The 2020 Science Group was composed of over 30 scientists spanning:

biology, physics, chemistry, biochemistry, astronomy, genetics, medicine, mathematics and computer science;

From 12 different nationalities, from some of the world’s leading research institutions and companies;
“Computers have played an increasingly important role in science for 50 years, and in particular the past decade and a half, and will continue to do so.

However, what this report uncovers, for the first time, is a fundamentally important shift from computers supporting scientists to ‘do’ traditional science to computer science becoming embedded into the very fabric of science and how science is done, creating what I am prepared to go so far as to call ‘new kinds’ of science.”
We believe that computer science is poised to become as fundamental to science, and in particular the natural sciences, as mathematics has become to science, and in particular the physical sciences.
Children:
(i) Take far bolder measures to interest children in science and then retain their interest in it and its importance for society;
(ii) urgently and dramatically improve the teaching of mathematics and science in schools;
(iii) make teaching of computing more than just 'IT' classes and how to use PowerPoint®.

Make basic principles of computer science, such as Abstraction and codification, a core part of the science curriculum.
The Four Elements that should make it!

- A well-defined curriculum (including written course text books and teaching guides);
- A requirement of a mandatory formal CS teaching license;
- Teacher preparation programs;
- A CS education research community and a CS teachers community.
Guidelines - standards

1. Computer Science is a full fledged scientific subject. It should be on the same par as Physics, Biology, and Chemistry.

2. The Program should concentrate on the key concepts and foundations of the field. Algorithmic thinking or Computational thinking is the key notion.

3. The “Zipper Principle”: Conceptual and experimental issues should be interwoven throughout the program.
4. A well-equipped and well-maintained computer laboratory is mandatory.

5. Teachers certified to teach CS must have adequate formal CS education, at least an undergraduate degree in CS and a teachers' certificate.

6. The program should focus on the most basic and lasting concepts of computer science, and should be attractive and challenging in the sense that it will relate also to the practical sides of the profession.
How did we make it?

- The Ministry of Education supported (in spirits and budget);
- Universities and colleges provided teacher preparation and certification programs (also with the support of the ministry of education);
- We established the community of researches supervising master and doctorate students;
How did we make it: Teachers

Most important: building a leading teachers community (the basis for ALL other activities) – Machshava.

Providing:

- Workshops / courses, meetings;
- An active web site, a journal.
- An annual conference and a summer seminar, which serve for meetings and discussions between teachers and CS researchers from academia and industry, for sharing pedagogical activities between colleagues, and assist in the social integration process of teachers from different backgrounds.
Our Biggest Challenge

- Stay alive!
  Maintaining the discipline as an elective, same as Physics, Biology, Chemistry;

- Help teachers survive the difficulties they have to deal with:
  Frequent changes in curriculum, and right now a massive update of the program;
- Getting familiar with new technologies.
Our biggest challenges

• Continue to foster professional leadership of CS teachers
• Create a professional community of CS teachers
• Supporting, assisting and consulting academic CSE groups, local teacher centers, CS teacher educators and researchers
• Collecting and distributing CSE knowledge and experience

(quotaton from the mission and goals of the CS teachers center)
Israel's Ministry of Education has launched a unique program to enhance science - technology education. It is a six year program for grades seven through twelve. The program introduces a new curriculum in computer science for junior-high school students. The computer science curriculum focuses on developing computational - algorithmic thinking.
Thank You!