IYNT

International Young Naturalists' Tournament

2013

Contents

Greetings

Dear young Friends!

For me, as the Governor of Eskisehir, it is a great pleasure to welcome you to Eskisehir, the Cultural Capital of Turkic World for 2013. You will see how much the Turkish culture is so close to your culture, too. Nowadays, education and science become one the bases of culture. People different in race, color, religion or nationality, nowadays become closer and closer to each other. The First International Young Naturalists' Tournament is just one example of it and I congratulate you for taking part in this wonderful Tournament. The young scientists are the future of our World. I believe that you will enjoy your stay in Eskisehir taking part in the events related to Eskisehir-2013 Cultural Capital of Turkish World Program.

I would mention that Eskisehir is not just the Cultural Capital of Turkic World. Being at the middle of former and present capital of Turkey, Eskisehir is one of the science and education centers in Turkey. In our city we have one of the biggest university of Turkey – the Anadolu University, as well as your host university – Osman Gazi University. Eskisehir is not only science and education and cultural center – it is one of the industrial center of Turkey, one example is enough: the aircraft industry of Turkey is based in Eskisehir.

Again, I would like to welcome all of you in Eskisehir and Turkey and you will be welcome always in our city. I wish all of you success in this Tournament, reminding that this is a competition where all of you are true winners – winners of friendship and of scientific cooperation, which the most important result of the Tournament.

Kadir Kocdemir, PhD
Governor of Eskisehir, Turkey
The Chairman of Cultural Capital of the Turkic World Agency

My dear friends - participants of the International Young Naturalists' Tournament,

I would like to greet you at this intellectual competition that involves all those interested in Nature and in Physics in all its diversity! This tournament will give you the opportunity to learn a lot about the world, will teach you to think about the solution of the problems you face, and you will try yourself in the studies of natural phenomena.

Tournament is a competition, and, as in any competition, there will be winners. But the IYNT is special in that regard, as there will be no losers, because the experience of the research work and the knowledge that you acquire will be all yours – it will be the experience that you take into the future and something that never gets lost.

It is so pleasing to see your passion for physics and your desire to cooperate on research with other young people. I am sure that the IYNT will provide you unique opportunity to build international friendships that will last a lifetime.

Tournament will teach you a lot – to think logically, to articulate coherently and express your thoughts to other participants of the tournament, to defend your point of view, to carry out a reasoned debate and to learn to understand each other.

I wish all of you good luck, as well as new knowledge, new ideas and new friends!

Vladimir Shiltsev
President of International Young Naturalists' Tournament,
Director of Accelerator Physics Center Fermi National Accelerator
Laboratory (Fermilab) Batavia, IL USA,
Fellow of American Physical Society

Dear young Scientists, Dear Friends!

It is a great pleasure to welcome you to Turkey to take part in a such noble cause.

I congratulate all of you for choosing to be a part of scientific venture for the betterment of humanity and for helping the world become a better place through science and technology.

Science is a phenomenon that bridges all the differences. Science does not see differences in race, color, religion or nationality. Water always boils in 100 Centigrade for any race, any color or any nation. Nature, is our ultimate guide for living in harmony and welcoming diversity.

I strongly believe that you, the next generation Scientists of the World, will achieve great new accomplishments and will develop technologies that will make our world a better place to live in peace and prosperity for all. You will not be scientists to destroy each other; on the contrary, you will work together to build bridges and close gaps.

Scientific knowledge is now a more of a determining factor in the global scene than it has ever been. It probably will be the most influential factor in the World you will live inherit. I wholeheartedly believe that you will continue to improve science and technology for peaceful purposes.

Again, I would like to welcome all of you to Turkey and I would like to let you know that you are always welcome here. I am happy to see you to collaborate with your Turkish friends today and always.

I wish all of you success in this Tournament, reminding that each one of you is a true the winner of scientific cooperation which matters the most for our world and humanity.

Davut Kavranoglu
Deputy Minister for Science, Industry and Technology

Dear young friends,

As one of the organizing countries of the first International Young Naturalists' Tournament I am extremely proud of it on the benefit of my country. If we will go back to the history of three organizing countries, Turkey, Russia and Bulgaria, we can see a very complicated contradictive historical relations between our countries. Very frequently we were on opposite political sides. Mainly for this reason the organizing of IYNT by our three countries is a very special sign and a message to the young generation how we can live together in this nice, beautiful and peaceful part of the world – it is wonderful.

I would like to thank the Minister of Education of Turkey for providing the host for IYNT. I hope that our young natural scientists will use the possibility to be together and to compete each other in IYNT for establishing friendships and to trace the future closed collaboration in science when they will be adult. I hope that some day, some of them why not will be ministers of education and science of their countries and never will forget exciting time they had during International Young Naturalists' Tournament.

Especially I would like to thank the Governor of Eskişehir city for being so kind to be the host of International Young Naturalists' Tournament.

I wish all of you good luck and to find a lot of new friends in International Young Naturalists' Tournament.

Stefan Vodenicharov
Vice President of International Young Naturalists' Tournament,
Minister of Education, Youth and Science of Bulgaria,
President of Bulgarian Academy of Sciences

Dear young friends and team leaders,

Thank you all for your participation and your contributions to the International Young Naturalists' Tournament.

IYNT is a great opportunity for young students, they will discover how exciting nature and science can be once they get involved in IYNT. At that point leaders guidance and motivation have an important role. Based on my experience working with students of your ages I can say that at this ages students accept the Nature at the most emotional way. Any understanding of mysterious events in the world makes you more found to new adventure in your scientific world. I am sure that these positive emotions, which you will get in the Tournament, will trace all your for rest of life in the best way. You will never forget the friends you got during the competition.

I wish you to have a good time in Eskisehir city and to enjoy the cultural program planned for you by the the organizers. We hope your contributions to the Tournament will trigger new ideas and bring you many happy moments.

I wish you a successful tournament.

Ventsislav Recep Dimitrov
Vice President of the International Organizing Committee,
Director of ITAP Physics Olympiad School

Dear colleagues and participants of the International Young Naturalists' Tournament,

World that we live in is largely reshaped by people thinking and working in science, technology, arts, culture and sports. Not only the high technology devices that we built, but largely scientific and artistic thought combined with our rich cultural diversities provide us with new opportunities to promote peace, freedom, joy and sustainability of all. Besides understanding the universe, we are also responsible for using these opportunities in the most acceptable ways.

We should promote the young generations to do better than us in turning these opportunities into peaceful outcomes. We should help free and creative young minds to built more rational societies than we did. Mathematics and science is one of the most fundamental languages that we can use. Like what Eugene Wigner and many other deep thinkers say, it is a puzzling universal beauty that we, the humankind, has to do more work to fully appreciate.

With our minds we should find ways of merging competition and friendship into an harmonious pair. 2013 International Young Naturalists' Tournament is yet another opportunity for us.

ITAP wishes all competing friends the best and we hope that you will all have unforgettable memories in Eskişehir.

Tugrul Hakioglu
Chair of the Local Organizing Committee
ITAP Director

Town

Eskisehir (turkish: eski "old", şehir "city") is a city in northwestern Turkey and the capital of the Eskisehir Province.

The city is located on the banks of the River Porsuk, 792 m above sea level, where it overlooks the fertile Phrygian Valley. In the nearby hills one can find hot springs.

The city is 233 km (145 mi) to the west of Ankara, 330 km (205 mi) to the southeast of Istanbul.

The city was founded by the Phrygians in around 1000 BC.

Whenever it was mentioned by ancient geographers, the city was described as one of the most beautiful in Anatolia.

The population of the city is 648,396.

> *Eskisehir is like an open air museum, and being there you can feel harmony of the past and the present*

Most of the Eskisehir was rebuilt after the war of independence and is now a modern city. The changes did not affectthe historic district Odunpazarı, wherewell-preserved architecture of the Ottoman Empire.

The city has many places of interest; the Archaeological Museum which houses the Phrygian objects and sculptures; the Ottoman House Museum which is a very fine example of the 19th century local architecture and has many ethnographical items. There are three significant tombs around Eskisehir: the Sheik Edibali Tomb, the Kumbet Baba Tomb, and the Cupola of Alemsah. The Phrygian Valley, the Falcon Fortress, the Unfinished Monument, and the Gerdek Rock are other historical sites to visit.
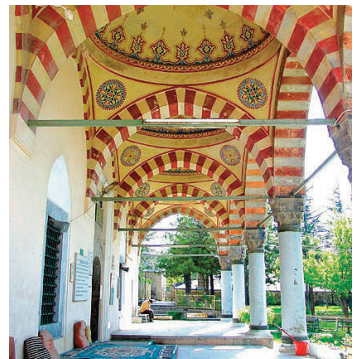
In accordance with the decision of the summit of Turkic-speaking countries in 2013, Eskisehir is the **"cultural capital of the Turkic World 2013"**.

Known as a university town, both Eskisehir Osmangazi University and Anadolu University which has one of the largest student enrollments in the world) are based in Eskisehir.

The main venues of the IYNT 2013 will be the Eskisehir Osmangazi University

Osmangazi University has now become one of the leading universities in central Anatolia with 9 faculties, three schools, 4 vocational schools and 5 graduate schools, that are on five campuses. Currently, it has 21,529 students and 1233 teaching and research staff. In the body of ESOGU, there are fourteen research, development and innovation centres operating in cooperation with state and private institutions.
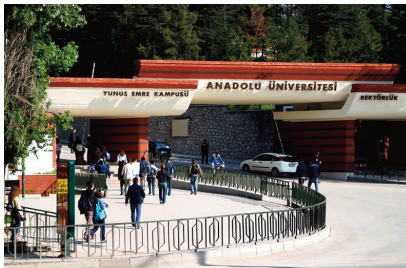
Anadolu University was created in 1982 from the union of four existing higher education institutes in Eskişehir: the Academy of Economics and Commercial Sciences of Eskişehir, the State Academy of Architecture and Engineering, the Institute of Education, and amedical school. As the Academy of Economics and Commercial Sciences was founded earliest (in 1958), Anadolu University has adopted that year as their date of establishment.

Eskisehir is industrial center, which works with locomotive manufacturing, wood, aircraft constructing, cement, textile, food. It is also a center for cotton research.

The city expanded with the coming of the railway in the late 19th century and the immigration of Turks from the European provinces of the Ottoman Empire in the early 20th century. Despite its name ("Old City"), most of the city was rebuilt after its destruction in the Turkish War of Independence (1919-22). Now it is a rail junction on the Istanbul-Ankara and Istanbul-Baghdad lines.
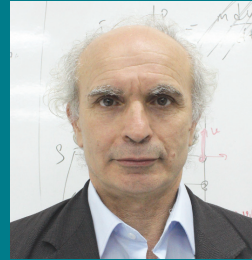
International Organizing Committee

Vladimir Shiltsev

President
Director of Acceleration Physics Centre Fermilab (USA)

Stefan Vodenicharov

Vice President
President of Bulgarian Academy of Sciences

Ventsislav Recep Dimitrov

Chair of IOC
Director of ITAP Physics Olympiad School

Evgeny Yunosov

Chair of Russian Young Naturalists' Tournament

German Chetin

Chief of Staff IYNT
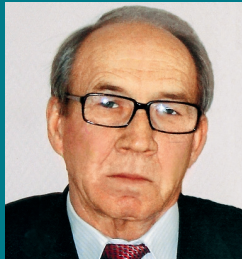General director of Journal «Potential» and LLC "Azbuka-2000"

Tugrul Hakioglu

Chair of LOC
Director of ITAP

Vladimir Chub

Chair of the Jury IYNT
Lomonosov Moscow
state University

Valery Vavilov

Professor Kolmogorov
Research Center

Andrey Kravtsov

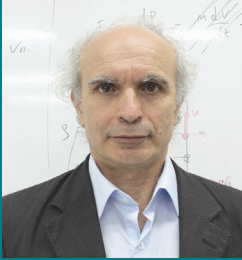Bauman Moscow State
Technical University

Elsen Veli

Kocaeli University (Turkey)
Chair of Department
of Physics

Chapman Anna

*President of foundation
UMA*

Committee which organized the tournament in Eskisehir, Turkey

Ventsislav Recep Dimitrov

Chair of IOC
Director of ITAP Physics Olympiad School

Tugrul Hakioglu

Chair of LOC
Director of ITAP

M. Bahaddin Acat

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German Chetin

Chief of Staff IYNT
General director of Journal «Potential» and LLC "Azbuka-2000"

Evgeny Yunosov

Chair of Russian Young Naturalists' Tournament

Mustafa Kumru

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Mehmet Sahin

Ankara University
Department of Mathematics

Yusuf Durmus

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Department of Biology

Natalia Shalaru

Coordinator
of staff IYNT

Ismail Kasarci

Research Assistant and
a postgraduate student
at the Department
of Educational Sciences

Sabahattin Esen

Physics teacher in
Commercial High School
Ibrahim Atali of Adana,
Cukurova

Honorary Members
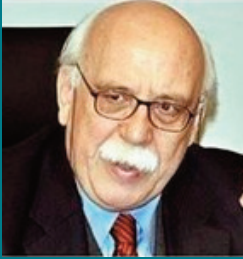
Nabi Avcı

Honorary President
Minister of Education
of Turkey

Davut Kavranoglu

Deputy Minister
of Ministry of Science,
Industry and Technology
of Turkey

Kadir Kocdemir

Eskisehir Governor

Hasan Gonen

*Rector of Eskisehir
Osmangazi University*

Senay Yalcın

*Rector of Bahcesehir
University*

Jury

Fatih Akay
Team leader/Juror
Afghanistan

Siarhei Seniuk
Team leader/Juror
Belarus

Antoaneta Nikolova
Team leader/Juror
Bulgaria

Mladen Matev
Team leader/Juror
Bulgaria

Dina Izadi
Team leader/Juror
Iran

Guram Mikaberidze
Team leader/Juror
Georgia

Louis De-La Rey Heyns
Team leader/Juror
Kazakhstan

Buras Boljiev
Team leader/Juror
Kyrgyzstan

Igor Evtodiev
Team leader/Juror
Moldova

Alexander Sigeev
Independent Juror
Russia

Alina Astakhova
Independent Juror
Russia

Andrey Kravtsov
Independent Juror
Russia

Diana Kovtunova
Team leader/Juror
Russia

Dmitrii Agarkov
Independent Juror
Russia

Ekaterina Mendeleeva
Independent Juror
Russia

Elena Snigireva
Independent Juror
Russia

Marina Sergeeva
Independent Juror
Russia

Natalia Borodina
Team leader/Juror
Russia

Sergey Sabaev
Team leader/Juror
Russia

Valentin Lobyshev
Independent Juror
Russia

Vladimir Vanovskiy
Independent Juror
Russia
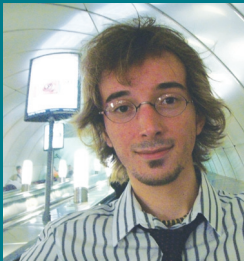
Ilya Marchenko
Independent Juror
Switzerland

Ahmet Cabuk
Independent Juror
Turkey

Dursun Eser
Independent Juror
Turkey

Emel Algin
Independent Juror
Turkey

Ersin Karademir
Independent Juror
Turkey

Jeyhun Jabarov
Team leader/Juror
Turkey

Ismail Kiran
Independent Juror
Turkey

Naime Arslan
Independent Juror
Turkey

Timothy Timur
Team leader/Juror
Turkey

Yusuf Ilker Yaman
Team leader/Juror
Turkey

Sergey Zelenin
Team leader/Juror
Ukraine

Teams

Nation	Team Name	Team Member
Afghanistan	**ARIANA** ID № 502	**Fatih Akay** **Mehmet Abdullah Aslan** *Firoz Sayed Rahim* *Abdylqahar Sarwarkhan* *Masihullah Noor Mohammad* *Shabir Ahmad Bashir Ahmad* *Mieveys Muhammed* *Mo.Jawad Mo.Asef*
Belarus	**UNIVERSUM** ID № 505	**Siarhei Seniuk** **Julia Sapronova** *Anton Khvalyuk* *Aliaksandr Audzeyeu* *Katsiaryna Hrachova* *Artsem Zhyvalkouski* *Katsiaryna Hopsha* *Dmitriy Voynov*
Bulgaria	**BULGARIA** ID № 504	**Mladen Matev** **Daniela Karashanova** *Valentin Aleksandrov* *Dilyan Hristov* *Dimitrina Foteva* *Yordan Kanev* *Samuil Slavchev* *Maria Karaboeva*
Bulgaria	**SCIENCE GIRLS** ID № 510	**Antoaneta Nikolova** **Margarita Radoslavova** *Feria Remzi* *Ekaterina Nikolova* *Rukiye-Ayshe Egeli* *Aidana Kulmakhanova* *Diana Nikiforova*
Iran	**IRAN** ID № 508	**Dina Izadi** *Parmis Tabari* *Mohammed Mahdi Malek* *Kimia Kazemi* *Chakameh Mallehzadel*
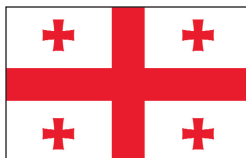
Georgia

RAVEKO
ID № 506

Guram Mikaberidze
Nika Sabashvili
Giorgi Tsereteli
Nugzar Nabakhtiani
Lasha Kapanadze
Andro Gvivradze
Daviti Grigalashvili
Ana Kakabadze

Kazakhstan

NIS DREAMTEAM
ID №513

Louis De-La-Rey Heyns
Aiganym Khassenova
Temirlan Zhakupov
Malika Shektibayeva
Ainura Utebayeva
Malika Gumarova
Madina Arystanova
Lunara Nurgaliyeva

Kyrgyzstan

ALATOO
ID № 512

Buras Boljiev
Aibek Djalalov
Zahiddin Avtandil
Kadyrbek Adiev
Raimbek Ysmanaliuulu
Ruslan Rakhimov
Alisher Aitiev
Ahror Abdulkhamidov

Moldova

ECO GENERATION
ID № 509

Igor Evtodiev
Silvia Evtodiev
Eugeniu Dimitriu
Vladlena Hornet
Gleb Vizitiv
Mihaela Lana Raischi
Romina Dolgopol
Laurentiu Calancea

Russia

TMOLIMPIYCY
ID № 501

Olga Yakunina
Diana Kovtunova
Kirill Zaruba
Konstantin Gorpynchenko
Uliya Shenshina
Denis Glazov
Anastasiya Negodenko
Kirill Goftenuk

Russia

RLC
ID № 503

Sergey Sabaev
Svetlana Shindyonkova
Ivan Uteshev
Anastasiia Uvarova
Maria Markunina
Roman Tepaykin
Alexey Sorokin
Vsevolod Grishunin

Russia	**MG 12** ID № 511	**Natalia Borodina** **Natalia Vasyova** *Ilya Timoshenko* *Alexandr Bondarenko* *Olga Gordiychuk* *Tatyana Grinkevich* *Anastasiya Elovatskaya* *Anna Fedotova*
Turkey	**SAMANYOLU** ID № 515	**Jeyhun Jabarov** **Hamdi Öztürk** *Tuluhan Bozkurt* *Verda Sağlam* *Betül İyigün* *Süheyla Ceyda İyimaya* *Cem Emre Tural* *Beyza Doğan*
Turkey	**BAHCESEHIR** ID № 516	**Yusuf Ilker Yaman** **Mehmet Özdemir** **Oleinik Evgeniy** *Emre Yaman* *Alper Tunga Celebi* *Mustafa Berk Turgut* *Deniz Akyildiz* *Ender Sahin* *Özenç Devrim Polat*
Turkey	**FATIH –** **ESKISEHIR** ID № 517	**Timothi TİMUR** **Mamoika Aliaksandr** *Bengisu Binboga* *İlke Ekici* *Burcu Er* *Burak Bayar* *Cem Karamanli* *Anıl Kaplan*
Ukraine	**RICHELIEU** ID № 514	**Sergey Zelenin** *Iryna Vasylieva* *Mikhailo Rashkovetskyi* *Nikita Postoronko* *Dariia Diecheva* *Alla Brynza* *Maksym Percheklii* *Mykola Prystupa*

Tournament program

Monday, April 29	Arrival and chek-in of all teams Free time for the teams Jury meeting
Tuesday, April 30	Opening ceremony Selective competition (exp) 1
Wednesday, May 1	Excursion Work with teams and jurors
Thursday, May 2	Jury meeting Selective competition 2
Friday, May 3	Selective competition (exp) 3 Selective competition 4
Saturday, May 4	Semi Final Competition Final Competition Jury meeting
Sunday, May 5	Awards ceremony IYNT party on the campus
Monday, May 6	Departure and chek-out Free time for the teams

Problem set for the home stage of the IYNT 2013

1. Invent Yourself

Suggest your own research problem for the Tournament and solveit.

2. The Bulb in the Glass

There is a popular way to force onions in a glass, filled with water (see figure). The bulb gives roots and leaves, and at the same time the volume of water in the glass decreases. What factors can influence the speed of water uptake? Test your hypothesis by experiment.
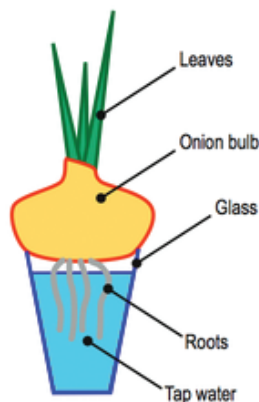
3. Magnetic Arrows

Place two suspended magnetic arrows close to each other. After a short time they will reach the equilibrium where the opposite poles are aligned together. Deflect one of the arrows by some small angle and release it. Both arrows will start oscillations. Investigate and explain the character of the coupled oscillations of the magnetic arrows.

4. Fresh and Salted Water

Electroconductivity of natural water depends on concentration of dissolved salts. The table below shows the conductivity of water samples taken from different natural sources.

1. Match the sample source with its conductivity
2. What might be the source of water with 13.2 μS/cm conductivity?
3. At the tournament you will be provided by a sample of water.

Measure the electroconductivity of the new sample. Decide whether it is distilled water, tap water or mineral water. Please, bring with you the equipment for the electroconductivity measurement.

Source	Conductivity(µS/cm)
BlackSea	
DeadSea	
Baltic Sea at Neva estuary	
LakeBaikal	
Moscow-river, upstream of Moscow City (in winter)	
Peatboglake	
Moscow-river, downstream of Moscow City (in winter)	

Possible values of the electroconductivity, µS/cm: 10; 125; 420; 580; 4580; 45600; 228000.

5. A Compass and a Ruler

Two schoolboys – Alex and Boris – got a task to make a given segment (initial length L) n times longer. Alex is allowed to use a compass and a ruler. Boris is allowed to use a compass only while he is asked to plot only the end points of the final segment.

Suggest some way (or a few ways) of solving the problem for both schoolboys.

Choose a solution Alex might use and let A(n) be a total number of

lines drawn by the compass and the ruler in the solution for a segment of nL length. Choose a solution Boris might use and let B(n) be a total number of lines made by the compass for the points at nL length. Find A(2), A(3), ..., A(10) and make a bar diagram 1. Find B(2), B(3), ..., B(10) and make a bar diagram 2. Determine which solution is the best calculating A(n) / B(n) for each case separately. What reasonable assumptions about A(n) and B(n) behavior for all n can you make from the comparison of diagram 1 and diagram 2? For example, what can you tell about   A(n) / B(n) behavior when n goes to infinity?

6. Nontypical Crystals

Crystals of substances have usually form typical shapes. For example, the sodium chloride crystals are cubes, and the crystals of alum are octahedrons. Is it possible to grow untypically shaped crystals, for example, cube alum (or as some other shape, but not octahedrons)? Explain your opinion and prove it experimentally. You can use your own examples of crystalline substances.

7. Fastidious Flour Moth

For several weeks Lucy as a tourist was enjoying a nice travel. At that time a flour moth (Anagasta) found a way to some food stocks in her kitchen. Coming back, Lucy found, that moth larvae appeared in porridge oat, in dry figs and ginger, in shelled sunflower seeds and hazelnuts. Flour moth paid less attention to dried plumes. Salt, sugar, roasted coffee grains, beans, cinnamon, cocoa powder, jam and peas remain intact. Explain the preferences of the flour moth.

If possible, test in laboratory other 2–3 stocks as food for moth. Avoid the infection of your own food stocks by any moth!

8. A Good Battery

While in class, physics teacher has noticed that the TV remote control is not working properly. He was thinking that its battery has died. At the end of the lesson he suggested that the schoolchildren do a scientific research to buy the best battery for the remote control device. That is how the competition "Who buys the best battery" has started. Carry out a similar research. Based on its results, suggest the best battery you can buy in the store.

9. Plant Fertilizers

You have got sodium hydrophosphate, barium dihydrophosphate, potassium phosphate, potassium dihydrophosphate, potassium nitrate, sodium chloride, copper(II) chloride, cobalt(II) nitrate, zink sulfate, aluminium sulfate. What substances could possibly be used to prepare soluble fertilizers for desert cacti (fam. Cactaceae) and moisture-loving spiderworts (Tradescantia)? What precautions should be taken not to cause harm to the plants?

10. The Land lease Contract

The chief of the tribe Chingachgook is settling a bargain with a cowboy Joe. The chief is about to turn over some of the Indian land to the cowboy, but only the land which Joe will be able to fence around with the help of four stakes and the same number of ropes tighten between each pair of stakes. The chief also has put forward the demand according to which the lengths of the ropes are to come to the quantities of $(1 - 7t)$, $(14t + 5)$, $(7 - 6t)$ and $(5 - 3t)$ where t is a certain number.

What is the value of t at which Joe will be able to fence the largest area and what is the size of that area?

11. Flowering Chrysanthemums

Chrysanthemum indicum is a well-known autumn-flowering ornamental plant from India. Indira from Delhi sent a new large-flowered variety of chrysanthemum to her friends. Fatma planted those chrysanthemums in Istanbul, where they gave flowers on October 1st. Helen lives in Moscow, and Mary lives in Sydney (Australia). But their plants produced flowers at another date, rather than in Istanbul. Explain this phenomenon and calculate when Indira, Helen and Mary will see the flowering chrysanthemums, planted by themselves.

12. A Fireproof Handkerchief

This problem was suggested by the team of Moscow Suvorov Military School in the home stage of YNT-2012 and received the highest score from the Jury. Please watch the video (see link below). Carry out the similar experiments on your own and explain the results. Make sure you follow the fire safety rules during the experiments! The presence of your teacher is required!

The problems are prepared by
V. V. Vavilov, D. M. Zhilin, N. I. Morozova,
V. V. Choob, and E. N. Yunosov.
Edited by V. V. Choob.

The Regulations of the International Young Naturalists' Tournament

I. Young Naturalists' Tournament

The International Young Naturalists' Tournament (hereinafter the IYNT) is a team competition for students of secondary schools aged 12 to 16 in their ability to solve the problems of the natural sciences, convincingly present their solutions, and defend them in scientific discussions called Science Fights (SF.)

II. International Organizing Committee

The IYNT is governed by the International Organizing Committee (IOC) established by the founding countries of the IYNT.

III. Participants of the IYNT

National teams

1. The participating teams are representing the countries wishing to take part at the IYNT.

2. The participating teams join the IYNT through an application.

3. Any invited country is represented by one team.

4. The countries responsible for the organization of the IYNT have the right to nominate two teams.

5. For all other countries, the IOC has the right to allow a second team per country.

The membership of the teams

6. A team is composed of six secondary school students. All team members must either be citizens of the country they represent, or be enrolled as students in a school of the country they represent. The students who turn the age of 16 years before the closing day of the IYNT cannot be participants. The IOC may allow participation of teams of five or four students. The composition of the team cannot be changed during the

Tournament. The team is headed by a Captain who is the official representative of the team during the IYNT.

7. The team is accompanied by two team leaders, and one of them should be qualified to work in the Jury.

8. The teams that have registered on the webpage of the IYNT but not included into the list of official participants, can attend the IYNT out of the competition, if there is available accommodation. The IOC decides to allow such teams to attend the event and about the conditions of such a participation.

IV. Problems of the IYNT
Main problems
1. The main problems of the IYNT are theoretical and experimental problems in natural sciences (astronomy, biology, geography, physics, chemistry, ecology) and problems in mathematics. The set of main problems is published no later than one month prior to the opening of the tournament.

2. The main problems of the IYNT may be used in any competition that could lead to selection of a national team for the IYNT.

Additional problems
3. The additional problems of the IYNT are not published in advance and are offered to the teams directly in the course of the Science Fights.

V. Team registration
1. In order to participate at the IYNT, each team must register on the webpage of the Tournament and submit their filled registration form to the IOC.

2. Registration on the webpage of the IYNT. Each team must register on the webpage of the IYNT and submit their filled registration form to the IOC. Each team is then assigned by the IOC with their identification

number (ID). The ID of the team will be used in all official IYNT forms and protocols.

3. It is desirable that the teams send a short video or an image gallery giving a visual impression about the team members and leaders.

4. The teams are given the possibility to send to IOC a provisional solution for one or several main problems for the IYNT: problems No. 1 to No. 5. The solutions will be graded by the Jury and the grades will be sent back to the teams. This will allow teams to have an impression about the grading criteria. Furthermore, this will allow teams to be better informed when they improve their solutions in the remaining time.

The teams should not submit provisional solutions to the problems No. 6 to No. 12.

VI. Jury

1. The international scientific Jury is nominated by the IOC and consists of independent experts experienced in judging intellectual competitions for students.

2. The groups of jurors are formed for the Science Fights of the IYNT (Jury of the SFs, JSF.) Each group consists of 4 experts or more. When possible, the personal composition of each group should not change.

3. One of the independent experts acts as a chairperson of Science Fights.

4. Three team leaders, one from each team, work in the Jury in the groups where their teams do not compete. The IOC distributes the jurors according so that the team leaders:

a) participate in a specific JSF no more than once;

b) cannot participate in the JSF in the Fights where their teams participate;

c) do not meet with other team leaders in the JSFs more than once;

d) should not, when possible, grade the same team more than twice.

5. Team leaders are informed about their participation in a specific JSF immediately prior to the Science Fight.

VII. The agenda of the IYNT

1. The IYNT is carried out during 5 to ten days in a period determined by the IOC (from April to July.)

2. Each team presents itself in a short performance at the Opening Ceremony.

The presentation can be of any genre and of any kind. Team leaders may also take part in the presentation.

The duration of the presentation is limited to 3 minutes.

The Jury evaluates the presentation on a scale of 10 points and the score is one of the grading parameters at the IYNT.

3. All team compete in the rounds called Science Fights in groups of three or two teams. If the total number of teams is proportional to three, all groups for the selective SFs consist of three teams. Otherwise, a number of groups will consist of two teams. The distribution of teams among the groups is by the lot.

The lots are drawn at the Opening Ceremony. The scheme of the drawing lots is made public prior to the procedure. The lots will allow for such distribution of teams in the groups that:

a) any two teams shall not meet each other more than once;

b) the teams having the highest ratings based on the provisional results shall not meet each other in the Selective SFs. The number of such teams equals the number of groups

c) the roles of teams in the three qualifying Selective SFs shall rotate

d) each team has to change rooms so that each time it is graded by a different group of jurors.

e) the teams from the same geographical region should not be in the same group.

Exemplary distribution for the number of teams 16 – 18:

	Groups																	
	A			**B**			**C**			**D**			**E**			**F**		
SF 1	1	7	13	2	8	14	3	9	15	4	10	16	5	11	17	6	12	18
SF 2	12	17	4	7	18	5	8	13	6	9	14	1	10	15	2	11	16	3
SF 3	15	6	11	16	1	12	17	2	7	18	3	8	13	4	9	14	5	10
SF 4	2	9	18	3	10	13	4	11	14	5	12	15	6	7	16	1	8	17
	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III

Note: in the first Stages of the fourth and following SFs the roles will be determined by their TSP in the decreasing order.

4. The number of selective Science Fights and the sets of problems offered for these SFs are decided by the IOC for the specific tournament. For IYNT-2013 there are two selective SFs with the main set of the problems and two selective SFs with the additional experimental problems.

5. Nine teams which have the best results after the Selective SFs take part in the Semi-Final SF.

6. Three or four best teams participate in the Final SF.

7. During the IYNT, additional contests in various nominations are held. Such contests will not influence the rating of the teams. "Invent Yourself": the Jury will select the best wordings in the category of "Invent Yourself" and they may be used as the problems for the future IYNTs.

8. The host country provides a cultural program for the participants of the IYNT.

VIII. Science Fight regulations

1. Before the beginning of a SF, the Jury and the teams are introduced.

2. In the course of the SF the members of a team communicate only with each other. They are not allowed to use mobile data transfer and the

internet. When needed, the organizers may provide laptop computers and other equipment.

3. In the groups of three teams, the SF is carried out in three Stages. In each Stage, each team plays one of the three roles: the Reporter, the Opponent, and the Reviewer. After each Stage, the roles are reassigned in the following order: the Reporter goes on to become Reviewer; the Opponent goes on to become Reporter; the Reviewer goes on to become Opponent.

4. In the groups of two teams, the SF is carried out in two Stages. In the first Stage, one team acts as the Reporter, and the second team is divided into two subgroups that take the role of the Opponent and the Reviewer, respectfully. In the second Stage, the teams change their roles.

Team	Stage			Team	Stage	
	I	II	III		I	II
A	Rep	Rev	Opp	A	Rep	Opp, Rev
B	Opp	Rep	Rev	B	Opp, Rev	Rep
C	Rev	Opp	Rep			

Note: Rep is Reporter, Opp is Opponent, Rev is Reviewer.

5. When one of the team members takes to the floor as Reporter, Opponent or Reviewer, all other team members may work as assistants, offer technical support to the presenter, pass notes with short commentaries and if allowed by the chairperson can make short remarks.

6. During one Science Fight each team member may take the floor only once in one role.

7. Throughout all selective SFs, each team member can take the floor no more than once in any of the three roles.

8. Team leaders can be observers when their team takes part in a Fight, if they do not work in the Jury in other rooms. They have no right to intervene in any of the actions, and communicate with the teams and the Jury throughout the Science Fight.

IX. Stage regulations

№	Performance	Duration
1	Challenge. The Opponent challenges the Reporter to present a solution for one of the problems available in the Science Fight.	See *1
2	Preparation oftheReporter	See *2
3	The Reporter takes the floor	8 min
4	Clarifying questions of the Opponent to the Reporter	3 min
5	Preparation of the Opponent	See *3
6	The Opponent takes the floor	4 min
7	Discussion between the Opponent and the Reporter	5 min
8	Clarifying questions of the Reviewer to the Reporter and the Opponent	2 min
9	Preparation of the Reviewer	2 min
10	The Reviewer takes the floor	3 min
11	Discussion of the Reviewer with the Opponent and the Reporter	3 min
12	Clarifying questions of the Jury to the speakers	5 min
13	Concluding remarks of the Reporter	1 min
14	Thegrading	3 min
15	Concluding remarks of the Jury	4 min
16	Summary and results of the Stage	1 min
17	Break	10 min
Total for a 3-team SF with 2 breaks		appx. 3 h
Total for a 2-team SF with 1 break		appx. 2 h

*1: The time for the challenge is 2 min in Selective SFs with main problems and in the Semi-Final SF; The time for the challenge is 6 min

in SFs with additional experimental problems;

The procedure of the challenge is repeated until the Challenge is accepted.

The challenge is omitted in the Final SF.

*2: The preparation time for the Reporter is 3 min in Selective SFs with main problems and in the Semi-Final SF; The preparation time for the Reporter is 45 min in SFs with additional experimental problems; The preparation time for the Reporter is 1 min in the Final SF.

* 3: 3 min. In the SF with two teams, the team of Opponent is divided into two independent groups of which one acts as the Opponent, and another acts as the Reviewer.

X. Team performance in the Stages

1. The Reporter presents the essence of the solution to the problem by their team. The Report must contain the formulation of the problem, the basic ideas and methods for the solution, including the description of the observations and the experiments, and also the clear conclusions. All basic points of the Report must be presented visually as tables, graphs, mathematical formulae, photos and videos, etc.

2. The Opponent criticizes the report, including its contents and form. The Opponent points to possible inaccuracies and errors in the understanding of the problem and in the solution by the Reporter. The Opponent should emphasize the advantages of the Report. The Opponent should express their agreement or disagreement with the Reporter's conclusions. The presentation of the Opponent should not become a presentation of their own solution.

3. The Reviewer presents a short evaluation of the presentations by Reporter and Opponent pointing to the strong sides and to the possible drawbacks and disadvantages.

XI. Rules of problem-challenge and rejection

1. All problems presented in the same SF must be different.

2. In the Selective and Semi-Final Science Fights, the Opponent can

challenge the Reporter on any problem available for such Fight, except for those problems that:

a. the Reporter has previously reported (in earlier SFs);

b. the Opponent has previously reported;

c. the Reporter has previously opposed;

d. the Opponent has previously opposed.

3. The Reporter can reject the Challenge. Such rejection is recorded in the protocol. In such case, the Opponent makes a new Challenge.

4. It is allowed to make a challenge on the problem that has been previously rejected.

5. In a situation that no problems are left for a challenge, the restrictions in the p. 2 are lifted in the following order: first d., then c., then b., then a.

XII. Penalties

1. Penalties will be applied to the Reporter for rejecting a challenge if during the Science Fight the Reporter exceeded the allowed number of rejections for a challenge.

2. In the Science Fights with the main IYNT problems, the total allowed number of rejected challenges not incurring a penalty is two. Such Science Fights are two Selective fights and one Semi-Final fight.

3. In the Science Fights with the additional (experimental) IYNT problems, the total allowed number of rejected challenges not incurring a penalty is two. Such Science Fights are two Selective fights with additional (experimental) IYNT problems.

4. Repeated rejection (if a challenge on the same problem has been rejected by the team before) incurs no penalty.

5. Penalties will reduce the value of the Reporter's Coefficient which was initially set to 1 and is decreased by 0.1 with each challenge rejected after the rejections allowed in p. 2 and p. 3.:

6. Penalties incur only within one Science Fight, and previous rejec-

Number of rejected challenges	0, 1, or 2	3	4	etc.
Reporter's Coefficient	1	0.9	0.8	

tions in previous Science Fights do not count. In each new Science Fight, the Reporter's Coefficient is initially set to 1 regardless of the number of earlier rejected challenges.

XIII. Grading parameters

1. Grades (G)

Each juror grades the performances of the teams by giving integer grades:

the presentation during the Opening Ceremony on a scale of 1 to 10 points;

for the Reporter in a SF from 1 to 30 points;

for the Opponent in a SF from 1 to 20 points;

for the Reviewer in a SF from 1 to 10 points.

All grades are recorded in the protocol.

2. Average points (P)

The average points (P) for the performances of the teams are calculated in the following manner: the maximum and the minimum grades are replaced with one grade equal to their arithmetic mean. In the next step, the arithmetic mean of this and the remaining grades is calculated.

For the Report, the resulting mean is multiplied by the Reporter's Coefficient (RC).

All results are rounded to 0.1 points.

3. Sum of Points (SP) in a Science Fight

The Sum of Points is equal to the arithmetic sum of all the Average Points of the team in all performances in the given SF.

4. Total Sum of Points (TSP)

The integer value of TSP is equal to the sum of all SPs for the team during all completed stages and performances. The resulting value is rounded to 1 point.

The grading parameters are published as a table in the end of each round of the IYNT.

XIV. Semi-Final SF

1. The nine best teams participate in the Semi-Final. The decisive parameter is the TSP. In case of equal TSPs, the IOC decides about their participation in the Semi-Finals based on other grading parameters of the teams. The Semi-Finals are held in 3 groups of 3 teams.

2. The distribution of the teams is according to the following scheme:

Semifinal group A	Semifinal group B	Semifinal group C
1 6 7	2 5 8	3 4 9
Here the numbers of teams indicate their rating based on the TSP in descending order		

In case of equal TSPs, the IOC decides about the order of the teams based on other grading parameters of the teams.

XV. Final SF

1. Three teams winning in their respective Semi-Final groups participate in the Final SF. In case of equal results, the IOC decides about the Finalists based on other grading parameters of the teams.

2. The forth team can participate in the Final in case their TSP is higher than the TSP of one of the winners of the Semi-Final groups.

3. The distribution of the teams in the first stage of the Final SF is according to the following scheme:

Teams	1	2	3	4
Roles	Reporter	Opponent	Reviewer	Observer (only if allowed, see p. 2)
Here the numbers of the teams indicate their rating based on the TSP in the descending order				

4. During the four hours since the results of the Semi-Finals are announced, the Finalists select the problems for their reports. In case of conflicting choices, priority is given according to the order of presentation in the Final (see p. 3.) The choice is made public immediately.

XVI. Winners

1. The members of the team winning in the Finals are awarded 1st place diplomas.

2. Other teams participating in the Finals are awarded 2nd place diplomas.

3. All other teams participating in the Semi-Final SFs are awarded 3rd place diplomas.

4. All other participants of the IYNT receive certificates of participation.

5. Team leaders receive certificates indicating the ranking of their team.

XVII. Official language

The official language of the IYNT is English.

XVIII. The status of the regulations of the IYNT

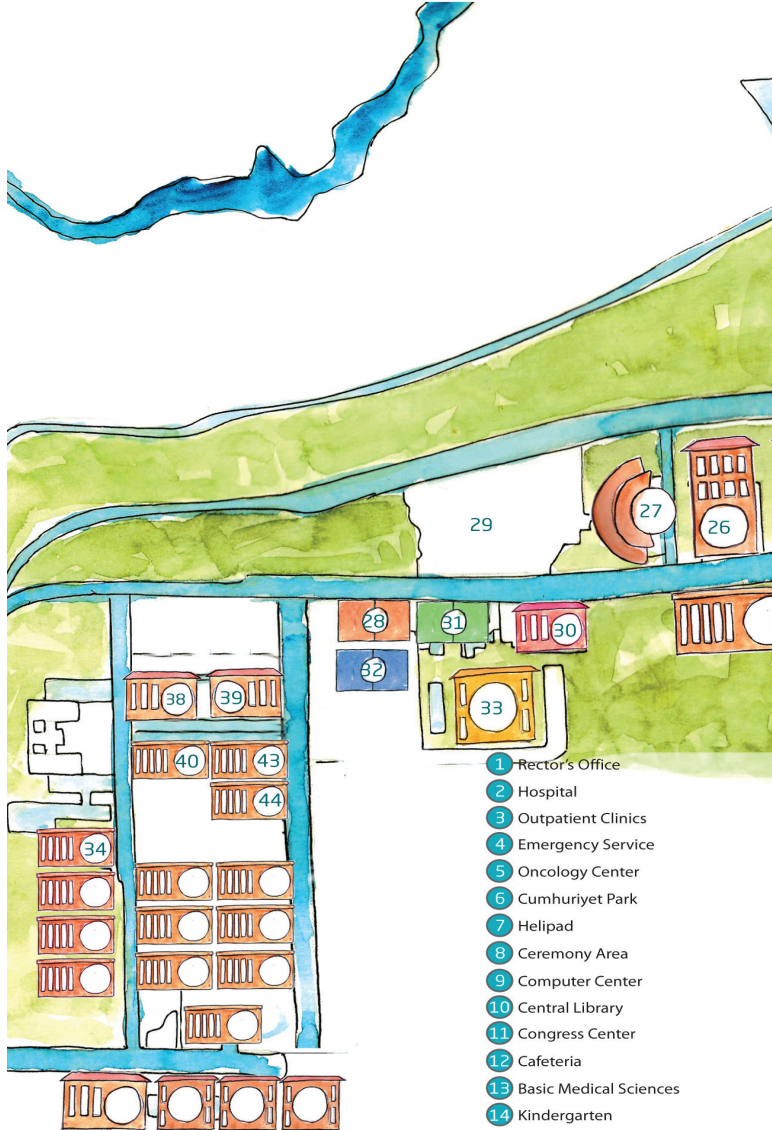The regulations are established by the IOC and may be changed only by the IOC.
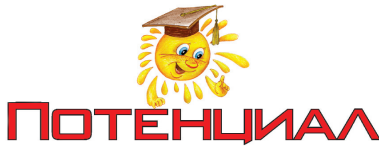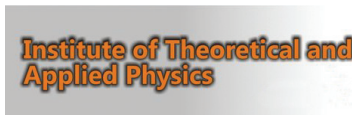
Notes

Notes

Map of Osmangazi University

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1 Rector's Office
2 Hospital
3 Outpatient Clinics
4 Emergency Service
5 Oncology Center
6 Cumhuriyet Park
7 Helipad
8 Ceremony Area
9 Computer Center
10 Central Library
11 Congress Center
12 Cafeteria
13 Basic Medical Sciences
14 Kindergarten
15 Social Center / Vocational School of Health Services
16 Faculty of Medicine Classrooms

17 Eskişehir Vocational School of Health

18 Basic Medical Units

19 Faculty of Medicine Directorate for Construction

20 Heating Center

21 Faculty of Humanities and Science

22 Faculty of Economics and Administrative Sciences (FEAS)

23 FEAS Dean's Office

24 Student Affairs

25 Zoology Museum

26 Faculty of Education

27 Amphitheatre

28 Social Center

29 Indoor Tennis Court

30 Sports Hall

31 Indoor Football Field

32 Swimming Pool

33 Faculty of Engineering and Architecture Dean's Office

34 Laboratory of Geology

35 Laboratory of Electrics and Electronics

36 Laboratory of Civil and Mechanical Engineering

37 Institute of Science

38 Mining Engineering/ Geological Engineering

39 Mechanical Engineering

40 Civil Engineering

41 Materials Engineering/ Institute of Metallurgy

42 Laboratory of Engine/ Laboratory of Machine Tools

43 Electrical and Electronics Engineering

44 Chemical Engineering

45 Laboratory of Hydraulics

46 Laboratory of Mining

47 Laboratory of Physics

48 Laboratory of Chemistry

48 Laboratory of Civil Engineering

48 Printing House

48 Substation

48 Workshops

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