje się również autorstwo:

Thales from Milet was probably the author of:

1. dowodu, że średnica dzieli koło na połowy,
1. the proof that diameter shares the circle in halves,



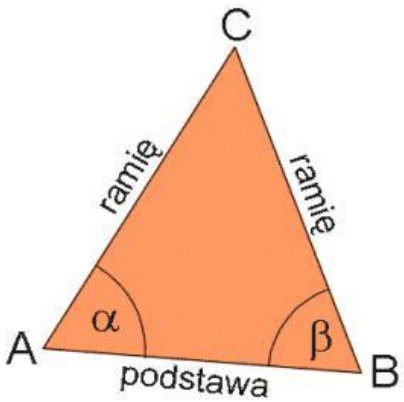
r - promień

d - średnica

$|DE|$ - cięciwa

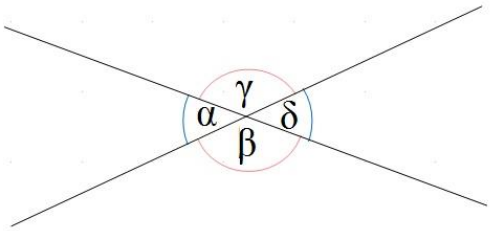
$d = 2r$

2. odkrycia, że kąty przy podstawie w trójkącie równoramiennym są równe,
2. the discovery, that base angles are equal in isosceles triangles,



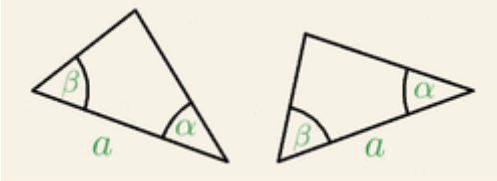
3. twierdzenia o równości kątów wierzchołkowych,

3.theory about the equality of point angles,



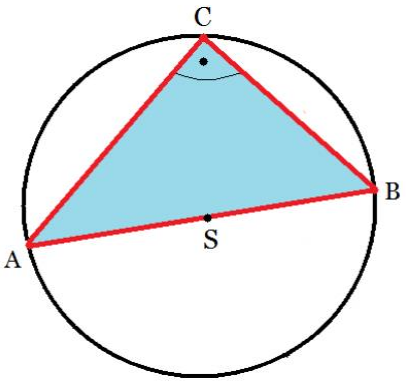
4. twierdzenia o przystawaniu trójkątów o równym boku i przyległych dwu kątach,

4.theory about congruence triangles with equal side and two adjacent angles,

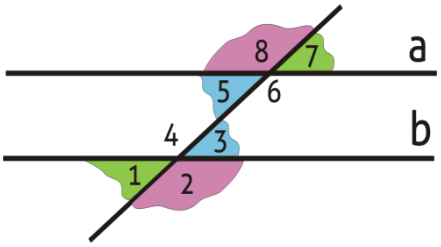


5. twierdzenia, że kąt wpisany w półokrąg jest prosty.

5. the line AB is a diameter, then the angle ∠C is a right angle.



6. twierdzenia, że jeżeli dwie proste równoległe przetniemy dowolną prostą to kąty naprzemianległe i odpowiadające będą sobie równe.



Rozwiąż zadania. Wykonaj odpowiednie rysunki.

Solve tasks and draw.

Uczniowie rozwiązują zadania, następnie udzielają sobie informacje zwrotne:

Students solve tasks next give feedback each other:

(elementy OK)

(elements of Formative Assessment)

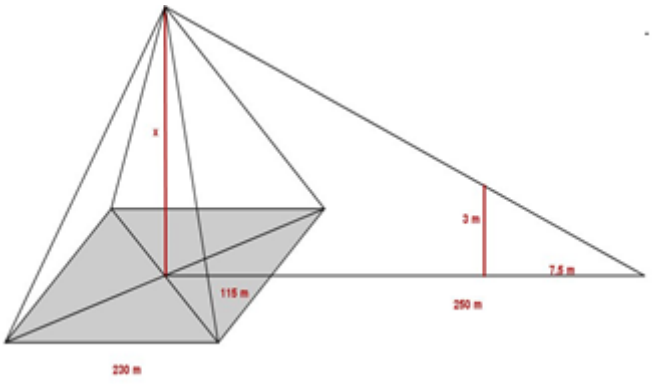
- dobrze zrobiłeś ……., well done ……
- źle zrobiłeś …….., bad……..
- zwróć uwagę na ……., pay attention on ……..

Zad.1 Task1

Oblicz wysokość piramidy Cheopsa wiedząc, że:

Count the height of Cheops' pyramid when you know that:

– długość krawędzi podstawy wynosi 230 m, the length of edge base is 250 m,
– długość cienia piramidy 250 m, the shade length of pyramid is 250 m,
- długość użytego drąga 3 m, the length of used rod is 3 m,
– długość cienia drąga 7,5 m, the shade length of the rod is 7,5 m.



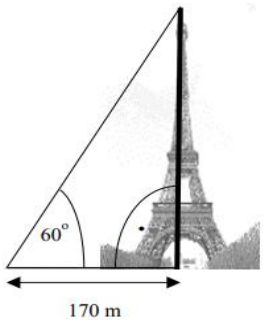
Tales zmierzył wysokość piramidy Cheopsa za pomocą cienia.

Thales measured the height of Cheops pyramid by means of shade.

Zad.2 Wieża w Pizie rzuca cień długości 88m. W tym samym czasie cień chłopca o wzroście 1,5m jest równy 2,4m. Oblicz z wysokość wieży.

Task 2 The shade of Pisa Tower is 88 m. At the same time the boy's shade is 2,4 m. The boy's height is 1,5 m. Count the tower length.

Zad.3 Oblicz wysokość Wieży Eiffla wykorzystując informacje podane na rysunku. Wynik podaj z dokładnością do setek metrów. Zapisz obliczenia, przyjmując $\sqrt{3}$ =1,73.



Task 3 Count the height of The Eiffel Tower using the data in the picture. Write the calculations taking $\sqrt{3}$ =1,73.

Podsumowanie lekcji.

Lesson resume

Dokończ zdania:

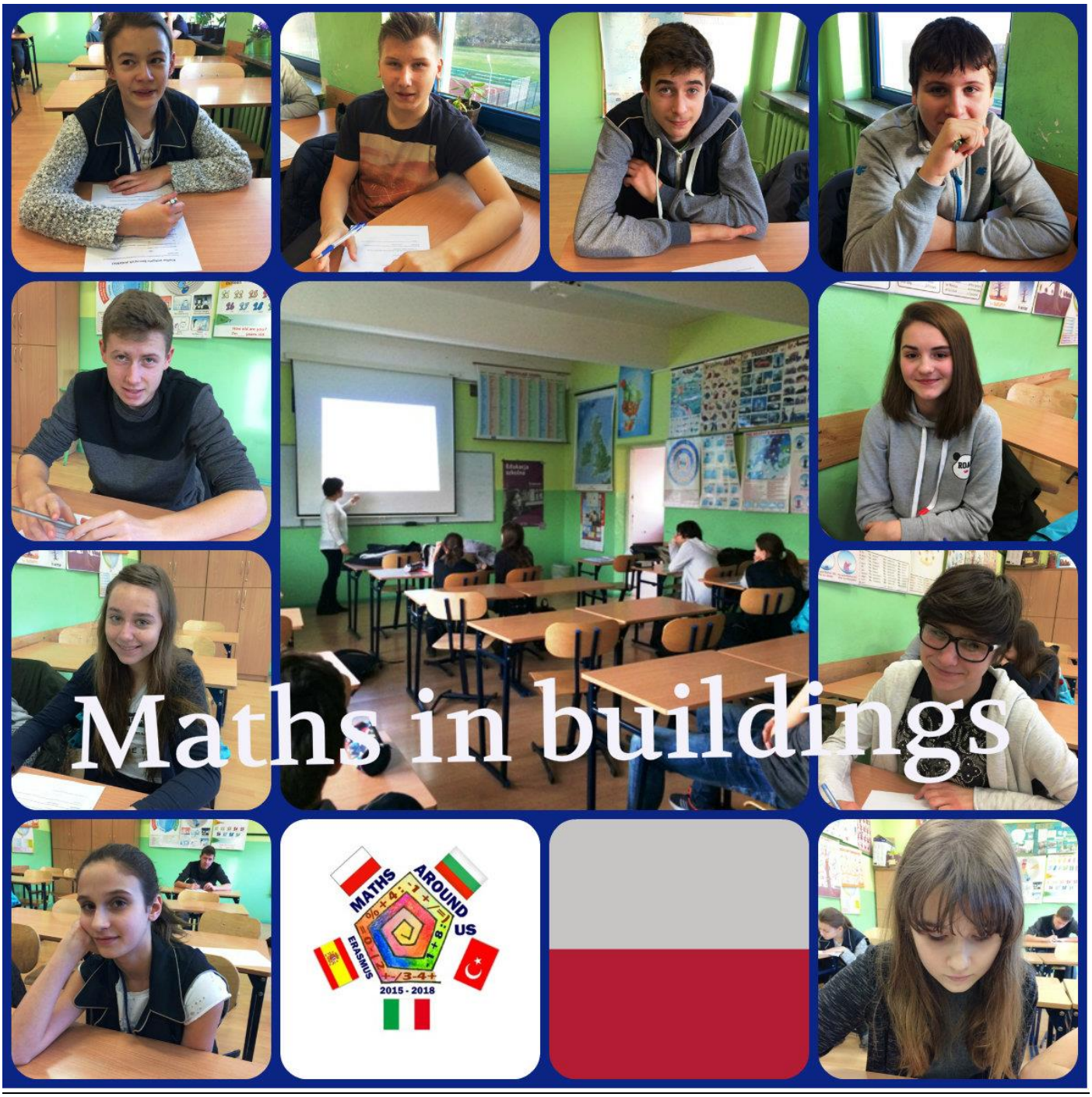
Finish the sentences:

(elementy OK) (Formative Assesment elements)

- na lekcji dowiedziałem/dowiedziałam się, że ……. during lesson I found out that ……
- na lekcji zaciekawiło mnie, że…….. during lesson I was interested in …….
- na lekcji zastanowiło mnie, że ……. I was wondering about ……

ICT applications:

Pixlr to make collages:



Matchmemory: https://matchthememory.com/ziebice

MATHS IN BUILDINGS

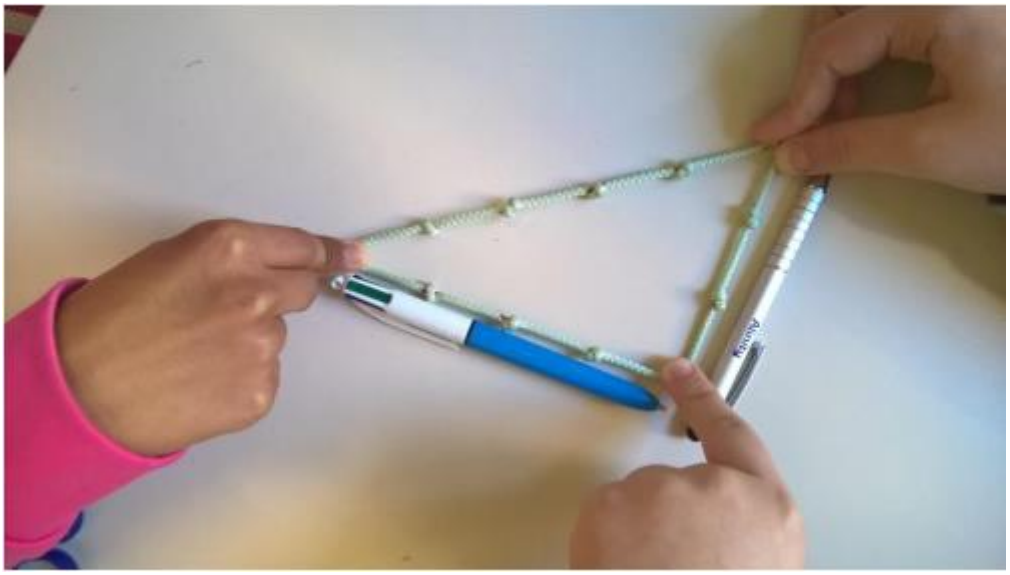
Argomento della lezione : Matematica nelle costruzioni.
Lesson topic: Maths in building

Obiettivo principale : trasferire nella realtà l'immaginazione geometrica , sviluppare il pensiero logico e comprendere la necessità di utilizzare il teorema di Pitagora.
La storia della matematica offre spunti per le attività in classe. Se lo studente sa collocare storicamente un concetto aggiunge all'apprendimento matematico un significato paragonabile alla conoscenza delle sue applicazioni pratiche nella realtà attuale. Il teorema di Pitagora offre al ragazzo la possibilità sia di costruire un percorso che affronti aspetti aritmetici e geometrici, sia di stabilire un collegamento fra concetti matematici e realtà storica.
E' noto che Egizi e Babilonesi , già parecchi secoli prima di Pitagora , conoscevano varie terne oggi dette pitagoriche. Ai nostri alunni è stato proposto di ricercarne qualcuna

ragionando sui quadrati perfetti : esistono coppie di quadrati perfetti la cui somma da un altro quadrato perfetto :

9+16=25 36+64=100

Quando i nostri alunni pensano agli Egizi pensano alle piramidi . Ma come avranno fatto gli antichi geometri a tracciare gli angoli retti delle basi quadrate delle piramidi? Il loro metodo era basato sulla conoscenza delle terne di numeri naturali che oggi chiamiamo terne pitagoriche. Con una corda suddivisa in 12 tratti uguali tramite dei nodi, si ottiene un triangolo rettangolo.



I numeri 3,4,5 costituiscono una terna pitagorica e rappresentano le lunghezze dei lati del triangolo rettangolo di sopra.

Main aim: transfer the geometric imagination into reality, develop logical thinking and understand the need to use Pythagorean theorem.
Maths history offers ideas for the class activities. It the students can historically piace a concept he adds a meaning to mathematical learning comparable to the knowledge of its practical applications in the current reality.
Pythagorical theorem offers to the student the possibilità both to build a path which tackles arithmetic and geometric aspects and establish a link between mathematical concepts and historical reality. It is known that Egyptians and Babylonians already several centuries before Pythagoras, knew several triade today called Pythagorean.

Our students were asked to look for some of them by reasoning about the perfect squares: there are pairs of perfect squares whose sum gives another perfect square

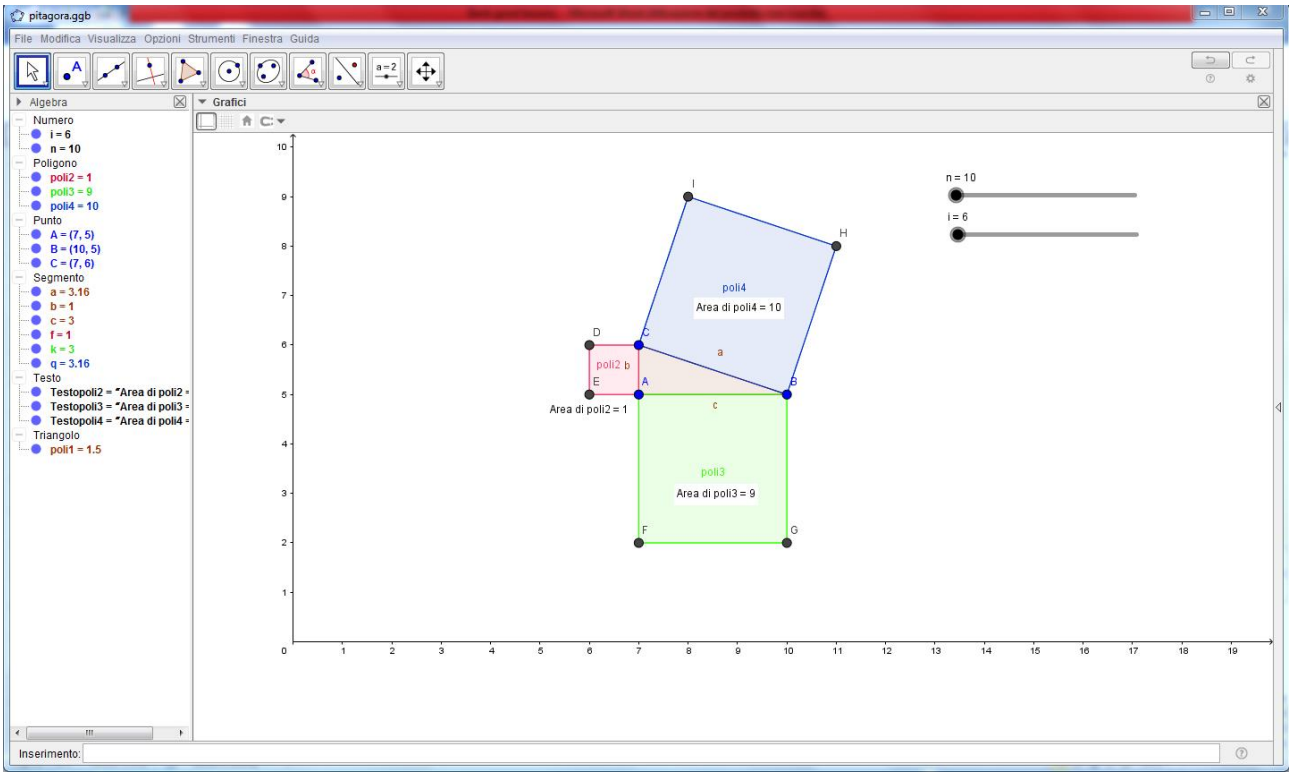
9+16=25 36+64=100

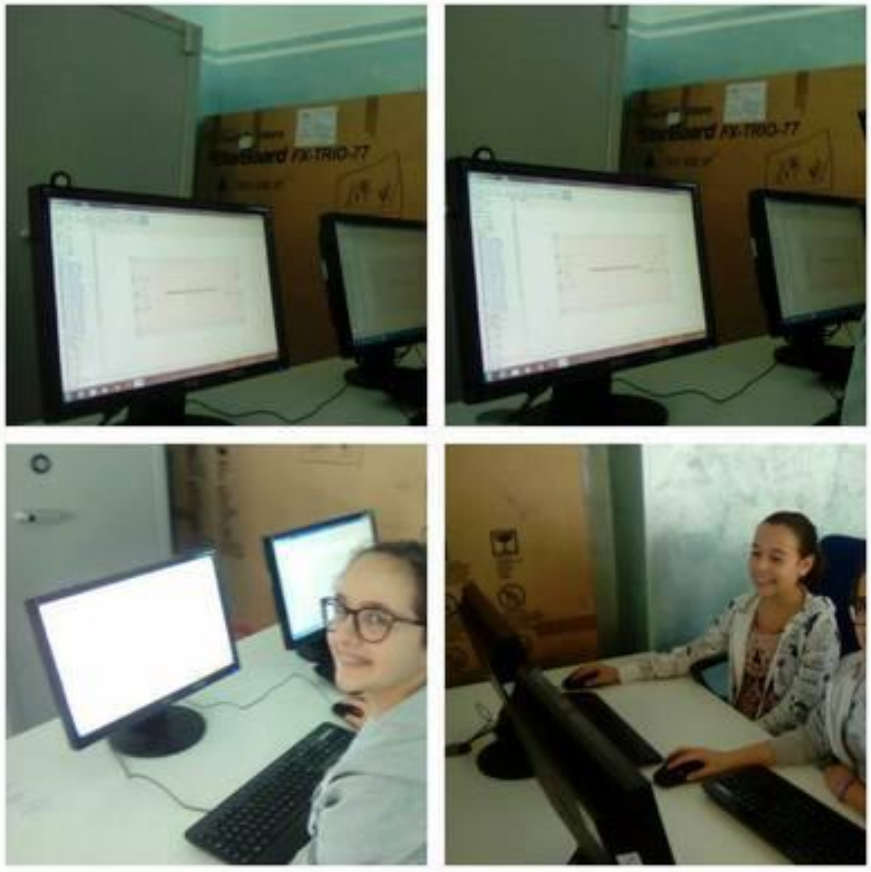
When our students think about Egyptians they think about pyramids. But how did the ancient surveyors to track the right angles of the square bases of the pyramids? Their method was based on the knowledge of the terns of natural numbers that today we call Pythagorean triads. With a rope divided into 12 equal lenghts by means of knotes a rectangular triangle is obtained.

Number 3,4,5 make up a Pythagorean triple and represent the lenghts of the slides of rectangular triangle above.

Esercitazione N.1

Un gruppo di ragazzi attraverso il programma geogebra dimostra il teorema di Pitagora :





https://www.youtube.com/watch?v=POEe4KHzWt8

Task 1

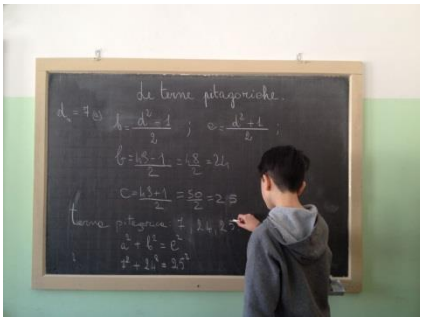
A group of students use the software Geogebra which shows Pythagorean theorem

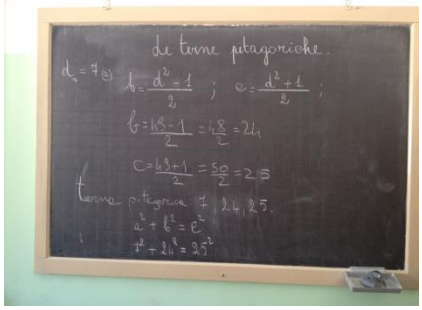
Esercitazione N.2

Un gruppo di ragazzi calcola le terne Pitagoriche partendo da un numero pari e da un numero dispari:

Task 2

A group of students calculates the Pythagorean triple starting from an even number and from an odd number.





Esercitazione N.3

In un triangolo rettangolo l'ipotenusa e un cateto misurano rispettivamente 85 cm e 75 cm. Calcola il perimetro e l'area del triangolo rettangolo.

Task 3

In a rectangular triangle the hypotenuse and a cathetus measure 85 cm and 75 cm respectively. Calculate the perimeter and the area of the rectangular triangle

I ragazzi affermano di aver compreso la lezione e di aver svolto bene gli esercizi, pertanto danno un feedback positivo.

Elementi di valutazione formativa :

Durante la lezione ho capito che……

Durante la lezione mi ha interessato molto……

Interessantissimo ……

At the end students say they have understood the lesson and have done the exercises well, so their feedback is positive.

Formative assessment elements:

Complete the following sentences:

During the lessons I have understood that…..

What interested me most was…..

ICT applications: Geogebra

MATHS IN BUILDINGS

Lesson topic: Scales

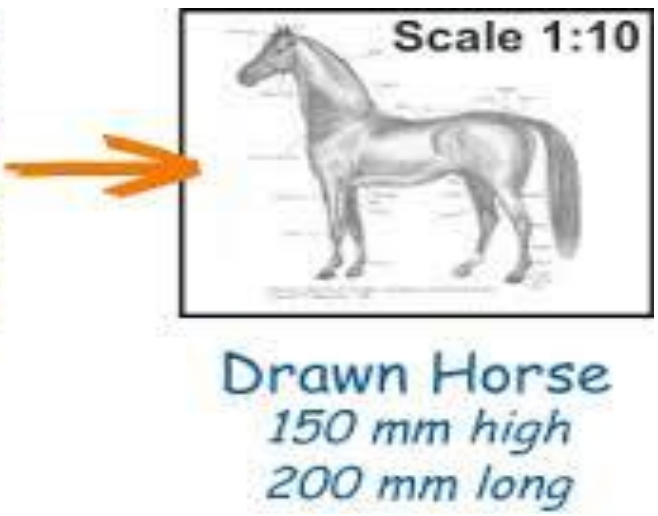
Main lesson aim: Calculating scale dimensions

Lesson aim: Students will learn how to use the scale on a model to determine distance and to measure the size of objects.

Definition of Scale

The ratio of the length in a drawing (or model) to the length of the real thing

Example:



In the drawing anything with the size of "1"

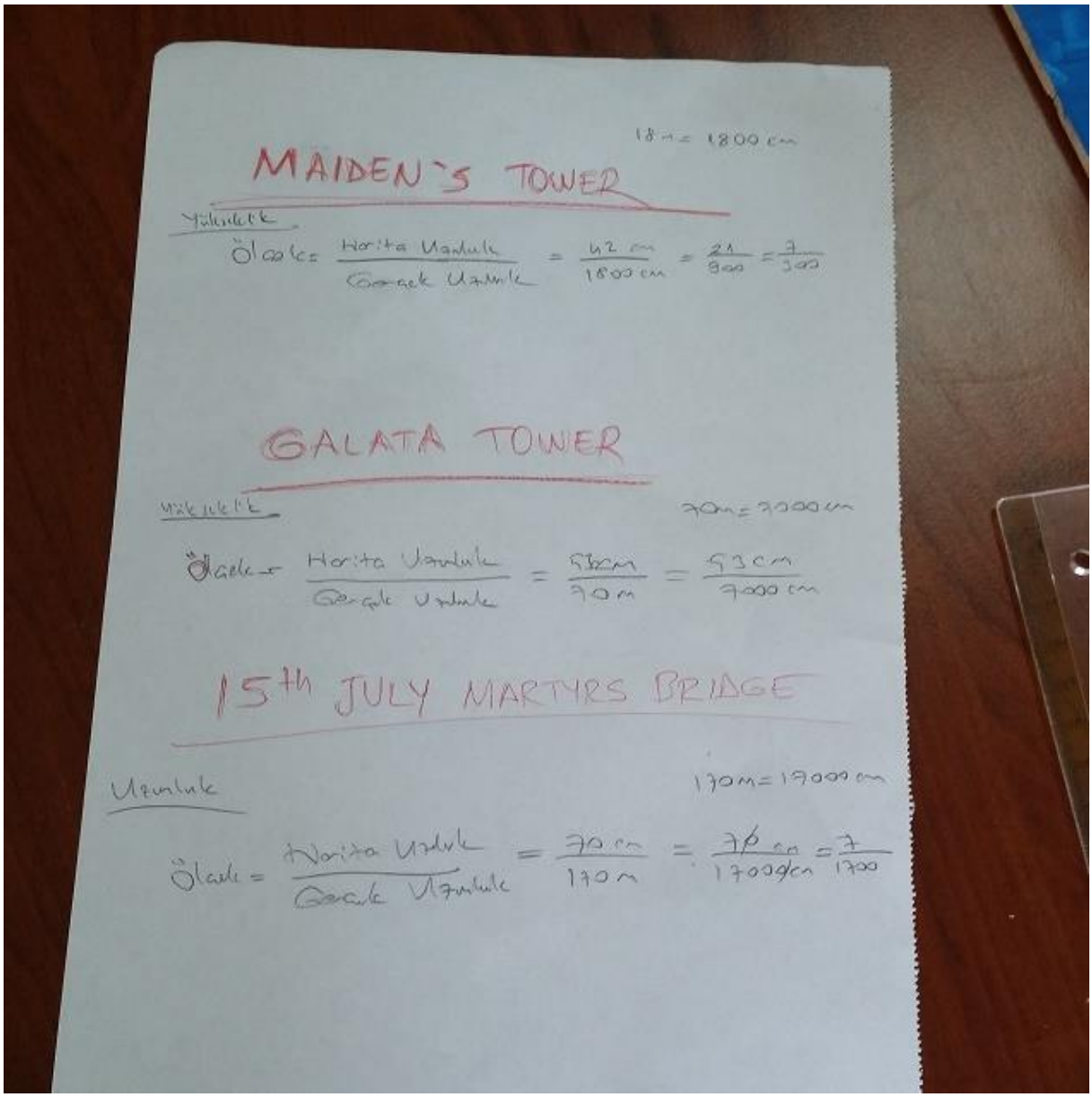
would have a size of "10" in the real world, so a measurement of 150mm on the drawing would be 1500mm on the real horse.

This horse in real life is 1500mm high and 2000 mm long, so the ratio of its **height to length** is

$$1500 : 2000$$

What is that ratio when we draw it at 1/10th normal size?

$$1500 : 2000 = 1500 \times \mathbf{1/10} : 2000 \times \mathbf{1/10}$$
$$= \mathbf{150 : 200}$$


18 m = 1800 cm
MAIDEN`S TOWER
Yükseklik
Ölçek = Harita Uzunluk / Gerçek Uzunluk = 42 cm / 1800 cm = 21/900 = 7/300
GALATA TOWER
Yükseklik
70m = 7000 cm
Ölçek = Harita Uzunluk / Gerçek Uzunluk = 91cm / 70 m = 91 cm / 7000 cm
15th JULY MARTYRS BRIDGE
Uzunluk
170m = 17000 cm
Ölçek = Harita Uzunluk / Gerçek Uzunluk = 70 cm / 170 m = 70 cm / 17000cm = 7/1700


DIV. 326

Task 1

The tallest building in the world, the Burj Khalifa in Dubai, is 828 metres tall. A model of the building is made using the ratio 1 : 5,000.
How high is the model in centimeters?

Answer

Height of the model = 828 m ÷ 5,000
= 82,800 cm ÷ 5,000
= 16.56 cm

Task 2

The distance between two towns on a map is 5 cm. If the real distance between the two towns is 25 km, what is the scale of the map?

Answer

You can only compare the two distances if they are measured in the same unit. So the first step is to convert the real distance to centimetres:

First convert to m: 25 km = 25 × 1,000 m = 25,000 m
Then to cm: 25,000 m = 25,000 × 100 cm = 2,500,000 cm

So the scale of the map is 5 cm : 2,500,000 cm
Which is 1 : 500,000

Lesson resume

(Formative assesment elements)

Make connections to prior knowledge or experience and finish sentences

I changed my attitude about_____

I became more aware of_____

I was surprised about_____

I felt_____

Maths in nature

Temat lekcji: Symetria, procenty - wiosna w Polsce.

Lesson topic: Symmetry and percent – spring in Poland.

Cel główny: Dostrzeganie symetrii w przyrodzie.

Main lesson aim: Finding symmetry in nature.

Cel lekcji: Uczeń:

- rozpoznaje figury, które mają oś symetrii, które mają środek symetrii
- wskazuje oś symetrii i środek symetrii figury
- potrafi obliczyć procent liczby oraz liczbę na podstawie jej procentu

Lesson aims: Student:

- can identify the shapes with axial symmetry and center of symmetry
- indicate axial symmetry and center of symmetry
- can count percent of figure and figure using its percent

RZEPAK **RAPESEED**

Podróżując po Polsce w maju zobaczycie z okien autobusu, samochodu, żółte łany.

While you are travelling across Poland in may you are sure to see yellow fields.

Są one nieodłącznym elementem naszego polskiego wiosennego krajobrazu. Tą rośliną jest rzepak, z którego nasion produkuje się olej jadalny, margarynę i inne tłuszcze kuchenne.

Yellow Fields are strongly connected with spring Polish landscape. This plant is called rapeseed. Rapeseed is used for production of plant oil, margarine and other plant fat.

Polska produkuje rocznie około 2 miliony ton rzepaku, co plasuje nas w ścisłej europejskiej czołówce.

Every year Poland produces about 2 million tones of rapeseed what gives Poland the top place in Europe.

Zadanie 1. Ile osi symetrii ma kwiat rzepaku?

Task 1 How many axis of symmetry has the rapeseed flower got?

Zadanie 2

Z jednego hektara (jednostka powierzchni używana w rolnictwie i leśnictwie) =10 000 m^2 można zebrać średnio 3 tony nasion rzepaku.

Jaka była powierzchnia uprawy rzepaku, z której zebrano 17,5 ton nasion?

Wynik podaj w m^2 i hektarach.

Task 2

From 1 hectare (area unit used in agriculture and forestry) =10 000 m^2 **we can get average 3 tones of rapeseeds.**

Question: What would be the area of rapeseed field if people could get 17,5 tones seeds of this plant?

Write the answer in m^2 and hectares. ……..

How is rapeseed in your language? …….

BOCIANY STORKS

Populacja bociana białego na świecie liczy ok. 200 000 osobników (2004). Z tego 23,5 proc. tych ptaków wybiera Polskę na miejsce pobytu.

To oznacza, że co czwarty bocian jest Polakiem!

Bociany wolą Polskę niż Francję, Niemcy czy Danię. Cenią bioróżnorodność, klimat i środowisko naszego kraju.

Ponad **65** proc. bocianów wije swoje gniazda na słupach energetycznych.

The world population of storks is about 200 000 (2004). 23,5% of these birds chose Poland as their home.

It means that every fourth stork I Polish!

Storks prefer Poland than France, German or Denmark. They like Polish climate and environment of our country.

Over **65%** of storks build their nests on electric posts.

Samce w ciągu życia zmieniają gniazda kilkukrotnie (fot. Agnieszka Sadowska / Agencja Gazeta)

In their livetime male storks change their nests several times.

Nasz żabojad jak na widelcu ;) Autor zdjęcia: Hanna Baster

Zad.1 W Polsce jest około 38 milionów ludzi. Przyjmując, że co czwarty bocian jest Polakiem oblicz ile bocianów żyje w Polsce?

Task 1 There are about 38 million people in Poland. Taking that every fourth stork is Polish count how many storks live in Poland?

Zad.2 Na podstawie rozwiązania zadania 1, oblicz ile w Polsce jest słupów energetycznych.

Task 2 Knowing the answer of task 1 count how many electric posts are in Poland?

Zad.3 Ile osi symetrii ma bocian?

Task 3 How many axial symmetries has the stork got?

WIOSENNE KWIATY

SPRING FLOWERS

Ile osi symetrii mają najpopularniejsze wiosenne polskie kwiaty?

How many axial symmetries have the most popular Polish flowers got?

Czy te kwiaty mają środek symetrii?

Have these flowers got the axial symmetries?

krokus, crocus

.....?

bratek, pansy

.....?

stokrotka, daisy

.....?

zawilec, anemone

……?

Podsumowanie lekcji.

Lesson resume.

Dokończ zdania:

(elementy OK) FA elements

- na lekcji dowiedziałem/dowiedziałam się, że ……..
- na lekcji zaciekawiło mnie, że……..
- na lekcji zastanowiło mnie, że …….

Finish th sentences:

- During the lesson found out……..
- during lesson I was interested in …….
- I was wondering about ……

ICT applications:

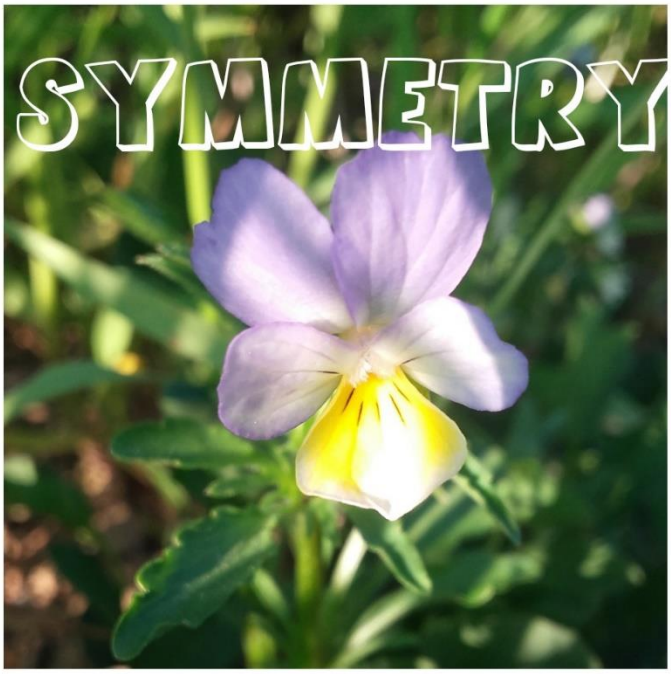
Smilebox Polish fauna and flora:, symmetry in naure

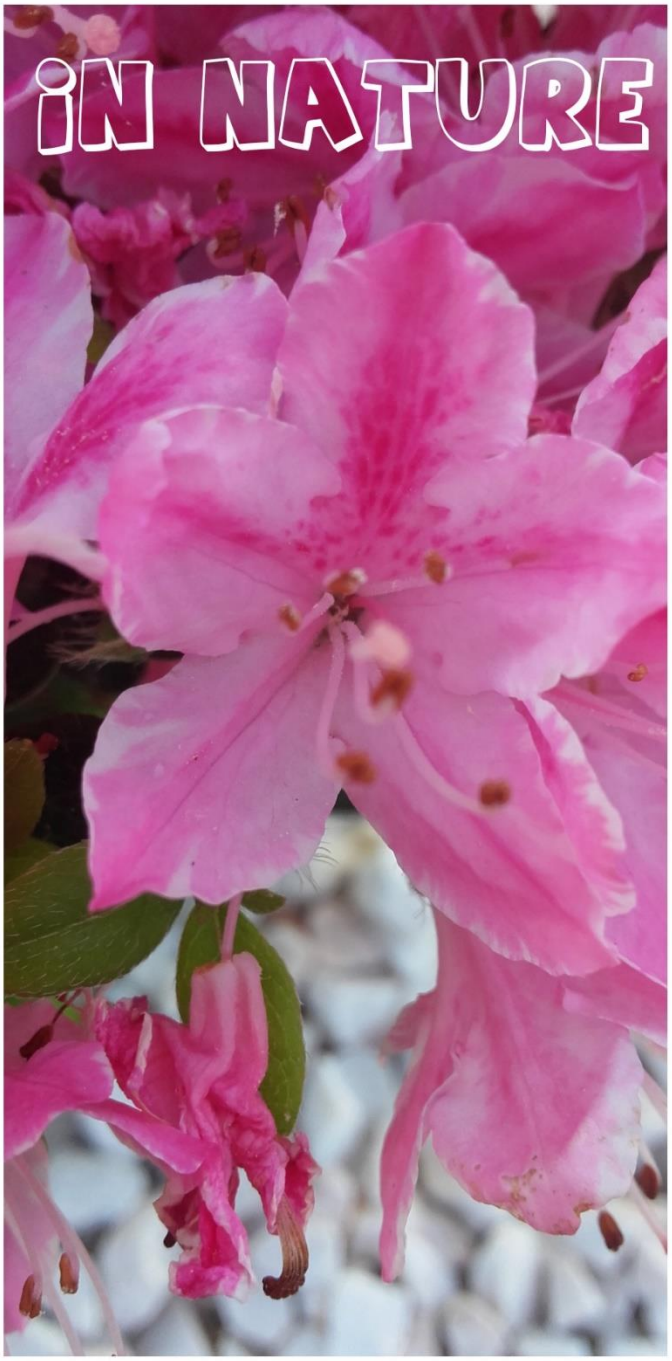
http://play.smilebox.com/SpreadMoreHappy/4e4455304d6a45344e6a56384d5441784e444d324d7a55330d0a

http://play.smilebox.com/SpreadMoreHappy/4e4455304f5451344e7a68384d5441304f4451334d6a51300d0a

moviemaker: https://youtu.be/hkpq34RGUl4

collages:


SYMMETRY


iN NATURE

matchmemories about Polish fauna and flora

Memory Game about Polish snakes:

https://matchthememory.com/Snakes

five the most popular Polish trees:

https://matchthememory.com/Polishtrees

Polish geography: Giants and dwarves game part 1

https://matchthememory.com/Polishgeography

Polish fauna and flora: giants and dwarves part 2

https://matchthememory.com/dzialek

and the rarest and endangered animals in Poland

https://matchthememory.com/gim8

Polish lesson was about Fibonacci numbers:

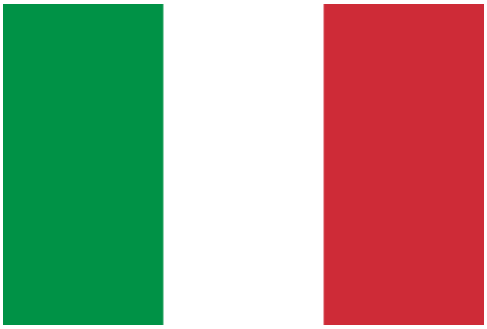
https://youtu.be/6tYWsHrxwXc

My place of living nature in Ziębice crossword:

http://crossbk.cba.pl/

and matching games:

http://mathsinnature.cba.pl



MATHS IN NATURE

Argomento della lezione : Matematica in natura.

Lesson topic: Mathematics in nature.

Obiettivo principale: la ricerca della simmetria in natura: simmetria assiale e simmetria bilaterale.

Main objective: the research of symmetry in nature: axial symmetry and bilateral symmetry.

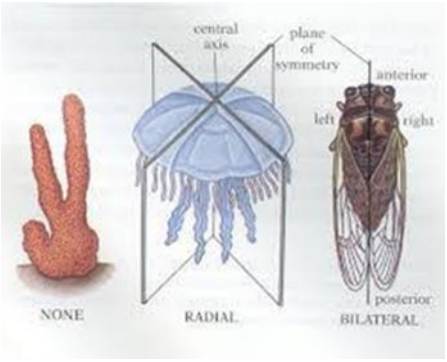
Attraverso una passeggiata in qualsiasi periodo dell'anno, in un bosco del nostro Gargano , lontani dalle costruzioni dell'uomo. Tra la grande varietà e complessità delle forme che ci circondano, incominciano ad emergere moduli ricorrenti, regolarità e simmetrie. Nel continuo mutamento , qualcosa sembra conservarsi ; certe direzioni o progetti sembrano essere privilegiati.
In un bosco si vedono gocce sferiche , neve che cade in cristalli esagonali , tronchi di alberi e funghi con simmetrie di rotazione attorno ad un asse centrale , fiori con simmetrie esagonali ,pentagonali. Molti insetti ,mammiferi e foglie con simmetria bilaterale. I millepiedi , i fili d'erba o le foglie delle felci mostrano una simmetria di traslazione.
Queste simmetrie non sono quasi mai perfette: le foglie di un quadrifoglio non sono esattamente uguali fra loro , e così la simmetria non è precisa come quella di un quadrato. Ma noi diciamo tranquillamente che la stella marina ha una simmetria pentagonale anche se una delle sue cinque punte è piegata o rotta. Probabilmente la natura si è organizzata in forme simmetriche per una maggiore funzionalità , ricambio, locomozione e risparmio energetico ecc.

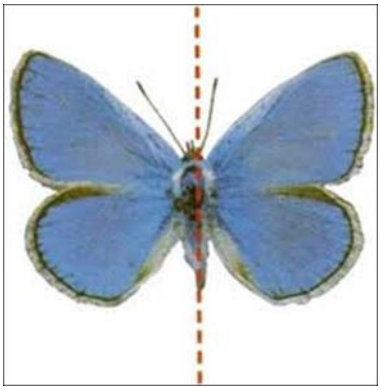
Through a walk at any time of the year, in a forest of our Gargano, far from the buildings of man. Among the great variety and complexity of the forms that surround us, recurring forms, regularities and symmetries begin to emerge.
In the continuous change, something seems to be preserved; certain directions or projects seem to be privileged. In a forest you can see spherical drops, snow falling in hexagonal crystals, trunks of trees and mushrooms with rotation symmetries around a central axis, flowers with hexagonal, pentagonal symmetries.
Many insects, mammals and leaves with bilateral symmetry. The centipedes, the blades of grass or the leaves of the ferns show a symmetry of translation.
These symmetries are almost never perfect: the leaves of a four-leaf clover are not exactly equal to each other, and so the symmetry is not as precise as that of a square.
But we quietly say that the starfish has a pentagonal symmetry even if one of its five points is bent or broken. Probably nature has organized itself in symmetrical forms for greater functionality, exchange, locomotion and energy saving and so on.

https://www.youtube.com/watch?v=LUQCGAK8ZUY

https://www.youtube.com/watch?v=7DJJEjBAmWA

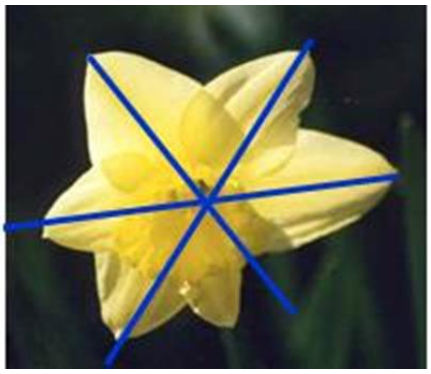
Esempi di simmetria (non ha simmetria – radiale –bilaterale)
Examples of symmetry (has no symmetry - radial -bilateral)



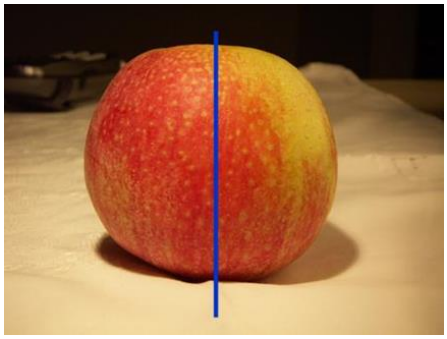


Simmetria bilaterale in una farfalla

Bilateral symmetry in a butterfly

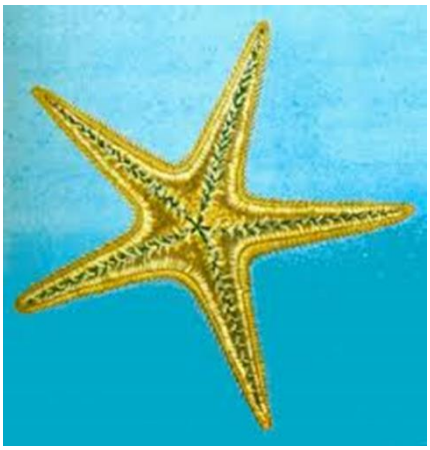


Esempi di simmetria bilaterale e radiale.
Radial and bilateral symmetry.



Simmetria Esagonale
Exagonal symmetry

Simmetria nella stella marina Simmetry in a starfish



Lezione pratica : il nostro Tavoliere delle Puglie è definito " il granaio d'Italia " per cui produce grandi quantità di grano. La pianta del grano arriva ad un'altezza di 50-60 cm e produce una spiga che ha un asse centrale con i chicchi che si dispongono simmetricamente da ambo i lati.

Practical lesson: our Tavoliere delle Puglie is defined as "the granary of Italy" for which it produces large quantities of wheat. The wheat plant reaches a height of 50-60 cm and produces a spike which has a central axis with the grains symmetrically arranged on both sides.

Spighe di grano *Ears of wheat*

I campi in primavera sono verdi e ondeggiano al vento per poi diventare gialli ed essere mietuti prima che entri l'estate. Ogni ettaro produce circa 30 quintali di grano che servirà per pane e pasta.
Se un contadino possiede 10 ettari coltivati a grano, in un anno produrrà circa 300 q di grano.

Misure agrarie :

1ha = 10.000 m^2

1 a =100 m^2

1ca = 1 m^2

The fields in spring are green and sway in the wind and then turn yellow and be harvested before summer comes. Each hectare produces about 30 quintals of wheat that will be used for bread and pasta.
If a farmer owns 10 hectares of wheat, in a year he will produce about 300 q of wheat

Agricultural measures:

1ha = 10000 m^2

1 a = 100 m^2

1ca = 1 m^2

Esercitazione n° 1

Se un contadino possiede 1000 a di terreno quanti quintali di grano produce?

Task n ° 1

If a farmer owns 1000 hectares of land how many quintals of grain does he produce?

Esercitazione n°2

Esegui le seguenti equivalenze:
10ha = ……a
600 a=…… ca
10000 ca=……. ha

Task n ° 2

Perform the following equivalences:

10ha = ... a

600 a = ... ca

10000 ca = ... ha

I ragazzi hanno considerato la lezione molto interessante e semplice esprimendo un feedback positivo.

Elementi di valutazione formativa :

Mi interessava molto……

Mi chiedevo……

Ho capito che……..

The boys considered the lesson very interesting and simple, expressing positive feedback.

Elements of formative evaluation:

I was very interested .....

I was wondering……

I understand that……

ICT applications

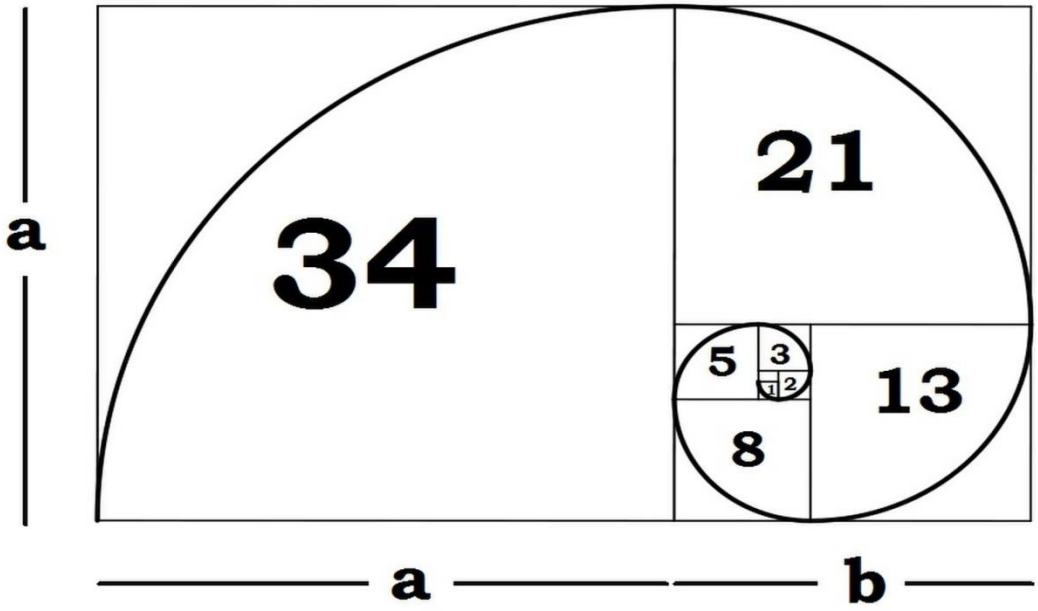
You tube

MATHS IN NATURE

Lesson topic: Golden Ratio

Main lesson aim: Defining golden ratio and explaining how the golden ratio is used in geometry

Lesson aim: Our students will describe examples of the golden ratio in the real world. What is the Golden Ratio?



In the golden ratio, *a* + *b* is to *a* as *a* is to *b*.

The Golden ratio is a special number found by dividing a line into two parts so that the longer part divided by the smaller part is also equal to the whole length divided by the longer part. It is often symbolized using phi, after the 21st letter of the Greek alphabet. In an equation form, it looks like this:

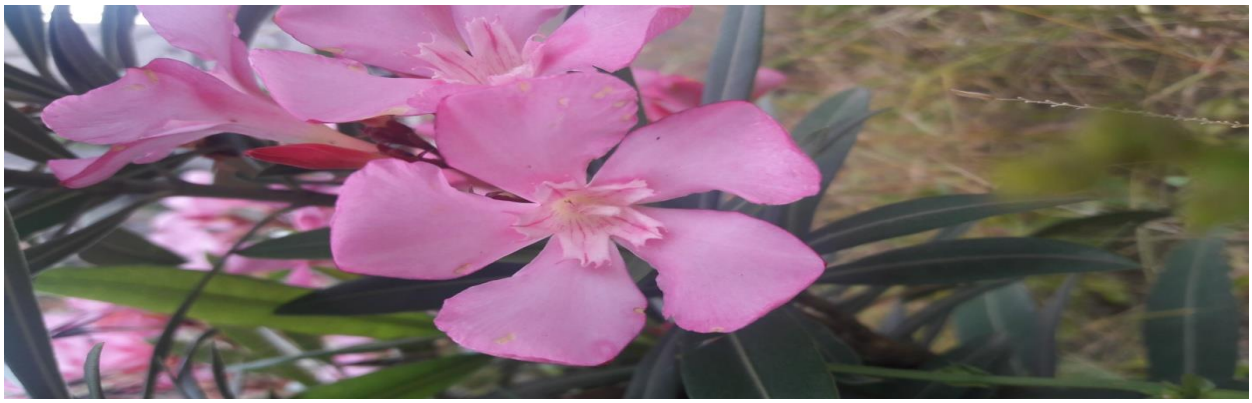
a/b = (a+b)/a = 1.6180339887498948420 …

Around 1200, mathematician Leonardo Fibonacci discovered the unique properties of the Fibonacci sequence. This sequence ties directly into the Golden ratio because if you take any two successive Fibonacci numbers, their ratio is very close to the Golden ratio. As the numbers get higher, the ratio becomes even closer to 1.618. For example, the ratio of 3 to 5 is 1.666. But the ratio of 13 to 21 is 1.625. Getting even higher, the ratio of 144 to 233 is 1.618. These numbers are all successive numbers in the Fibonacci sequence.

The Golden ratio also appears in all forms of nature and science. Some unexpected places include:

Flower petals: The number of petals on some flowers follows the Fibonacci sequence. It is believed that in the Darwinian processes, each petal is placed to allow for the best possible exposure to sunlight and other

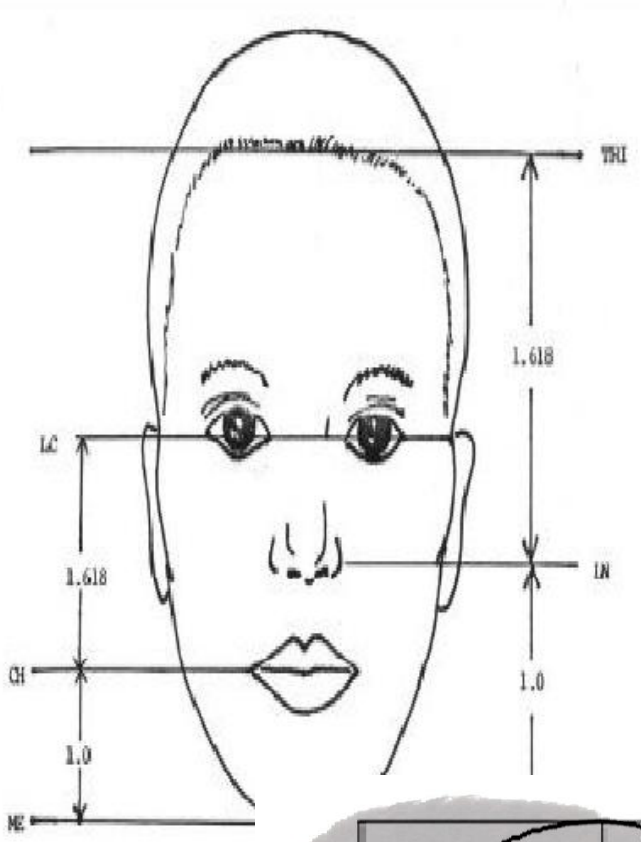
factors.

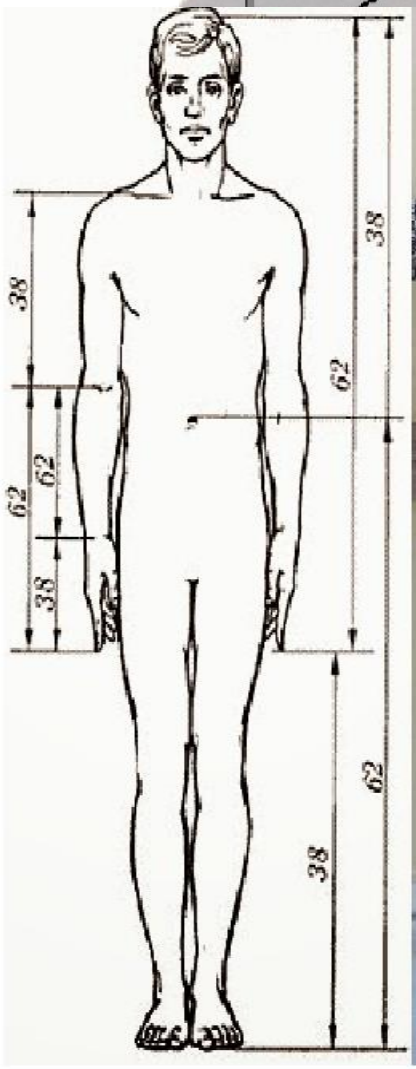


Pinecones: The spiral pattern of the seed pods spiral upward in opposite directions. The number of steps the spirals take tend to match Fibonacci numbers.

Shells: Many shells, including snail shells and nautilus shells, are perfect examples of the Golden spiral

HumanHuman body : human body represents and exhibits perfect proportionality in terms of the golden ratio.





ICT applications:

Paint
Movie maker

https://www.youtube.com/edit?o=U&video_id=Sd2cWqiPSOI

Lesson resume

(Formative assesment elements)

Make connections to prior knowledge or experience and finish sentences

I changed my attitude about_____

I became more aware of_____

I was surprised about_____

I felt_____

Maths in games

Temat lekcji: Jak rozwiązać SUDOKU?

Lesson topic: How to solve SUDOKU?

Cel główny: Nauka logicznego myślenia.

Lesson main aim: Teaching of logical thinking.

Cel lekcji: Uczeń pozna zasady rozwiązywania SUDOKU.

Lesson aim: Student is going to know SUDOKU rules.

Zasady gry w SUDOKU:

SUDOKU rules:

- kwadratowa plansza jest podzielona na dziewięć identycznych kwadratów 3 x 3 - w każdym z nich znajduje się dziewięć komórek**, a square board is divided into nine identical squares 3 x 3**
- w niektóre pola wpisane są cyfry od 1 do 9, **in some squares there are figures frim 1 to 9,**
- zadaniem gracza jest wypełnienie wszystkich komórek planszy cyframi od 1 do 9. **The player task is to complete all squares with figures from 1 to 9.** W każdym wierszu i każdej kolumnie dana cyfra może występować jedynie raz. **In each line and column the figure must appear only once.**

Historia powstania gry

Game history

Jego protoplastą były kwadraty łacińskie wymyślone w 1783 r. przez szwajcarskiego matematyka, **Leonarda Eulera**. Były to kwadraty złożone z liter alfabetu łacińskiego, w których każda litera pojawiała się tylko raz w każdym wierszu i każdej kolumnie, np.:

A B D C
C D B A
B A C D
D C A B

Firstly there were Latin squares which were figured out in 1783 by Swiss mathematician Leonard Eulera. There were squares consisted of Latin letters, each letter appeared only once in each line and in each column for example:

A B D C
C D B A
B A C D
D C A B

Współczesne Sudoku zostało wynalezione przez Amerykanina Howarda Garnsa w 1979 r. i opublikowane pod nazwą „Number Place". Łamigłówka przeszła wiele zmian. Dzisiejsze sudoku pojawiło się po raz pierwszy w Japonii w 1986 r., w czasopiśmie Nikoli, jednak międzynarodową sławę zyskało dopiero w 2005 r.

Modern Sudoku was invented by American Howard Garns in 1979 and published with the title "Number Place". The puzzle has changed a lot. For the first time modern Sudoku appeared in Japan in 1986 in the newspaper Nikoli but international fame gained in 2005.

Rozwiąż SUDOKU:

Solve SUDOKU

Można pracować samemu lub w parach.

Work alone or in pairs.

A.

			3	6	7			
1		8		5		6		3
7		6		8		5		4
		4				3		
8		2		1		9		7
5		1		3		2		6
			2	9	6			

C.

				9			8	
		6	3				2	
	1	4				6		
				7	4			8
6								5
8			2	6				
		8				3	5	
	9				7	1		
	2			4				

D.

			8				
3	4				8	1	
8			5			4	
		2			1		
		7			6		
	1			8			4
	7	4				8	6
				1			

Dokończ zdanie: Finish sentence:

(elementy OK) FA elements

W grze SUDOKU pomagają takie cechy charakteru, jak ……..

ICT applications:

Issuu:

https://issuu.com/ewanenkin/docs/sudoku.pptx

imovie:

https://www.youtube.com/watch?v=faIxwLkzTE0&feature=youtu.be

Polish teachers: Auelia Przybył, Ewa Nenkin

MATHS IN GAMES

Argomento della lezione : Matematica nei giochi.

Lesson topic: Mathematics in games

Obiettivo principale : lo scopo di questo argomento di matematica è di far valutare in modo quantitativo, cioè con dei numeri, il grado di fiducia che è ragionevole attribuire a diversi eventi incerti.
L'introduzione al calcolo delle probabilità nella scuola dell'obbligo permette all'alunno di comprendere meglio la società moderna ,infatti come afferma Laplace "E' sorprendente che una scienza , nata per questioni riguardanti i giochi d'azzardo , stia diventando l'oggetto più importante della conoscenza umana. Le questioni serie della vita sono , quasi sempre , solo problemi di calcolo delle probabilità."
Il calcolo delle probabilità viene proposto ai ragazzi partendo da situazioni reali , giochi di vario tipo (tombola e gioco dell'oca) per poi creare formule matematiche (problemsolving) .

Main objective: the purpose of this mathematical argument is to make quantitative evaluation, that is to say with numbers, the degree of trust that is reasonable to attribute to various uncertain events. The introduction to the calculation of probabilities in compulsory schooling allows the pupil to better understand modern society. In fact as Laplace says "It is surprising that a science, born out of matters concerning games of chance, is becoming the object more important than human knowledge. Serious matters of life are almost always just probabilities. " The probability calculation is proposed to the students starting from real situations, games of various types (bingo and game of the goose) and then create mathematical formulas (problem solving).

Esercitazione N.1

Durante una festa di classe si gioca a tombola , l'insegnante durante l'estrazione dei numeri che vanno da 1 a 90 chiede ai ragazzi :

- Qual è la probabilità che esca un numero pari ?
- Qual è la probabilità che esca un multiplo di tre ?
- Qual è la probabilità che esca un numero primo ?
- Qual è la probabilità che esca un multiplo di cinque ?
- Qual è la probabilità che esca un quadrato perfetto ?
  Esprimi la probabilità anche sotto forma di percentuale

Task N.1

During a class party you play bingo, the teacher during the extraction of numbers ranging from 1 to 90 asks the boys:

- What is the probability that an even number will come out?
- What is the probability that a multiple of three will come out?
- What is the probability that a prime number comes out?
- What is the probability that a multiple of five will come out?
- What is the probability that a perfect square will come out?

Express the likelihood also as a percentage.

https://twinspace.etwinning.net/50148/materials/files

Esercitazione N.2

Da un mazzo di 40 carte ”napoletane” viene estratta una carta. Calcola la probabilità dei seguenti eventi esprimendola con una frazione e con la corrispondente percentuale. Che tipo di frazione si ottiene ogni volta ? Perche?

- Estrarre una carta di denari
- Estrarre una figura
- Estrarre il tre di bastoni
- Estrarre una figura di spade
- Non estrarre una figura
- Non estrarre un asso

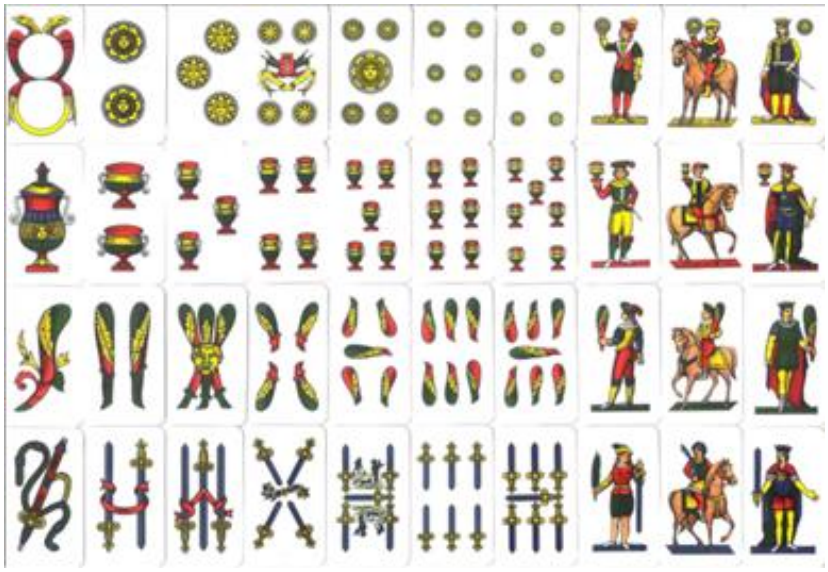
TaskN.2

A card is drawn from a deck of 40 "Neapolitan" cards. Calculates the probability of the following events. What kind of fraction will you spin every time? Because?

- Extract a figure
- Take out the three of sticks
- Extract a figure of swords
- Do not extract a figure
- Do not extract an ace

Alla fine si confrontano tutti i risultati e si correggono quelli errati con approfondite spiegazioni e i ragazzi esprimono un feedback positivo.

At the end all the results are compared and the wrong ones are corrected with detailed explanations and the boys express positive feedback.



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https://twinspace.etwinning.net/files/collabspace/8/48/148/50148/files/bfe233e2.pdf

https://www.youtube.com/watch?v=FYiEAMhU4mE

Elementi di valutazione formativa :

durante la lezione ho scoperto che……

mi interessava molto ……

ho avuto conferma……

mi chiedevo……..

Elements of formative evaluation:

during the lesson I discovered that ……. ..

I was very interested ……

I had confirmation ……

I was wondering……..

ICT applications: Power Point – Publisher

Italy teachers: Iannantuono Michelina, Tresca Lydia, Urbano Angela, Villani Celeste.

MATHS IN GAMES

Lesson topic : Angles

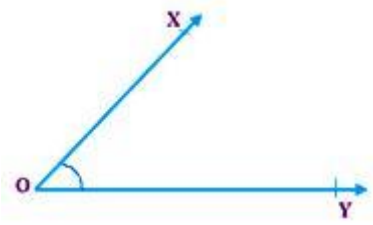
Main lesson aim: Naming different kinds of angles such as right angle, acute angle and obtuse angle.

Lesson aim : Students will know what creates an angle and the different types of angles.

Classification of angles on the basis of their degree measures are given below:

Acute Angle:

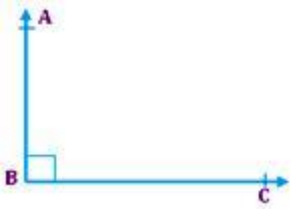
An angle whose measure is more than 0° but less than 90° is called an acute angle. Angles having magnitudes 30°, 40°, 60° are all acute angles. In the adjoining figure, ∠X0Y represents an acute angle.



∠X0Y < 90°

Right Angle:

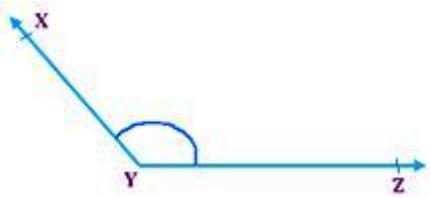
An angle whose measure is equal to 90° is called a right angle. In the adjoining figure ∠ABC represents a right angle.



∠ABC = 90°

Obtuse Angle:

An angle whose measure is more than 90° but less than 180° is called an obtuse angle. In the adjoining figure, ∠XYZ represents an obtuse angle.



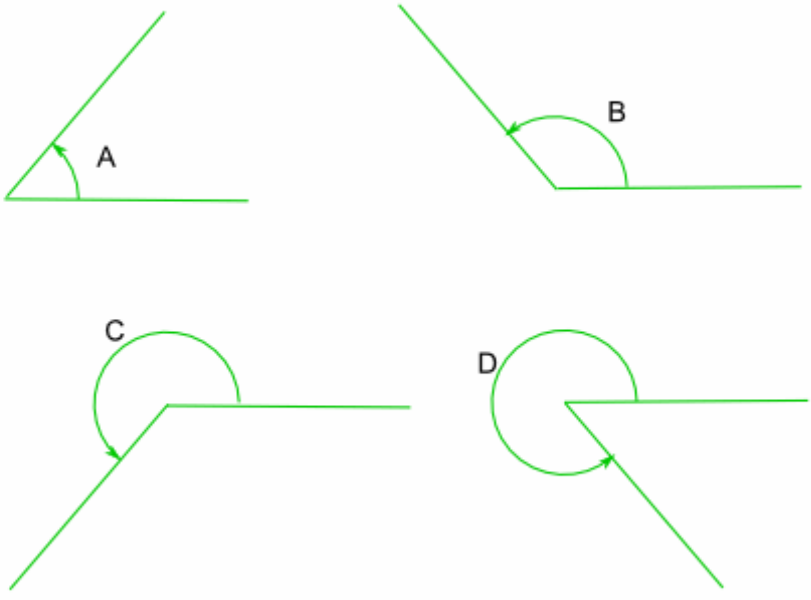
∠XYZ > 90°

ICT applicaions:

Moviemaker

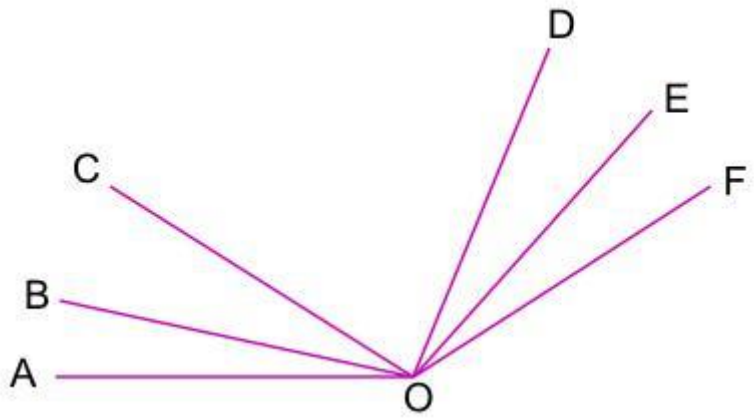
https://www.youtube.com/watch?v=FzP2zJKb2hY

Task 1



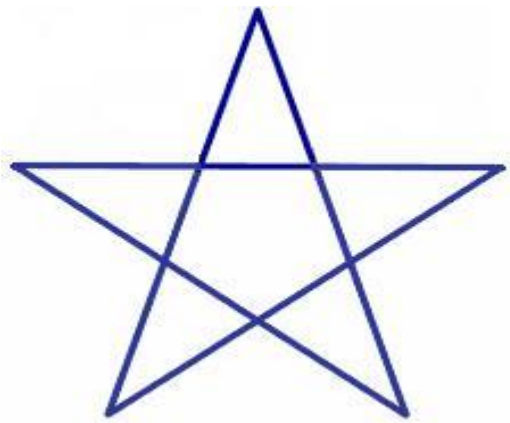
One of these angles is 130°. Which one do you think it is?

Task 2



How many obtuse angles are there in the diagram?

Task 3



How many acute angles are there in this pentagram?

Lesson resume

(Formative assesment elements)

respond to three separate statements:

- 3 things you didn’t know before
- 2 things that surprised you about this topic
- 1 thing you want to start doing with what you’ve learned