The Israel Program: Science and Technology Leadership Reserve[1]

Description

The students who participate in this program will study the regular curriculum and will get supplementary reinforcement in the curricular areas of science, technology and mathematics; They will take part in additional programs that accelerate, widen, deepen and enrich the scientific, technological and mathematical contents that are studied in the regular program. The demands put on the students will be high and uncompromising – but they will enjoy support related both to their studies as well as at their personal needs level – emotional and behavioral support – integrated with elements of social and values education.

Participating schools receive an special budget for employing the additional teachers/hours required by the program; to provide training programs for the participating teachers; and for the extracurricular and extramural activities and for other enrichment initiatives that are included in the program.

The program includes the following guidelines:

1. Detection of students with potential to excel in MST as early as possible.
2. Exposure of the students with potential to excel in MST to a challenging high level program.
3. Provision of equal opportunities while bridging through socio-economic disparities.
4. Encouragement of girls to choose and cope with scientific-technological studies with priority given to Physics/ high level Technology.

This program should reach 25% of the age cohort in the educational system.

Rational

The relatively small share of students that excel in science and technology is troubling, with its implications for the status and competitive capacity of Israel in regional and global terms. To accomplish change the Ministry of Education wishes to lead a clear policy in this area and to engage in measures that are both consistent and of long term. For this purpose the Ministry decided to encourage schools to open special scientific-technological classes.

Scope

The scope of the program is national but with initial priority given to the development regions of the North, South and Jerusalem. These areas have a larger proportion of disadvantaged populations.

The program set as its operational goals:

1. To increase the number of students who get a strengthened baccalaureate of science-technology by about 78% and reach 25,000 such students in five years.
2. To increase the share of students who get a quality baccalaureate of science-technology by 100% and reach 18,000 such students in five years.
3. To increase the share of students who get an **Excellent** baccalaureate of science-technology by 100% and reach 6,000 such students in five years.

[1] From (Hebrew)
http://cms.education.gov.il/EducationCMS/Units/MadaTech/technology/AtudaMadaitTechnologit/atuda_madait_technologit.htm

Translation by Makash of the master guidelines for the Program for a Science and Technology Leadership Reserve of the Administration for Science and Technology of the Ministry of Education of Israel (2013) - the original paper is available (in Hebrew) at http://cms.education.gov.il/NR/rdonlyres/1D3F7B9C-ED4C-4681-B79D-C289B4849DB5/152656/resource_837309670.pdf

Ministry of Education

The Administration for Science and Technology

Science and Technology Leadership Reserve

1. Master Plan

2013

1. Preface
2. Goals and Objectives
    a. Goal

    Establishment of a program for scientific/technological excellence, that will substantially increase the number and the quality of the seniors who complete studies with a diploma "Quality Baccaulerate in Sciences-Technologies" that will include in addition to the compulsory demands also the following set of disciplines"

        a. Mathematics at the intensive level - 5 Study Units
        b. One of the Natural Sciences disciplines (Physics or Chemistry or Biology)at an intensive level – 5 Study Units
        c. Technological trend (to be chosen between Software Engineering, Electronics Engineering, Mechanical Engineering, Biotechnology, Scientific Technology and Health Systems) or an additional scientific discipline at an intensive level (Physics, Chemistry, Biology, Computer Science) – 5 Study Units

    The program will operate in the schools that fulfill the entry conditions and the published criteria.

    b. Objectives

        a. To double in five years the share of the students entitled to a "Quality Baccaulerate in Sciences-Technologies" (basis year is 2010).

b. To double in five years the share of the students entitled to a "Quality Baccaulerate in Sciences-Technologies" cum laude according to the usual criteria for a Baccaulerate with Excellence (basis year is 2010).

3 Principles for implementing the program

a. Exposure of students with potential to excel in the scientific areas, technology and mathematics to a challenging and interesting program with an high level of studies.
b. Detection of students with potential to excel in the scientific areas, technology and mathematics in the junior high schools, as earliest as possible.
c. Provide equal opportunities to bridge the gap of socio-economic disparities.
d. Encouragement of girls to choose and cope with studies in the scientific-technological area with an stress on physics/technology at an high level.

4 The proposed program

a. The students that participate in the program study the regular curriculum with an stress in intensification the studies in the areas of science, technology and mathematics beginning from junior high school.
b. The students that participate in the program take part in a supplemental program that accelerates, widens, deepens and is enriched with contents on sciences, technologies, and mathematics that are part of the regular curriculum.
c. High demands without compromises from the students while providing support at the level of the studies but also at the level of their personal, emotional and behavioral needs.

5 Implementation of the program in 2013

In 2011 the Administration inaugurated the program in 30 secondary schools of six years. In each school two groups two groups were established: one in the grade 7 and another in grade 10 with the purpose to establish an excellence track of six years which leads to a "Quality Baccaulerate in Sciences-Technologies"

In 2012 the program was extended to more than 200 schools that choose to join the program. In the year 2012 the Administration aspire to extend the program to additional schools and establish such excellence track from grade 7 up to grade 12. In the year 2013 there will be three kinds of schools:

a. Schools that have just joined the program and in which groups will be open in grade 7 and in grade 10. Continuing schools in which new groups will be opened in grade 7 and/or grade 10.
b. The program will continue to be implemented in the groups that have continued to grades 8-9 and 11-12. The budgeting of the continuing groups will be carried out according to the principles established in the present document.
c. Continuing schools in which no new groups will be established but the program will be implemented with the groups that continue into grade 8-9 and 11-12. The budgeting of the continuing groups will be carried out according to the principles established in the present document.

5.1 Implementation of the program in Junior High School, 2013

a. The schools will receive for three year an additional allocation of 21 Weekly Hours (WH) as detailed in the following table:

Table 1: Details on the number of additional hours per student in the science/technological groups in Junior High School

Grade	Mathematics		Science and Technology		Computer Science and Robotics	
7	7 WH	5 – regular program 2 – Excellence	6 WH	4 – regular program and enlarged 2 – Additional program[2]	2 WH	specially designed program in CS
8	7 WH	5 – regular program 2 – Excellence	6 WH	4 – regular program and enlarged 2 – Additional program	2 WH	specially designed program in CS
9	7 WH	5 – regular program 2 – Excellence	6 WH	4 – regular program and enlarged 2 – Additional program	2 WH	specially designed program in CS

b. The educational institution will allocate for the teaching of the additional charge of Physics in the junior high school a teacher of Physics who was approved by the National Inspector for Teaching Science and Technology.
c. The educational institution will allocate for the teaching of Mathematics in the junior high school a teacher of Mathematics who was approved by the National Inspector for the Teaching of Mathematics.
d. The educational institution will allocate for the teaching of Mathematics in the junior high school a teacher of Computer Science who was approved by the National Inspector for Computer Science.
e. The teachers that participate in the program MUST participate in the training programs specially designed for the program and teach following the curriculum published by the National Inspectors.
f. The students that participate in the program have to take the exam of the National Inspector and the Meitzav exam following the guidelines of the National Inspectors for the Discipline and RAMA (National Authority for Measurement and Evaluation).
g. The educational institution will operate the program following its guidelines (see appendix number 1).
h. The program will clearly define the learning outputs and the expected results – see appendix number 2).

5.2 **Implementation of the program in High Schools**

a. For three years the school will receive additional teaching hours for implementing the program as detailed below:

Annual layer participating in the program	Number of hours allocated to the school

[2] Two hours for the student, 3 hours for the school

Only the 10th grade layer	10
10th and 11th grades layers	22
10th, 11th and 12th grades layers	30
Only the 12th grade layer	8

b. The additional budget is allocated for the disciplines: Mathematics intensive, a Scientific discipline intensified and a Technological discipline or another additional Scientific discipline intensified. The school will indicate which disciplines were intensified and will document (proof) that the additional hours are provided over the regular standard hours and only for those students who comply with theconditions of the program "Science and Technology Leadership Reserve".

c. In each age layer that participates in the program for Mathematics the school will allocate at least 4 teaching hours. In schools in which the grades layers 10th to 12th participate in the program the groups will include all the students who are studying the three areas in an intensive way: 5 study units in Mathematics; 5 study units as intensive study of one of the Science disciplines (Physics, Chemistry or Biology); and a Technology trend or an additional Science discipline (Physics, Chemistry or Biology) at the level of 5 study units.

d. If a schools detects in grade 10th students who are taking 4 study units in Mathematics and are also taking intensive program a Science discipline and a Technology discipline (or two Science disciplines) – then the school can use two hours **from** the intensification hours allocated to Mathematics only in the **first** three months of the school year to intensively support such students so to have them able to take 5 study units of Mathematics. Only the students who at the end of November have taken 5 hours of Mathematics will be entitled to join the Reserve program with the implications.

e. The school will define an officer with the responsibility for the program in High School. Such person will carry out a monthly follow up of the students, personal meetings with the students and their parents, identify problems and difficulties and seek to encourage the students. The person responsible will receive at least 2 weekly hours per age layer for personal work with the students. Such role will not be distributed between different persons.

f. The school will operate the program according to the guidelines of Annex number 1.

g. The expected results (Metrics for outputs and results are detailed in Annex number 2.

- The school should show an increase of the number of students who are studying three scientific/technological disciplines intensively (5 study units in each discipline) of at least 6% relatively to the share of its seniors who succeeded in obtaining such achievements in the average for the years 2009-2010. The increase will be verified against a biannual mean of the number of seniors who completed the 12th grade with an intensive science/technology Baccaulerate in the previous two years.

- The school should carry knowledge exams for the students of the Reserve and will detect in this way those requiring an intensification of support in their studies.
- The additional hours (over and above the standard hours) will be provided in small groups for the students detected as requiring them following the mapping and follow up through the year. These hours are not provided to substitute the standard hours of the discipline, are not a provision of additional hours for the group and are not provided to be split between the study groups.
- The school budget is **conditioned** to maintenance of the entry requirement conditions to the program throughout all the period of its participation. In case that the educational institution did not fulfill the basic qualification criteria and/or provided misleading information, then the sum that was provided will be deduced from the any payments due to the school; this deduction will be carried out through the central payment unit of the Ministry of Education.

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