



Brussels, 6 May 2020

MEMORANDUM

Ref.: 2020-04-M-7-en

Orig.: FR

Cancels and replaces Memorandum 2019-05-M-9 of 5 June 2019.

To: Directors, Deputy Directors for the secondary cycle of the European Schools and of the Accredited Schools

From: László MUNKÁCSY

Subject: **1/ Decision taken by the group of experts concerning the arrangements for acquisition and the procedure for purchase of the technological tool with the characteristics required by the mathematics syllabuses, as approved by the Board of Governors at its meeting of 14-16 April 2010, by the parents and by the teachers**

2/ Decision taken by the group of experts concerning the technological tool matching the characteristics required by the new mathematics syllabuses approved by the Joint Teaching Committee at its February 2019 meeting (2019-01-D-48-2 and 2019-01-D-49-2) and at its February 2020 meeting (2019-01-D-48-3 and 2019-01-D-49-3).

On behalf of the group of experts responsible for choosing the technological tool to be deployed in the context of the mathematics syllabuses, I am writing to inform you, by means of this memorandum, of the decision taken by the group, which convened remotely on 23 April 2020. This decision was taken during the meeting, chaired by Mr Alper YILMAZ, the Inspector in charge of mathematics for the secondary cycle of the European Schools and in the presence of Ms Urszula LACZYNSKA, the Inspector in charge of physics for the secondary cycle of the European Schools.

Decision

1/ In accordance with the arrangements for acquisition of the technological tool with the characteristics required by the mathematics syllabuses, as defined in document 2010-D-242-en-3 and the annexes thereto, approved by the Board of Governors, and following an analysis of developments in the hardware and software available;

2/ In accordance with the characteristics of the technological tool required by the new s4p4 and s4p6 syllabuses, as approved by the Joint Teaching Committee, which entered into force with effect from September 2019;

3/ In accordance with the characteristics of the technological tool required by the new s5p4 and s5p6 syllabuses, as approved by the Joint Teaching Committee, which will enter into force with effect from September 2020,

the group of experts in charge of choice of the technological tool, which convened remotely on 23 April 2020, recommends the following:

- To accompany the mathematics syllabuses for secondary year **s4** of the European Schools, with effect from the beginning of the 2020-2021 school year in September 2020, a **non-graphing and non-programmable scientific calculator** (the model used in s3, where applicable, is sufficient).
- To accompany the new mathematics syllabuses for secondary year **s5** of the European Schools, with effect from the beginning of the 2020-2021 school year in September 2020, a **device allowing GeoGebra 6 software to be used in the classroom**, at least in offline mode (see characteristics of the device below); in addition, a **non-graphing and non-programmable scientific calculator is required** for the 2020-2021 school year examinations (the model used in s4, where applicable, may be sufficient).
- To accompany the mathematics syllabuses for secondary years **s6** and **s7** of the European Schools, with effect from the beginning of the 2020-2021 school year in September 2020, **TI-Nspire CAS software**:
 - **in version 4.5.2.8** for students equipped with the **TI-Nspire CX CAS** calculator;
 - **in version 5.1.3.73 or higher** for students equipped with the **TI-Nspire CX II-T CAS** calculator.

Furthermore:

In accordance with the characteristics of the technological tool required by the new physics syllabuses for years **s4 and s5**, as approved by the Joint Teaching Committee, which entered into force with effect from September 2019 for s4 and which will enter into force with effect from September 2020 for s5,

the group of experts in charge of choice of the technological tool, which convened remotely on 23 April, recommends:

- To accompany the new physics syllabuses for secondary year **s4** of the European Schools, with effect from the beginning of the 2020-2021 school year in September 2020, a **non-graphing and non-programmable scientific calculator** (the model used in s3, where applicable, is sufficient).
- To accompany the new physics syllabuses for secondary year **s5** of the European Schools, with effect from the beginning of the 2020-2021 school year in September 2020, a **device allowing GeoGebra 6 software to be used in the classroom**, at least in offline mode (see characteristics of the device below); in addition, a **non-graphing and non-programmable scientific calculator is required** for the 2020-2021 school year examinations (the model used in s4, where applicable, may be sufficient).

Minimum recommendations for devices running GeoGebra in the classroom / examination room

GeoGebra 6 can run on several devices (tablet or laptop) online or offline. The group of experts does not specify a model. However, the group recommends at least the following, for adequate use of GeoGebra 6 (these are minimum specifications, but the choice of more powerful devices would allow for more diverse and in-depth uses):

- Operating system: any operating system supporting GeoGebra 6 (complete name in EN: GeoGebra Classic 6)
- Minimum RAM: 1 GB for a tablet and 4 GB for a laptop
- Minimum storage: 16 GB for a tablet and 32 GB for a laptop
- Screen size and resolution: 7" can be allowed provided there is a good display resolution (minimum 720 p), but at least 9" for comfortable viewing with minimum 1080 p. resolution.

For students with an educational support agreement in place, the relevant special arrangements should be applied.

I would also draw your attention to the following recommendations:

- For the 2020-2021 school year, the group of experts recommends that teachers use in years **s4 and S5** (just like for years s1-s3 moreover) GeoGebra 6 software (open source application, free of charge, multilingual, multiplatform and with an exam mode) or any other software offering the same functionalities. Time for information about and training in the GeoGebra 6 software program is included in the round of decentralised training courses, which started in spring 2020 and which will be continued in autumn 2020, when the health situation so allows.
- For harmonisation purposes, the group of experts recommends use of a single software program in the school. Reasons for using any complementary software will need to be justified by the difficulty of solving a given problem with the 'generalist' software chosen.
- With the introduction of the new **s5** mathematics and physics syllabuses for the next school year (2020-2021), and after examination, the group of experts partially revised its recommendation for the implementation timetable (see Annex 1) and suggests deferring for one year use of GeoGebra 6 software in examinations – solely for this particular year. **Using it in the classroom, during lessons, remains compulsory**, but not for next year's semester examinations in s5. **Its use will be compulsory during the semester examinations in the 2021-2022 school year for years s5 and s6.**
- In order to make optimum preparations for that due date, **s5** students need to start practising using GeoGebra 6 software as from the beginning of the 2020-2021 school year, hence the recommendation that students should have their own device and this software program.

- *This recommendation also applies to use by s4 students of this same software for work in dedicated ICT rooms or 'ordinary' classrooms on hardware, a tablet or a computer, made available by the school. This recommendation is in line with the learning objectives of the new syllabuses and is applicable immediately, following approval by the Joint Teaching Committee at its February 2020 meeting of the new document specifying the characteristics of the technological tool (ref. 2020-01-D-76).*
- *Finally, this recommendation also takes account of the future introduction of the syllabuses for years s6 to s7, which will lead to use of this type of software, contributing in particular to the development of students' digital competence.*
- *Additional recommendations regarding general training and 'exam mode' training for teachers and general training and 'exam mode' training for students during the 2020-2021 school year:*

GeoGebra software: face-to-face and remote training plan for teachers

The face-to-face training plan scheduled for spring 2020 could be implemented only very partially, training sessions having been held in just four schools before the arrangements for restricting travel were introduced as a result of the current health context. It is impossible at the moment to propose an alternative timetable. However, a lesson can already be drawn from the training sessions run so far: the wide variety of levels identified requires differentiated training provision to be implemented for future training sessions.

Until face-to-face training courses can be run, the Experts Working Group will propose various options for distance learning and self-study. They are as follows:

- *remote interactive training session(s) for small groups;*
- *more 'classic' training session(s) (interaction restricted to chat);*
- *'question-answer' type session(s) concerning the versions of the software, the possible aids and exam mode;*
- *sharing of online documents via Teams, including lists of links to existing training possibilities (You Tube videos in particular).*

In setting up these remote training tools, the specific needs of physics teachers should not be overlooked. One possible idea is to draw on teachers' existing skills in using TI-Nspire software to adapt them to the GeoGebra platform.

In addition, it should be borne in mind that GeoGebra software can be used for teaching, learning and assessment purposes in the other scientific subjects, even though no binding decision on use of the software has been expressly made.

GeoGebra software: pilot schools for its use in examinations (general training and training in 'exam mode' of students)

Some schools have been involved for varying periods of time in BYOD pilot projects, something which gives them an advantage to some extent in terms of practical experience gained. But all the schools are invited to 'experiment' in tests and/or mock exams in year s5, with use of GeoGebra software. Such tests may possibly contribute to the student's A mark. This will allow useful data to be gathered in order to decide on the best way to proceed and to produce instructions governing use of the software in examinations. In order to explore different options, the group of experts will draw up guidelines, which will be communicated to the schools at the earliest opportunity.

At the same time, and again within the framework set by the Board of Governors and the Joint Teaching Committee for the arrangements for acquisition of the technological tool to be deployed, as foreseen by the mathematics syllabuses, the group of experts has requested me to communicate to you the text below, so that it is included in the list of books for the **2020-2021 school year** for the mathematics and physics courses in years **s4p4** and **s4p6** or **s5p4** and **s5p6** or for the mathematics courses in years **s6p3**, **s6p5**, **s6ma**, **s7p3**, **s7p5** and **s7ma**, as the case may be.

This memorandum replaces the memorandum with the reference number 2019-05-M-9 dated 5 June 2019.

Text for the list of books for 2020-2021

- *In accordance with the characteristics required by **the mathematics and physics syllabuses** for secondary year **s4** of the European Schools and by decision of the group of experts, which convened on 23 April 2020, for the beginning of the **2020-2021 school year** in September 2020, year **s4** students must have a **non-graphing and non-programmable scientific calculator** (the model used in s3, where applicable, may be sufficient).*
- *In accordance with the characteristics required by **the mathematics and physics syllabuses** for secondary year **s5** of the European Schools and by decision of the group of experts, which convened on 23 April 2020, for the beginning of the **2020-2021 school year** in September 2020, year **s5** students must have **their own device allowing GeoGebra 6 software to be used in the classroom, at least in offline mode (see minimum characteristics of the device below)**. In addition, **a non-graphing and non-programmable scientific calculator will be required** for the 2020-2021 school year examinations (the model used in s4, where applicable, may be sufficient).*

Minimum recommendations for devices running GeoGebra in the classroom / examination room

GeoGebra 6 can run on several devices (tablet or laptop) online or offline. The group of experts does not specify a model. However, the group recommends at least the following, for adequate use of GeoGebra 6 (these are minimum specifications, but the choice of more powerful devices would allow for more diverse and in-depth uses):

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For students with an educational support agreement in place, the relevant special arrangements should be applied.

- In accordance with the characteristics required by the mathematics syllabuses for secondary years **s6** and **s7** of the European Schools, for the beginning of the 2020-2021 school year in September 2020, years **s6** and **s7** students must have **a TI-Nspire CX CAS calculator equipped with version 4.5.2.8 or higher of TI-Nspire software or a TI-Nspire CX II-T CAS calculator, equipped with version 5.1.3.73 or higher of TI-Nspire software.**



László MUNKÁCSY,
Head of the Pedagogical Development
Unit

Annex 1: Overview of use of the technological tool as from s4
cc: 'Experts in charge of choice of the technological tool' Working Group

Annex 1: Overview of use of the technological tool as from s4

Classroom and exam 2020/2021

	Classroom	Exam
s4	Scientific calculator and school device ¹ or BYOD	Scientific calculator
s5	Scientific calculator and BYOD	Scientific calculator
s6	TI Nspire CX CAS or TI Nspire CX II-T CAS	TI Nspire CX CAS or TI Nspire CX II-T CAS
s7	TI Nspire CX CAS or TI Nspire CX II-T CAS	TI Nspire CX CAS or TI Nspire CX II-T CAS

Classroom and exam 2021/2022

	Classroom	Exam
s4	Scientific calculator and school device ¹ or BYOD	Scientific calculator
s5	BYOD	BYOD
s6	BYOD	BYOD
s7	TI Nspire CX CAS or TI Nspire CX II-T CAS	TI Nspire CX CAS or TI Nspire CX II-T CAS

Classroom and exam 2022/2023 and following

	Classroom	Exam
s4	Scientific calculator and school device ¹ or BYOD	Scientific calculator or BYOD ²
s5	BYOD	BYOD
s6	BYOD	BYOD
s7	BYOD	BYOD

¹ computer labs or trolleys

² needs to be decided