

Official Report

- IBO 2010 -

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The 21st International Biology Olympiad (IBO 2010)

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Thanks Note from the Chairman of the IBO 2010 Organizing Committee

The intense summer passed all too soon and finally the end day of 2010 has come. The IBO 2010 left me with unforgettable memories. As writing this thanks note, I recalled the past 6 months. And I find that this summer was one of the happiest moments in my whole life.

I know well that the students felt nervous with the stress from the complex tests, the leaders worried for their students' final results and all staffs also worked hard for the successful operation of the IBO 2010. It is definitely true that with those concern, the IBO 2010 came to an end without any big troubles.

As the chairman of the organizing committee, I want to express my deepest gratitude to many organizations and individuals. The generous financial support provided by the government of Korea and the industry sponsors was critical for the success of this event.

Finally, I want to say BIG thanks to all students, international juries, and observers. I hope all of you went back to your home with happy memories of Korea.

I wish you all the very best for your future.

With warmest regards,

Prof. Kil-Jae Lee

Chairman

IBO 2010 Organizing Committee

The 21st International Biology Olympiad (IBO 2010)

1. Outline

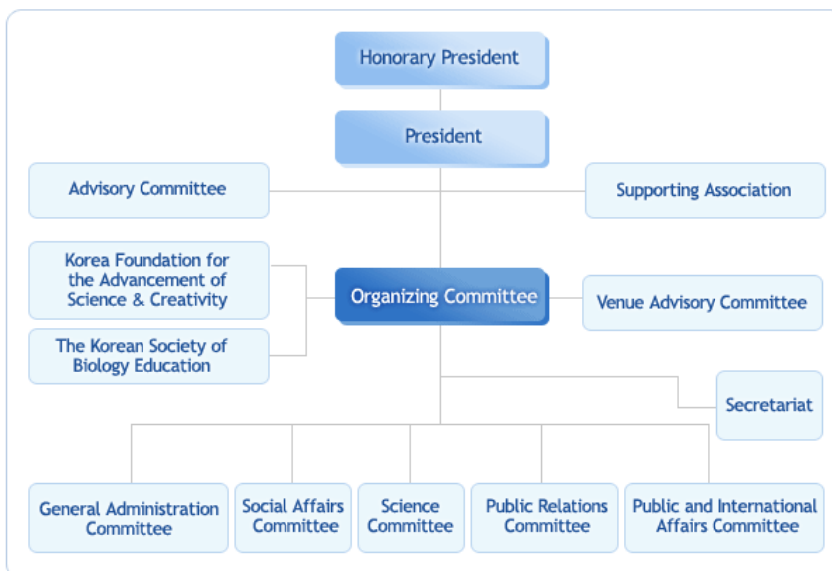
- Period : July 11 - 18, 2010
- Venue : Changwon National University, Korea
- Host Organizations
 - The Korean Society of Biology Education
 - Ministry of Education, Science and Technology
 - Korea Foundation for the Advancement of Science & Creativity
- Supporting Organizations
 - Gyeongnam Province
 - Changwon City City of Changwon
 - Changwon National University
 - College of Life Sciences and Biotechnology, Korea University
 - Seoul National University of Education
 - The Korean Association of Biological Sciences
 - Korean Society for Molecular and Cellular Biology
 - The Federation of Korean Microbiological Societies
 - The Korean Society for Biochemistry and Molecular Biology
 - National Research Foundation of Korea
- Sponsors
 - POSCO, ZEISS, Olympus, Daekyo, Bioneer Corp., Korea Tourism Organization, Functional Proteomics Center, Celltrion, Korea Basic Science Institute, LG Life Sciences, Macrogen, Shinsegae Food, Dyne Bio Inc.

- Participants : 440 from 60 countries (including 1 observing country)
 - Students : 233
 - Juries & Observers : 207

- Test Results
 - Practical Test
 - July 13, 2010 at Changwon National University
 - Areas
 - : each 90 min test in
 - 1) Plant & Animal Systematics
 - 2) Physiology & Anatomy
 - 3) Genetics & Cell Biology
 - 4) Ecology
 - Theoretical Test
 - July 15, 2010 at Changwon National University
 - Part A : 120 min
 - Part B : 150 min
 - Medals Split-up
 - 25 Gold medals
 - 46 Silver medals
 - 70 Bronze medals

2. Organization

- Organizational Chart



- Organization

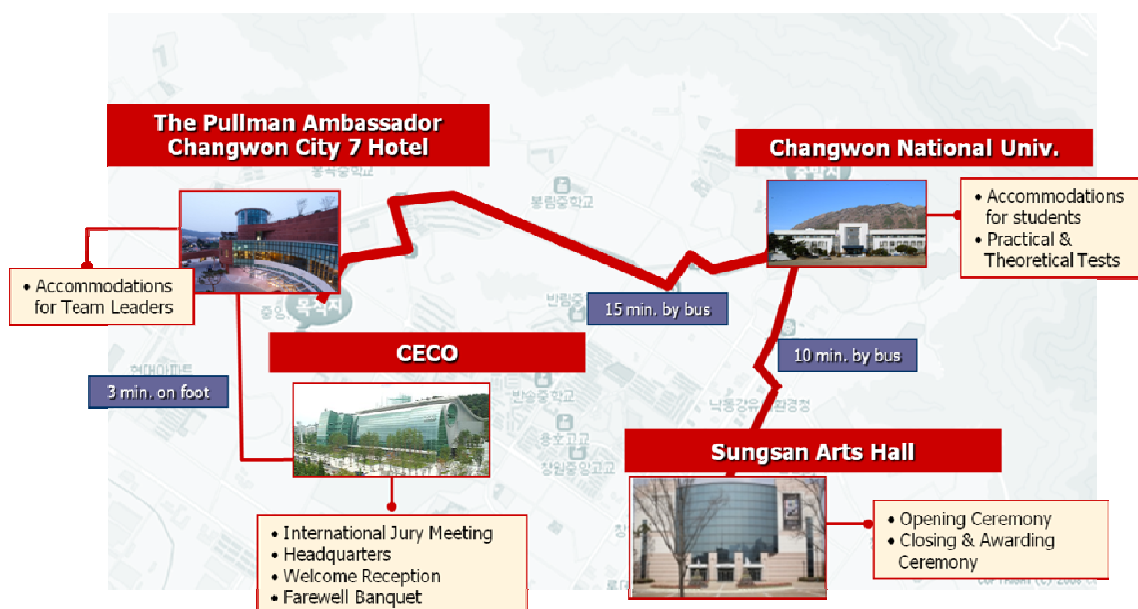
- Honorary President
 Dr. Ahn Byung-Man
 (Minister of the Ministry of Education, Science and Technology)
- President
 Prof. Young-Soo Kim (Seoul National University)
- Chairman
 Prof. Kil-Jae Lee (Korea National University of Education)
- Advisory Committee
 Chair Emeritus Professor Wan-Ho Chung
 (Korea National University of Education)
 Members Emeritus Professor Nam-Gi Jang (Seoul National University)
 Prof. Sang-Ho Nam (Daejeon University)
 Prof. Sang-Gu Kim (Seoul National University)
 Prof. Tae-In Ahn (Seoul National University)
 Prof. Jae Young Kim
 (Seoul National University of Education)
- Supporting Association
 Chair Dr. Sang Kee Suh (Member of the National Assembly)
 Members Dr. Eunhee Bae (Member of the National Assembly)
 Mr. Hak-Sik Kim (CEO, ZEISS)
- Science Committee
 Chair Prof. Sung-Ha Kim (Korea National University of Education)

- Vice-chairs Prof. Yunbae Pak (Gyeongsang National University)
Prof. Jong-Gil Na (Kunsan National University)
Prof. Hyesoon Kang (Sungshgin Women's University)
- Members Prof. Hawk-Bin Kwon (Sunmoon University)
Prof. Yong-Hwan Moon (Pusan National University)
Prof. Soo-Hwan Kim (Yonsei University)
Prof. Myungjin Moon (Dankook University)
Prof. Hyung-Cheul Shin (Hallym University)
Prof. Kil Won Kim (Incheon University)
Prof. Ahn-Heum Eom
(Korea National University of Education)
Prof. Ki-Joong Kim (Korea University)
Prof. Yun-Taik Kim (Chungbuk National University)
Prof. Hyun Sook Lee (Konkuk University)
Prof. Sue-Yun Hwang (Hankyong National University)
Dr. Kyong-In Suh (Korea University)
Prof. Heeyoung Cha (Korea National University of Education)
Prof. Jin-Su Jeong (Daegu University)
- Social Affairs Committee
 - Chair Prof. Sang-Hak Jeon (Seoul National University)
 - Vice-chair Prof. Tae-Hoon Kim (Changwon National University)
 - Members Prof. Ilha Lee (Seoul National University)
Prof. Young-Gyu Ko (Korea University)
Prof. In-Seob Han (University of Ulsan)
Prof. Joohong Ahnn (Hanyang University)
 - Public Relations Committee
 - Chair Prof. Heui-Baik Kim (Seoul National University)
 - Members Prof. Jin-Yeol Cha (Korea National Park Service)
Prof. Jae-Keun Park
(Gyeongin National University of Education)
Prof. DaeSik Park (Kangwon National University)
 - Public and International Affairs Committee
 - Chair Prof. Joon Kim (Korea University)
 - Vice-chair Prof. Jongsik Chun (Seoul National University)
 - Members Prof. BuHyun Youn (Pusan National University)
Prof. Yoon Ki Kim (Korea University)
Prof. Kwang Pum Lee (Seoul National University)
 - General Administration Committee
 - Chair Prof. Chae-Seong Lim
(Seoul National University of Education)
 - Vice-chair Prof. Donghoon Shin (Chosun University)
 - Members Prof. Keum-Hyun So
(Busan National University of Education)
Prof. Se-Ho Park (Korea University)
 - Venue Advisory Committee
 - Prof. Un-Haing Cho (Changwon National University)

3. Venue

The 21st International Biology Olympiad was held at Changwon City in Gyeongnam Province, Korea. Changwon is located at the southeastern part of Korean peninsula. As being the first planned city in Korea, Changwon pursues the environmental capital in the era for the green growth. For the success of the IBO 2010, Changwon gave its full material and emotional support.

● Overview of the IBO-Associated Places in Changwon



● Changwon National University

All the students and team guides including operating staffs stayed at the BTL dormitory in Changwon National University. In this facility, two students shared one room which was equipped with two single beds, a bathroom and a shower stall.

A large dining hall with 600 seats was used for students' meals. Also, students and team leaders reunited here after each test session.

IBO 2010 Facilities in Changwon National University



4. Schedule

	Student	Jury & Observer
July 11 (Sun)	Arrival and Registration	
July 12 (Mon)	Opening Ceremony	
	Welcome Reception	
July 13 (Tue)	Lab Tour & Campus Tour	Review and Translation of Practical Test
	Practical Test	Visit to Industrial Complex (Daewoo Shipbuilding & Engineering) & Pre-historic Tour to Goseong (Dinosaur Footprints)
	Re-union of Students and Juries	
July 14 (Wed)	Special Program	-
	Visit to Industrial Complex (Daewoo Shipbuilding & Engineering) & Pre-historic Tour to Goseong (Dinosaur Footprints)	Review and Translation of Theoretical Test
July 15 (Thu)	Theoretical Test	Temple Visit to Tongdosa
	Re-union of Students and Juries	
July 16 (Fri)	Friendship Party	Examination of Practical Test Answers
	Excursion to Gyeongju of Silla Kingdom (Bulguksa Temple & Gyeongju National Museum)	
July 17 (Sat)	Visit to the City 7 Mall	Examination of Theoretical Test Answers Medal Presentation Approval Meeting Coordinators' Meeting
	Experience of Korean Culture	Visit to Gyeongnam Art Museum or Experience of Korean Culture
July 18 (Sun)	Closing & Awarding Ceremony	
	Farewell Banquet	
	Back to Home	

- Welcome Reception (July 12) was hosted by the governor of Gyeongnam Province.
- On July 13, after the practical test, students had a special program for experiencing the Korean cultures. They went through hands-on experience in pottery-making and twisting pieces of straws into a rope. They also enjoyed various traditional games such as Tuho (throwing sticks into the barrel).
- Friendship Night (July 15) was hosted by the president of Changwon National University. During the Friendship Night, students tried wearing Hanbok, the traditional Korean clothing.
- During the morning of July 17, students had another special program for experiencing Taekwondo and Samulnori. Taekwondo, an Olympic event, is one of the most popular traditional martial arts of Korea. Samulnori is a unique traditional percussion music.
- Farewell Banquet (July 17) was hosted by the mayor of Changwon City.

5. Opening Ceremony

- 10:00 am – 11:30 am, July 12 (Monday) at Sungsan Arts Hall

- Program
 - Presentation of the participating national delegations
 - Opening performance – Ogomu (Five Drum Dance) by Changwon City Dance Company
 - Opening remarks - Prof. Young-Soo Kim
(President of the IBO 2010, President of the Korean Society of Biology Education)
 - Congratulatory addresses
 - Dr. Ahn Byung-Man
(Honorary president of the IBO 2010, Former Minister of Education, Science and Technology)
 - Dr. Yoon Chung
(President of Korea Foundation for the Advancement of Science & Creativity)
 - Dr. Poonpipope Kasemsap (Chairman of IBO)
 - Welcome messages
 - Mr. Doo-Kwan Kim (Governor of Gyeongnam Province)
 - Mr. Wan-Su Park (Mayor of Changwon City)
 - Dr. Sung-Ho Park (President of Changwon National University)
 - Presentation of the IBO 2010 programs
 - Prof. Kil-Jae Lee (Chairman of the IBO 2010 Organizing Committee)
 - Oath by the competitors' representatives
 - Yeji Kwon & Young-Jun Hur (Competitors of Korea)
 - Oath by the representative of the international juries
 - Dr. Shirley Lim (International jury from Singapore)

Ogomu (Five Drum Dance) is a dance that originates from the Buddhist and shaman rituals, where the dancers themselves play five drums slung around them while dancing ; the lively and dazzling sound of the drum beats is characteristic of this performance. About 50 dancers from Changwon City Dance Company palyed in this performance.

- Speeches

Prof. Young-Soo Kim

(President of the IBO 2010, President of the Korean Society of Biology Education)

Dear participants, distinguished guests, ladies and gentlemen, I am delighted to be here to give an opening remark of the 21st International Biology Olympiad as the president of the Korean Society of Biology Education.

I would like to give special thanks to Dr. Byong Man Ahn, Minister of Education, Science, and Technology, Dr. Eunhee Bae, the member of National Assembly, Dr. Poonpipope Kasemsap, Chairman of the International Biology Olympiad, Dr. Yoon Chung, the President of Korea Foundation for the Advancement of Science & Creativity, Mr. Doo-Kwan Kim, the Governor of Gyeongnam Province, Mr. Wan-Su Park, the Mayor of Changwon City, Mr. Yi-Su Kim, the Chairman of Changwon City Council and Dr. Sung-Ho Park, the President of Changwon National University. They all supported this IBO 2010 to make such a wonderful event.

In addition, I would like to express my sincere gratitude for the members of the organizing committee for their heroic efforts in preparation of this event. In particular, Prof. Kil-Jae Lee, the chairman of the organizing committee, thank you very much for your hard work and sacrifice for the meeting.

Biology is a comprehensive study that deals with human beings and other living things exist with us. Biology is a natural science concerning the nature of living things, including their structure and function, metabolism, homeostasis, continuity, evolution, diversity, and interaction. Creativity is the essence of biology, whose boundary is only set by the imagination of biologists.

What else is biology? Biology is also ‘friendship’. Biology is a wonderful arena in which we make new friends easily. Through the endless research in the field of biology, we share our findings with many, many good friends all over the world. Of course, it is a hard work and

sometimes you might get exhausted. But, please remember this. Hard work will pay off in the end with joy and satisfaction.

Dear participants! You are here to partake in IBO 2010. You have achieved a lot already by being here today. The Biology Olympiad is more a festival than a competition. It is also a great beginning for every one of you as a biologist.

Thank you very much.

Dr. Ahn Byung-Man

(Honorary President of the IBO 2010, Former Minister of Education, Science and Technology)

Good morning, ladies and gentlemen.

Please allow me to begin by mentioning how pleased I am to host the "21st International Biology Olympiad in Korea. I extend my warmest welcome to all delegates and science talents who have travelled far to attend this Olympiad.

I convey my deep appreciation to Dr. Poonpipope Kasemsap, Chairman of the International Biology Olympiad, Dr. Eunhee Bae, a member of the National Assembly, and Dr. Kil-Jae Lee, Chairman of the Organizing Committee of the IBO 2010 for organizing such a successful event.

My special gratitude also goes to in Changwon City and Gyeongnam Province for making this Olympiad possible.

In the knowledge-based society of the 21st century, nation's competitiveness depends heavily on knowledge and information. We live in the age of boundless competition in which only the best can gain advantage.

As you are well aware, the advancement of science and technology is the source of nation's strength. It is crucial to identify and nurture qualified youths with passion and potential in science.

Since all of you here have great potential to become excellent scientists in the future, your countries have high expectations of you.

I know that you are gifted students in biology who have gone through the intense competitions to represent your countries. You are future Nobel Prize winners, inventors, and explorers.

Dear students,

The International Biology Olympiad is an event that brings together gifted students from all over the world to test their skills in tackling biological problems. It also tries to challenge and stimulate these students to expand their talents and promote their career as scientist. In the process, they also build friendship with peers in an open and friendly competition.

Thus, I hope that all of you will exert yourselves to the fullest to achieve good results. Most of all, I hope that you will be able to make many new friends during the stay.

I wish all participants a pleasant stay and an enriching experience in Korea.

Thank you.

Dr. Yoon Chung

(President of Korea Foundation for the Advancement of Science & Creativity)

Good Morning, Ladies and Gentlemen, and distinguished guests,

My name is Yoon Chung, and I am the president of the Korea Foundation for the Advancement of Science and Creativity (KOFAC).

On behalf of KOFAC, the co-host of International Biology Olympiads 2010, I am delighted and honored to be here to welcome you with open arms for coming to Korea to be with us today.

My special thanks go to all the distinguished guests and delegates from countries around the world, and to the IBO committee members and staffs who have worked so hard to stage this event.

I am very excited to hold the event in Changwon, Korea. This year's IBO is all the more special and significant because this year is the International Year of Biodiversity, declared by the UN.

As we all aware, science and technology has been, and always will be, the source of development throughout history, and it is also a crucial part of national competitiveness. Countries around the world compete in developing new science technology, and make investments that will produce outstanding human resources in science and technology.

Today, we are facing several global concerns together: climate change, energy consumption, new disease, food and water shortage, to name just a few. These global issues are not restricted to just one or a few countries, but are shared by the world as a whole. Most of the major global issues involve science technology, and eventually, we will have to find solutions through science & technology development. Therefore, we will see increasing demands for creative minds that are not afraid to ask, challenge, and explore unknown worlds, and bring about development in our society with new scientific knowledge.

The future scientists here in this room will be the main players of future society, working together to resolve global issues and making the world a better place to live for all.

The International Science Olympiad is where the youth with outstanding talent in science come from all over the world and compete with each other using their creativity and research skills, nurturing their dreams while building confidence and experience in an international setting. It is also an opportunity to share good experiences and memories with many other

future global leaders. In this globalized era, making friends from other countries, and building a network with them, will be a great personal asset for each of you.

Korea is often called The Land of the Morning Calm. Korea with five thousand years of history and traditional culture is, in fact, one of the most dynamic countries in the world. It is a country that has successfully transformed itself from one of the most impoverished countries to a leading economic giant in just half a century. The main source behind this impressive development was none other than science technology, and outstanding human resources.

I hope your visit to Korea to be an opportunity to understand and learn the dynamics of Korea and its thousand years of tradition and culture. I wish you the best of luck and good health, now and always.

Thank you.

Dr. Poonpipope Kasemsap
(Chairman of IBO)

Dear distinguished guests, Organizers, Colleagues and last but not least, dear competitors,

I would like to say a few words on behalf of all coordinators of this Olympiad.

Welcome you all to the 21st IBO. A special welcome applies for the newcomer(s): competitors from Hungary and United Arab Emirates. There are 233 competitors from 59 countries in this Olympiad, both are new records.

I congratulate each of you for your success in winning (in your own countries) National Biology Olympiad. You have come a long way. All of you are already winners. Your achievement in biology is being honored here, today and throughout this week, by your participation in this great Olympiad, the 21st IBO. Yes, you will become the most important part of IBO history that no man could pay to join.

Ladies and gentlemen, I like to draw your attention to the aims of the Olympiad:

Biology Olympiad is dedicated to the proposition that "biology is a beautiful and valuable subject". We are here to challenge and to stimulate gifted students to expand their talents. Biology talents are really needed for better world.

During these past centuries, advances in basic and applied biological sciences, without a doubt, have made our life better - food security, improved nutrition, and good health. We hope that IBO will help to promote (their) career as biologists, so that we may be able to bring these good things to more people and to ensure sustainability, for our future generation.

Dear Participants,

Olympiad is about competition. Competition has always been very significant to our world. This beautiful world would not be what it is today without competition, which is an important component of 'evolution'.

Molecular biology is bringing about rapid changes to our world of biology from advance research to biology education. It is like new 'trait' in evolution context. A very important challenge in the next decades will be constructing strong collaboration between molecular genomics and traditional biology.

Anatomists, morphologists, taxonomists, physiologists, and other traditional biologists must be working together with molecular biologists to ensure integrate studies at multiple levels of organization from molecular genetics to physiology to ecology.

And it all may begin right here, right now. I believe this IBO will provide excellent opportunity for our young biologists to build warm friendship that will lead to strong collaborations in their future career. I can tell you that in the world of biology 'collaboration' may be even more important than 'competition'.

Charles Darwin once said "In the long history of humankind (and animal kind, too) those who learned to collaborate, and improvise most effectively, have prevailed." And Biology Olympiad is very much concern with collaboration? It is one of our aims to promote collaboration among competitors, and also the local and international scientists.

Only 60% of you, will win a medal, but this doesn't mean that the remaining 40% are losers. Because all of you can win the most valuable prize of friends. It only takes a few seconds to make a new friend. To make friend is the most significant step to establish successful and sustainable collaboration.

May I wish you all a great success in this Olympiad.

6. Closing Ceremony

- 2:30 pm – 5:30 pm, July 17 (Saturday) at Sungsan Arts Hall

- Program
 - Opening performance
 - Dance Theatre Love Concert (Love story between Chunhyan & Mongyong)
by Jeonnam Provincial Orchestra Institute for Korea Traditional Performing Arts
 - Closing remarks
 - Prof. Young-Soo Kim
(President of the IBO 2010, President of the Korean Society of Biology Education)
 - Congratulatory messages
 - Dr. Poonpipope Kasemsap (Chairman of IBO)
 - Awarding for video competition
 - Dr. Gérard Cobut (IBO Steering Committee member)
 - Message from the IBO Coordinating Center
 - Dr. Tomas Soukup
 - Report from the Science Committee of the IBO 2010
 - Prof. Sung-Ha Kim (Chairman of the IBO 2010 Science Committee)
 - Presentations of medals (Bronze, silver and gold medals)
 - Special performance - Vision 21 by Jeonnam Provincial Orchestra Institute for
Korea Traditional Performing Arts
 - Closing address
 - Prof. Kil-Jae Lee (Chairman of the IBO 2010 Organizing Committee)
 - Handover of the IBO cup to the next host country
 - Invitation from the host country of the 22nd International Biology Olympiad
 - Good-bye, IBO 2010
 - Unforgettable memories (AV)
 - Introduction of the members of the IBO organizing committee and the guides

Opera Chunhyangjeon, love story between Chunhyang and Mongyong, is a one of the most renowned pansori (Korean opera) in Korea.

Speeches

Prof. Young-Soo Kim

(President of the IBO 2010, President of the Korean Society of Biology Education)

Good afternoon, participants, distinguished guests, ladies and gentlemen. I am Young-Soo Kim, president of IBO 2010.

Today is already the last day of our journey, the 21st International Biology Olympiad, which was launched with an opening ceremony on the 12th of July.

With great thanks to the hearty cooperation from the 440 participants from a total of 60 different countries, this olympiad has been the biggest event in its history with a great success. This could not have been possible without the dedicated support from the Ministry of Education, Science and Technology, Kyung Nam Province, Changwon City, Changwon National University, several sponsors, volunteers and the organizing committee. On behalf of all the members of our organizing committee, I would like to take this opportunity to express my sincere gratitude to all of you who have made this olympiad such a great success: for all your help, devotion, and hard work even in hidden places. We are very thankful to you.

Dear participants! As you well know, biology has provided us with prosperity and affluence in life by developing our knowledge and skills of food, health, and the environment. Biology is the key to a bright future. Humanity and the future are in the hands of all of you, future biologists. You are our tomorrow!

With the memories of Korea during the olympiad, I hope that you will grow into a world-renowned biologist. I will pray for your continued growth and health.

Tomorrow, you will be on a flight to return to your home. I wish you all a safe and comfortable journey home, and hope to see you again some day in the future.

Thank you very much.

Dr. Poonpipope Kasemsap
(Chairman of IBO)

Dear friends,

How many new friends have you met so far this week? 233? Counting yourself as one. Let me tell you that quantity does not really tell. It is the quality of the bun you are making with your friends.

Well, I don't know the names of the countries, because they dared not to tell the names of the countries, yesterday. They had challenging tests of matching the identification numbers of your students, of competitors with the correct numbers on the envelopes. And they were required to put the right numbers, the right matches into the envelopes. Many people would say that this test isn't very easy. It can't be done with your eyes closed.

Remember. If you choose to go the right things, you can. Leave your meaningful footprints in this world of biology.

Well, I am down to my last speech.

This International Biology Olympiad lasts up only a few days. In fact, it will end tomorrow. But all these wonderful memories we shared will certainly be alive in the heart of soul, forever.

Thank you very much, everyone, for this wonderful biology Olympiad. And we will meet next year in Taiwan. Good-bye.

Prof. Kil-Jae Lee
(Chairman of the IBO 2010 Organizing Committee)

Distinguished Guests, Ladies and Gentlemen, Dear Our Students!

I want to congratulate you for the successful completion of the 21st International Biology Olympiad at Changwon National University in Korea.

First, as the chairman of the organizing committee, I want to command and express my sincere appreciation to each one of you for your efforts in making this Olympiad successful.

I believe that this venue along with related activities offered each participant with ample opportunities to enjoy and learn the unique culture of Korea.

As you know, Biology has a long history of demonstrating its positive contributions to the enhancement of human civilization.

Therefore, as biologists, we must not slow down our pace to work together to support and improve the well beings of the human race and the betterment of environment within which we live.

I want to close my remarks by expressing my deepest gratitude to supporting organizations and individuals. The generous financial support provided by the government of Korea and the industry sponsors was critical for the success of this event.

I'd like to acknowledge the efforts of all the members of various committees and helping staffs. I want to personally express my appreciation to the numerous student volunteers who assisted in various capacities throughout the duration of the event.

Finally, I want to say BIG thanks to all students, international juries, and guests who participated in this Olympiad, especially those who had to travel far from other counties.

I wish you all the very best for your future. Thank you.

7. Participants

● Participating Countries

No.	Countries	No.	Countries
1	Argentina	31	Kyrgyzstan
2	Armenia	32	Latvia
3	Australia	33	Lithuania
4	Azerbaijan	34	Mexico
5	Belarus	35	Moldova
6	Belgium	36	Mongolia
7	Brazil	37	Netherlands
8	Bulgaria	38	New Zealand
9	Canada	39	Nigeria
10	China	40	Pakistan
11	Chinese Taipei	41	Poland
12	Cyprus	42	Romania
13	Czech Republic	43	Russia
14	Denmark	44	Singapore
15	Estonia	45	Slovakia
16	Finland	46	Slovenia
17	France	47	Spain
18	Georgia (*)	48	Sri Lanka
19	Germany	49	Sweden
20	Greece	50	Switzerland
21	Hungary	51	Tajikistan
22	India	52	Thailand
23	Indonesia	53	Turkey
24	Iran	54	Turkmenistan
25	Ireland	55	Ukraine
26	Italy	56	United Arab Emirates
27	Japan	57	United Kingdom
28	Kazakhstan	58	United States of America
29	Korea	59	Uzbekistan (Disqualified)
30	Kuwait	60	Vietnam

(*) Observing country

● Participants

▪ Students (233)

Argentina (4)

Nadia Wieczorko
Lihuen Antonelli
Tomas Masson
Matias Ducasa Torres

Armenia (4)

Lusine Hovhannisyan
Armen Nazaryan
Gor Avoyan
Gor Margaryan

Australia (4)

Paul Khoo
Jingchun Chen
Gina Tonkin-Hill
Vivian Li

Azerbaijan (3)

Nihat Aliyev
Sadig Niftullayev
Bakhtiyar Taghizada

Belarus (4)

Andrei Sukhareuski
Viktoryia Staravoitava
Anastasiya Vaishnarovich
Margarita Gotmanowa

Belgium (4)

Honorine Maes
Cedric Van De Bruaene
Laura Pacyna
Thomas Linne

Brazil (4)

Leo Benevides
Rafaell Lima
Luis Usier
Jean Santos

Bulgaria (4)

Desislava Staneva
Desislava Georgiev
Antonina Karakostova
Mira Nencheva

Canada (4)

Yun Jia Guan
Run Ze Cao
Xiuqi Xia
Qingda Hu

China (4)

Tong Mu
Junfeng Zhao
Suo Cheng Tan
Fan Fan

Chinese Taipei (4)

Te-Wei Tseng
Ching Wen Huang
Tsao Wei Huang
Te-Hung Chen

Cyprus (4)

Charis Demetriou
Konstantinos Christofi
Nicholas Avraamides
Irin Charalambous

Czech Republic (4)

Jana Faltynkova
Jitka Tukova
Jan Smycka
Vojtech Dostal

Denmark (4)

Ailsa Main
Gabriele Berman
Casper Thorup
Simon Larsen

Estonia (4)

Katrin Kalind
Mona Teppor
Erik Määrsepp
Eero Vaher

Finland (4)

Tiia Boman
Antti Karisto
Lassi Meronen
Lassi Overmark

France (4)

Fanny Brun-Barriere
Thomas Coutant
Augustin Lenoir
France Rose

Germany (4)

Jan Krieghoff
Nils Klughammer
Christina Gebler
Erik Winter

Greece (4)

Paraskevas Deligiannis
Dimitrios Giannelos
Nikolaos Ignatiadis
Evangelia Koukaki

Hungary (4)

Marton Szentirmai
Mate Naszai
Bertalan Gyenes
Peter Novinszky

India (4)

Apoorv Singh
Preet Hathi
Sahal Kaushik
Syed Mustafa Hashmi

Kuwait (4)

Zahraa Atash
Abdulrazaq Alawadhi
Ali Alqudaihi
Hussain Dashti

Indonesia (4)

Irfan Haris
Danang Crysanto
Harun Sugito
Thoriq Salafi

Iran (4)

Mohammadhossein Motealehiardakani
Farnam Mohebi
Mahdi Hakiminezhad
Farhad Pishgar

Ireland (4)

Gillian Crowe
Youngmook Lim
Emma O'Deorain
William Mullan

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Alessio Capobianco
Cristofer Pezzetta
Daniele Cervettini
Luca Biavati

Japan (4)

Risa Sakamoto
Saori Kurihara
Tomohito Minakuchi
Tomoyuki Mikami

Kazakhstan (4)

Nursultan Tompiyev
Zhassulan Shaikhygali
Yernar Tursynbay
Talap Kossybakov

Korea (4)

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Meesun Lee
Hyun Jun Cho
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Kyrgyzstan (4)

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Nurseit Mamyrov
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Emil Semetei Uulu

Latvia (4)

Gunda Zvigule
Eva Drucka
Anna Stikane
Anete Pole

Lithuania (4)

Julius Juodakis
Mantvydas Lopeta
Egle Povilaityte
Emilija Emma

Mexico (4)

Jose De Jesus Naveja
Pedro Marquez
Rolando Gonzalez
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Adrian Castravet
Tatiana Romanschi
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Mongolia (4)

Munkhzul Tsogtsaikhan
Tsogt-Itgel Munkhbat
Bayanbaatar Munkhsaikhan
Nasanbat Sharavjamts

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Laura Van Den Berge
Remie Janssen
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New Zealand (4)

Geoffrey Hoggins
Shumeng Sun
Yuanye Xu
Yujie Zhou

Nigeria (4)

Aduramo Olasode
Jesuferanmi Igbinegie
Godspower Oboli
Victor Igono

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Fatima-Tun-Nissa Raza
Warda Faridi
Abdul Khan
Ama Tus Salam Naila

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Anna Trzeciecka
Katarzyna Paczkowska
Norbert Wasik

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Paula Enache
Alina Sacarescu
Emilia Pascu
Mihaela Georgescu

Russia (4)

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Sofiya Kolchanova
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Slovakia (4)

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Eugen Hruska
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Orsolya Szaboova

Slovenia (4)

Sara Strasner
Iva Jurov
Filip Cvetko
Dejan Zivko

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Lucas Ramon Diaz Anadon
Ion Lerga Jaso
Daniel Ortega Quijano

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Dulshan Jayasinghe
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Ilhomiddin Mamajanov
Aziz Khdiraliyev
Kamila Zununova
Tamonno Sultanzoda

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Thitikorn Kittiboonya
Nattapong Sanguankiattichai
Nattawat Leelahakorn
Tanat Chotijarumaneewong

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Osman Kargin
Dogukan Dogu
Sukru Sogut
Emir Sevim

Turkmenistan (4)

Shohrat Allayev
Shagylych Tagangylyjov
Toyly Hojageldiyev
Orazdurdy Rahimov

Ukraine (4)

Vladyslava Bandurko
Valeriya Sapozhnikova
Andrii Ovsianikov
Oleksandr Gubar

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Abdalazez Alkhaja
Yaqub Almarzoqe
Abdallahman Aljabre

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Adam Wright
Hannah Ingamells

United States of America (4)

Charles Du
Eric Liaw
Debra Van Egeren
Chelsea Voss

Uzbekistan (3)

#1
#2
#3

Vietnam (4)

Vu Thi Ngoc Oanh
Bui Thuy Anh
Dao Hai Yen
Cao Bao Anh

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Maria Ortiz
Matias Pellegrino

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Gayane Ghukasyan
Hripsime Matevosyan

Australia (3)

Mary Oliver
Genevieve Martin
Julie Cooke

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Anar Majidov

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Louis De Vos
Marleen Van Strydonck

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Claudia Russo
Rubens Oda

Bulgaria (2)

Snezhanka Tomova
Albena Jordanova

Canada (2)

Robert Roddie
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Hongjun Li
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Sucipto Hariyanto
Lulu Fitri
Mochamad Mas`Ngud
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Siuk Yoo
Sung-Soo Jun

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Guadalupe Vidal

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John Adams

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Jonathan Ogidi

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Zafar Khalid
Muhammad Saeed

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Alexandra Simon-Gruita
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Natalia Tomm

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Boon Chuan Low
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Mijung Kim
Aik Ling Tan
Joyce Chiu Fui Mok
Sek Man Wong
Yew Jin Lee

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Bohuslav Uher
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Helena Vicar

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Jose Luis Barba Gutierrez
Maria Concepcion Hevia Ojanguren

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Hiran Amarasekera
Horadigala Nandadasa
Jayantha Wijeyaratne

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Lena Lundquist
Lena Clapham
Dag Ekholm

Switzerland (4)

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Daniel Wegmann
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Miriam Luginbuehl

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Husnu Yaman

Thailand (6)

Supachitra Chadchawan
Poonpipope Kasemsap
Pitiwong Tantichodok
Teerapong Buaboocha
Noppadon Kitana
Orasa Choosakul

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Ertunc Gunduz
Ismail Turkan

Turkmenistan (1)

Sevki Aydin

Ukraine (2)

Nataliia Skrypnyk
Svitlana Fitsailo

United Arab Emirates (2)

Khalid Bin Dawood
Abdualrahman Mohhamed Shake

United Kingdom (4)

David Rigby
Neil Richard
Norma Broadbridge
Andrew Treharne

United States of America (2)

Kathleen Frame
Scott Mills

Uzbekistan (5)

A
B
C
D
E

Vietnam (9)

Mai Sy Tuan
Dinh Doan Long
Pham Van Lap
Le Dinh Tuan
Duong Minh Lam
Nguyen Huu Xuan
Nguyen Quang Huy
Vo Thi Bach Mai
Vu Duc Luu

Practical & Theoretical Tests

1. Overview

The Science Committee

- Prof. Sung-Ha Kim (Korea National Univ. of Education) **Chair & International Jury Co-Chair**
- Prof. Yunbae Pak (Gyeongsang National Univ.) **Vice Chair & International Jury Co-Chair**
- Prof. Hyesoon Kang (Sungshin Women's Univ.) **Vice Chair**
- Prof. Jong-Gil Na (Kunsan National Univ.) **Vice Chair**
- Prof. Hawk-Bin Kwon (Sunmoon Univ.)
- Prof. Yong-Hwan Moon (Pusan National Univ.)
- Prof. Soo-Hwan Kim (Yonsei Univ.)
- Prof. Myungjin Moon (Dankook Univ.)
- Prof. Hyung-Cheul Shin (Hallym Univ.)
- Prof. Kil Won Kim (Univ. of Incheon)
- Prof. Ahn-Heum Eom (Korea National Univ. of Education)
- Prof. Ki-Joong Kim (Korea Univ.)
- Prof. Yun-Taik Kim (Chungbuk National Univ.)
- Prof. Hyun Sook Lee (Konkuk Univ.)
- Prof. Sue-Yun Hwang (Hankyong National Univ.)
- Dr. Kyong-In Suh (Korea Univ.)
- Prof. Chang-Ho Lee (Gangneung Wonju National Univ.)
- Prof. Janie Brooks (Sungkyunkwan Univ.) **English Proofreading**
- Prof. Heeyoung Cha (Korea National Univ. of Education) **Assessment team**
- Prof. Jin-Su Jeong (Daegu Univ.) **Assessment team**

Jury Sub-group Committee for IBO2010

July 7 ~ July 11 at CECO

- Poonpipope Kasemsap (Thailand)
- Hans Morelis (Netherlands)
- Anindya Sinha (India)
- Mary Collette Oliver (Australia)
- Daniel Wegmann (Switzerland)
- Alexander M. Rubtsov (Russia)
- Kwok-Tung Lu (Chinese Taipei)
- Sung-Ha Kim (Chair, Korea)
- Olga Waksman (IBO Member)
- Alexander Friedmann (IBO Member)

Overview of Test

Practical Test :

July 13, 2010 at Changwon National Univ.

Areas :

90 min test in

- 1) Plant & Animal Systematics
- 2) Physiology & Anatomy
- 3) Genetics & Cell Biology
- 4) Ecology

Theoretical Test :

July 15, 2010 at Changwon National Univ.

- Part A : 120 min
- Part B : 150 min

Korea received questions from:

Argentina, Belarus, Belgium, China, Chinese Taipei, Cyprus, Denmark, France, Germany, Greece, Hungary, India, Indonesia, Iran, Ireland, Italy, Korea, Kuwait, Mexico, Netherlands, New Zealand, Pakistan, Poland, Romania, Singapore, Slovakia, Spain, Switzerland, Tajikistan, Thailand, Turkmenistan, Ukraine, United Arab Emirates, United Kingdom, United States of America (35 countries)

Thanks for the collaboration!

International Questions for the Theoretical Test

Part A	Country	Point	Chief Reviewer
14	Swiss	1	MYH
15	Korea	1	KSH
37	Korea	1	HSY
38	Slovakia	1	MYH
42	Denmark	1	NJK
Subtotal		5	

Part B	Country	Point	Chief Reviewer
3	Turkmenistan	1.5	PYB
4.1	Thailand	1	MYH
8	Netherlands	1.5	KHB
9	Thailand	2	HSY
22	Hungary	2	KYT
30.2	India	1.6	KKW
31	Turkmenistan	1.5	KKW
39	Italy	3	NJK
46	Netherlands	2	KHS
Subtotal		16.1	

10 Countries		
14 Questions	14/102	14%
21.1 Points	21.1/158.1	13%

Medal split-up

- 25 Gold medals
- 46 Silver medals
- 70 Bronze medals



2. Final Results

Rank	Country	Student Code	First Name	Last Name	Prac 1 50	Prac 2 49	Prac 3 50	Prac 4 51	Practical TOTAL	Theo A 51	Theo B 107.1	Theo TOTAL	Final T-score	Medal
1	CHN-	1001	Tong	Mu	40.95	38	50	42	170.95	44	91	135	71.496	Gold
2	CAN-	0902	Run Ze	Cao	36	34.5	34	43	147.5	44	89.1	133.1	67.569	Gold
3	USA-	5704	Chelsea	Voss	34.3	34	41.3	46	155.6	42	84.6	126.6	67.398	Gold
4	USA-	5702	Eric	Liaw	30.6	33.5	34.2	48	146.3	40	88.6	128.6	66.428	Gold
5	USA-	5701	Charles	Du	26.8	31	48	45	150.8	39	84.8	123.8	66.079	Gold
6	IDN-	2201	Irfan	Haris	30.3	29.75	40	44	144.05	41	86.8	127.8	65.919	Gold
7	CAN-	0901	Yun Jia	Guan	25.75	28.25	33	45	132	43	92.5	135.5	65.753	Gold
8	KOR-	2804	Young-Jun	Hur	24.3	31	33.7	46	135	42	90	132	65.457	Gold
9	TPE-	1101	Te-Wei	Tseng	36.55	31.5	32.2	42	142.25	37	89.4	126.4	65.350	Gold
10	IDN-	2203	Harun	Sugito	28.95	31.5	47.8	45	153.25	35	83.4	118.4	65.295	Gold
11	KOR-	2802	Meesun	Lee	26.4	32	30.8	43	132.2	40	91.8	131.8	64.993	Gold
12	CHN-	1002	Junfeng	Zhao	30	30.5	38.75	41	140.25	37	88.3	125.3	64.815	Gold
13	TPE-	1103	Tsao Wei	Huang	40.65	31	22.7	37	131.35	42	89.3	131.3	64.759	Gold
14	THA-	5103	Nattawat	Leelahakorn	27.7	32	16	48	123.7	47	89.6	136.6	64.741	Gold
15	TPE-	1104	Te-Hung	Chen	22.25	29.5	36.5	45.5	133.75	40	89.4	129.4	64.714	Gold
16	DEU-	1801	Jan	Kriehoff	30.8	28	39	41	138.8	37	86.1	123.1	64.128	Gold
17	SGP-	4303	Yan Zheng Daniel	Lim	23.5	24.5	35.4	51	134.4	45	80.7	125.7	64.022	Gold
18	TPE-	1102	Ching Wen	Huang	28.85	29.5	31.8	46.5	136.65	36	87.9	123.9	63.975	Gold
19	THA-	5104	Tanat	Choijarumaneevong	24	32	29.8	49	134.8	38	85.7	123.7	63.655	Gold
20	THA-	5102	Nattapong	Sanguankiatichai	28.2	26.5	32.2	41	127.9	42	86.1	128.1	63.558	Gold
21	LTU-	3201	Julius	Juodakis	33.05	33.5	26	43	135.55	37	85.4	122.4	63.490	Gold
22	IND-	2103	Sahal	Kaushik	25.9	30.5	30.3	43	129.7	40	85.4	125.4	63.252	Gold
23	CHN-	1003	Suocheng	Tan	28.9	29.5	25.2	42	125.6	41	86.3	127.3	63.042	Gold
24	DEU-	1803	Christina	Gebler	29.15	30.5	25.8	37.5	122.95	42	85.8	127.8	62.750	Gold



Rank	Country	Student Code	First Name	Last Name	Prac 1 50	Prac 2 49	Prac 3 50	Prac 4 51	Practical TOTAL	Theo A 51	Theo B 107.1	Theo TOTAL	Final T-score	Medal
25	JPN-	2602	Saori	Kurihara	28.8	36.5	20	43.5	128.8	41	82	123	62.604	Gold
26	USA-	5703	Debra	Van Egeren	22.6	33.5	31.4	40.5	128	40	82.35	122.35	62.345	Silver
27	TUR-	5201	Osman	Kargin	26	28.5	33	45	132.5	37	82	119	62.306	Silver
28	SGP-	4302	Xianbin	Yong	21.3	31.5	31.8	43	127.6	34	87.1	121.1	62.019	Silver
29	SGP-	4304	Tian Chen	Zeng	19.15	34.5	29.6	35.5	118.75	39	88	127	61.949	Silver
30	AUS-	0304	Vivian	Li	23.05	32.5	38.2	48	141.75	34	76.7	110.7	61.924	Silver
31	NZL-	3701	Geoffrey	Hoggins	25.85	30	26.4	44	126.25	39	81.9	120.9	61.773	Silver
32	CHN-	1004	Fan	Fan	26.3	30	24.5	45.5	126.3	38	82.8	120.8	61.759	Silver
33	GBR-	5603	Adam	Wright	24.25	29	24.4	42	119.65	38	86.8	124.8	61.614	Silver
34	KOR-	2801	Yeji	Kwon	24.45	25.75	17.4	36.5	104.1	41	93.2	134.2	61.285	Silver
35	UKR-	5403	Andrii	Ovsiannikov	23.65	27.5	50	28	129.15	39	77.2	116.2	61.205	Silver
36	KOR-	2803	Hyun Jun	Cho	25.45	21.5	38.8	34.5	120.25	35	87.4	122.4	61.192	Silver
37	SGP-	4301	Kylie Jin Ying	Goh	25.7	19.5	36.4	43	124.6	34	81.7	115.7	60.415	Silver
38	THA-	5101	Thitikorn	Kitiboonya	22.9	30	22.7	43	118.6	34	84.9	118.9	60.197	Silver
39	AUS-	0301	Paul	Khoo	19.15	27	34	40.5	120.65	38	78.7	116.7	60.036	Silver
40	FRA-	1702	Thomas	Coutant	29.9	31.5	41.6	33	136	31	74.8	105.8	60.014	Silver
41	IND-	2104	Syed Mustafa	Hashmi	25.5	27.5	35.2	37.5	125.7	33	77.7	110.7	59.513	Silver
42	SWE-	4802	Erik	Wannerberg	21.75	30	33	45	129.75	33	74.7	107.7	59.481	Silver
43	GBR-	5604	Hannah	Ingamells	21.35	33	21	43.5	118.85	34	80.6	114.6	59.317	Silver
44	JPN-	2601	Risa	Sakamoto	27.95	31	7.6	35	101.55	40	86.4	126.4	59.237	Silver
45	IND-	2102	Preet	Hathi	23	28.5	14.6	44	110.1	39	80.6	119.6	59.070	Silver
46	JPN-	2603	Tomohito	Minakuchi	23.4	27	12.6	35.5	98.5	44	83.5	127.5	59.014	Silver
47	RUS-	4201	Larisa	Akulkina	21.9	25.5	27	37.5	111.9	37	79.8	116.8	58.743	Silver
48	CZE-	1303	Jan	Smycka	33.45	28	24.6	37	123.05	30	76	106	58.112	Silver
49	RUS-	4204	Ilya	Ustyantsev	31.7	31.5	21	40	124.2	29	76.1	105.1	58.093	Silver
50	IRN-	2302	Farnam	Mohebi	20	28	25	41	114	33	79.2	112.2	58.076	Silver
51	BLR-	0501	Andrei	Sukhareuski	23.45	33.25	14.6	36	107.3	35	81.3	116.3	57.945	Silver



Rank	Country	Student Code	First Name	Last Name	Prac 1 50	Prac 2 49	Prac 3 50	Prac 4 51	Practical TOTAL	Theo A 51	Theo B 107.1	Theo TOTAL	Final T-score	Medal
52	DEU-	1804	Erik	Winter	27.4	32.25	30	41	130.65	30	69.85	99.85	57.941	Silver
53	CAN-	0903	Xiuqi	Xia	24.5	33	19.5	42	119	28	79.65	107.65	57.856	Silver
54	HUN-	2004	Peter	Novinszky	23.45	30.5	13.6	45	112.55	34	77.8	111.8	57.773	Silver
55	TUR-	5204	Emir	Sevim	39.65	27.5	22.5	22.5	112.15	31	80.6	111.6	57.670	Silver
56	IND-	2101	Apoorv	Singh	19.9	26	23	38.5	107.4	39	75.8	114.8	57.640	Silver
57	EST-	1504	Eero	Vaher	17.45	29	19	46.5	111.95	30	79.45	109.45	57.181	Silver
58	CZE-	1302	Jitka	Tukova	26.5	34	38.8	24.5	123.8	34	66.5	100.5	57.051	Silver
59	CZE-	1301	Jana	Faltnykova	20.75	33.75	22.4	29.5	106.4	37	75.5	112.5	56.999	Silver
60	RUS-	4202	Evgeniya	Zotova	34.95	28.5	22.2	25	110.65	34	75	109	56.890	Silver
61	VNM-	5904	Cao Bao	Anh	20.85	18.5	24.45	34.5	98.3	36	81.6	117.6	56.871	Silver
62	IRN-	2301	Mohammadhossein	Motealehiardakani	18.75	21.5	26	33	99.25	42	73.9	115.9	56.651	Silver
63	AUS-	0302	Jingchun	Chen	31.2	25	24.5	42	122.7	27	72.1	99.1	56.587	Silver
64	VNM-	5902	Bui Thuy	Anh	24.45	23.5	39.4	34	121.35	28	72	100	56.576	Silver
65	HUN-	2003	Bertalan	Gyenes	23	28.75	14.6	39	105.35	35	76	111	56.521	Silver
66	JPN-	2604	Tomoyuki	Mikami	22.85	27.5	19	36.5	105.85	30	80.1	110.1	56.404	Silver
67	IRN-	2304	Farhad	Pishgar	23.05	29	36.1	25	113.15	28	76.9	104.9	56.390	Silver
68	FRA-	1703	Augustin	Lenoir	31.8	24	34.6	38.5	128.9	31	61.6	92.6	56.130	Silver
69	CHE-	4902	Rahel	Brügger	24.8	29	24.25	44.5	122.55	29	66.4	95.4	55.774	Silver
70	ROU-	4104	Mihaela	Georgescu	20.5	30	28.8	40	119.3	27	69.7	96.7	55.564	Silver
71	NZL-	3703	Yuanye	Xu	23.75	22	18.6	38	102.35	31	77.1	108.1	55.451	Silver
72	IDN-	2202	Danang	Crysnanto	14.45	17.5	20.2	35	87.15	35	82.5	117.5	55.175	Bronze
73	TUR-	5202	Dogukan	Dogu	24.45	28	19.4	28.5	100.35	30	78.1	108.1	55.151	Bronze
74	HUN-	2001	Marton	Szentirmai	24.2	27	12.2	36	99.4	33	74.9	107.9	54.966	Bronze
75	HUN-	2002	Mate	Naszai	18.5	31	27.9	39.5	116.9	35	60.1	95.1	54.862	Bronze
76	IDN-	2204	Thoriq	Salafi	20.15	19.5	13.6	39	92.25	34	77.3	111.3	54.617	Bronze
77	NLD-	3602	Laura	Van Den Berge	22.95	31	14.3	41	109.25	27	71.6	98.6	54.460	Bronze
78	LTU-	3202	Mantvydas	Lopeta	21.6	23.25	17.45	40.5	102.8	32	70.9	102.9	54.409	Bronze



Rank	Country	Student Code	First Name	Last Name	Prac 1 50	Prac 2 49	Prac 3 50	Prac 4 51	Practical TOTAL	Theo A 51	Theo B 107.1	Theo TOTAL	Final T-score	Medal
79	CZE-	1304	Vojtech	Dostal	21.1	21.5	29.8	29	101.4	33	70.35	103.35	54.295	Bronze
80	NLD-	3601	Leon	Loopik	18.35	24	20	46	108.35	31	66.9	97.9	54.175	Bronze
81	BGR-	0802	Delyan	Georgiev	19.7	22.5	31	27.5	100.7	32	71.1	103.1	54.136	Bronze
82	EST-	1503	Erik	Miirrepp	22.05	30	20.4	34	106.45	24	74.7	98.7	54.061	Bronze
83	CAN-	0904	Qingda	Hu	17.8	25	11.8	44.5	99.1	31	72.85	103.85	54.056	Bronze
84	RUS-	4203	Sofiya	Kolchanova	28.05	27	8.8	24.5	88.35	35	76	111	53.968	Bronze
85	NLD-	3603	Remie	Janssen	21.15	29	17	36	103.15	25	75	100	53.843	Bronze
86	SVK-	4402	Eugen	Hruska	38	27	0	25.5	90.5	31	77.5	108.5	53.757	Bronze
87	NZL-	3704	Yujie	Zhou	19.35	25.25	11.3	42.5	98.4	30	72.7	102.7	53.705	Bronze
88	IRN-	2303	Mahdi	Hakimezhad	22.65	14	21.2	34.5	92.35	31	75.6	106.6	53.629	Bronze
89	BRA-	0703	Luis	Uster	21.5	25.5	15	40.5	102.5	27	72.1	99.1	53.553	Bronze
90	KAZ-	2704	Talap	Kossybakov	19.75	29	25.2	25.5	99.45	28	73.05	101.05	53.511	Bronze
91	TUR-	5203	Sukru	Sogut	20.85	16.5	25.7	39	102.05	31	67.4	98.4	53.336	Bronze
92	MEX-	3303	Rolando	Gonzalez	18.7	31	29.4	38	117.1	26	61.75	87.75	53.323	Bronze
93	ESP-	4602	Lucas Ramon	Diaz Anadon	19.9	27.5	20	37.5	104.9	27	68.9	95.9	53.230	Bronze
94	ITA-	2501	Alessio	Capobianco	31.4	25.5	14	42.5	113.4	27	62.3	89.3	53.098	Bronze
95	UKR-	5404	Oleksandr	Gubar	21.4	28	9.1	31.5	90	35	69.8	104.8	52.892	Bronze
96	FIN-	1603	Lassi	Meronen	27.2	24	16.4	41	108.6	27	64	91	52.740	Bronze
97	LTU-	3203	Egle	Povilaityte	22.7	20.25	25.4	38	106.35	23	68.7	91.7	52.552	Bronze
98	TKM-	5303	Toily	Hojageldiyev	20.5	25.5	16	23.5	85.5	31	75.3	106.3	52.536	Bronze
99	FRA-	1704	France	Rose	29.2	30.5	27.2	20	106.9	27	63.9	90.9	52.463	Bronze
100	CHE-	4904	Anja	Jordan	22	36	15.5	33.5	107	25	65.7	90.7	52.436	Bronze
101	SVK-	4403	Kristina	Kicova	18.05	28.5	13.8	32	92.35	28	72.9	100.9	52.413	Bronze
102	DEU-	1802	Nils	Klughammer	23.5	23.5	23.4	31	101.4	30	63.5	93.5	52.192	Bronze
103	CHE-	4903	Cora	Olpe	22.55	23.5	11.8	42.5	100.35	27	66.65	93.65	52.067	Bronze
104	BLR-	0503	Anastasiya	Vaishnarovich	20.25	23.5	26.4	32	102.15	24	67.9	91.9	51.963	Bronze
105	FRA-	1701	Fanny	Brun-Barriere	35.5	17	30.6	32	115.1	30	51.45	81.45	51.678	Bronze



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106	ITA-	2504	Luca	Biavati	22.4	20	22.8	34.5	99.7	29	63.15	92.15	51.649	Bronze
107	TKM-	5302	Shagylych	Tagangylyjov	20.85	11.5	16.3	31.5	80.15	29	76.7	105.7	51.605	Bronze
108	BRA-	0701	Leo	Benevides	22.9	25	17.6	38.5	104	27	61.7	88.7	51.558	Bronze
109	SWE-	4801	Jonathan	Lindstrom	28.5	16.5	19.4	34	98.4	25	66.65	91.65	51.347	Bronze
110	BGR-	0804	Mira	Nencheva	18.1	24	13.5	30	85.6	32	68.5	100.5	51.313	Bronze
111	NZL-	3702	Shumeng	Sun	20.75	23	27.25	39	110	23	60.15	83.15	51.275	Bronze
112	BLR-	0504	Margarita	Gotmanowa	21.4	25.5	24.1	27	98	23	68.4	91.4	51.233	Bronze
113	GRC-	1903	Nikolaos	Ignatiadis	15.55	23	14.2	33	85.75	26	73.9	99.9	51.208	Bronze
114	CHE-	4901	Daniel	Ballmer	37.4	26.5	3.6	36.5	104	23	63.95	86.95	51.185	Bronze
115	FIN-	1602	Antti	Karisto	15.5	18.5	20	45	99	26	63.7	89.7	51.021	Bronze
116	VNM-	5901	Vu Thi Ngoc	Oanh	20.9	23.25	19	23	86.15	28	70.5	98.5	50.969	Bronze
117	NLD-	3604	Stephen	Skoopol	14.75	25	13.9	32	85.65	26	72.8	98.8	50.958	Bronze
118	GBR-	5602	Daniel	Rowlands	20.7	22	10.4	32	85.1	29	70	99	50.918	Bronze
119	LTU-	3204	Emilija	Emma	11	26	28.8	27	92.8	22	71	93	50.794	Bronze
120	SVN-	4502	Iva	Jurov	19.85	31	13.6	27	91.45	28	65.4	93.4	50.677	Bronze
121	ITA-	2502	Cristofer	Pezzetta	25.6	26.5	16	32	100.1	29	58.2	87.2	50.652	Bronze
122	SWE-	4803	Erik	Osterman	18.3	16.5	27.8	33	95.6	29	61.1	90.1	50.595	Bronze
123	MEX-	3301	Jose De Jesus	Naveja	15.45	28	6.2	36	85.65	27	69.7	96.7	50.510	Bronze
124	POL-	4002	Anna	Trzeciecka	17.5	17.5	5	35	75	28	76	104	50.469	Bronze
125	LVA-	3103	Anna	Stikane	15.8	24.5	19.2	31.5	91	26	65.9	91.9	50.289	Bronze
126	UKR-	5402	Valeriya	Sapozhnikova	25.05	19.5	19.85	21.5	85.9	25	69.45	94.45	50.067	Bronze
127	SVN-	4504	Dejan	Zivko	11	21	6.3	38.5	76.8	31	69.5	100.5	49.992	Bronze
128	PAK-	3904	Ama Tus Salam	Naila	12.15	24.5	21.7	31	89.35	28	63.6	91.6	49.977	Bronze
129	BLR-	0502	Viktoryia	Staravoitava	22.65	29	18.6	18.5	88.75	24	66.6	90.6	49.673	Bronze
130	DNK-	1403	Casper	Thorup	20.95	26.5	18.2	37.5	103.15	23	56.15	79.15	49.392	Bronze
131	GRC-	1901	Paraskevas	Deligiannis	14.1	25	13.2	32	84.3	25	66.5	91.5	49.197	Bronze
132	SVN-	4503	Filip	Cvetko	17.8	26	20.4	26.5	90.7	21	65.95	86.95	49.187	Bronze



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133	FIN-	1604	Lassi	Overmark	14.4	25.5	17.8	36.5	94.2	21	62.5	83.5	48.976	Bronze
134	IRL-	2401	Gillian	Crowe	22.1	24.5	12.4	31.5	90.5	22	63.4	85.4	48.826	Bronze
135	AUS-	0303	Gina	Tonkin-Hill	18.1	28	12.7	30	88.8	22	64.4	86.4	48.784	Bronze
136	AZE-	0401	Nihat	Aliyev	14.75	21.5	6	26.5	68.75	33	66.6	99.6	48.591	Bronze
137	BEL-	0601	Honorine	Maes	23.3	25.5	23.1	32.5	104.4	19	54.9	73.9	48.459	Bronze
138	PAK-	3902	Warda	Faridi	17.25	26.5	4.8	24.5	73.05	28	67.2	95.2	48.297	Bronze
139	IRL-	2402	Youngmook	Lim	21	22.5	21	34	98.5	18	57.4	75.4	47.893	Bronze
140	ITA-	2503	Daniele	Cervettini	18.8	28	18.8	27	92.6	25	54.5	79.5	47.882	Bronze
141	ROU-	4101	Paula	Enache	18.75	24	16.6	25.5	84.85	20	64.75	84.75	47.839	Bronze
142	LVA-	3101	Gunda	Zvigule	18.1	18.5	26.4	19.5	82.5	32	53.65	85.65	47.678	
143	ARG-	0104	Matias	Ducasa Torres	13.95	21.5	13	27	75.45	24	66.1	90.1	47.569	
144	EST-	1502	Mona	Teppor	18.55	13	24.5	33	89.05	23	55.35	78.35	47.104	
145	FIN-	1601	Tiia	Boman	21.45	19	3.6	27	71.05	24	66.5	90.5	46.994	
146	ARG-	0103	Tomas	Masson	19.4	24	21.4	14.5	79.3	19	65.4	84.4	46.931	
147	POL-	4004	Norbert	Wasik	11.6	23	4.8	26.5	65.9	26	67.8	93.8	46.925	
148	SWE-	4804	Orvar	Lorimer Olsson	13.35	20	9.6	36	78.95	22	62.35	84.35	46.867	
149	POL-	4001	Anna	Olezykowska	17.55	8.5	13.2	27.5	66.75	26	66.5	92.5	46.775	
150	CYP-	1201	Charis	Demetriou	17.5	23.5	13.3	26	80.3	22	60.4	82.4	46.654	
151	ESP-	4601	Antoni	Beltran Marques	20.65	19	14.4	27	81.05	22	59.15	81.15	46.500	
152	SVK-	4401	Jaroslav	Ferenc	17.75	25	17	18.5	78.25	27	55.7	82.7	46.410	
153	VNM-	5903	Dao Hai	Yen	19.75	17.25	12.8	20.5	70.3	26	61.7	87.7	46.283	
154	ROU-	4103	Emilia	Pascu	18.65	16	27	17	78.65	23	58.5	81.5	46.214	
155	GRC-	1904	Evangelia	Koukaki	10.8	23.5	5.75	36.5	76.55	22	59.1	81.1	45.813	
156	EST-	1501	Katrin	Kalind	23.9	24	6.5	24	78.4	22	57.6	79.6	45.771	
157	LVA-	3104	Anete	Pole	19.15	24.75	2.4	22	68.3	22	64.6	86.6	45.748	
158	TKM-	5301	Shohrat	Allayev	16.95	9	14.5	28	68.45	25	60.7	85.7	45.579	
159	LKA-	4702	Seneeth	Dilanka	15.5	16.5	12	26.5	70.5	25	58.55	83.55	45.428	



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160	KAZ-	2703	Yernar	Tursynbay	17.5	22.5	3.2	23.5	66.7	22	62.9	84.9	45.145	
161	BGR-	0801	Desislava	Staneva	14.45	22.5	13.5	17	67.45	27	56.95	83.95	45.055	
162	ESP-	4603	Ion	Lerga Jaso	15.7	16.5	16.8	31	80	22	53.1	75.1	45.051	
163	UKR-	5401	Vladyslava	Bandurko	20.15	20	15	14.5	69.65	19	63.15	82.15	45.001	
164	NGA-	3801	Aduramo	Olasode	19.7	26.5	7.5	37	90.7	15	52.3	67.3	44.993	
165	ROU-	4102	Alina	Sacarescu	14	22	13.2	14	63.2	27	59.1	86.1	44.875	
166	BEL-	0602	Cedric	Van De Bruaene	16.55	28	11.4	32	87.95	20	48.2	68.2	44.772	
167	KAZ-	2701	Nursultan	Tompiyev	12.85	18	15.4	17.5	63.75	21	63.4	84.4	44.595	
168	BRA-	0702	Rafaell	Lima	17.9	14	2.8	31	65.7	24	58.9	82.9	44.568	
169	LKA-	4701	Dulshan	Jayasinghe	15.5	14.25	5.8	20.5	56.05	29	59.45	88.45	44.303	
170	ARG-	0101	Nadia	Wieczorko	16.25	21	21.25	29	87.5	18	48.3	66.3	44.299	
171	DNK-	1401	Ailsa	Main	18.15	19	22.8	10	69.95	20	58.3	78.3	44.224	
172	BRA-	0704	Jean	Santos	9.4	21.5	11	17.5	59.4	29	56.6	85.6	44.198	
173	AZE-	0402	Sadig	Niftullayev	16.75	10.5	13	16.5	56.75	26	61.1	87.1	44.120	
174	KAZ-	2702	Zhassulan	Shaikhygali	16.05	8.5	11.2	21	56.75	21	62.7	83.7	43.394	
175	BGR-	0803	Antonina	Karakostova	17.3	21.5	3.6	18.5	60.9	24	56.4	80.4	43.313	
176	GRC-	1902	Dimitrios	Giannelos	18.85	14	14.8	22.5	70.15	18	55.6	73.6	43.251	
177	SVN-	4501	Sara	Strasner	14.65	19.5	2.8	34	70.95	21	51.4	72.4	43.115	
	UZB-		Uzb#2(*disqualified*)		8.7	48	0	12.5	39.2	47	47.5	94.5	43.064	
178	ARG-	0102	Lihuen	Antonelli	17.25	16	10.6	25	68.85	17	55.65	72.65	42.853	
179	BEL-	0603	Laura	Pacyna	25.05	18.5	23.4	17.5	84.45	15	45.3	60.3	42.560	
180	PAK-	3903	Abdul	Khan	13.6	12	6.8	22	54.4	24	57.3	81.3	42.529	
181	LKA-	4704	Buddhika	Rajapakshalage Don	14.95	18	2	16	50.95	21	61.5	82.5	42.267	
182	KGZ-	3002	Nurseit	Mamyrov	16.5	25.5	13.2	12.5	67.7	21	49.4	70.4	42.200	
183	LKA-	4703	Ishan	Hewa Ranepurage	17.9	16	16	18.5	68.4	18	51.5	69.5	42.113	
	UZB-		Uzb#1(*disqualified*)		14.35	11.5	0	7	32.85	45	49.25	94.25	42.057	
184	DNK-	1402	Gabriel	Berman	16	7.5	11.2	28.5	63.2	21	51.3	72.3	41.930	



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185	ARM-	0202	Armen	Nazaryan	16.5	24.5	0	15	56	17	59.8	76.8	41.809	
186	SVK-	4404	Orsolya	Szaboova	20.75	18.5	3	24	66.25	17	52	69	41.684	
187	DNK-	1404	Simon	Larsen	10.5	22	4.6	22.5	59.6	18	54	72	41.325	
	UZB-		Uzb#3(*disqualified*)		8.2	40.5	4	0	49.7	47	52.1	99.1	41.117	
188	KGZ-	3001	Bauyrzhan	Temiraliyev	18.65	18.5	1.8	16.5	55.45	21	51.7	72.7	40.851	
189	POL-	4003	Katarzyna	Paczkowska	12.15	5	1.2	14	32.35	29	58	87	40.434	
190	KGZ-	3003	Myrzabek	Alibaev	16.35	7.5	0	18	41.85	28	51.65	79.65	40.292	
191	BEL-	0604	Thomas	Linne	14.55	23.5	5	19.5	62.55	19	46.05	65.05	40.285	
192	MDA-	3404	Radu	Breahna	17	20.5	6.8	16.5	60.8	16	48.3	64.3	39.862	
193	TJK-	5001	Ilhomiddin	Mamajanov	12.35	11.5	18.25	7.5	49.6	18	52.85	70.85	39.578	
194	MEX-	3302	Pedro	Marquez	17.75	13	4	17.5	52.25	17	50.55	67.55	39.271	
195	ESP-	4604	Daniel	Ortega Quijano	10.05	7.5	10.4	24	51.95	17	49.2	66.2	38.938	
196	AZE-	0403	Bakhtiyar	Taghizada	17.65	14.5	6	19.5	57.65	18	43.9	61.9	38.876	
197	MEX-	3304	Jose De Jesus	Berber	9	20	8	13	50	17	50	67	38.816	
198	MDA-	3402	Tatiana	Romanschi	15.95	20.5	4.2	16.5	57.15	9	52.35	61.35	38.684	
199	PAK-	3901	Fatima-Tun-Nissa	Raza	18.45	14	9	8	49.45	19	47.2	66.2	38.563	
200	NGA-	3803	Godspower	Oboli	17.8	19.5	1	22.5	60.8	13	43.3	56.3	38.154	
201	LVA-	3102	Eva	Drucka	21.6	20.5	4.6	14.5	61.2	12	44	56	38.150	
202	MDA-	3401	Adrian	Castravet	12.75	7.5	14	11	45.25	19	46.2	65.2	37.718	
203	TJK-	5002	Aziz	Khidraliyev	15.2	9	17	8.5	49.7	13	45.3	58.3	36.914	
204	ARM-	0204	Gor	Margaryan	15.5	12.5	5	9.5	42.5	17	45.9	62.9	36.814	
205	CYP-	1204	Irini	Charalambous	14.9	3	3.4	21.5	42.8	16	45.75	61.75	36.614	
206	KWT-	2904	Hussain	Dashti	17.25	19	8	7	51.25	20	35.1	55.1	36.464	
207	TKM-	5304	Orazdurdy	Rahimov	13.75	19	3.2	5	40.95	16	45	61	36.176	
208	CYP-	1203	Nicholas	Avraamides	7.9	13.5	3.4	7	31.8	17	47.9	64.9	35.634	
209	ARM-	0201	Lusine	Hovhannisyan	16.4	5.5	0	18	39.9	14	45	59	35.592	



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210	ARE-	5504	Abdulahman	Aljabre	9.3	14.75	4.5	8	36.55	12	49.1	61.1	35.537	
211	CYP-	1202	Konstantinos	Christofi	15.5	6.25	2	16	39.75	14	44.3	58.3	35.420	
212	NGA-	3804	Victor	Igono	7.7	7	4	5	23.7	16	48.05	64.05	34.236	
213	KGZ-	3004	Emil	Semetei Uulu	7.3	18	4.2	9	38.5	22	31.55	53.55	34.218	
214	IRL-	2403	Emma	O`Deorain	16.1	17	2	6	41.1	11	38.15	49.15	33.669	
215	KWT-	2902	Abdulrazaq	Alawadhi	9.7	5.5	4.25	16	35.45	12	40.15	52.15	33.461	
216	MNG-	3501	Munkhzul	Tsogtsaikhan	13.4	7.5	0	6	26.9	17	38.8	55.8	32.956	
217	ARE-	5501	Jamal	Al Ali	16.45	7.5	2	9	34.95	10	38.85	48.85	32.682	
218	ARM-	0203	Gor	Avoyan	13.7	5.5	0	7	26.2	13	41.5	54.5	32.573	
219	NGA-	3802	Jesuferanmi	Igbinegie	11.8	11	0	8	30.8	18	31.6	49.6	32.218	
220	KWT-	2903	Ali	Alqudaihi	11.7	4.5	8.7	2	26.9	14	36.2	50.2	31.761	
221	TJK-	5003	Kamila	Zununova	11.45	17	0	6	34.45	14	30.75	44.75	31.731	
222	MDA-	3403	Daniel	Maslo	10.8	10.5	8	8	37.3	9	31.45	40.45	31.242	
223	MNG-	3502	Tsogt-Irgel	Munkhbat	14.15	7	0.8	5	26.95	16	29.45	45.45	30.754	
224	TJK-	5004	Tamonno	Sultanzoda	1.1	15	0	4	20.1	16	33.9	49.9	30.675	
225	ARE-	5503	Yaqub	Almarzoqe	10.2	8.5	0	6	24.7	16	30.6	46.6	30.662	
226	IRL-	2404	William	Mullan	13.9	13	0	3	29.9	10	32.65	42.65	30.600	
227	ARE-	5502	Abdalazez	Alkhaja	8	4	11	8	31	6	34.6	40.6	30.327	
228	MNG-	3503	Bayanbaatar	Munkhsaikhan	16.3	4	1	5	26.3	13	28.75	41.75	29.867	
229	KWT-	2901	Zahraa	Atash	10.5	4	0	8	22.5	15	28.7	43.7	29.712	
230	MNG-	3504	Nasanbat	Sharavjamts	9.85	4	4.5	3	21.35	14	30.4	44.4	29.689	

Mean	20.25	22.31	17.23	28.82	88.60	27.25	64.99	92.24
SD	6.759	7.973	11.649	12.501	33.291	8.897	15.542	23.425

3. Statistical Analysis of Results

Summary Statistics of Raw Scores

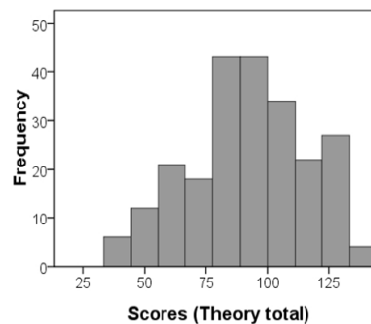
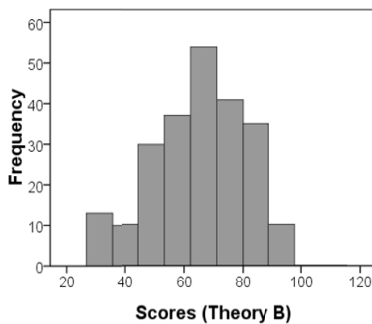
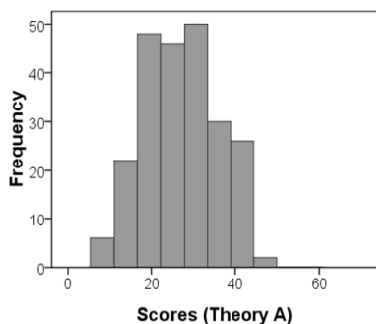
(Total N = 230)

	Max obtainable points	Range		Mean	Relative Mean	SD	CV
		Min	Max				
Practical 1	50	1.1	40.95	20.38	40.8	6.70	0.33
Practical 2	49	3	38	22.42	45.8	7.95	0.35
Practical 3	50	0	50	17.45	34.9	11.56	0.66
Practical 4	51	2	51	29.11	57.1	12.30	0.42
Practical total	200	20.1	170.95	89.36	44.7	32.82	0.37
Theory A	51	6	47	27	52.9	8.68	0.32
Theory B	107.1	28.7	93.2	65.19	60.9	15.54	0.24
Theory total	158.1	40.45	136.6	92.19	58.3	23.57	0.26

Summary Statistics of Theoretical Tests

	Max obtainable points	Range		Mean	Relative Mean	SD	CV
		Min	Max				
Theory A	51	6	47	27	52.9	8.68	0.32
Theory B	107.1	28.7	93.2	65.19	60.9	15.54	0.24
Theory total	158.1	40.45	136.6	92.19	58.3	23.57	0.26

Frequency Distribution of Theoretical Test Scores



Estimation of Test Reliability

- The degree to which the test consistently and accurately evaluates students' performance can be quantified using Kuder-Richardson Method

$$R = (K / K-1)[1 - \{X(K-X) / KX\}]$$

R = test reliability

K = number of items on the test

X = mean of the raw scores from the total test

S = variance of the raw test scores from the total test.

Reliability score of 0.70 ~ 0.80 → good test

0.80 ~ 0.90 → very good test

0.90 ~ 1.00 → excellent test

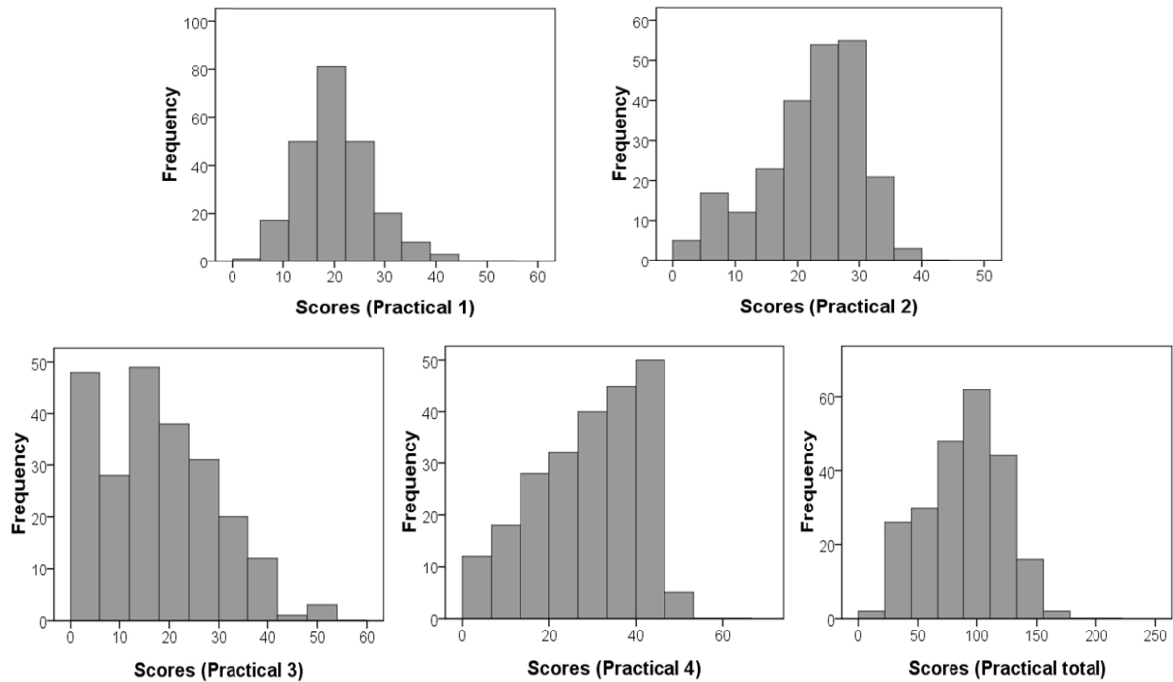
R (Theory A) = 0.86

R (Theory B) = 0.97

Summary Statistics of Practical Tests

	Max obtainable points	Range		Mean	Relative Mean	SD	CV
		Min	Max				
Practical 1	50	1.1	40.95	20.38	40.8	6.70	0.33
Practical 2	49	3	38	22.42	45.8	7.95	0.35
Practical 3	50	0	50	17.45	34.9	11.56	0.66
Practical 4	51	2	51	29.11	57.1	12.30	0.42
Practical total	200	20.1	170.95	89.36	44.7	32.82	0.37

Frequency Distribution of Practical Test Scores

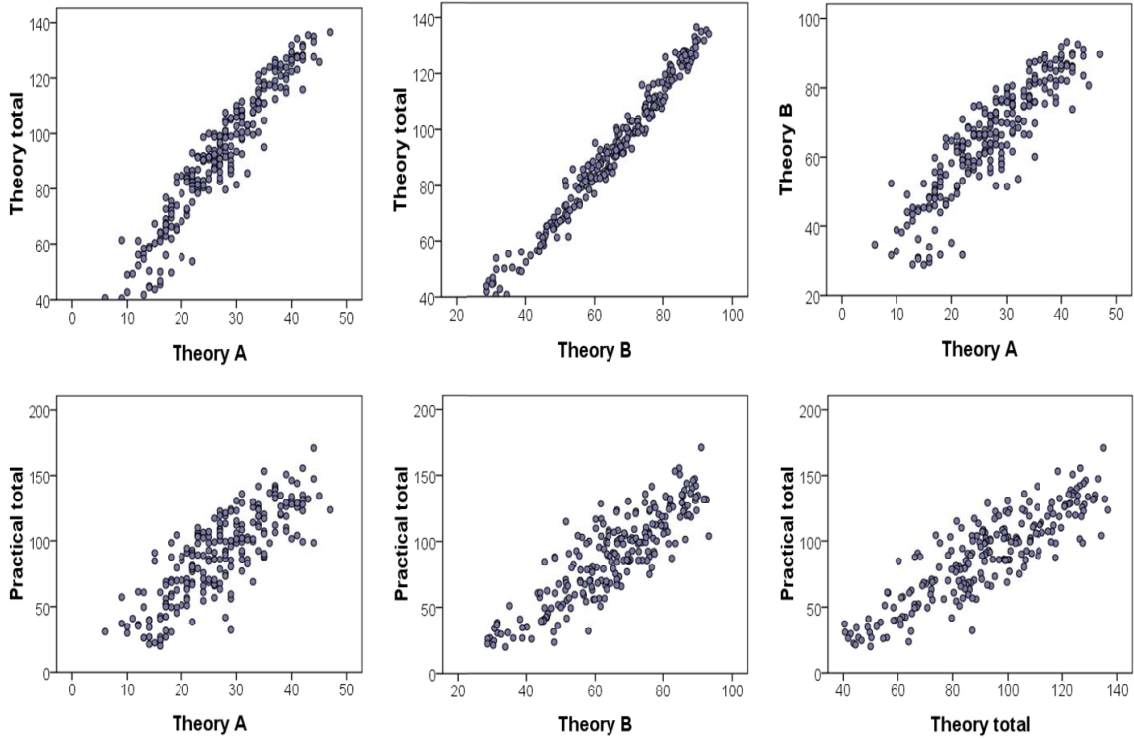


Correlation Matrix

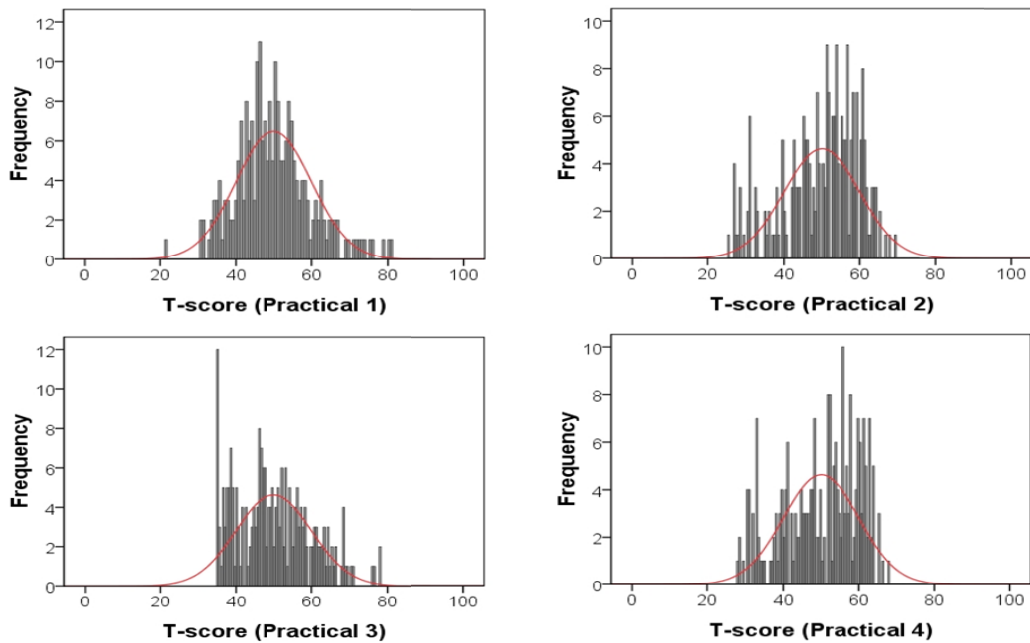
Correlation Coefficient								
	Practical 1	Practical 2	Practical 3	Practical 4	Practical total	Theory A	Theory B	Theory total
Practical 1	1	0.62	0.60	0.60	0.79	0.64	0.67	0.67
Practical 2		1	0.59	0.71	0.84	0.68	0.75	0.75
Practical 3			1	0.63	0.85	0.67	0.67	0.69
Practical 4				1	0.89	0.76	0.82	0.82
Practical total					1	0.82	0.86	0.87
Theory A						1	0.88	0.95
Theory B							1	0.99
Theory total								1

All correlations are significant at alpha = 0.01 level (2-tailed).

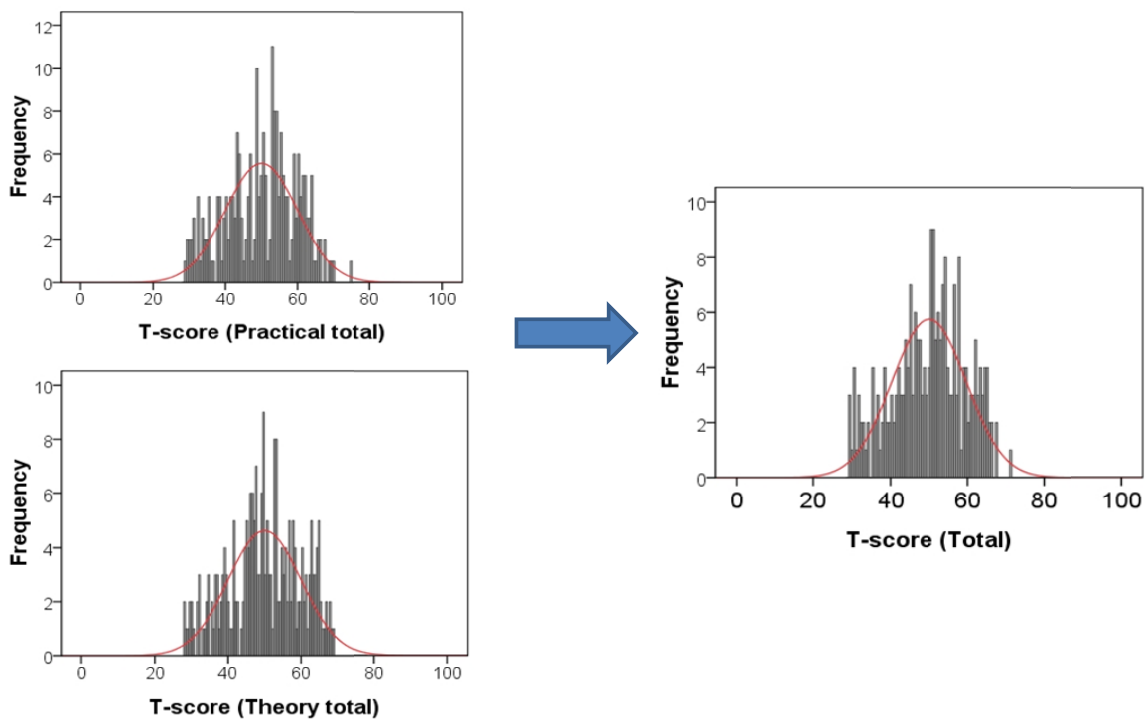
Scatter Plots of Raw Scores



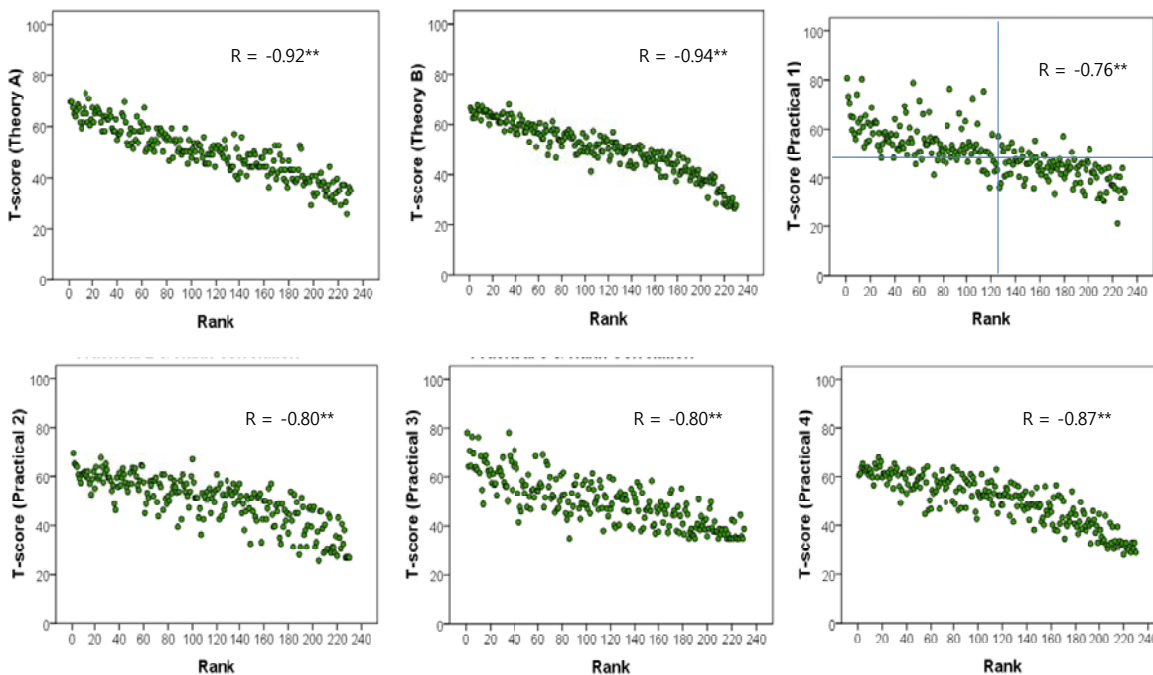
Frequency Distribution of Standardized Scores (1)



Frequency Distribution of Standardized Scores (2)

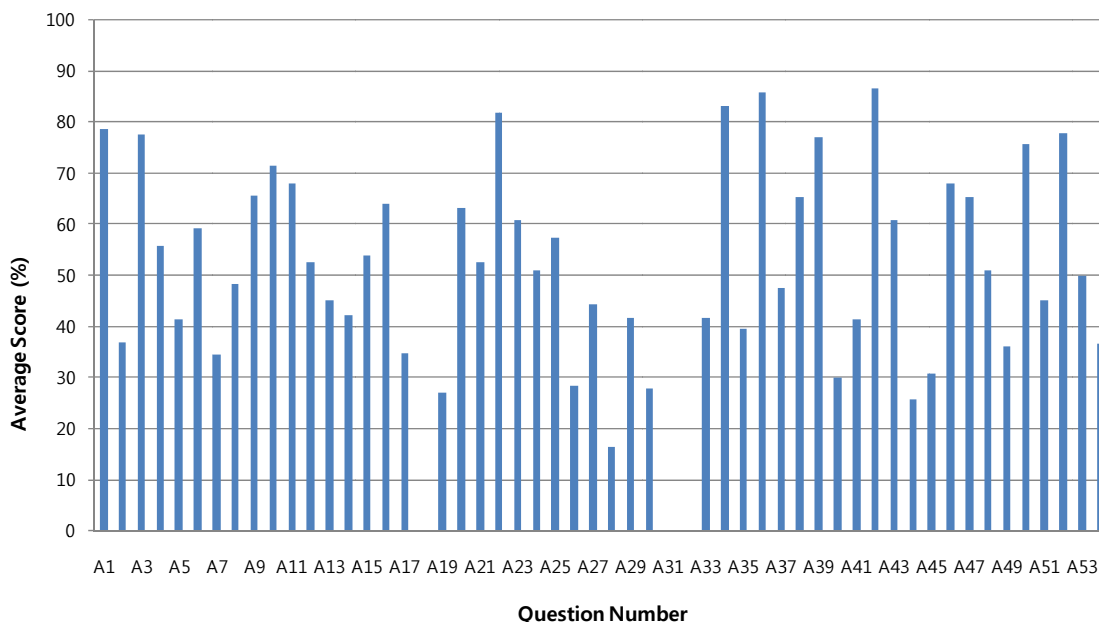


Correlations between Standardized Scores and Ranking



4. Supplementary Analysis of Theoretical Test Results

Theory A - Average Score (%) of Each Question



Average score of Theory A and B : 56.6%
 Q of the highest average score in Theory A : **A42**, 86.5%
 Q of the lowest average score in Theory A : **A28**, 16.5%

Theory A – Discriminatory Power of Each Question

Q	DP Evaluation	Q	DP Evaluation	Q	DP Evaluation
A01	0.109	A19	0.104	A38	0.122
A02	0.074	A20	0.170	A39	0.126
A03	0.157	A21	0.170	A40	0.091
A04	0.200	A22	0.104	A41	0.109
A05	0.074	A23	0.122	A42	0.109
A06	0.130	A24	0.161	A43	0.200
A07	0.135	A25	0.183	A44	0.091
A08	0.239	A26	0.074	A45	0.030
A09	0.178	A27	0.139	A46	0.061
A10	0.165	A28	0.000	A47	0.174
A11	0.122	A29	0.104	A48	0.161
A12	0.083	A30	0.061	A49	0.187
A13	0.183	A33	0.139	A50	0.191
A14	0.178	A34	0.083	A51	0.122
A15	0.052	A35	0.065	A52	0.152
A16	0.187	A36	0.109	A53	0.152
A17	0.174	A37	0.126	A54	0.087

DP	DP grouping
DP ≥ 0.15	High DP
0.10 ≤ DP < 0.15	Middle DP
DP < 0.10	Low DP

Theory A - Average Score (%) of High DP Questions by Medal Groups

Medal	A3	A4	A8	A9	A10	A13	A14	A16	A17	A20	A21	A24	A25	A43	A47	A48	A49	A50	A52	A53
Gold	100.00	72.00	92.00	92.00	96.00	76.00	76.00	88.00	88.00	96.00	96.00	76.00	96.00	100.00	100.00	80.00	52.00	100.00	100.00	92.00
Silver	97.83	89.13	71.74	86.96	95.65	67.39	58.70	89.13	56.52	73.91	69.57	73.91	82.61	84.78	82.61	63.04	58.70	93.48	93.48	65.22
Bronze	81.43	58.57	55.71	72.86	75.71	48.57	47.14	64.29	27.14	74.29	52.86	50.00	58.57	55.71	71.43	58.57	41.43	85.71	84.29	45.71
N1	73.33	46.67	22.22	46.67	57.78	26.67	22.22	44.44	22.22	51.11	33.33	31.11	42.22	46.67	57.78	37.78	11.11	71.11	75.56	46.67
N2	40.91	15.91	13.64	36.36	38.64	18.18	18.18	43.18	6.82	27.27	29.55	34.09	22.73	36.36	25.00	22.73	20.45	31.82	40.91	20.45
Overall mean	78.70	56.46	51.06	66.97	72.76	47.36	44.45	65.81	40.14	64.52	56.26	53.02	60.43	64.71	67.36	52.42	36.74	76.42	78.85	54.01

Theory A - Average Score (%) of Middle DP Questions by Medal Groups

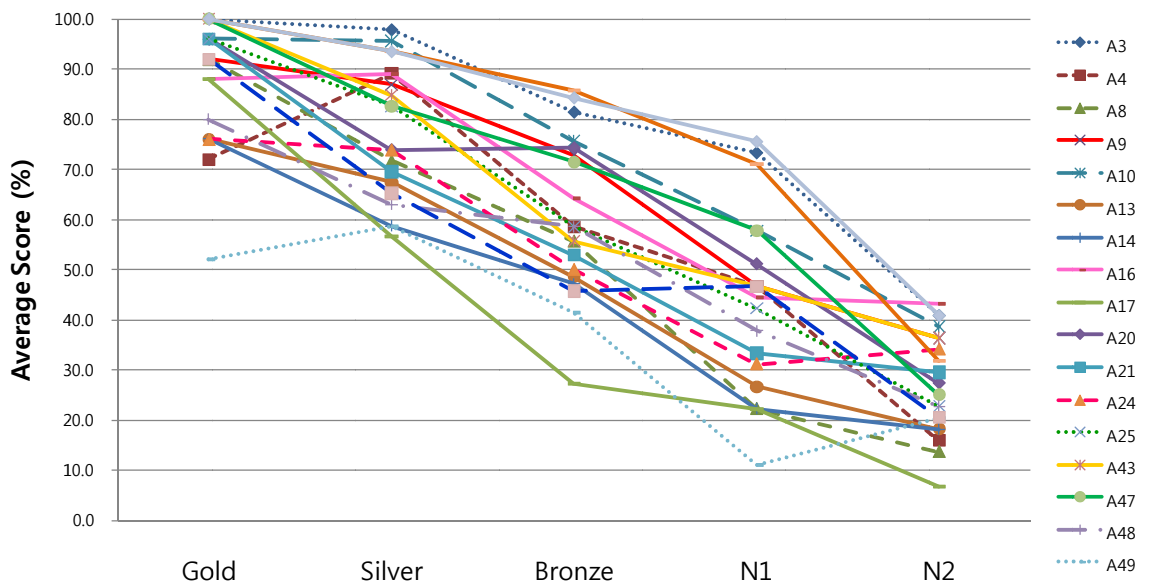
Medal	A1	A6	A7	A11	A19	A22	A23	A27	A29	A33	A36	A37	A38	A39	A41	A42	A51
Gold	96.00	92.00	60.00	96.00	44.00	96.00	88.00	72.00	88.00	60.00	100.00	76.00	96.00	92.00	72.00	100.00	84.00
Silver	93.48	69.57	52.17	84.78	45.65	95.65	82.61	63.04	47.83	54.35	93.48	65.22	89.13	86.96	54.35	97.83	52.17
Bronze	82.86	61.43	32.86	71.43	22.86	87.14	60.00	41.43	37.14	58.57	94.29	37.14	55.71	85.71	38.57	90.00	38.57
N1	68.89	55.56	26.67	55.56	15.56	86.67	55.56	35.56	37.78	13.33	82.22	35.56	53.33	80.00	31.11	86.67	33.33
N2	56.82	29.55	11.36	40.91	15.91	45.45	29.55	22.73	20.45	20.45	59.09	40.91	50.00	40.91	25.00	61.36	38.64
Overall mean	79.61	61.62	36.61	69.74	28.79	82.18	63.14	46.95	46.24	41.34	85.82	50.96	68.84	77.12	44.21	87.17	49.34

N: Non-Medal

Theory A - Average Score (%) of Low DP Questions by Medal Groups														
Medal	A2	A5	A12	A15	A26	A28	A30	A34	A35	A40	A44	A45	A46	A54
Gold	60.00	48.00	84.00	72.00	52.00	20.00	60.00	96.00	56.00	40.00	56.00	72.00	80.00	72.00
Silver	50.00	50.00	58.70	56.52	32.61	23.91	28.26	89.13	36.96	45.65	32.61	30.43	69.57	45.65
Bronze	32.86	42.86	52.86	52.86	28.57	7.00	20.00	85.71	44.29	31.43	22.86	24.00	70.00	25.71
N1	33.33	28.89	48.89	53.33	17.78	16.00	26.67	84.44	37.78	24.44	17.78	29.00	64.44	35.56
N2	20.45	38.64	31.82	43.18	20.45	20.00	22.73	63.64	27.27	11.36	13.64	20.00	59.09	25.00
Overall mean	39.33	41.68	55.25	55.58	30.28	17.38	31.53	83.79	40.46	30.58	28.58	35.09	68.62	40.78

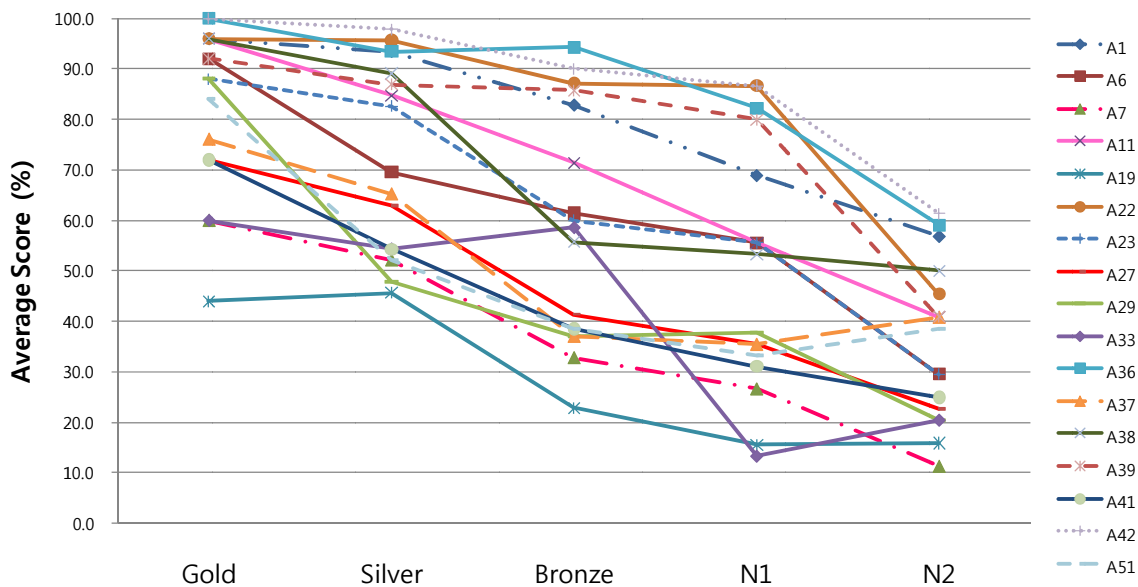
N: Non-Medal

Theory A – Scores of High DP Questions by Medal Groups



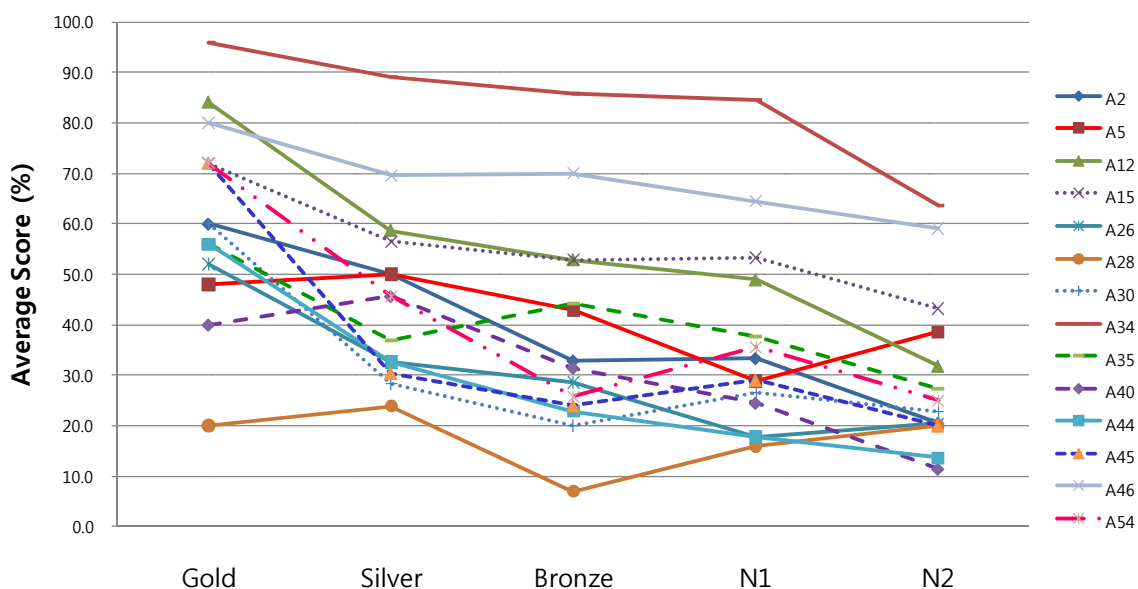
DP	DP grouping
DP ≥ 0.15	High DP
0.10 ≤ DP < 0.15	Middle DP
DP < 0.10	Low DP

Theory A – Scores of Middle DP Questions by Medal Groups



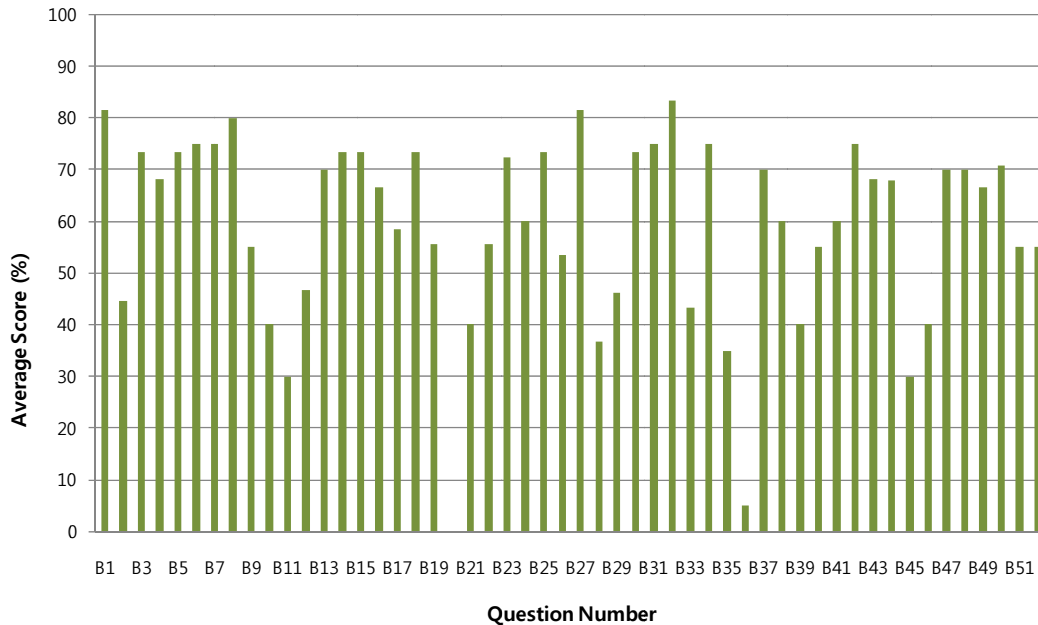
DP	DP grouping
DP \geq 0.15	High DP
0.10 \leq DP < 0.15	Middle DP
DP < 0.10	Low DP

Theory A – Scores of Low DP Questions by Medal Groups



DP	DP grouping
DP \geq 0.15	High DP
0.10 \leq DP < 0.15	Middle DP
DP < 0.10	Low DP

Theory B – Average Score (%) of Each Question



Average Score of Theory A and B : 56.6%
 Q of the highest average score in Theory B : **B32**, 83.3%
 Q of the lowest average score in Theory B : **B36**, 5.0%

Theory B – Discriminatory Power of Each Question

Q	DP Evaluation	Q	DP Evaluation	Q	DP Evaluation
B01	0.701	B18	0.492	B36	0.423
B02	0.518	B19	0.431	B37	0.271
B03	0.494	B21	0.566	B38	0.437
B04	0.663	B22	0.349	B39	0.584
B05	0.342	B23	0.258	B40	0.304
B06	0.395	B24	0.254	B41	0.603
B07	0.492	B25	0.411	B42	0.655
B08	0.440	B26	0.424	B43	0.359
B09	0.419	B27	0.564	B44	0.574
B10	-0.064	B28	0.393	B45	0.546
B11	0.439	B29	0.551	B46	0.414
B12	0.467	B30	0.606	B47	0.493
B13	0.460	B31	0.373	B48	0.679
B14	0.348	B32	0.602	B49	0.409
B15	0.715	B33	0.538	B50	0.563
B16	0.614	B34	0.445	B51	0.564
B17	0.450	B35	0.462	B52	0.530

DP	DP grouping
DP ≥ 0.50	High DP
0.40 ≤ DP < 0.50	Middle DP
DP < 0.30	Low DP

Theory B - Average Score (%) of High DP Questions by Medal Groups

Medal	B1	B2	B4	B15	B16	B21	B27	B29	B30	B32	B33	B39	B41	B42	B44	B45	B48	B50	B51	B52
Gold	100.00	59.11	97.27	96.40	96.00	96.00	73.33	61.33	72.92	98.40	91.33	78.93	92.00	100.00	90.91	81.14	98.00	90.40	94.50	95.00
Silver	99.03	52.17	86.96	91.52	90.58	82.34	72.10	51.09	66.56	95.22	90.58	70.72	75.00	86.41	76.78	78.11	88.04	86.09	86.96	67.39
Bronze	93.81	47.94	75.32	79.14	70.95	78.04	58.57	41.67	47.25	77.43	85.00	61.52	62.86	63.57	77.14	71.02	76.79	71.71	75.36	58.93
N1	79.26	42.72	56.97	64.67	62.96	70.83	44.44	27.41	44.10	65.78	78.52	52.89	38.89	43.89	62.93	65.24	68.33	61.78	71.11	45.56
N2	40.40	29.80	40.08	48.86	34.09	53.13	17.05	15.91	15.91	44.09	65.91	36.67	12.50	20.45	43.18	42.05	23.86	40.45	33.24	23.86
Overall mean	82.50	46.35	71.32	76.12	70.92	76.07	53.10	39.48	49.35	76.18	82.27	60.15	56.25	62.87	70.19	67.51	71.01	70.09	72.23	58.15

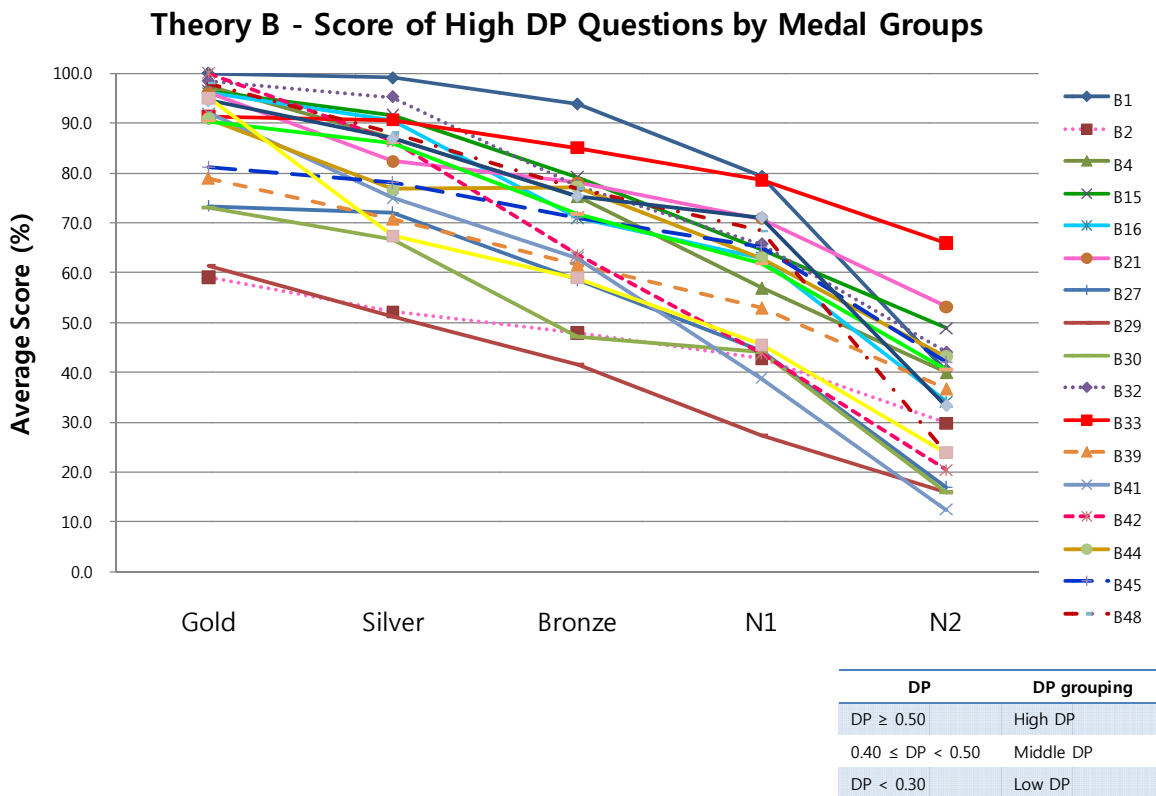
N: Non-Medal

Theory B - Average Score (%) of Middle DP Questions by Medal Groups

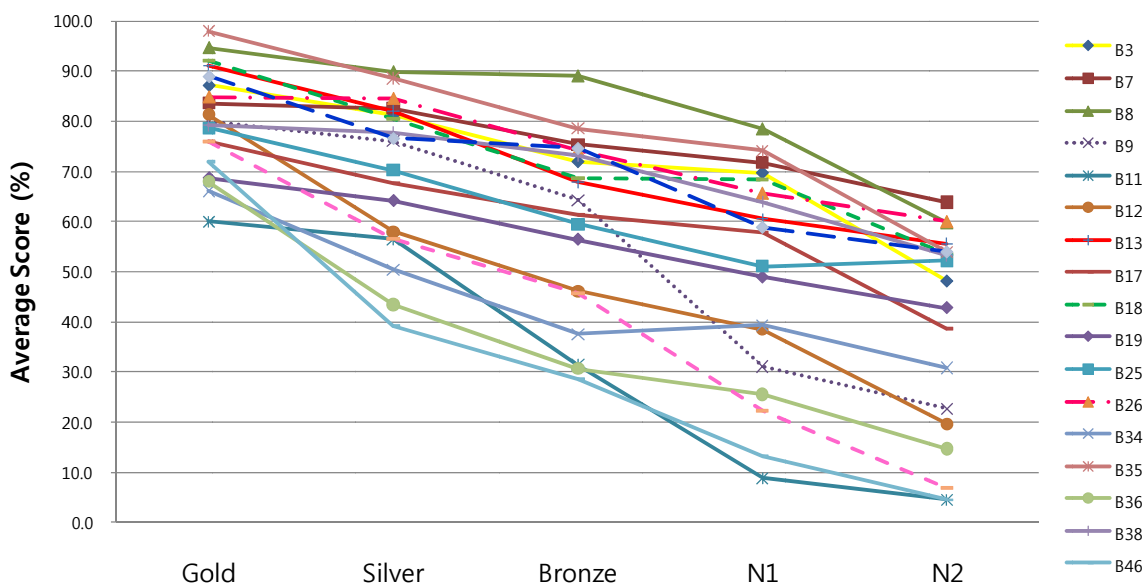
Medal	B3	B7	B8	B9	B11	B12	B13	B17	B18	B19	B25	B26	B34	B35	B36	B38	B46	B47	B49
Gold	87.20	83.60	94.67	80.00	60.00	81.33	91.00	76.00	92.00	68.67	78.67	84.80	66.13	98.00	68.00	79.20	72.00	76.00	89.00
Silver	81.30	82.61	89.86	76.09	56.52	57.97	82.07	67.75	80.43	64.13	70.29	84.49	50.43	88.59	43.48	77.83	39.13	56.52	76.63
Bronze	72.00	75.43	89.05	64.29	31.43	46.19	67.86	61.43	68.57	56.43	59.52	74.19	37.62	78.57	30.71	73.14	28.57	45.71	74.64
N1	69.78	71.78	78.52	31.11	8.89	38.52	60.56	57.78	68.44	48.89	51.11	65.63	39.33	74.17	25.56	64.00	13.33	22.22	58.89
N2	48.18	63.86	59.85	22.73	4.55	19.70	55.68	38.64	53.64	42.80	52.27	60.00	30.83	53.98	14.77	53.18	4.55	6.82	53.98
Overall mean	71.69	75.46	82.39	54.84	32.28	48.74	71.43	60.32	72.62	56.18	62.37	73.82	44.87	78.66	36.50	69.47	31.52	41.46	70.63

N: Non-Medal

Theory B - Average Score (%) of Low DP Questions by Medal Groups												
Medal	B5	B6	B10	B14	B22	B23	B24	B28	B31	B37	B40	B43
Gold	93.33	89.00	31.20	97.33	66.00	73.33	87.33	90.67	83.20	18.00	58.00	86.00
Silver	86.23	79.89	37.68	84.06	49.46	75.36	81.16	88.65	81.30	15.22	59.78	83.15
Bronze	75.71	76.07	33.81	71.90	37.86	69.05	71.67	83.97	78.57	4.29	38.57	79.29
N1	67.41	67.44	37.04	77.04	30.56	70.37	72.59	82.22	75.56	0.00	31.11	69.44
N2	65.15	60.23	43.94	63.64	30.68	56.06	68.94	72.81	57.73	0.00	32.95	64.20
Overall mean	77.57	74.53	36.73	78.79	42.91	68.83	76.34	83.66	75.27	7.50	44.08	76.42

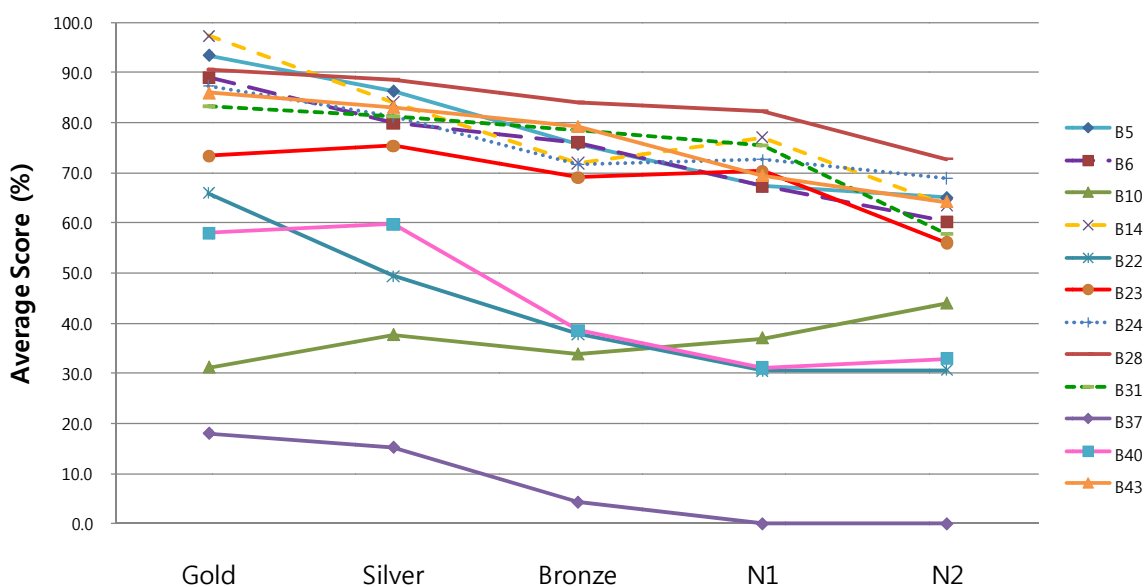


Theory B – Score of Middle DP Questions by Medal Groups



DP	DP grouping
DP \geq 0.50	High DP
0.40 \leq DP < 0.50	Middle DP
DP < 0.30	Low DP

Theory B – Score of Low DP Questions by Medal Groups



DP	DP grouping
DP \geq 0.50	High DP
0.40 \leq DP < 0.50	Middle DP
DP < 0.30	Low DP