LESSON PLAN

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Participating on the web

3.2 Learning Maths

Short Activity Title	Learning Maths
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Topic	Participating on the Web
Competences	Mathematical competence and basic competence in science and technology / Communication in the mother tongue / Digital competence
Level	☑ Easy ☑ Intermediate ☐ Difficult
Age Group	13-14 years
Duration	40 minutes
Aim of this lesson	• Demonstrate the various ways that maths can be useful on the internet. • Encourage students to work collaboratively. • Allow students to discover the advantages and disadvantages of using the internet for maths activities. • Demonstrate how to create powerful passwords using maths.
Introduction	**For teachers:** The lesson will focus on ways to responsibly use the Web in maths classes, project work and homework. • It will discuss several tools that can be used in maths: » How to build a strong password, the use of games and blogs/wikis in learning maths, » The use of Facebook groups for collaboration - also stressing the advantages and risks. • Students will be asked to interpret data and create a graph, compare tools, solve some simple probabilities and/or function graph tasks, create a poll and interpret it statistically - in order to build maths skills, logical reasoning, problem-solving skills, while learning to use the Web safely at the same time. **For students:** Maths activities can be much more fun if done collaboratively, and the internet offers a lot of good tools. But in order to work collaboratively we need to find ways to collaborate and communicate safely and efficiently. In this lesson, we will try to discuss some ways of doing that.
Tools	Computers with internet access, Projector, Flipchart
Process	
Warm up students' activity - (2 minutes)	Look at the graph on http://goo.gl/bcVT8r. Estimate how many people use the internet today.

Step 1 – (5 minutes)	**Web tools in maths activities** **Questions for students:** 1. In your opinion, which of the following tools could be useful for maths activities (yes/no)? • Blogs • Wikis • Games • Twitter • Email • Facebook • Chat or similar apps • Search engines • Google Drive 2. Can you think of advantages of using these tools for maths activities compared to face-to-face interaction? For example, a shy student could find it easier to express his opinions over the Web than in class. 3. Which of the following features can be advantages (A)/disadvantages (D) of using the internet for maths classes and activities? • Instant access to information • Long distance communication • Getting viruses/spam • Fake user profiles • Huge quantity of educational resources • Easier communication with the teacher • Advertising • Online translation tools • Spending a lot of time indoors • Self-time management • More visibility • Understanding of the message/content 4. Count each category and calculate the ratio A/D. Is this bigger or smaller than 1? How would you interpret that?
Step 2 – (5 minutes)	**Building a strong password** Many of the online tools require registration. Creating a password is something we do very often, but do we give it enough thought? A strong password should: • Be at least eight characters long. • Not include your real name. • Not contain a whole word. • Significantly differ from your other passwords. • Include at least one uppercase letter, a lowercase letter, a number and a keyboard symbol.

Example: take a word and substitute some of the letters with digits or signs, such as in “p1n@pp!E” (from “pineapple”)

Check on https://howsecureismypassword.net/ how strong the password is you have created. Caution students not to test their real passwords given the limitations of password checking tools (hacking potential, non-transparent assessment algorithms, etc.)

Questions:

1. How many different passwords can you create with the same eight characters?
2. If two students use the same eight characters, what is the probability they have the same password?

Ask students to look at this infographic (http://goo.gl/fgblHH) about creating a new password and think of the tips that are new to them. Also, they can use the maths computational engine Wolfram Alpha (www.wolframalpha.com/) for creating strong passwords, as explained in this article (http://goo.gl/Ak08cK.)

Step 3 - (8 minutes)

Gaming in maths

Discuss the main benefits that gaming (especially logical and strategy games such as Minecraft) can bring to maths learners. Suggestions:

- Users develop problem-solving and reasoning skills, strategy and reactions;
- Get clear progress illustration;
- Learn to take risks, learn to become more engaged etc.

Also, discuss the risks of gaming: addiction, aggressiveness, false identities, bad language, advertising, cyberbullying, use of time, living in a different reality, sight problems, etc.

Questions for students:

1. Look at infographic http://goo.gl/gPnjuQ about gamification in eLearning and create a bar chart from this paragraph: “Learners recall just 10 per cent of what they read and 20 per cent of what they hear. If there are visuals accompanying an oral presentation, the number rises to 30 per cent , and if they observe someone carrying out an action while explaining it, 50 per cent. But learners remember 90 per cent “if they do the job themselves, even if only as a simulation.”
2. Do you consider that multiplayer online games (MMO or MO games) also have risks? If yes, give some examples.
3. What is your worst experience due to unsafe behaviour in online gaming? What could you have done to avoid that?
4. If an online game partner asked you to meet in real life or requested your personal information, what would you do?

Step 4 - (10 minutes)

Blogs/wikis in maths

Ask students to rank the following uses of a blog in maths activities, from 1 (not useful) to 10 (the most useful):

- Concept explanation/glossary
- Posting class notes
- Embedding PowerPoints and other class resources
- Announcements
- Problem practice
- Collaborative/project work with classmates or another schools
- Case studies
- Real world maths
- 'Problem of the week'
- Review

Some rules for using blogs:

1. Never post personal data and pictures on your blog, not even on your profile.
2. Never forget copyright rules.
3. Remember that your post is public, visible to teachers and parents and it can be reposted.
4. Choose comments settings that require your moderation before being published.
5. Think before you post, either on your own blog or as a comment!
6. Know how to report and block unwanted users.
7. Never share your credentials.
8. If you invite more contributors to your blog, give them the appropriate rights for their role.
9. Be as polite when giving feedback as you would be in class. Make feedback useful and fair.
10. If you see anything that shouldn't be on your screen, tell your teacher or parents immediately.

Activity: Have your students work in pairs to devise more rules and write them on the flipchart. Then choose the most useful 10 rules and create The 'Blogger's Decalogue'.

Step 5 – (10 minutes)

Facebook and maths activities

Activity: Let's assume that according to statistics, the age distribution of Facebook users is the following. Create a pie chart to illustrate it.

Age bracket	Percentage
13-17	14.8%
18-24	32.3%
25-34	26.6%
35-44	13.2%
44-54	7.2%
55-64	3.5%
64+	2.4%

Questions for students:

1. How often do you check your Facebook newsfeed?
2. What do you use Facebook for? Suggestions: chat, posting photos, staying in touch with my friends, posting about major events in my life, uploading photos, playing games etc.
3. Name five pieces of information about yourself that should not be posted on your profile.
4. Have you ever used Facebook for school activities?
5. Do you think it could be used for that? How?
6. Chose the three best ways you could use Facebook in maths activities from this list:

- A class group to share information and turn in assignments
- Schedule events
- Work in groups
- Post notes for students who missed class
- Share multimedia resources
- Involve shy students
- Reminders, announcements, upcoming deadlines
- Use educational apps
- Help students connect better
- Collaborate with other schools
- Run polls

Do you know any maths-related Facebook pages?

Have students work in groups of four to create five netiquette and safety rules for a maths Facebook group. They can find examples on http://goo.gl/JHqYiA, check local guidelines for social media in schools) ask them to avoid copy-paste and they can also do a quick research on their school website to determine whether the school has Social Media and Acceptable Use policies.

Follow up options	**Follow-up 1:** Create a Google Form for your classmates about one of the Web tools mentioned in this lesson, its best uses in maths, its benefits and risks etc. Send the Google Form to your colleagues and ask them to answer. Then share the collected data and create a statistical interpretation. **Follow-up 2:** Play the Big Brain Game http://vsav.webducation.info/ (possible registration required).
Links	http://stats.areppim.com/stats/stats_internetxfcstx2010.htm http://bit.ly/1CtKGQW http://bit.ly/1xaFlg0 http://www.wolframalpha.com/ http://bit.ly/1wBuxFO http://elearninginfographics.com/gamification-in-elearning-infographic/ http://www.edudemic.com/school-social-media-policy/ http://vsav.webducation.info/ (possible registration required)