Lesson Title: Computer Science
Lesson Subject: Computer Networks
Grade Level: 8 (second year of middle school)

Objectives
Once the lesson has been completed, students will be able to:

- *describe what a computer network is,*
- *explain how can two computers be connected to a network,*
- *present the advantages and disadvantages of networks,*
- *specify the categories of networks according to their geographical coverage,*
- *describe the Internet as a global network that interconnects computer networks together, and*
- *present the ways of connecting to the Internet.*

Overview
This lesson subject is taught in the first month of the second year of middle school. Students have already been taught about the digital world (the concepts of digital and analog information) and the interior of a computer system. The lesson is blended, including both face-to-face lectures and virtual instruction/activities. Why blended and not full virtual? Well, students at this age are required to attend their physical school and most families don't even have the means for a person to stay at home so that their children could attend a virtual school. Moreover, students at this age need always an initial guidance even if they were to go on a virtual school. Therefore, a teacher should be physically present for them, whereas incorporating virtual instruction and activities into the traditional classroom can surely make the lesson much more interesting and activate students in many ways. The teacher has set up in advance an LMS where he has uploaded all the material regarding this lesson subject. Students have their own accounts in the system and can access the lesson material from their homes and from the school lab during the lesson. Teacher's role is both an instructor and facilitator in this case. She/he presents the lesson's concepts in an interesting way, by using digital material, whereas much time is devoted to letting students access the online system and view some material or do some online activities. Students' homework is required to be done online. Resources for this lesson subject include: *hand-printed textbook, e-book, notes, lectures (pdfs and ppts), on-line exercises, websites, photos* and *videos*.

Virtual Components and Lesson Activities

As mentioned above, the teacher has already set up an LMS for the lesson, i.e. **Moodle**. Every student (and the teacher) has an individual account in the system. First of all there is an area in the system where students can view every lecture regarding the lesson, which are **recorded** versions of the traditional **lectures** in the classroom. This is a useful tool especially for some students that for some reasons missed some of the traditional lectures.

The main subject of the lesson is divided into sub-domains (i.e. adv/disadvantages, categories of networks etc.), each corresponding to a separate lecture. There is no on-line synchronous activity in this lesson planning (except the chat area mentioned

below, but this is not considered in our plan as a learning activity), because students already have a face-to-face communication and instruction with the teacher (which is synchronous) in the physical school. A very important tool of the system is the **discussion forum**. The teacher has set up a discussion forum for the lesson subject, where students can give help and advice to others, exchange views about the subject, ask questions to the teacher and get answers. There is also a **chat** area which can be used by students to communicate directly if they want to, but it should not be used in the lab.

For every sub-domain of the main subject there are (on-line) appropriate **notes**, **photos** (like showing how two computers can form a network) and **videos** (like showing examples of LANs and WANs - from YouTube and TeacherTube). Students are also provided supplementary material in the form of links to **websites** regarding every sub-domain. The remaining tools and activities of our lesson plan are described in the next section because they are part of the grading.

Grading/Evaluation
The grading policy for this lesson subject is the following one:

On-line Activities

- **(20%) Quizzes**: A special area in the on-line system where students are required from their home, after reviewing every sub-domain, to answer to multiple-choice questions.
- **(10%) Discussion forum**: For every sub-domain the teacher poses two questions in the discussion forum. Every student should post answers to these questions.
- **(30%) Peer Project**: A separate area in the on-line system where students submit a final project for the lesson subject and evaluate each other projects (and their own ones) according to specific pre-defined rubric criteria. For this project, they are given specific directions over a variety of different options they have for the material. Namely, some can create a presentation in *PowerPoint*, whereas another one can create a small video with *Windows Movie Maker* and upload it on YouTube, or another one can create an animated video in *Go!Animate*. Every option for the project is fully supplied with appropriate instruction, tutorials, notes etc.
- **(5%) Logging Statistics**: The teacher has an administrative account in the LMS and can view the logging statistics of every student. Therefore, students who don't participate at all or don't see some of the required material, don't receive this percentage in their final grades.

Lab Activities

- **(20%) Lab Quizzes**: Before starting the next traditional lecture in the lab, students complete a hand-provided 10 minute quiz (consisting of multiple-choice questions and one open-answer question). Therefore, teacher can actually realize from the results of both on-line and lab quizzes that what is done on-line by a student is an authentic work. If there is strictly no "matching" between both results, the student loses both the grade from on-line quiz and the grade from the lab quiz.
- **(15%) Traditional Participation**: Students' participation in answering questions the teacher makes in a traditional lecture is required. Moreover, participation in discussion is also evaluated.

The total grade for this lesson subject (Computer Network) is of 100%, which covers a 10% of the total grade of the whole lesson (i.e. Computer Science). Similar methodology and activities can support the rest lesson subjects of the whole lesson and create an interesting and indeed demanding learning environment.