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Mad for Science
the third edition

2018/19 EDITION

MAD FOR SCIENCE

The first national edition

Given the great success and the positive impact the first two editions of the **Mad for Science** Competition had on Scientific High Schools in Piedmont, for the 2018-2019 third edition DiaSorin has involved all Italian Scientific High Schools that need to expand and implement new equipment in their bio-laboratory, because passion for science knows no boundaries! For the first time, schools will be called upon to reflect on the targets of the 2030 Agenda and on the Sustainable Development Goals.

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The theme of the third edition

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Through the Mad for Science Competition, **Scientific High-School students actively engage in the change towards sustainability.** DiaSorin has took up the challenge launched by the UN 2030 Global Agenda for Sustainable Development with its 17 SDGs (Sustainable Development Goals), which was agreed upon by the 193 Member States of the United Nations. The Agenda implementation requires a strong commitment from Countries but also from people and the whole Society, from private enterprises to the public sector, from civil society to universities and research institutions.

Scientific High Schools taking part in the national Competition will be called upon to develop a list of **5 educational experiences consistent with the 2030 Agenda goals**, in particular those concerning climate change and its global impacts (**SDG 13**), conserve and sustainably use the oceans (**SDG 14**), protect, restore and promote sustainable use of terrestrial ecosystems (**SDG 15**).

The project aims to stimulate **reflection on the relationship between the environment and health of citizens and young people** and it challenges school to apply scientific learning to the environment (for instance biodiversity protection, soil consumption, waste-cycle management, urban pollution, food waste) as a starting point to reflect upon public health. By analyzing the surrounding environment students and teachers become aware of the **combination environmental quality/well-being**, designing experimental and interdisciplinary research activities to be conducted at school and in collaboration with scientific bodies of local importance to highlight the influence of environmental conditions in relation to health status and quality of life.

Competition Timeline

- **Launch of the project**
  24 November 2018
- **Application presenting details of the project**
  by 25 January 2019
- **Selection of the 50 finalists**
  by 5 February 2019
- **Project submission deadline**
  by 16 April 2019
- **Selection of the 8 finalists**
  by 10 May 2019
- **Mad for science Challenge**
  22 May 2019

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Prize

1° Prize

The winning High school of the Mad for Science Challenge 2019 is awarded a prize of **50,000 thousand euros** for the **implementation** of **its biolaboratory** and **5,000 thousand euros per year** for the following 5 years (for a total of 25,000 thousand euros over the five-year period) for the **supply of consumables required for the implementation of the proposed laboratory experiences**.

2° Prize

The High School which ranked second at the Mad for Science Challenge 2019 is awarded a prize of **25,000 thousand euros** for the **implementation** of its **biolaboratory** and **2,500 thousand euros per year** for the following 5 years (for a total of 12,500 over the five-year period) for the **supply of consumables required for the implementation of the proposed laboratory experiences**.

Premio Speciale di Comunicazione

The Finalist High School that will stand out for the quality of its presentation, public speaking skills and ability to disseminate Science will be awarded a **Special Prize for Communication**, amounting to **10,000 thousand euros for the purchase of laboratory items** chosen by the winning High School.

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In-depth analysis of SDGs

SDG13 – Take urgent actions, at all levels, to combat climate change

Climate change affects countries all over the world with high costs both for people and the environment and communities. We are already experiencing its impacts, such as change in weather conditions, the rise in sea levels and extreme weather events, that may have devastating effects on communities. Greenhouse gas emissions deriving from anthropic activities are at the root of climate change and seem to be escalating, hitting the highest levels in all of human history. We need to take urgent actions to avoid significant consequences for many countries and communities: for instance, the effects of desertification or the rise in sea levels for many island communities. Climate change is a global challenge which crosses national boundaries: from institutions, to governments and individual citizens. This issue requires internationally coordinated solutions and the cooperation among Countries..

Excerpted and changed from:
https://unric.org/it/obiettivo-13-promuovere-azioni-a-tutti-i-livelli-per-combattere-il-cambiamento-climatico/

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SDG14 – Conserve and sustainably use the oceans, seas and marine resources for sustainable development

Three quarters of the Earth's surface is covered by water. Oceans are not only a source of life and nourishment for many forms of life (oceans contain more than 200,000 different species), they also help mitigate the impact from the rising temperatures due to climate changes and influence the global systems that make Earth habitable for human beings. The oceans are the very foundation of human life let's think about the water cycle, sea currents, some regions benefitting from a milder and more livable climate thanks to ocean currents. Oceans and seas play also an essential role from an economic and social point of views as from earliest recorded history they have served for trade and commerce. A careful management of this global, important resource is the foundation for a sustainable future.

Excerpted and changed from:
https://unric.org/it/obiettivo-14-conservare-e-utilizzare-in-modo-durevole-gli-oceani-i-mari-e-le-risorse-marine-per-uno-sviluppo-sostenibile/

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SDG15 Protect, restore and promote sustainable use of terrestrial ecosystems

Forests are a key repository for biodiversity: they are home to more than 80% of all terrestrial species of animals, plants and insects. They cover around 30% of the Earth's surface and provide food and shelter to communities and are crucial to combating climate change. Around thirteen million hectares of forests are lost each year while the persistent degradation of drylands has led to the desertification of 3.6 billion hectares.

The deforestation and desertification – caused by anthropic activities and climate changes – pose demanding challenges in terms of sustainable development and affect the lives and livelihood of millions of people around the world. A sustainable management of the terrestrial ecosystem is crucial to halting biodiversity loss, protecting habitat and preventing the extinction of threatened species. It also positively and sustainably contributes to human nutrition as about 80% of food is made from plants (mainly rice, corn and wheat).

Excerpted and changed from:
https://unric.org/it/obiettivo-15-proteggere-ripristinare-e-favorire-un-uso-sostenibile-dellecosistema-terrestre/

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The 8 Finalist
High Schools

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High School 1

High School name: High School Beata Vergine San Luca – Bologna (BO)

Team members:

TEACHER Federico Plazzi

STUDENTS Maria Costanza Balbinot, Enrico Benuzzi, Lorenzo Fabretti, Alex Fantini, Thomas Gualandi

Years: third and fourth

Theme: Ocean Literacy (OL), understanding the relationship between seas and humankind by implementing five educational lines to foster a stronger ocean-related education.

Abstract: Seas and oceans have a strong impact both on the planet and the economy but, as we know, sea phenomena are poorly understood: challenges and threats are often ignored and also schools pay little attention to this issue. Ocean Literacy (OL) means understanding the relationship between seas and humankind: it requires scientific knowledge and the ability to disseminate such knowledge and make informed choices on this issue. Our project aims to implement five educational lines designed to foster a stronger ocean-related education. One educational line focuses on dissemination skills in relation to peers, that is friends and classmates. The other four lines are focused on different aspects concerning the sea: abiotic/geologic factors; animal biodiversity; plant physiology; genetic diversity. The first strand of action concerns a collaboration with the CNR-ISMAR, a body which is active in the OL field and available to give short scientific dissemination courses and build a Museum of the Sea in our school. The other four educational lines will be developed with Hydrosynergy during the school year.

High School 2

High School name: High School Ariosto Spallanzani - Reggio Emilia (RE)

Team members:

TEACHER Eleonora Franchini

STUDENTS Simone Pucci, Tommaso Siligardi, Maria Chiara Benevelli, Federico Pessina, Tommaso Pagliani

Years: third

Theme: Smog alarm and improvement of air quality through educational experiences investigating pollution in the territory.

Abstract: Smog alarm in Emilia Romagna! The fight against CO2, Sox and Nox seems a losing battle but the battle is lost only for those who do not fight! Our project originates from our desire to be actively engaged in a change and we need knowledge to improve. That's why we are proposing experiences to promote a greater awareness among students about pollution in the territory and its effect on living organisms. Starting from the implementation of a microenvironment to study water cycle and the effect of pollutants to the analysis of pollutant concentration in water samples taken from the territory, which will be later used for growth of water plants, our objective is to study the pollutant impact on biodiversity and the ability of some species to act as phytoremediation. Furthermore, our project plans to use an in vitro model of eukaryotic cell cultures to assess vitality of the cells that may have been exposed to pollutants and to produce biogas using an anaerobic digester. Every year we will propose a contest to collect proposals for a green economy.

High School 3

High School name: High School Lorenzo Cobianchi– Verbania (TO)

Team members:

TEACHER Claudio A. Vicari

STUDENTS Lorenzo Beggio, Gaia Micotti e Fabio Motetta, Melania Alcide, Sophie Cavallini

Years: third

Theme: Towards a sustainable Plastic Age! Fight against the huge production of synthetic polymers by investigating the microplastics issue in all its environmental and health aspects.

Abstract: More and more students are aware of the need to move from a linear to a circular economy where waste becomes a resource for a new cycle. The huge production of synthetic polymers, which are not easily biodegradable and thus are everywhere, led us to an era we could define as “Plastic Age”. It is essential to understand in depth the microplastics issue in all its environmental and health-related aspects and work for a sort of “sustainable Plastic Age” to relieve, in future, the growing burden of pollution on aquatic and terrestrial ecosystems. The project has been developed with the support of the Water Research Institute (Verbania) for the reasearch of microplastics in Lake Maggiore’s environmental matrices, in some species of fish and for the qualitative analysis of polymers through infrared spectrophotometry. We thought also about possible solutions through bioplastics synthesis and the analysis of its biodegradability.

High School 4

High School name: High School G. Battaglini – Taranto (TA)

Team members:

TEACHER Rosa Lo Noce

STUDENTS Sara Boccardi, Ginevra Della Rocca, Santo Dono, Matteo Grandinetti, Paola Vozza

Years: third

Theme: Sustainable use of phosphorus, an essential component in agriculture, to preserve its reserves for future generations

Abstract: The abundance of chemical elements shows that phosphorus - an essential component in agriculture- is a critical factor as it is difficult to find and is dangerous when released into the environment. We are approaching the “Peak Phosphorus”, the point at which demand begins to outstrip supply and intensive agriculture cannot continue to provide current yields. The objective of our project is fostering a sustainable use of phosphorus in order to preserve its reserves for future generations. We aim to analyze the biogeochemical cycle through the study of phosphate mineral and rock samples from Karst in Puglia, in collaboration with the University of Bari. We will determine the presence of phosphates in water and soils from which we will isolate phosphorus solubilizing bacteria. The purpose is to develop a sustainable strategy for the mobilization of phosphorus in soil and create biofertilizers to replace superphosphates that are currently used in agriculture

High School 5

High School name: High School Copernico – Prato (PO)

Team members:

TEACHER Pierangela Scarnato

STUDENTS Simone Chesi, Irene Cencetti, Fabio Scrocco, Andrea Platania, Alessia Berni

Years: third and fourth

Theme: Investigating microbiota which grows on serpentines and lives in association with roots of serpentinicola plants adapted to a dry and heavy metal rich habitat.

Abstract: The idea behind our project stems from one of the 2030 Agenda SDGs, particularly paragraph 3 of Goal 15 “Protect, restore and promote sustainable use of terrestrial ecosystems”, stating that “Micro-organisms and invertebrates are key to ecosystem services, but their contributions are still poorly known and rarely acknowledged”. We designed laboratory experiences that can be conducted at school and linked to our regional area which is very interesting from a biological point of view and features the presence of ophiolites in the Park of Galceti and a remarkable biodiversity. The objective of our project is investigating microbiota which grows on serpentines and lives in association with roots of serpentinicola plants, such as Alyssum bertolonii, adapted to a dry and heavy metal rich habitat like the Park of Galceti, near Prato. We will perform a genetic and chemical characterization in collaboration with the University of Florence, in order to understand the role of some substances produced by these micro-organisms.

High School 6

High School name: High School Giovanni Spano – Sassari (SS)

Team members:

TEACHER Manuela Piras

STUDENTS Alessandro Cherchi, Aurora Piras, Davide Piroddu, Maria Pisano, Edoardo Sanna

Years: third

Theme: Decarbonization, design of eco-sustainable paths for wheat cultures and elimination of plastics in the seas.

Abstract: Our project aims to raise awareness about our planet's wounds, caused by air, soil and water pollution and the need to halt climate change. Against with this backdrop and in collaboration with the Agriculture Department of the University of Sassari, our team designed a three-goal setting path: decarbonization, design of eco-sustainable path for wheat cultures along with circular economy so that brewing waste may become a new resource, and elimination of plastics in the seas. The cycle starts with durum wheat cultivation, continues with threshing recycling which can be reused to fertilize durum wheat cultivation and as substratum where plastic-eating microorganisms may grow. The path ends with the implementation of experimental protocols for the cultivation of microorganisms capable of producing bioplastics and destroying plastics polluting the oceans.

High School 7

High School name: High School Failla Tedaldi - Castelbuono (PA)

Team members:

TEACHER Annunziata Cangelosi

STUDENTS Alessia Cordone, Emanuele Di Gesare, Vincenzo Puccia, Gaia Schicchi, Christian Sottile

Years: Fourth

Theme: Role of local microbial biodiversity on pollutants reduction and on soil fertility, with the aim of rebalancing marginal soils ecology

Abstract: Our project aims to study the role of local microbial biodiversity on pollutants reduction and on soil fertility, in line with the SDG 13 and 15 of the UN 2030 Agenda. The loss of biodiversity entails a lower ecosystems resilience, with a negative impact also on farm production. The development of innovative solutions for soil management, which are based on the combination of knowledge of microbial dynamics, molecular biology and biotechnologies, may result in a greater agricultural sustainability. The project includes the study of biopolymers systems colonized by hydrocarbon-degrading bacteria and the use of mycorrhizas and native microorganisms capable of rebalancing marginal soils ecology. The microbiological analysis will be carried out with traditional and molecular biology techniques. We will work together with the Department of Biological, Chemical and Pharmaceutical Sciences and Technologies of the University of Palermo and with local, organic farmhouses.

High School 8

High School name: High School Leonardo Da Vinci – Treviso (TV)

Team members:

TEACHER Michele Zanata

STUDENTS Monica Zizola, Margherita De Longhi, Marco Silvestri, Davide Pontini, Asmae Ait Abdallah

Years: third and fourth

Theme: Creation of a Biodiversity Park to be used as outdoor laboratory for the territory and open to the public, where students will act as guides and tutors

Abstract: This project provides the observation and study of natural phenomena and biological cycles both on the field and in laboratory. Our objective is to create a Biodiversity Park in an area of about one and a half hectare to be used as outdoor laboratory for our High School and the other schools and open to public to raise the territory awareness. Here students will act as guides and tutors. The Park, whose construction started in 2017/18, will be divided into specific areas dedicated to environmental protection, protection of biodiversity and well-being of people. For instance, the Park will feature a permaculture garden, a lowland wood, a wetland and an orchard with ancient trees. The High School will express its scientific vocation through testing protocols in relation to environmental factors such as soil, water, air and through the study of the cultivation technique effect on garden and orchard or the effect of biomass combustion and phyto-purification of water.

Winners

First Prize

High School Ariosto Spallanzani
Reggio Emilia (RE)

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Winners

Second Prize

High School G. Battaglini
Taranto (TA)

FONDAZIONE DiaSorin

Winner

Special Prize for Communication

High School Lorenzo Cobianchi
Verbania (TO)

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