

1. Internet: Anytime, Anywhere

” “We are all now connected by the Internet, like neurons in a giant brain.”

Stephen Hawking, theoretical physicist

CHECKLIST FACT SHEET 1 – GETTING CONNECTED

Have you made sure that your Internet connection is secured by setting up an antivirus, a firewall and by setting a password for your Wi-Fi router?

Have you set up an acceptable use policy (sometimes called a responsible use policy) for anyone using/accessing the Internet through your network and devices?

Have you set up “guest” accounts on devices that are used by your children?

CHECKLIST FACT SHEET 2 – ONLINE PRESENCE AND THE CLOUD

Have you included contact details in your website or blog?

Have you taken steps to protect your online privacy?

Have you checked that the content that you are using for your website/blog is in accordance with copyright law?

CHECKLIST FACT SHEET 3 – WEB 2.0, WEB 3.0 AND MORE

Systematically seek permission from people featuring in the photos and videos you post online.

User recommendations on travel and product sites can be helpful, but are you sure they are real?

User-generated content fosters creativity and freedom of expression, but also places the onus on you if the Internet is to become a better place.

CHECKLIST FACT SHEET 4 – BLOGS AND VLOGS

Protect your privacy by using a pseudonym and hold back certain personal details.

Protect your blog or vlog from hackers by setting up appropriate security precautions and saving your content regularly.

Understand your blog goal and audience when posting content.

CHECKLIST FACT SHEET 5 – INTERNET ON THE GO

At what age can children safely begin to use mobile devices and which ones are most appropriate for very young children?

Do you understand geolocation and Bluetooth sufficiently to use your mobile devices comfortably and safely?

M-learning and mobile wallets are areas in which the use of mobile devices is changing the way we learn, work and shop. What do you know about these recent evolutions?

Getting connected



The Internet is a worldwide network of computers linked together through servers which function as connection nodes¹. In June 2016 there were an estimated 3.5 billion Internet users in the world of which 614 million were in Europe².

— How does the Internet work and why is it important to know the process? You are most likely already using the Internet on a daily basis, even more frequently than your bike or car. While you do not need to know all the technical details about how the Internet works, you should at least have a basic grasp of how it works, much like knowing how to change a tyre on your bike or check the oil level on your car.

— At home, you are most likely connected to the Internet by using a router, that mysterious box that connects either to your telephone line or to your TV cable. All of your devices, be it your smartphone or your computers are connected to that router either via an Ethernet cable or via Wi-Fi.

1. http://en.wikipedia.org/wiki/Node_%28networking%29

2. www.Internetworldstats.com/stats.htm

Now imagine that your router was connected with a cable to your neighbours' router, and your neighbour's router to the house next door etc. That is exactly what the Internet is on a smaller scale. The Internet is simply a huge number of routers connected to each other that allow you to forward and transmit information (data that contain emails, pictures, videos etc.) from one point (your home computer for instance) to another (the smartphone of your friend who is on vacation at the other end of the world).

As amazing as it may sound, there are huge underwater cables that stretch under the ocean across all continents, running directly into a cable landing point which connects into the land-based infrastructure (usually telephone lines).

So just imagine, whenever you send a picture from your computer to a friend this is what happens: your picture gets chopped up into tiny pieces of data called packets which are labelled much like an envelope in the post office (destination, origin and information on how to put that piece of data back together to recompose your picture). Instead of having information like a street name and house number, data packets contain the IP address³ from where it was sent and the IP address of where they are supposed to go. They then go through your telephone line to your Internet service provider's facilities which are connected to the Internet backbone (which is the huge number of interconnected routers we talked about). The packets are redirected by these routers several times until they reach their destination (that's called the number of hops). But what is really the destination of your picture? If you send a picture via email for instance, the destination isn't your friend's computer, but the data centres of the email client your friend uses.

Data centres are huge warehouses filled with routers and hard drives. Your picture will be stored across multiple hard drives (to protect the data in case of hard disk failures). If your friend uses Gmail for instance, then the picture that you have sent to your friend may physically be stored on one of the Google data centres either in the United States, Ireland, Belgium, the Netherlands and many more countries⁴. And your friend, when he or she wants to look at it, sends a request from his or her computer which is redirected through the Internet backbone all the way to that data centre, which then sends on the data with your picture onto his or her computer screen.



INTERNET GOVERNANCE

But how was the Internet set up in the first place? Who is responsible for maintaining the current infrastructures and creating new ones? Who decides on standards such as IP addresses?

While the idea of hyperlinks and interconnected web pages came from Tim Berners-Lee and Robert Cailliau, working at CERN in Switzerland, the first interconnected network called ARPANET was established in the US between universities⁵.

Therefore, the very first body that was responsible for the allocation of unique "addresses", which essentially allowed someone to connect to the network, was set up in the USA (IANA – Internet Assigned Numbers Authority).

As the Internet grew, so did the need to better co-ordinate the development, maintenance, stability and security of the Internet. The United States Department of Commerce pushed for a reform of IANA which became ICANN⁶ (the Internet Corporation for Assigned Names and Numbers) in 1998. ICANN was officially set up as a non-profit corporation "for charitable and public purposes", with a strong "bottom-up" approach to governance, consisting in the co-ordination of thousands of stakeholders across the globe, including private sector stakeholders, civil society and governments. However, it has faced much criticism and calls for reforms from countries around the world due to its ties to the US Government and the risk of over-representing US interests.

In response, ICANN has opened up to a wide variety of stakeholders including 111 states and

3. https://en.wikipedia.org/wiki/IP_address

4. <http://www.google.com/about/datacenters/inside/locations/index.html>

5. https://en.wikipedia.org/wiki/World_Wide_Web

6. <https://www.icann.org/>

a number of observers, such as key telecommunications organisations and the Council of Europe. But ICANN remained criticised for its lack of democratic input and broader consultation of stakeholders, which prompted the creation of the Internet Governance Forum (IGF) in 2006 by the United Nations.

— The IGF meets annually and provides the opportunity for a broad range of stakeholders, including young people, to share their views on the future of the Internet.



EDUCATIONAL BENEFITS

- The Internet offers access to a wealth of new ideas, resources, learning opportunities, information and services.
- The Internet facilitates exchange of experience and communication between users across international borders in a variety of ways: forums, e-mail, social networks, chats, video conferences and so on. It thereby offers students the opportunity to take part in projects and work with other students without the need for expensive travel.
- The Internet makes research tools accessible even to those who do not regularly visit a traditional library.
- With additional devices and software, the Internet can open up new opportunities to those with special needs.
- Learning about how the Internet is governed enables all citizens to get involved in key decisions that will shape its future.



ETHICAL CONSIDERATIONS AND RISKS

- Be aware that the Internet often provides a false sense of anonymity. Given how the Internet works, you always leave a trace whenever you go on the Internet (your IP address).
- As in the offline world, there is fraud, false information and inappropriate material for children.
- While the Internet offers a number of new possibilities, technical solutions are not always better than traditional ones. For example, e-mail has revolutionised communication and although video-conferencing can give a feeling of “almost being there”, it will never replace face-to-face communication.
- Internet governance can have a tremendous impact on your Internet experience with principles such as anonymity or net neutrality in the balance. There is a constant battle between the principle of a free and open Internet and those who wish to control it. Some companies try to redirect traffic to their own websites, apps or services by providing “free” mobile Internet plans limited to those websites, apps or services, and by charging for visiting others⁷. Facebook, for instance, has created the “Internet.org” portal which is the default home page for all users who connect via their Internet service in various parts of the world, especially in developing countries⁸.
- Be aware that anything you share online may be cached, stored or copied.



HOW TO

- Virtually all devices that you buy nowadays are capable of connecting to the Internet, either via Wi-Fi or mobile Internet access (smartphones and tablets, for instance, can connect via Wi-Fi or mobile Internet access), or via an Ethernet cable (most computers are equipped with an Ethernet port).

7. <https://en.wikipedia.org/wiki/Zero-rating>

8. <https://en.wikipedia.org/wiki/Internet.org>

- To connect to the Internet you have two main options:
 - ▶ Contact an ISP (Internet service provider), usually a telephone or cable company, that will provide you with a username and password and sometimes a modem/router to connect to the Internet either via your telephone line or your television cable.
 - ▶ Get a “mobile Internet” plan from your mobile phone operator. Keep in mind that the restrictions on the amount of data you can download/upload are still quite high with mobile Internet, although these will progressively diminish as more operators roll out 4G or 5G mobile telecommunications standards (with a great increase in speed).
- There are also more and more “open” Wi-Fi hotspots that you can use to connect to the Internet for free. You can find them in a variety of public places, such as a public library but also in bars, restaurants and shopping malls. Most of the time, before you connect, you will be asked to do one or more of the following: accept the terms of use, create an account using your e-mail address (be aware that your e-mail may then be used to send you advertising so be sure to create an e-mail address specifically for these situations) or enter a password to connect to the Internet. In bars, restaurants or hotels, for example, the “open” Wi-Fi is often only accessible to clients so you have to ask a member of staff to give you the password. Never share sensitive data or carry out sensitive operations such as mobile banking via public Wi-Fi hotspots.
- Most ISPs will provide you with a preconfigured router that you will just need to plug into your telephone/cable line in order to be connected. Sometimes, you will need to buy a router and configure it yourself. Be sure to check with your ISP if the router you have or that you intend to buy is compatible with your Internet subscription!

IDEAS FOR CLASSROOM WORK



On Windows 7 and above

1. Click on the “**Start**” button in Windows.
2. Type “**cmd**” in the “**search**” bar and click on the program icon that shows up in the start menu.

```

C:\Windows\system32\cmd.exe
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\>
  
```

3. Type “**tracert wikipedia.org**” and press “**enter**”.
4. You will then be able to see the “**hops**” that exist between your computer and the website you are trying to reach and how much time each “hop” takes. In this example, we see that to access Wikipedia, we first go through routers of our “local” ISP (in this case Belgacom from Belgium),

then we go across the Atlantic to a router in Washington (abbreviated “was”), finally to arrive to the place where Wikipedia is hosted. Students are of course encouraged to try this with other websites. Notice how much time each step took in milliseconds.

```

C:\Windows\system32\cmd.exe
C:\>tracert wikipedia.org

Tracing route to wikipedia.org [208.80.154.224]
over a maximum of 30 hops:
  0  12 ms   45 ms   7 ms   192.168.1.1
  1  25 ms   28 ms   175 ms  1.192-134-109.adsl-dyn.isp.belgacom.be [109.134.192.1]
  2  *      *      *      Request timed out.
  3  193 ms  39 ms   77 ms  ae-12-1000.ibrstr3.isp.belgacom.be [91.103.246.108]
  4  30 ms   43 ms   52 ms  ae2.brq21.ip4.gtt.net [141.136.102.217]
  5  126 ms  162 ms  133 ms  xe-7-3-0.was10.ip4.gtt.net [141.136.111.10]
  6  412 ms  388 ms  277 ms  xe-5-3-1.cr2-eqiad.wikimedia.org [173.241.131.218]
  7  201 ms  277 ms  185 ms  text-lb.eqiad.wikimedia.org [208.80.154.224]

Trace complete.
C:\>

```



On Mac OS X and above

1. Launch the network utility in Mac OS X (you can do this by going into Spotlight and typing “**network utility**” and clicking on the top hit).
2. Click on “**Traceroute**”.
3. Enter the domain name for which you want to perform a traceroute, such as “**Wikipedia.org**” and click on “**Trace**”.
4. You will then be able to see the “**hops**” that exist between your computer and the website you are trying to reach and how much time each “**hop**” takes.

Optional material for teachers

- For more information, watch the Naked Science Scrapbook’s video “How does the Internet work?”⁹.
- Start a classroom discussion on how online technology can benefit people with special needs, and take a look at the Council of Europe action plan to trigger ideas¹⁰.



GOOD PRACTICE

- Choose a connection appropriate for your Internet usage. If you are regularly using services that require a very fast Internet, such as high definition video streaming, be sure to get a faster Internet connection (at least 20 megabits per second, which is equivalent to ADSL2+). More especially, look for an Internet connection with no limitations to the amount of data downloaded. If you only require the Internet to read the news and send e-mails, then virtually any basic Internet subscription will be sufficient for you¹¹.
- Always turn off your devices (computers) or disable the Wi-Fi connection on your smartphone/tablet when you go to bed. Leaving your devices connected may increase the security risk to your data and might also pose health risks (see Fact sheet 19 on security).

9. <https://www.youtube.com/watch?v=oj7A2YDgIWE>

10. https://www.coe.int/t/dg4/majorhazards/activites/2013/DIDRR/Action_Plan_CoE_Easy_to_Read_13nov08_EN.pdf

11. www.cnet.com/internet-speed-test

- Be sure to know how to access the configuration page of your router. Most often, if you type one of the following IP addresses into your browser you can access it: 192.168.1.0 or 192.168.1.1. Why is this important? Most Wi-Fi configuration pages have “default” administrator accounts with very basic usernames and passwords (for instance username “admin” and password “admin”). It is very important to secure the access to your router’s configuration page as it can easily be used to change your settings or gain access to your home computer network.
- Sit next to your children whenever you can while they are surfing the Internet, in order to stimulate discussion about their online experiences and to increase trust; make it a challenge to learn together.
- Take an active interest in Internet governance and make your voice heard in public debates over fundamental principles such as anonymity, security or net neutrality.
- Draw up an acceptable use policy (AUP)¹² or responsible use policy (RUP) if others will be using the computer or network you are responsible for.



FURTHER INFORMATION

- The List is a worldwide directory of ISPs. <http://www.thelist.com>.
- Education websites such as European Schoolnet at <http://www.eun.org>, Global SchoolNet at <http://www.globalschoolnet.org/GSH/> and Education World at <http://www.educationworld.com/> offer resources and collaborative projects.
- Advice on writing an AUP can be found via Education World, an online portal for teachers and education professionals: http://www.educationworld.com/a_curr/curr093.shtml.
- The Insafe portal offers resources and advice on how to get connected and surf safely: <http://www.betterinternetforkids.eu/>.
- The official website of the Internet Governance Forum enables discussion to take place on public policy issues linked to the Internet: <http://www.intgovforum.org/cms/>.
- The following Wikipedia page contains various information about net neutrality: https://en.wikipedia.org/wiki/Net_neutrality.
- Information on ICANN can be found on their official website: <https://www.icann.org/>.

¹². http://en.wikipedia.org/wiki/Acceptable_use_policy