



# Swiss Young Naturalists' Tournament 2017

FHNW Brugg-Windisch  
6<sup>th</sup> May 2017



## Welcome to the SYNT 2017

Dear participants, teachers, jurors and parents,

The **Swiss Young Naturalists' Tournament** is making its debut! Following ten years of experience with the Swiss Young Physicists' Tournament, our association wished to offer the unique experience to a wider audience. The SYNT covers the three main natural sciences and introduces young students to the world of science and research.

With 34 participants and more than 50 jurors and guests at this years' SYNT, we are happy that the new competition is well received among students and teachers. We are pleased that the **FHNW Brugg-Windisch** will host this years' tournament. Its modern infrastructure and broad research scope makes it an attractive venue for the SYNT 2017.

The SYNT is only possible thanks to the generous financial contributions of our partners. Furthermore, we are delighted to count on numerous volunteers, teachers and the organizing committee to make the tournament successful.

It is our pleasure to welcome you to the first SYNT!

Pro IYPT-CH and Organizing Committee

Visit [www.swissynt.ch](http://www.swissynt.ch) for the latest information on the SYNT 2017.



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## Swiss Young Naturalists' Tournament

Where tomorrow's scientists meet.

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### IYNT

The **International Young Naturalists' Tournament** (IYNT, also see [www.iynt.org](http://www.iynt.org)), bridges gaps between natural sciences and inspires young students. The IYNT aims at promoting creative potential of teenagers aged 12 through 16 who are eager to explore the World, experiment, work in teams, and gain new skills in an international setting.

A so-called **Science Fight** resembles a scientific seminar and lines up three teams of six students each. The teams in turn present and discuss their solutions to one of the problems and review the performances of the other teams. They are then graded by professional jury of research scientists and educators.

The **problems** of the IYNT are published one year prior to the tournament and come from various areas of natural sciences. They are chosen such that no single correct solution exists and thus each presentation will show different aspects of the problem. Careful preparation and creativity in solutions are as important for creating a good impression, as is a good understanding of natural sciences.

In **preparing** for the IYNT students do not just learn how to tackle challenging science problems, but also how to work in a **team**, use computers to **collect and analyse data, present scientific results and debate**. The Science Fights are in **English**, helping the students prepare for their future at university where an increasing number of lectures and seminars are held in English.

### Pro IYPT-CH

The SYNT is organized by the organization Pro IYPT-CH. The aim of Pro IYPT-CH is to make the idea behind the International Young Physicists' Tournament (IYPT) better known in Switzerland and to promote and support the commitment of institutions, teachers and students. Starting 2017 our organization will also focus on younger students interested in science and offer a new tournament: the **Swiss Young Naturalists' Tournament** (SYNT).

Beside organizing the Swiss tournaments SYNT/ SYPT and the preparation events SYNT Workshop/ Physics Week, the tasks of Pro IYPT-CH include publicity, the selection and preparation of the Swiss teams for the IYNT and IYPT as well as the coaching during these tournaments. If you would like to support Pro IYPT-CH and the SYNT/SYPT and would like to be informed about our activities, you are very welcome to **become a member**. Please contact Lioba Heimbach (see below) to get more information about membership or register online ([www.swissynt.ch](http://www.swissynt.ch)).

**President:** Samuel Byland, MNG Rämibühl Zürich ([samuel.byland@swissynt.ch](mailto:samuel.byland@swissynt.ch))

**Members:** Lioba Heimbach, ETH Zürich ([members@swissynt.ch](mailto:members@swissynt.ch))

**Website:** [www.swissynt.ch](http://www.swissynt.ch)

## Agenda of the SYNT 2017

**Date:** Saturday, 6<sup>th</sup> May 2017

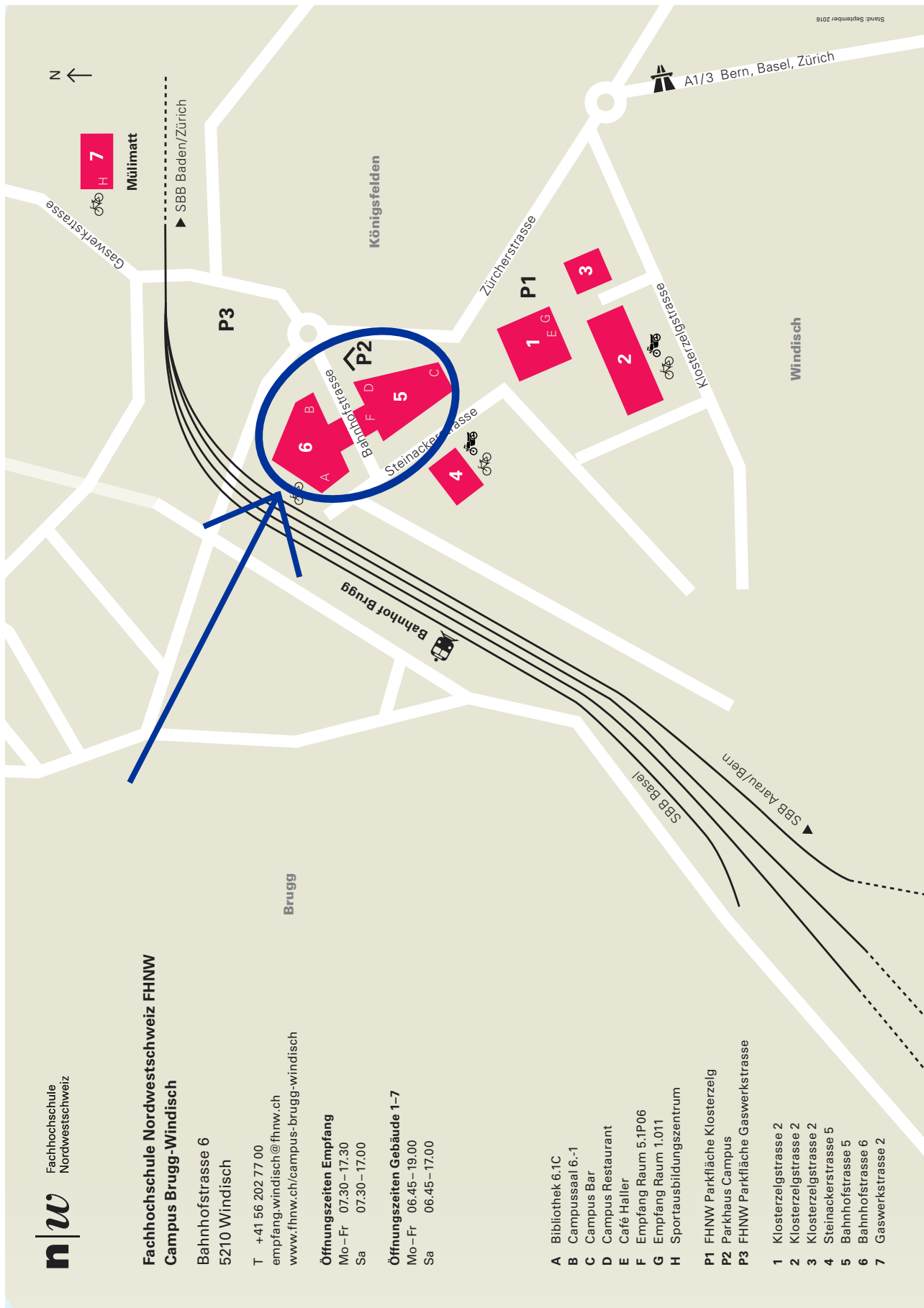
**Venue:** FHNW Brugg-Windisch

**Fees:** Participation at the SYNT is **completely free**. Lunch and dinner are offered by the organiser. Train tickets will be refunded after the tournament. To have your train ticket (return ticket, 2. class, Halbtax) reimbursed, please send a scan of the receipt along with all relevant banking information (such as IBAN, full name, address, ...) to our treasurer, Daniel Keller ([treasurer@swissynt.ch](mailto:treasurer@swissynt.ch)).

### Saturday, 6<sup>th</sup> May

from 8:15	Arrival, coffee & orange juice ( <b>entrance hall</b> in front of Forumsraum)
9:00	Address of welcome (Forumsraum 5.0B15/5.0B16)
9:30	Team photos (entrance hall) / Jury meeting (room 5.2A17)
10:30	Science Fights round 1 (See Fight Plan p. 8)
12:00	Lunch (Mensa)
13:00	Science Fights round 2 (See Fight Plan p. 9)
14:30	Coffee (entrance hall)
15:00	Final Fight (Forumsraum 5.0B15/5.0B16)
16:45	Award Ceremony (Forumsraum 5.0B15/5.0B16)
17:30	Dinner (entrance hall)

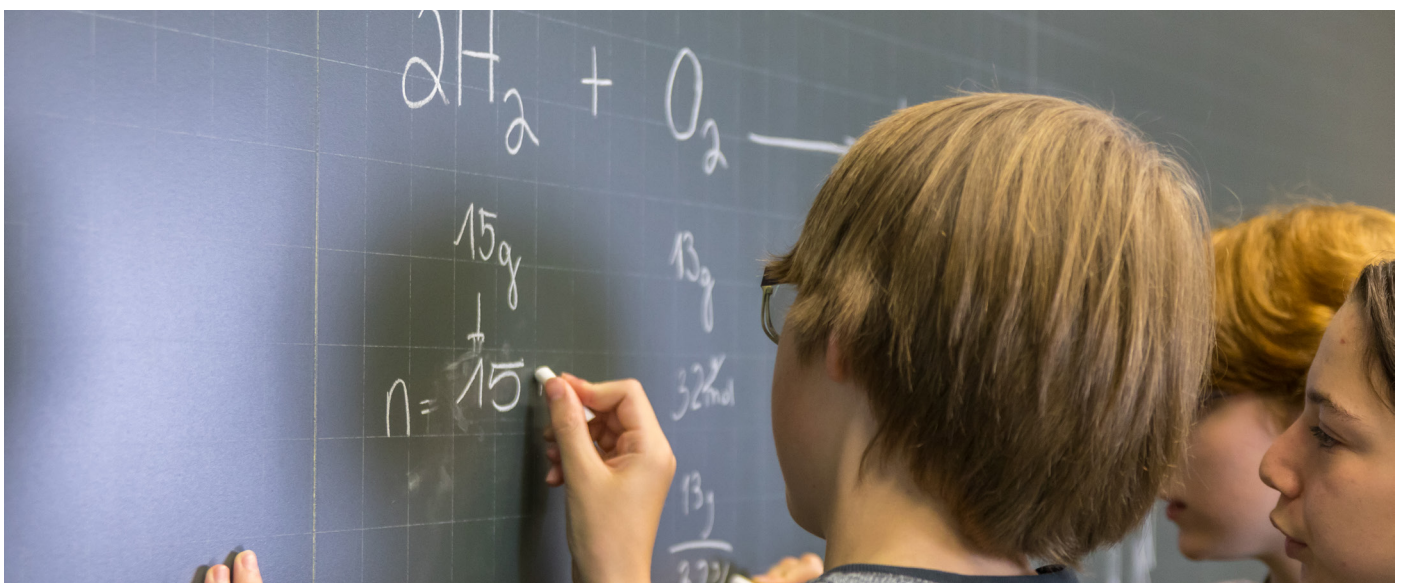




## Problems for the SYNT 2017

- A) **Apples:** Why do apple slices turn brown after being cut? Investigate the speed of this process and test methods to prevent browning of apple slices.
- B) **Growing through asphalt:** Can a little plant grow straight up through concrete or asphalt?
- C) **Tonic water in UV light:** Tonic water glows brightly when exposed to an ultraviolet black light bulb. It is however easy to quench the glow of tonic water by adding salt. Investigate this effect. What other common substances glow under UV light and how can one influence their glow?
- D) **Salt production:** Solar evaporation of seawater or salt mining are common methods to produce common salt (NaCl). Propose a method to extract salt from a natural source and determine both productive capacity of your method and purity of the product. Demonstrate an amount of salt produced by your method.
- E) **Rijke's tube:** If air inside a vertical cylindrical tube open at both ends is heated, the tube produces sound. Study this effect.
- F) **Grow light:** Investigate how different types of artificial lights affect plant growth. What is the role of light spectrum?
- G) **Milk:** Develop simple methods allowing determination of some of the important properties of milk. Suggest an investigation requiring comparison of various milk samples.
- H) **Allometry:** How do length and thickness of bones scale with overall size and weight of animal?
- I) **Routers and garden cress:** In 2013, five young students claimed a sensational discovery that garden cress (*Lepidium sativum*) won't germinate when placed near two Wi-Fi routers. Reproduce their experiments under controlled conditions to support or dismiss their conclusions.
- J) **Water from the air:** Design and construct a device allowing collection of water by condensing moisture from air. Determine if the water obtained with your device is suitable for drinking. What amount of water is possible to collect during one Science Fight?
- K) **Paper wrinkles:** When a piece of paper dries after being wet, it can get wrinkled. Investigate and explain this phenomenon.
- L) **Tornado machine:** Build a machine to produce an indoor air tornado. Investigate the properties and stability of the tornado. Is the machine portable enough to be demonstrated at a Science Fight room of the 1<sup>st</sup> SYNT?

(Problems from [www.iynt.org](http://www.iynt.org))



# Fight Plan SYNT 2017

Round 1 (Saturday, 6 May, 10:30 - 12:00)

Fight	Reporter	Opponent	
Fight 1.1 Room 5.1H14	Science Sentinels	O2	
	Adil Sadikovic J Water from the air	Izabela Jaszcz	
	O2	Science Sentinels	
Fight 1.2 Room 5.1H01	Ilinca Ledan C Tonic water in UV light	Michael Klein	
	Reporter	Opponent	
	Wind and Water	DIATOMICS	
Fight 1.3 Room 5.1D11	Noé Widmer J Water from the air	Simran Raheja	
	DIATOMICS	Wind and Water	
	Nina Klee C Tonic water in UV light	Timo Wiedmer	
Fight 1.4 Room 5.1H16	Reporter	Opponent	
	the 99er's	Funkycat	
	Shivram Sambhus D Salt production	Luna Kühne	
Fight 1.5 Room 5.2A17	Funkycat	the 99er's	
	Pascal Schmucki E Rijke's tube	Samuel Züllig	
	Reporter	Opponent	
Fight 1.6 Room 5.2D11	The Zenti-Boys	Entropy	
	Apostolos Papisikas E Rijke's tube	Ankit Singhal	
	Entropy	The Zenti-Boys	
Fight 1.7 Room 5.2H01	Luca Nashabeh D Salt production	Jeremy van der Schans	
	Reporter	Opponent	
	Die Noebodies	Photosynthathise	
Fight 1.8 Room 5.2H03	Noah Rosenbaum E Rijke's tube	Nadine Benvenisti	
	Photosynthathise	Die Noebodies	
	Emma Otis F Grow light	Tim Rogenmoser	
Fight 1.8 Room 5.2H03	Reporter	Opponent	Observer
	Schrödinger's Club	MNGirls	Chaotic Sysytems
	Philipp Herzog E Rijke's tube	Leia Kupferschmied	
	MNGirls	Chaotic Sysytems	Schrödinger's Club
	Hannah Fairless H Allometry	Alexander Georgiadis	
Fight 1.7 Room 5.2H01	Chaotic Sysytems	Schrödinger's Club	MNGirls
	Marit Fuchs C Tonic water in UV light	Max Huber	
	Reporter	Opponent	
Fight 1.7 Room 5.2H01	Entangled Particles	CARIDA	
	Alison Righes G Milk	Carlo Kühnis	
	CARIDA	Entangled Particles	
Fight 1.8 Room 5.2H03	Ida Herberstein A Apples	Lara Matijevic	
	Reporter	Opponent	
	Team 4	fresh air	
Fight 1.8 Room 5.2H03	Timmy Ho C Tonic water in UV light	Linus Beck	
	fresh air	Team 4	
	Iman Abidi A Apples	Titan Csokona	



# Fight Plan SYNT 2017

Round 2 (Saturday, 6 May, 13:00 - 14:30)

Fight	Reporter	Opponent	Observer
Fight 2.1 Room 5.1H14	Entangled Particles	Die Noebodies	
	Lara Matijevic J Water from the air	Noah Rosenbaum	
	Die Noebodies	Entangled Particles	
Fight 2.2 Room 5.1H01	Tim Rogenmoser L Tornado machine	Alison Righes	
	Reporter	Opponent	
	The Zenti-Boys	MNGirls	
Fight 2.3 Room 5.1D11	Jeremy van der Schans L Tornado machine	Hannah Fairless	
	MNGirls	The Zenti-Boys	
	Leia Kupferschmied C Tonic water in UV light	Apostolos Papisikas	
Fight 2.4 Room 5.1H16	Reporter	Opponent	Observer
	Science Sentinels	DIATOMICS	Team 4
	Michael Klein E Rijke's tube	Nina Klee	
Fight 2.5 Room 5.2A17	DIATOMICS	Science Sentinels	
	Simran Raheja A Apples	Adil Sadikovic	
	Chaotic Sysytems	Photosympathise	Team 4
Fight 2.6 Room 5.2D11	Alexander Georgiadis J Water from the air	Emma Otis	
	Photosympathise	Team 4	Chaotic Sysytems
	Nadine Benvenisti D Salt production	Timmy Ho	
Fight 2.7 Room 5.2H01	Team 4	Chaotic Sysytems	Photosympathise
	Titan Csokona L Tornado machine	Marit Fuchs	
	Reporter	Opponent	
Fight 2.8 Room 5.2H03	Schrödinger's Club	CARIDA	
	Max Huber J Water from the air	Ida Herberstein	
	CARIDA	Schrödinger's Club	
Fight 2.8 Room 5.2H03	Carlo Kühnis L Tornado machine	Philipp Herzog	
	Entropy	Funkycat	
	Ankit Singhal J Water from the air	Pascal Schmucki	
Fight 2.7 Room 5.2H01	Funkycat	Entropy	
	Luna Kühne L Tornado machine	Luca Nashabeh	
	Wind and Water	O2	
Fight 2.8 Room 5.2H03	Timo Wiedmer L Tornado machine	Ilinca Ledan	
	O2	Wind and Water	
	Izabela Jaszcz K Paper wrinkles	Noé Widmer	
Fight 2.8 Room 5.2H03	Reporter	Opponent	
	the 99er's	fresh air	
	Samuel Züllig J Water from the air	Iman Abidi	
Fight 2.8 Room 5.2H03	fresh air	the 99er's	
	Linus Beck L Tornado machine	Shivram Sambhus	

## Regulations for the SYNT 2017

### 1. Swiss Young Naturalists' Tournament

The [Swiss Young Naturalists' Tournament \(SYNT\)](#) is a science competition for students up to 16 years old (students must not turn 17 years during the calendar year of the respective tournament). Participants are challenged to prepare a theoretical and experimental solution to a complex problem and to present and defend their solution in a debate (Science Fight) against the opposing team's scrutiny.

The SYNT takes place on one day (e.g. Saturday) before the International Young Naturalists' Tournament (IYNT) of the same year (i.e. usually between March and May). The tournament is organised by the association Pro IYPT-CH.

In order to facilitate preparation for students wishing to participate at the SYNT, Pro IYPT-CH organizes the SYNT Science Workshop. The [SYNT Science Workshop](#) is a three-day long preparation course during which participants can conduct measurements and learn the basic skills required at the SYNT. The SYNT Science Workshop takes place a few weeks prior to the SYNT.

The [problems](#) for the SYNT are selected from the IYNT problems. They are published on the SYNT website ([www.swissynt.ch](http://www.swissynt.ch)) at least six months before the SYNT.

### 2. Website

Important information (deadlines, problems, results, etc.) about the SYNT and the Swiss team at the IYNT are published on the SYNT website ([www.swissynt.ch](http://www.swissynt.ch)).

### 3. Preregistration and Application

We encourage a [pre-registration](#) by 15<sup>th</sup> January 2017. The final deadline for registration is the [28<sup>th</sup> February 2017](#). This date applies both for students wishing to participate at the SYNT and the SYNT Workshop as well as for students who only wish to participate at the SYNT.

An application is only valid if the [terms of participation](#) arrives on time (as mentioned above) and with the respective signatures. The terms of participation can be found on [www.swissynt.ch](http://www.swissynt.ch). The terms of participation must be mailed to:

Samuel Byland  
Verein Pro IYPT-CH  
MNG Rämibühl, Physikinstitut  
Rämistrasse 54  
8001 Zürich

There are two possible ways to apply. In any case the deadline mentioned above apply:

- School teams: Any secondary school (including international schools, private schools and others) in Switzerland can nominate one or several [teams of two students](#).
- Individual participants: The organiser will try to match students applying as [individuals](#) with other students to form teams of two students.

Every student in a team has to present the solution to a different problem.

#### 4. Fees

The participation at the SYNT and SYNT Science Workshop is **free**. The costs for train tickets and for food are offered by the organiser and/or the host. Pro IYPT-CH has a limited budget for experimental equipment. Please contact the president in due time if you would like to benefit from financial support.

#### 5. Preparation

Pro IYPT-CH organizes the SYNT Science Workshop during which the students receive coaching and can prepare for the tournament.

In addition, Pro IYPT-CH seeks the support of **universities and research institutes** (e.g. ETH, Empa, Science Lab, etc.) in order to allow the students to use adequate experimental equipment where the schools cannot provide this or to get in contact with experts in the respective field.

#### 6. Science Fights

All teams participate in two rounds of **preliminary Science Fights**. The fight plan is published before the start of the SYNT. Every student in a team takes the role of Reporter and Opponent exactly once. The Science Fights are **in English**. In justified cases the organiser may allow exceptions.

#### 7. Science Fight Regulations

##### 7.1. Stages and Time Schedule

At the start of a round the jury members and the teams briefly introduce themselves.

A Science Fight with two teams is divided into two stages. In each stage the roles of the **Reporter** and **Opponent** are assigned according to the table below. If there are teams with more or less than two students or Science Fights with more or less than two teams, similar schemes apply.

Science Fight with two teams		
Stage	1	2
Team 1	Rep	Opp
Team 2	Opp	Rep

The tasks for the two students actively involved in a fight are as follows:

- The **Reporter** presents his/her solution for the selected problem. The solution is expected to cover at least an important aspect of the problem with a theoretical model and experimental results verifying this model. The solution should be understandable for a secondary school student.
- The **Opponent** asks clarifying and critical questions and points out possible shortcomings and mistakes in the solution presented by the Reporter. He/She shows the presentation's strengths and weaknesses. The discussion has to be based on the solution presented by the Reporter (not on the Opponent's). A good Opponent should lead the discussion in a way that both participants can learn something new.

The Science Fight follows a strict timetable (see table below). After the time reserved for a phase has been used up no new thought may be added. If the preparation time is exceeded, the time for the next phase is shortened accordingly.

Phase	Time (total 30')
Presentation of the Reporter	8'
Clarifying questions of the Opponent to the Reporter	3'
Preparation of the Opponent	3'
Statement by the Opponent	4'
Discussion between Opponent and Reporter	5'
Concluding Remarks of the Opponent	1'
Concluding Remarks of the Reporter	1'
Clarifying questions of the jury to all speakers	5'

## 7.2. Team Work and Aids

During a Science Fight the team members are allowed to communicate with each other. Support from outside the team (e.g. from their science teacher) is strictly forbidden.

During every stage of a Science Fight there is only one active participant per team. The other team members are allowed to help with short comments or give technical support.

## 8. Jury

The Jury is organised by Pro IYPT-CH. Each jury consist of a chair person who ensures that the SYNT-regulations are obeyed and other jurors.

At the end of every stage the jury assesses the performances and every juror shows marks from **1 to 30 for the Reporter** and from **1 to 20 for the Opponent**. The score for a team corresponds to the weighted average (highest and lowest mark with 50 %, all others with 100 %).

## 9. Ranking

The grades of each fight are used to make a team and an individual ranking. Both rankings will be published.





## 10. Final Fight

The two teams with the **highest total score** (team ranking) after two rounds qualify for the **Final Fight**. In case of two teams in second place with the same total score the more balanced individual scores are preferred. In the Final Fight the second team after second rounds presents first, the first team last.

Within thirty minutes after announcing the participants of the Final Fight, the teams notify the organiser of their favourite problem. If both teams intend to present the same problem, the better-placed team has higher priority. The accepted problems are announced immediately.

The Final Fight follows the same regulations as the normal Science Fights. In a team of two every team member has to be on stage in at least one role.

## 11. Absence of a Team Member

In case one team member is unexpectedly unable to attend the SYNT the team must report this to the organizers immediately.

The team is then expected to perform the roles of the missing team member. The grades do not count for the individual ranking. The remaining team member may find one additional helper who is eligible to participate at the SYNT and is not active in another fight. The helper is not allowed to take a role on stage. The organizers must be informed immediately.

## 12. Team Selection

Six students can qualify to represent Switzerland at the International Young Naturalists' Tournament (IYNT).

The members of the winning team are directly qualified, unless a team member missed one of his/her stages in the preliminary rounds. Other team members are selected by Pro IYPT-CH. For this Pro IYPT-CH considers the individual ranking as well as further criteria.

In case a member is unable to be part of the IYNT-team Pro IYPT-CH will approach further candidates.

## 13. Responsibilities

The regulations have been approved by the association Pro IYPT-CH.

Zurich, 14.12.2016

## Ranking, Team Selection and Awards

In addition to the **team ranking** a ranking of the scores of all participants (**individual ranking**) is published. The latter is based on the weighted sum of all individual scores in the first two rounds. The team with the highest score in the Final Fight wins the **SYNT Team Competition**.

Six participants are chosen to represent Switzerland at the **International Young Naturalists' Tournament (IYNT)**. The members of the winning team are directly qualified. The other members of the Swiss team are selected by Pro IYPT-CH (in cooperation with the jury). For this, the performance in the preliminary rounds will be considered, including the individual ranking as well as other criteria such as teamworking skills or scientific understanding.

Students who qualify for the IYNT will receive an invitation via email which has to be accepted within four days after the tournament (10<sup>th</sup> May). The members of the Swiss teams are expected to work on further problems for the IYNT and participate at preparation sessions.

All participants receive a **certificate** confirming their successful participation at the SYNT, and a small gift. The final teams and up to five additional teams will be awarded with **medals** and attractive **prizes**.

Rankings are published on [www.swissynt.ch](http://www.swissynt.ch).



## Marking Guidelines

### Presentation:

- Structure (balanced theoretical and experimental parts, focus on relevant results)
- Comprehensibility (adequate level, good visuals, clear statements)
- Completeness (greater context of problem, relevant parameters introduced, theoretical prediction for relevant aspects, comparison with own measurements, questions in task answered, bibliography)
- Scientifically correct (experiments well documented, valid approach and conclusions, consistent notation, units)
- Diagrams (correct axis labels, error bars, justified fit functions, fit parameters with correct units, conclusions drawn from results, deviations from fit function or theory discussed)
- Errors (reasonable error estimates, properly rounded results, comparison with theoretical predictions and/or literature)
- Layout (appealing and consistent design, titles, slide numbers, captions for figures and table, formulae set with formula editor)

### Discussion :

- Analytical skills (grasp strengths and weaknesses, reaction to new ideas)
- Understanding of natural sciences (broad and deep knowledge base, quickly grasps new concepts)
- Politeness (objective and constructive feedback, polite and calm discussion, persistent but fair)
- Course of discussion (Opponent leads the discussion without dominating, active and equal participation in discussion of Reporter/Opponent, discussion of relevant aspects whilst sticking to solution of the Reporter, clearly stating own opinion)

### Personal Skills:

- Language (understandable English, clear pronunciation, vivid speech, convincing body language)
- Teamwork (shares and explains own results, helps team with own skills, persuasive and motivating personality)
- Reaction to critique (can accept critique and reacts in a positive way)

Pro IYPT-CH and the SYNT are greatly supported by:



the **cogito** foundation

