Module 8
Research Project

Lesson 1 Getting Started

An introduction to planning, creating and presenting a research project. Students are divided into project groups and decide on a research topic from a given list. They begin to fill out the Research Project Worksheet and start brainstorming ideas for their projects.


Computer


Projector


Group Work


CD Resource


Printable Resource

Lesson 2 Research Time

Students begin to research their project on the Internet. They fill out some more sections on the Research Project Worksheet, distributed in Lesson 1.


Computer


Internet


Group Work

Lesson 3 What is a good Presentation?

The characteristics of a good presentation are presented to students in the PowerPoint presentation. Students plan and create their PowerPoint presentation.


Computer


Projector


Internet


Group Work


CD Resource

Lesson 4 Presentation Time

Students present their research projects to the class, using PowerPoint. Each member of the project team presents. The team answers project questions from the class and teacher.


Computer


Projector


Group Work

Lesson 1
Getting Started

Resources:
Getting Started (Resource 1), Research Topics (Resource 2), Research Project Worksheet (Resource 3), Unit Marking Sheet (See Appendix 1)

Key Vocabulary:
Computer Virus, Encryption, Hacking, Open Source, Social Media, Virtual Reality

Description:
Students are introduced to the idea of planning a research project. They are introduced to an adaptation of the MIT Media Lab creative thinking spiral model i.e. Imagine, Create, Share, Reflect and Imagine. Students are divided into project groups. A list of possible topics for research is presented to students in their groups. Students choose a topic that interests them from the list. They will conduct research on this over a number of lessons. The topics are based on computing in general. In this lesson students begin brainstorming on the topic of their choice.

Learning Objectives:
1. To introduce a structured approach to planning a research project to students.
2. To ensure students have a clear understanding of what is expected for the final presentation of the research project.
3. To allow students to choose a topic for research and begin brainstorming for ideas.

Lesson Introduction:
Explain to students that there are many interesting topics relating to computing and that they will be divided into groups during this lesson to research a topic of their choice from a list of given topics.

Lesson Breakdown:
1. Divide students into project teams. 2 students per team is ideal, but it may be necessary to have some teams of 3 students, depending on class size.
2. Begin PowerPoint presentation Getting Started (Resource 1). Tell students that they will be guided through the process of deciding on and planning their research.
3. Introduce the adapted version of the MIT Media Lab creative thinking spiral model – Imagine, Create, Share, Reflect and Imagine, as a model for their projects. Explain each element of the model to students.

4. Present the teams with Resource 2 (Research Topics). Allow the students some time to browse the topics and to decide on one that interests them.
5. Once they have decided on a topic, the team should also decide on a project title. They can be creative here!
6. Distribute the Research Project Worksheet (Resource 3) to students.
7. Tell students that they will need to fill out the worksheet as they progress in the project. They will need to submit the worksheet at the end of each class during their project work. This is important, as they will need to have the worksheet with them in class throughout the project.
8. Explain each part of the worksheet and answer any questions students may have at this stage. Ask students to write their names, project title and project topic at the top of the worksheet.
9. Explain the idea of brainstorming. Tell students they will begin brainstorming later in today's lesson and that they should write down all their ideas in the space provided on the Research Project Worksheet already provided.
10. Explain the idea of teamwork and that every team member will work on part of the project. Tell students they will divide the work among the team members later, once they have completed brainstorming on the chosen project topic.
11. Explain the PowerPoint presentation that each team is required to present at the end of their project. Tell students what needs to be included in the presentation and that they will have to answer questions from the class on their chosen topic at the end of the presentation.
12. Explain the Evaluation section. Tell students that they will have to ask the class for feedback on their presentation. They will then have to suggest 2 improvements for their project, based on this feedback and their own reflection. The improvements must be noted on the Research Project Worksheet.
13. Finally, explain how the project will be assessed and answer any questions they may have at this stage.
14. Ask students to begin brainstorming their topic. They should write down all ideas on the Research Project Worksheet.
15. Once they have finished brainstorming, they should divide the research work among the group members and fill in this section on the Research Project Worksheet.

Resource 1

Getting Started

A PowerPoint slideshow to introduce the Research Project to students

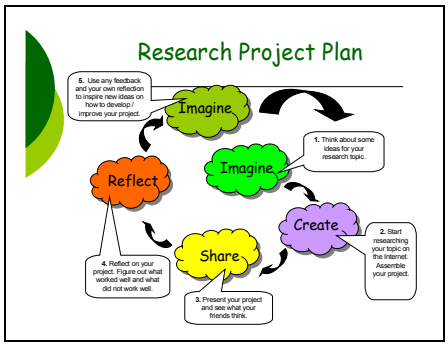
CD Resource

"M8L1R1 Getting Started.ppt"

Slide 1

Introduce the topic

Slide 2



Following the MIT Media Lab creative thinking spiral model, first people imagine. This involves thinking about some good ideas for the research topic you have chosen.

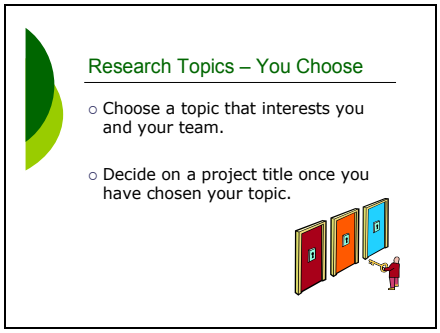
Next you start to create. This means you start researching your topic on the Internet, noting any useful sites you encounter. This also involves assembling your project and creating your final presentation for the class.

Next you share your project with the class by presenting your project and allowing your class to ask questions on your research topic and presentation.

Next step is the reflection. You reflect on your project. Think about how your project has progressed. You will also reflect on the feedback given by your class and teacher at the end of your project presentation.

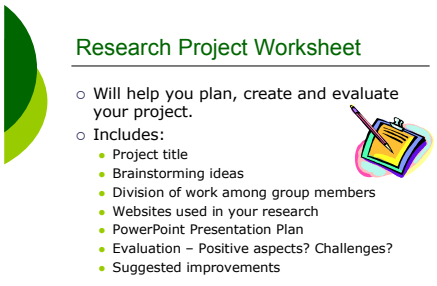
Finally, this reflection leads to suggestions for improvements to your project. You can then imagine new ways to develop your project in the future.

Slide 3



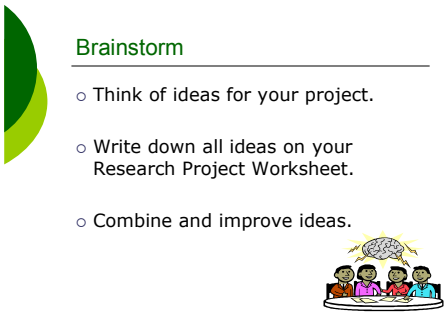
A list of research topics has been distributed to the class.
When choosing a topic, you should choose one that interests you and the rest of your team.
Once you have chosen, you should decide on a project title.

Slide 4



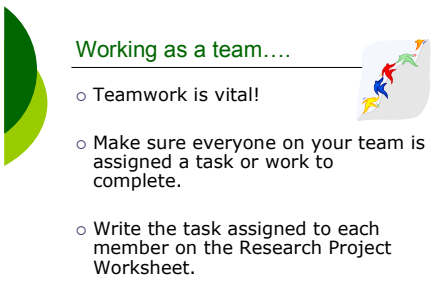
Make sure you have a copy of the Research Project Worksheet. This is a very important document and you will complete it throughout your project. It will also form part of your assessment at the end of the project.
It will help you to plan, create and evaluate your project.
The worksheet includes: Project title, brainstorming ideas, division of work among your group, websites used in your research, a plan for your final PowerPoint presentation and an evaluation section.
It also includes a suggested improvements section at the end.

Slide 5



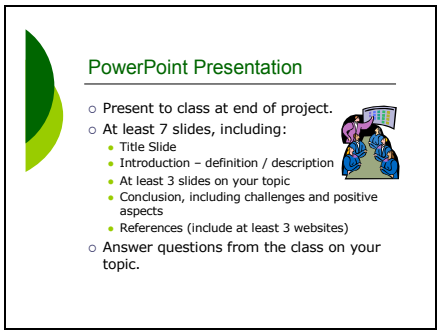
Brainstorming will be your first task for the project. This involves thinking of as many ideas as possible for your project.
Write down all ideas and suggestions.
The ideas can be combined and improved based on your team's suggestions.

Slide 6



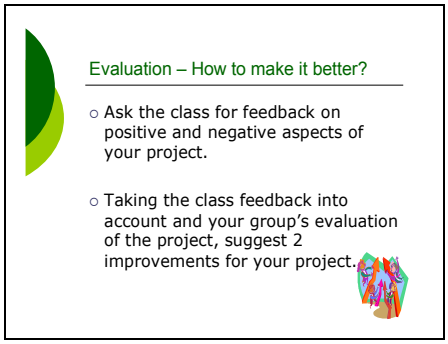
Teamwork is vital for your project.
Divide your work among all members equally. Every member should have work to complete, including research and presentation work.
Record the work that must be completed by each team member on the Research Project Worksheet.

Slide 7



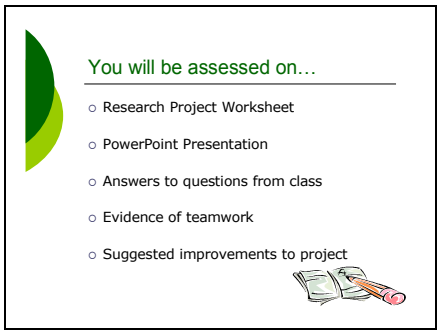
At the end of your research, present your project to the class. This presentation will form part of your assessment.
Use Microsoft PowerPoint for your presentation.
The presentation will include at least 7 slides including; Title slide, introduction (a short description or definition of the topic), at least 3 slides with information on your topic, a conclusion, which summarises the main ideas for your project (including challenges and positive aspects) and at least 3 websites as references.
You will be required to answer questions from the class on your research and presentation at the end. This means that you will have to research your topic very well.

Slide 8



At the end of your presentation, you will ask the class for feedback on your project and presentation.
Based on this feedback and your own evaluation, suggest 2 improvements for your project, which must be recorded on the Research Project Worksheet.

Slide 9



Remember, you will be assessed on the following:
Filling out your Research Project Worksheet (you will submit this at the end).
Your PowerPoint presentation (you will be given guidance on how to create a good presentation in a later lesson).
Your ability to answer questions on your research topic and presentation.
Evidence that you worked as a team and that the work was divided equally.
Suggested improvements to your project.

Resource 2

Research Topics

A handout containing a choice of 10 research topics for students.

Research Topics – Take your Pick

1. **Virtual reality – Second Life**
    - What is virtual reality? What is Second Life?
    - Find out 10 interesting facts about Second Life.
2. **Encryption**
    - What is encryption?
    - What is a cipher? Design a cipher to encrypt your name.
    - Name some ciphers
3. **Famous IT people:**
    - Steve Jobs
        a. Who is Steve Jobs?
        b. What contribution has he made to computing?
    - Tim Berners-Lee
        a. Who is Tim Berners-Lee?
        b. What contribution has he made to computing?
    - William Rowan Hamilton
        a. Who is William Rowan Hamilton?
        b. What contribution has he made to computing?
    - Sergey Brin
        a. Who is Sergey Brin?
        b. What contribution has he made to computing?
4. **Computer games**
    - Name 3 computer games and tell us who makes them.
    - What is your favourite game? Name 1 good character and 1 bad character.
    - Name 2 companies that develop computer games.
    - How are computer games made?
    - How are computer games today different to computer games in the 1970s?
5. **Social media**
    - What is social media?
    - What is social networking?
    - What social networking sites do you use? Give 3 interesting facts about these.
    - What is a wiki?
    - What is a podcast?
6. **Computers in animated films**
    - Name 3 animated films.
    - What is your favourite animated film? Name 2 characters.
    - How are computer animations created?
    - Find out about 2 computer animation companies.
7. **Computers in sport**
    - What is the software used in Formula 1 racing cars?
    - How does computerised analysis of sport work?
    - How are computers used in scoring / match results?

8. **History of the Internet**
    - How did the Internet begin?
    - What is HTML? What is HTTP?
    - What is W3C?
    - What are the most important developments in the Internet in the past few years?
9. **Computer hacking**
    - What is computer hacking and what are computer viruses?
    - What are ethical hackers?
    - What is a firewall?
    - How would you minimize the risk of hacking?
10. **Open Source**
    - What is Open Source Software?
    - Have you used Open Source Software? If so, say what you thought of it.
    - Give 5 examples of Open Source Software.

Resource 3

Research Project Worksheet

A worksheet to be filled out by students as they progress through their projects.

Our Research Project Worksheet

Students' Names: _____
_____
_____

1. **Project title:**

2. **Project topic:**

3. **Brainstorm ideas:**

4. **Divide work among group members.**

Team Member 1	Team Member 2	Team Member 3

5. **Websites we found useful:**

_____
_____
_____
_____
_____
_____

6. **Challenges we faced:**

_____
_____
_____
_____
_____

7. **Positive aspects / things we enjoyed**

_____
_____
_____
_____
_____

8. PowerPoint Presentation Plan

- **Slide content**

Slide 1 _____

Slide 2 _____

Slide 3 _____

Slide 4 _____

Slide 5 _____

Slide 6 _____

Slide 7 _____

Additional slides

_____
_____
_____
_____
_____

- **Colour scheme**

_____
_____
_____

9. Evaluation (after end-of-project presentation)

Once you have presented your project and have answered questions from your classmates and teacher, suggest 2 improvements for your project. Write the suggested improvements in the spaces which follow.

2 Suggested Improvements for our Project

1.

_____
_____
_____
_____

2.

_____
_____
_____
_____

Lesson 2
Research Time

Resources:
Unit Marking Sheet (See Appendix 1)

Key Vocabulary:
Not applicable

Description:
Students begin to research their topic on the Internet. They fill out the Research Project Worksheet distributed during Lesson 1. The sections to fill out include Websites we found useful, Challenges we faced, Positive aspects / Things we enjoyed.

Learning Objectives:
1. To allow students to begin research on their chosen topic on the Internet and to collaborate with team members as necessary.
2. To allow students to gather a list of useful websites for their research topic.
3. To enable students to identify and note challenges / positive issues they faced in the lesson.

Lesson Introduction:
- Explain to students that they will begin to research their topic in today's lesson.
- The Research Project Worksheets, which they worked on in Lesson 1, should be re-distributed to the relevant teams.
- Tell students they should fill out the sections Websites we found useful, Challenges we faced and Positive aspects / Things we enjoyed as they progress through the research today and in subsequent research classes.
- The Research Project Worksheet will be collected at the end of each class, as was explained in Lesson 1.

Lesson Breakdown:
1. Make sure students are assembled in their project teams and have a copy of their Research Project Worksheet.
2. Tell students that they can now start to research their topic on the Internet. They should fill out the Research Project Worksheet as they progress.
3. Explain to students that the main aim of today's lesson is to find a list of useful websites that they can use for their project.

Note: ***This Lesson, although labelled Lesson 2, may continue for a number of lessons, as the students gather information for their research***

topic. The number of lessons required for research may vary and is at the teacher's discretion.

Lesson 3
What is a good Presentation?

Resources:
Presentation Skills (Resource 1), Unit Marking Sheet (See Appendix 1)

Key Vocabulary:
Not applicable

Description:
Present the characteristics of a good presentation to students. In this lesson students are required to plan and create their PowerPoint presentation slides using their Research Project Worksheet.

Learning Objectives:
1. To teach the characteristics of good presentation skills to students.
2. To enable students to plan the content, design and create their Power-Point presentation.

Lesson Introduction:
- Tell students that a good presentation involves many skills.
- Explain that they will understand the characteristics of a good present-ation and that today they will begin to plan and create their research project presentation using PowerPoint.

Lesson Breakdown:
1. Start PowerPoint presentation 'Presentation Skills'.
2. Ask students to suggest characteristics of a good presentation.
3. Explain to students that a good presentation involves Presentation Pre-paration, Presentation Assembly, Practice and Delivery.
4. Emphasize the importance of eye-contact and speaking with a clear voice.
5. Students should also understand how to conclude a presentation and how to answer questions at the end of the presentation.
6. Ensure students understand that they will be assessed on all aspects of their presentation and not just on the content of their slides.
7. Once the PowerPoint presentation has been presented to the students, ask them to begin planning their own project presentations using the Research Project Worksheet, which should now be re-distributed to the relevant teams.
8. Once students have planned their slides and design on paper, they may begin to create their presentations using PowerPoint.

Note: ***Planning and creation of the PowerPoint presentations may take a number of classes and this is at the discretion of the teacher. It is***

advisable however to specify a date so that all teams are ready for class presentations.

Resource 1

Presentation Skills

A PowerPoint slideshow on presentation skills.

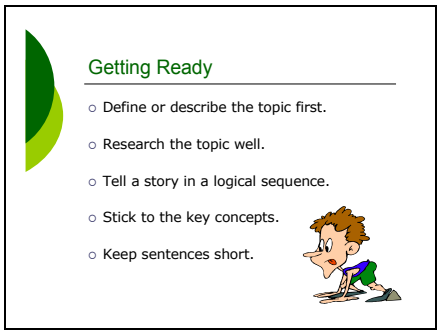
CD Resource

“M8L3R1 Presentation Skills.ppt”

Slide 1

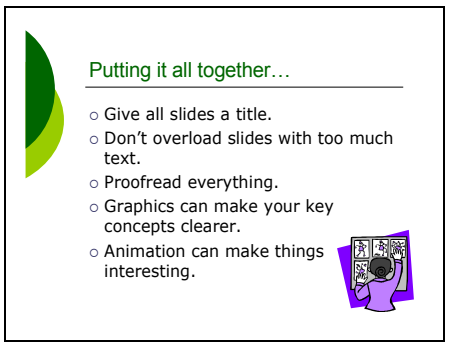
Introduce the topic

Slide 2



You should prepare well for your presentation.
First of all you should describe or define your topic for presentation and then research the topic well, so that you feel comfortable with it.
Organise your presentation so that it is in a logical sequence and tells a story.
Stick to the key concepts and keep your sentences short, so that your message is clear for the audience.

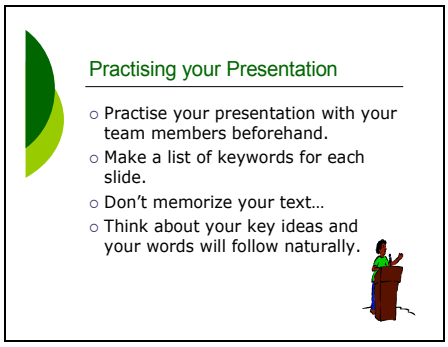
Slide 3



When creating your presentation, make sure all your slides have a title.
Don't overload slides with too much text and make sure you have bullet points to organise your slides.
Proof read everything and check for spelling and grammar mistakes.
Graphics can clarify concepts and make the presentation more interesting. Include graphs if appropriate. Make sure your graphics are relevant to the topic you are presenting.
Animation and slide transitions will enhance your presentation and make it more interesting for your audience. Use appropriate animations for your

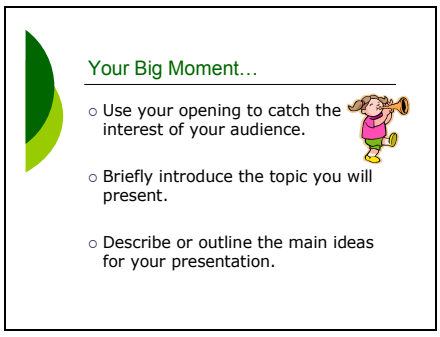
topic and audience.

Slide 4



Always practise your presentations beforehand, as this will give you confidence and ensure you are well prepared.
Make a list of keywords for each slide.
It is best not to memorize your text. Just think about the key ideas and your words will follow naturally.

Slide 5

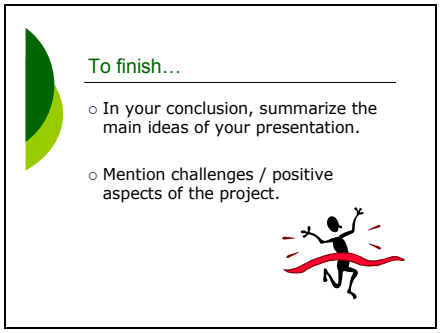


Use your opening to catch the interest of your audience. It could be a quote or an interesting fact for example.
Introduce your topic briefly and outline the main ideas for the presentation.

Slide 6

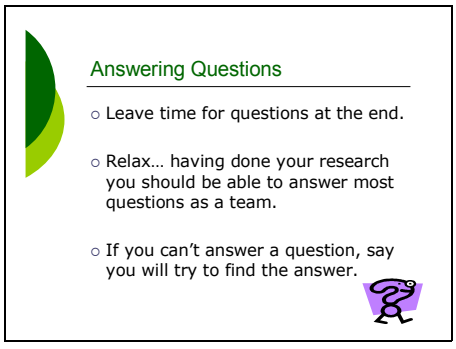
Your body language and voice are as important as the content of your presentation.
Keep your eyes on the audience and never turn your back on them when speaking.
Be enthusiastic and stand up straight. This portrays confidence.
Speak clearly so that everyone can hear you.
Pause briefly before each new slide, as this gives the audience time to digest the information.

Slide 7



Your conclusion should summarize the main ideas of your presentation.
You should mention any challenges you encountered during the project and also any positive experiences.

Slide 8



It is important when presenting to leave time for questions at the end.
You will be asked questions by the class and teacher on your research topic.
Relax. If you and your team have researched the topic well, you will be able to cope with the questions.
If you can't answer a question, just say so and tell the questioner you will try to find the answer for him / her.

Slide 9

Finally…. Good luck and enjoy!

Lesson 4
Presentation Time

Resources:
Suggested Questions for Teachers (Resource 1), Unit Marking Sheet (See Appendix 1)

Key Vocabulary:
Not applicable

Description:
Students present their research projects to the class, using PowerPoint. They answer questions from the class and teacher on their research and presentations. Their final mark will be based on this presentation and the Research Project Worksheet they have filled in.

Learning Objectives:
1. To allow students to experience presenting their project to their class and teacher.
2. To encourage students to cope with answering questions from their audience.

Lesson Introduction:
- Tell students that they will present their research projects to the class.
- Students should be organised into their research groups and given a short period of time to prepare.
- The order in which students present their projects is at the teacher's discretion.

Lesson Breakdown:
1. The first group of students present their PowerPoint presentation. Each member of the group presents part of the project.
2. Once the PowerPoint presentation is complete, class members are encouraged to ask questions on the research topic and presentation.
3. The teacher may also ask a number of questions from the Suggested Questions for Teachers sheet (Resource 1) and / or questions of his / her choice.
4. The class should be encouraged to make some suggestions for improvement of the project and / or the presentation and these should be noted by the project group as feedback.
5. Each project group presents in turn, as above until all groups have presented and answered questions from the class and teacher.
6. At the end of all presentations, students should be given time to reflect on their presentations and the feedback from the class.

7. Students then fill out the final part of their Research Project Worksheet i.e. 2 suggested improvements for their project.
8. Finally, students hand their Research Project Worksheets to the teacher for grading.
9. Teacher marks the research projects according to the criteria set out in the Research Project Marking Scheme (Resource 2). This may be returned to students.

Resource 1

Suggested Questions for Teachers

A sheet of suggested questions on each research topic. There are 3 questions for each topic.

Suggested Questions for Teachers on Presentation Topics

Topic 1 – Virtual Reality and Second Life

1. What is the currency in Second Life? Linden Dollar
2. Can you name some organisations using Second Life? Some embassies including Maldives and Sweden, some religious organisations, educational institutions e.g. University College Dublin, Open University UK etc.
3. Outline 2 dangers or problems with Second Life? People not able to separate fiction from reality, difficulty verifying age of inhabitants, isolation of participants…..

Topic 2 – Encryption

1. In encryption what is a key? The key is the special information used to encrypt and subsequently decrypt data.
2. What is public key encryption? This uses two keys - a public *key* known to everyone and a private or secret key known only to the recipient of the message. When John wants to send a secure message to Mary, he uses Mary's public key to encrypt the message. Mary then uses her private key to decrypt it. The public and private keys are related in such a way that only the public key can be used to encrypt the message and only the corresponding private key can be used to decrypt it.
3. Outline at least 2 areas where encryption is used. Computers, networks (e.g. Internet e-commerce), secret communication in the military and between governments, mobile phones, bluetooth devices and ATM machines.

Topic 3 – Famous I.T. people

Steve Jobs

1. Who was the co-founder of Apple? Steve Wozniak
2. Besides the computer industry, in what other industry is Jobs involved? The entertainment industry. He the largest shareholder in Walt Disney Company and is on its board of directors.
3. Outline 2 of Apple's best-selling products. E.g. iPod, iPod Touch, Macbook.

Tim Berners-Lee

1. What was his primary degree from Queen's College, Oxford? Physics
2. Can you name any publications or any awards he has received? 2004, Knighted by the Queen for services to the global development of the Internet. 1999, named one of the 100 greatest minds of the century by Time magazine. Publications: World Wide Web: Information Universe, The Semantic Web.
3. Tim Berners-Lee is the director of the World Wide Web Consortium (W3C). What is this? This is the main international standards organisation for the World Wide Web. It also engages in education and outreach, develops software and serves as an open forum on discussions about the Web.

William Rowan Hamilton

1. As well as mathematics, can you name another area in which he excelled? Languages, modern European as well as Arabic, Persian, Sanskrit.
2. At what Irish institution did he study? Trinity College Dublin.
3. What year was Hamilton Year and what did it celebrate? 2005 – it celebrated the 200th birthday of Sir William Rowan Hamilton.

Sergey Brin

1. Who co-founded Google with Segey Brin? Larry Page
2. What subjects did he study at undergraduate level? Computer Science and Mathematics.
3. Apart from the Google search engine, can you outline any other services Google provides? Gmail for email, Google Earth, an interactive mapping program, YouTube, video sharing website.

Topic 4 - Computer Games

1. Who invented the Xbox? Microsoft. Who invented the Wii? Nintendo. Who invented Playstation? Sony.
2. Which of the above 3 sells most? Nintendo Wii.
3. Outline 2 positive and 2 negative effects of playing computer games. Negative effects can include: lack of social skills, decline in schoolwork, confusion between reality and fiction, exposure to violence, leading to aggressiveness. Positive effects can include: problem solving skills, perseverance, pattern recognition, memory, quick-thinking and reasoning skills.

Topic 5 - Social Media

1. Name 2 other social networking sites not mentioned in your presentation. Bebo, Facebook, Flickr (photo sharing), MySpace, Jaiku, Linkedin (business).
2. Name 2 types of Social Media other than wikis, podcasts etc. Social bookmarking sites are del.icio.us and furl; Video sharing e.g. YouTube, Forums and Message Boards e.g. Rotten Tomatoes for film reviews.
3. Outline 2 problems posed by social media? Vandalism, as anyone can edit them, inaccuracy of information…

Topic 6 – Computers in animated films

1. In computer animated films what does CGI stand for? Computer generated image.
2. In animated films, explain what a story board is used for. A story board is a plan of each part of the animation, using images and text to describe what happens in each frame / scene.
3. Outline the types of skills / people needed on a computer animated film development team. Team work, multi-tasking, script development, communication, design skills, storyboard artists, programmers, and project managers.

Topic 7 – Computers in Sport

1. How do computers contribute to the televising of sporting events? Scores, match analysis, creation of highlights packages, storage of archives.
2. State one way in which computers help prepare athletes for sport. Analysis of past performance, training data.
3. State one way in which computers help improve sporting events. Event management software for planning of events, scheduling etc.

Topic 8 – History of the Internet

1. Name a web browser and name 3 Internet domains. Web browser: Mozilla Firefox, Internet Explorer. Internet domains: .ie, .gov, .edu, .com
2. Name 2 languages other than HTML used to develop web pages. Java, Javascript, PHP.
3. What is eCommerce? Outline how eCommerce can benefit a business. Electronic commerce is the buying and selling of goods or services over electronic systems such as the Internet. This can benefit a business by making it visible to millions of people and allowing people to buy goods and services in a convenient way.
   How do you know you are using a secure website and it is safe to give credit card details? The link begins with https://...

Topic 9 – Computer Hacking and Viruses

1. In the context of computer viruses what is a worm? This is a computer program that has the ability to copy itself from machine to machine. It uses computer networks and security holes to copy itself.
2. What is a denial of service attack? It is an attack that prevents an Internet site or service from functioning efficiently or at all.
3. How would your school minimize the risk of hacking? Establish Acceptable Use policies, teachers and students should be given information on the issues of hacking and the severe consequences of inappropriate behaviour. Teachers need to supervise students at all times. Provide strong passwords and rigorous password aging policies e.g. change every 6 months. All computer rooms should be locked when not in use.

Topic 10 – Open Source

1. What are the advantages of Open Source software? Open Source software development approach has helped to develop reliable, high quality software quickly and inexpensively. It is said to be more reliable as it has thousands of independent programmers testing and fixing bugs in the software.
2. Where can you find the Open Source homepage? www.opensource.org

3. How do people make money from Open Source? Many companies provide and charge for support services for Open Source software e.g. RedHat.

References

Lesson 1
Resource 1
Slide 2

Based on Scratch Process of Design model
http://scratch.mit.edu/files/Learning-with-Scratch.pdf