Frequency Emissions and 5G



How to pass on information on biological effects and measurement of Radio Frequency radiation

Micro-teaching assignment PCET Dec 19

Angel Garden

Introduction

This is a reflective report and analysis of the first micro-teaching assignment of the PCET course, using the Gibbs reflective model. (UK Essays)

Out of three ideas I decided on the most current, Frequency Emissions and 5G. This report will analyse planning, execution and evaluation of the teaching project in several contexts: the current level of pubic knowledge about frequency emissions and 5G, with regard to my first teaching experience, and with regard to professional standards and national well-being goals.

Aims and Objectives of the lesson.

Through research, I had developed a keen desire to educate about 5G and decided to use the micro-teaching to develop a lesson aiming for, not just understanding of RF emissions measurement, but the ability to pass the information on.

My teaching plan included the bare minimum information to understand the importance of measuring RF emissions, and then to do it and compare with two difference measurement scales.

The understanding needs to include context of why these levels are not being routinely measured, in line with policy and legislative frameworks.

In a world already saturated with radio frequency (RF) I wanted to help fill a need for a simple, swift and effective method of educating about the biological effects of wireless radiation.

The teaching had to take into account the context of public perception of 5G, including heavy media and Government bias in favour of promoting the International Commission on Non-ionising Radiation Protection (I.C.N.I.R.P), (GOV.UK)

The other measurement scale used was the International Guidelines on Non-Ionising Radiation. (I.G.N.I.R). (IGNIR.org)_

The lesson needed to explain that ICNIRP only accept thermal effects of RF fields and focus on average energy absorbed." (Starkey S. J, 2016, p 495).

The teaching also had to take into account public perception of criticism of ICNIRP's standards, with even the New York Times running a hit piece suggesting that those picking up the "network's alarms" were "seldom if ever noting the Russian origins." (Broad W.J. 2019)

Tech-wise I opted to include an RF meter along with my use of selected video clips and Powerpoint.

In practise

I started by asking people what they knew about 5G. All agreed it was just another level, or generation, of ordinary technology.

I went through the slides elaborating each one to explain the necessity to understand and measure radio frequency emissions in order to understand the dangers of them, due to standards which don't measure biological effects.

I gave out the "SAM" sheet and asked the learners to fill in their own phone model by the two phones strapped to "SAM's" head.

In spite of me having checked and charged the batteries a few days prior, the RF meter was completely flat when I came to measurement and my volunteer had her phone all ready. This did interfere with V2 and A4 standards - learners have opportunity to assess their own ability in tasks.

Luckily, in my enthusiasm I had already put a large cardboard measurement table on the devices backed with blu-tak, with levels already on, for example "iphone with wifi and bluetooth but not mobile wireless" and various other connective combinations. We used this instead to demonstrate RF measurement and still finished on time.

My reflection on this micro-teaching project using Gibbs has involved seeking information and sources from several different disciplines, including teaching theory, methods, FR science, media, technology, and legal frameworks

Personal reflection

We were encouraged and even exhorted to take risks, and I'm glad I listened to this as I've learned so much that's applicable to the real world.

I enjoyed delivering the lesson, even though there was a major hiccough in the middle when we got to the 'using the RF meter to measure RF emissions from someone's phone. When I turned the meter on, the battery measurement said 0%!

However, I'd previously attached an RF measurement chart borrowed from Safe Technology Swansea onto the wall, in case we had time to explore it. So even this

error helped to get the message across of the limitations of technology and to perhaps pose questions as to the wisdom of its unbridled deployment per se, as opposed to appropriate use and limits of technology, as one method of teaching among many others.

From the point of view of my passion and interest, the lesson went well, and I believe it achieved proof of concept, both of the importance of teaching the subject, in using one sheet to do it, and showing several areas of improvement that can easily be adopted which can be expected to improve the lesson.

Evaluation

Planning

Feedback on my plan included that there were too many points to cover. It was perhaps a bit ambitious, and I will consider how to simplify that, and get away from powerpoint more and onto a page that tells the story and the facts, and that can be taken away.

A suggestion was to include more detail of slides in the plan to be clear which slides cover which elements. The plan needs to include the full number of slides in the whole lesson.

The powerpoint could possibly be redesigned to teach more about the one sheet. This suggests two distinct teaching possibilities; one in a classroom with these technologies available, and the other with just the sheet, anytime anywhere.

Tech-wise I opted to include an RF meter along with my use of video and Powerpoint.

The Lesson

Time planning worked well and I did not run over in spite of technical issues.

My main mistake was in not checking equipment adequately. I should have checked the RF that day, not just two days before. The batteries were completely flat. This possibility wasn't even written down in the risk assessment, and shows the need for tech vigilance. It can be easily rectified by having a checklist.

Another main mistake was to overlook the natural depressing effect of the learning. I should have spent more time making sure people were not unduly traumatised by being given difficult information and then left alone with it, with no support.

Selection of Facts

It was difficult to select the important facts to teach in a topical and daily changing subject to show how issues need to be thought about **before**, not after, changes with potential negative effects are introduced without properly informed consent.

Moving too fast to convert everyone to electric vehicles for example, could negativity impact sustainable and well-being goals down the line in potentially colder winters due to the electric car's significant loss of power in the cold (Loveday S, 2019).

Not a scientist

I learned about simplifying a complex subject which makes people feel "I'm not a scientist", a category I'm in myself. I'm glad I had the courage to dive into a scientific subject.

The opportunity to use the wall chart instead of a meter allowed me to meet the planned standard V3, (using evidenced scientific measurement standards), which could still be measured against two different scales on the 'SAM' sheet.

This has also prompted me to change the sheet to have items similar to those that stick to the wall-chart, but this time drawn in the middle of the sheet. Learners can then draw lines to each side of the sheet to estimate where the objects land on the two scales.

All devices will still be above the modified safe levels of the International Guidelines on Non Ionising Radiation. (Environmental Health Trust 2019*)*

Feedback

I received positive feedback: well laid out objectives, (meeting simple learning goals standard of K1), a clear and confident delivery, passion for the subject, good engagement and encouraging participation. The videos worked well in the presentation.

Measurement could be better, not just the meter problems, but measuring whether the class was working, i.e. whether necessary facts were transferred and retained.

This reflection has led me back to the simplicity of ‘SAM’, the Specific Anthropomorphic Mannequin, and using visual storytelling with science. This includes finding a way to reference research which can be also incorporated into the sheet.

Although I didn’t have time for a formal test, only one person later refused to sign a petition asking for the Precautionary Principle to be upheld in Swansea, which I feel can be seen as successful and also fulfils the professional standard of being assessed by others too (A3).

Additional Learning Needs

Standing up and moving directions is disorientating for me, due to uneven surfaces in my feet and moving around in even quite small spaces causes pain due to not concentrating enough on foot placement. I decided that I wanted to stand up mainly, just to have that “normal” stature. As a result I lost some awareness of my whole physicality, in concentrating on delivery and so did turn my back, as reflected in my feedback. In retrospect this is a conclusion I don’t much like, because it means I shouldn’t stand, at least until I”m way more familiar with the material, but I will have to work with that.

Analysis

One Sheet Teaching for “anyone anywhere”.

Searching for ‘one page’ teaching theory after the event, revealed an array of examples in the arena of young and or Additional Learning Needs children and/or adults and sometimes used as a revision aid.

The simplified sheet for “anywhere anytime” can, however, use a combination of visual teaching, a story to listen to, and to be able to fill it in, or even colour it in, take it away to use and refer to, use as a resource, and share it.

Although some teachers consider use of cartoons as “low brow” (EduComics Feb 2019), visual imagery is certainly an efficient and universal language for a generalised lesson like this, with science to back it up as a teaching tool, (Oetting 2015).

Seeking to make a page that can be used by just about everyone and work on different levels to impart enough information through kinaesthetic, as well as visual and aural learning, and that can be tested, is a tall order, but then again so is living in a world bathed in micro-wave radiation!

The need for precaution causes depression.

A main take-away was the helpless depression caused by the information which felt like a counter-intuitive way to teach.

Misunderstanding of the Precautionary Principle

My second take-away follows on, that people can easily misunderstand the precautionary principle, viz:

"*Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation*" (European Commission 2017).

Emergent technology in the context of teaching about frequency emissions.

Further limitations of emergent technology were easy to demonstrate. Had I not valued the kinaesthetic, and varied approach in planning, (UMass 2019) and had the chart and cardboard cut-out phones and devices with the levels of RF radiation in them, I wouldn't have been able to complete the measurement part of the session at all. (The Learning Web). This mistake and recovery enhanced K2 and K3 standards, (using a balance of appropriate teaching methods, including Including visual, aural, and kinaesthetic learning).

Informed Consent and Professional Standards

Low initial levels of knowledge raise an important question. Should learner teachers, so clearly ignorant of the dangers of the RF emissions of much emergent tech, be told, a priori, that they should promote it?

Doesn't such a directive take for granted that effective safety regulations exist? But this lesson is all about the knowledge that *no biological effects* of RF emissions are acknowledged in the ICNIRP standards.

So was the project itself on the wrong side of emergent technology policy or did it represent enhanced appropriate use? (Standards A2 and K4)

All recent legislative instruments, the ALN Act, Wellbeing of Future Generations Act, the UNCRC, Social Care Act, stress the importance of sustainability, i.e operating in a manner that will not prejudice the futures of others.

Understanding the biological effects of RF emissions is therefore a necessity in order to comply with professional standards, of safety and responsibility for not exposing students to any known dangers.

Decisions about whether to protest or take precautionary measures against RF emissions are also “affected by understanding of exposure” (Claassen L, et al 2017).

Standards and Regulatory Context

The convergence of the Donaldson Curriculum reforms and the Well-being of Future Generations Act is useful in this exercise due to the wide age range of possible learners.

Whether or not it conflicts with industry narratives and institutional policy on emergent technology, the teaching fulfils the sustainable development principle and well-being goals as described in the Well-being of Future Generations (Wales) Act 2015.

Section 5 describes the necessity for public bodies to act “*in a manner which seeks to ensure that the needs of the present are met without compromising the ability of future generations to meet their own needs*.”

This must balance short term needs with those of the future, must examine actions in the light of well-being goals, including health, must examine conflicting needs, and consider how deploying resources to prevent or mitigate problems may contribute to meeting well-being objectives.

Conclusions

Micro-teaching is a rich learning experience. Not only was I able to ‘try out’ a teaching methodology on a very current globally significant subject that people know little about, but I also gained several important research insights and an understanding of how this teaching fulfils mandates in the new teaching framework: Successful Futures learning goals.

The Wellbeing of Future Generations Act also demands and supports the widest possible teaching of biological effects of wireless radiation in order to achieve the wellbeing goals in the Act, the protections of the UNCRC, the Human Rights Act, and the European recommendations.

Mistakes have encouraged me to explore the one sheet methodology further, including the use of images to teach such a broad larger audience.

Being personally motivated by a genuine desire to increase knowledge about biological effects of wireless radiation, all elements of the experience, good or bad, are useful in honing down the teaching objectives, improving the delivery, and finding settings in which to pass the learning on.

That includes the absolute failure to pass on an understanding of the precautionary principle, evident in a participant’s comment that “i don’t believe there’s enough evidence to show it’s dangerous.”

It was certainly not ‘disproof of concept’ and I’m inspired to develop it further, encouraged by my tutor’s suggestion to deliver the lesson as part of my placement, a very positive idea to create an evolving and increasingly helpful piece of teaching in its own right.

This has been an analysis of the whole exercise from beginning to end in the context of knowledge base, standards, legislative framework, and my own teaching practise.

Action Plan

- Redesign the sheet to reflect and include the basic important information without which someone would be unable to pass this on.

- Equipment check-lists.

- Upload powerpoint, including videos, in a companion online resource, elaborating on all parts of the sheet, so that those who want to teach it can get the sources for the information they will be sharing.

- Divide the teaching into two possible settings, one teaching people *about* the sheet and how to share it. The other is the self-contained micro lesson of the sheet itself, containing much of the same information and involving kinaesthetic learning in spite of being so basic.

- Include links to research and connections near the top. Lead with the numbers of people, towns and cities that are questioning the accepted narrative. (This also matters because if you don't have a positive thing to do people may assuage their distress by being more likely to chose not to believe it as it's just too difficult.)

- Simple visual explanation of the Precautionary Principle in cartoon. A bird looks from the top of an object on a lake. Across the water we can see an adult and a child who wants to swim in the lake. The bird explains that the adult has heard that there may be, or might be a crocodile in the water. Would you let the child swim in the lake before you knew there was no crocodile in there?

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Web:

Precautionary Principle
https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=LEGISSUM%3Al32042

UK Professional Standards Framework (UKPSF): https://www.advance-he.ac.uk/guidance/teaching-and-learning/ukpsf


50

Tell someone about 5G

Frequency Emissions

5G,
4G, 3G, 2G,
4G LTE

Global Roll-out of 5G

Department for Digital, Culture, Media & Sport

Freedom of Information Team
4th Floor
100 Parliament Street
London SW1A 2BQ
E: foi@culture.gov.uk

www.gov.uk/dcms

5 November 2019

Alan Dransfield
alanmdransfield@gmail.com

Our Ref: FOI2019/11365

Dear Mr Dransfield,

Thank you for your email of 21 October to the Secretary of State for Digital, Culture, Media and Sport in which you made the following request for information:

1.Please provide me with a copy of the Environmental Protections Plans for the 5G system Nationwide .

2.Please provide me with a copy of the H&S Preconstruction Plans for the 5G systems.

3.Please provide me with a copy of the technical details for the .Nation wide 5G System.

Your request has been passed to the Department for Digital, Culture, Media and Sport and I have dealt with your request under the Freedom of Information Act 2000 (the Act). I can confirm that DCMS does not hold information within scope of any parts of your request.

For your information, the government's primary role in the rollout of 5G networks will be to create a policy and regulatory environment which will ensure the right conditions for the development and support the deployment of 5G networks. The department is not responsible for the deployment of the networks themselves, which will be conducted by the mobile network operators.

Yours sincerely,

Freedom of Information Team
Department for Digital, Culture, Media and Sport



“We won’t wait for the standards”.”

Tom Wheeler of Federal Communications Commission in US - 2016


Senate Commerce Hearing, Blumenthal Raises Concerns on 5G Wireless Potential Health Risk
MR. BLUMENTHAL
Play (k)
3:37 / 4:48

ICNIRP

International Commission on Non-Ionising Radiation Protection


5G Swansea City Council questions on 26.09.2019 - ANM
far more knowledgeable than I am
ANM
Pause (k)
5:34 / 15:54

Treaty on the Functioning of the European Union
Article 191
the Precautionary Principle enables

“a rapid response to be given in the face of a possible danger
to human, animal or plant health,
or to protect the environment.”

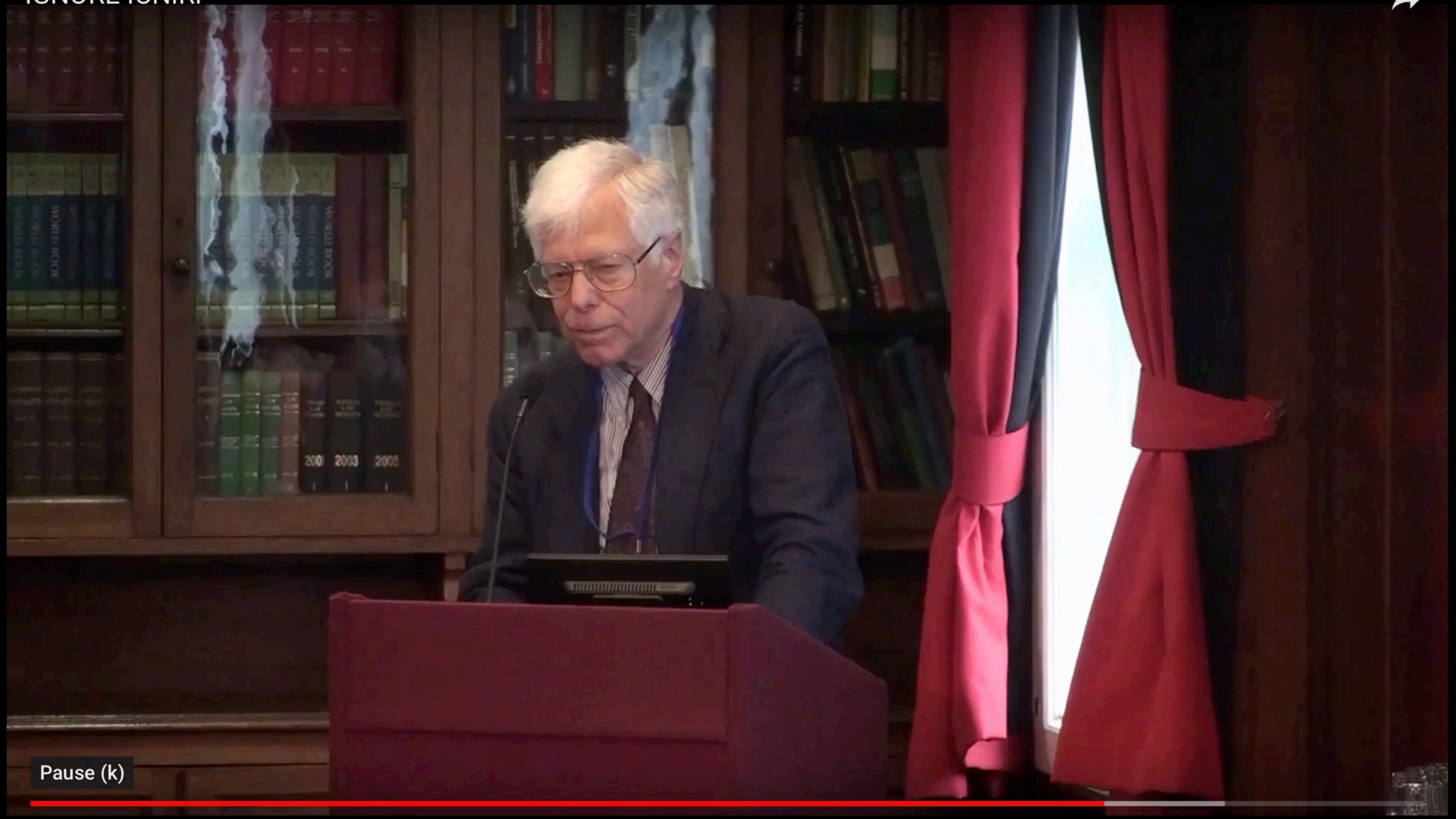
“The precautionary principle may only be invoked when the three preliminary conditions are met:
1. identification of potentially adverse effects;
2. evaluation of the scientific data available;
3. the extent of scientific uncertainty.”

“In particular, where scientific data do not permit a complete evaluation of the risk, recourse to this principle may, for example, be used to stop distribution or order withdrawal from the market of products likely to be hazardous.”

Public Health England and
Public Health Wales
both refer to ICNIRP

Roll of UNCRC / Children's Commissioner WFGen Act


Swansea Commits to the UNCRC, Friday, 11th of October, 2013
ANM
0:20 / 3:32


IGNORE ICNIRP
Pause (k)
5:45 / 7:28

ICNIRP
International Commission on
Non-ionising Radiation Protection

What does the “protection” stand for?

Thermal Effects

ICNIRP

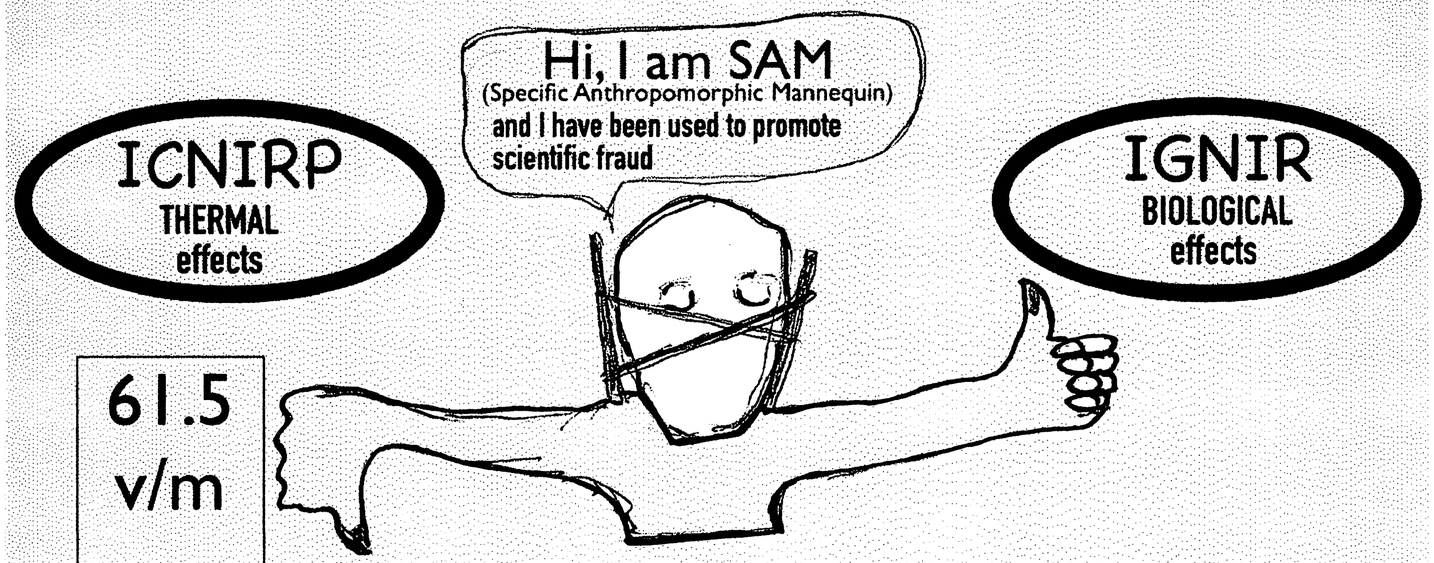
Biological Effects

EUROPAEM, IGNIR & OTHERS

Medical Conditions linked with EMF Exposure

- Autism
- ADHD / Behavioural
- Epilepsy
- Arrhythmia
- Tinnitus
- Hormonal Disruption
- Food Allergies
- Sterility
- Multiple Chemical Sensitivity
- Alzheimer's
- Parkinson's
- Cardiovascular
- Thyroid Dysfunction
- Cancer
- Migraine
- Mood Disturbance
- Insomnia
- Electromagnetic Hypersensitivity

How electromagnetic frequency emissions are measured



61.5
v/m

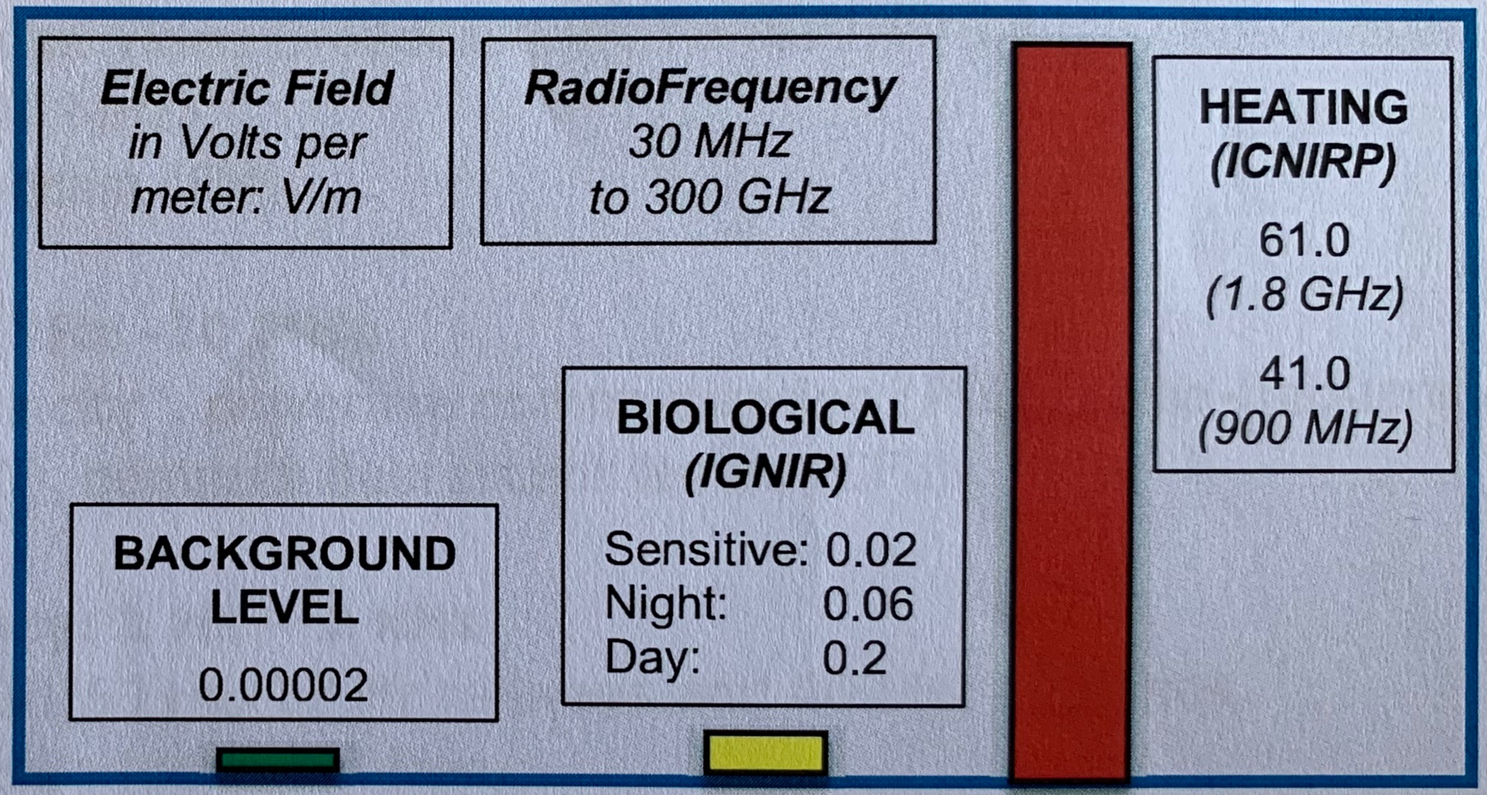
0.02
v/m

A chart to represent the differences between:

- Background environmental level;
- Biological Guidelines *(IGNIR)* maximum long-term;
- Heating Guidelines *(ICNIRP)* maximum short-term (6 min.)

RF Power Density in microWatts per meter squared: μW/m²

Background: *0.000001*
Biological: *100-10-1*
Heating: *9,600,000-4,500,000*



Time-varying or information-carrying signals are more biologically active than continuous waves. For RF Power Density, background environmental levels are roughly a million times lower than Biological Guidelines, which are roughly a million times lower than Heating Guidelines.

Frequency range	Metric	Type of reading	D Day	N Night	S * Sensitive *
Radio Frequency *30 MHz – 300 GHz*	V/m	average	0.06	0.02	0.006 to <0.001
	$\mu W/m^2$		10	1	0.1
	V/m	maximum	0.2	0.06	0.02 to <0.002
	$\mu W/m^2$		100	10	1

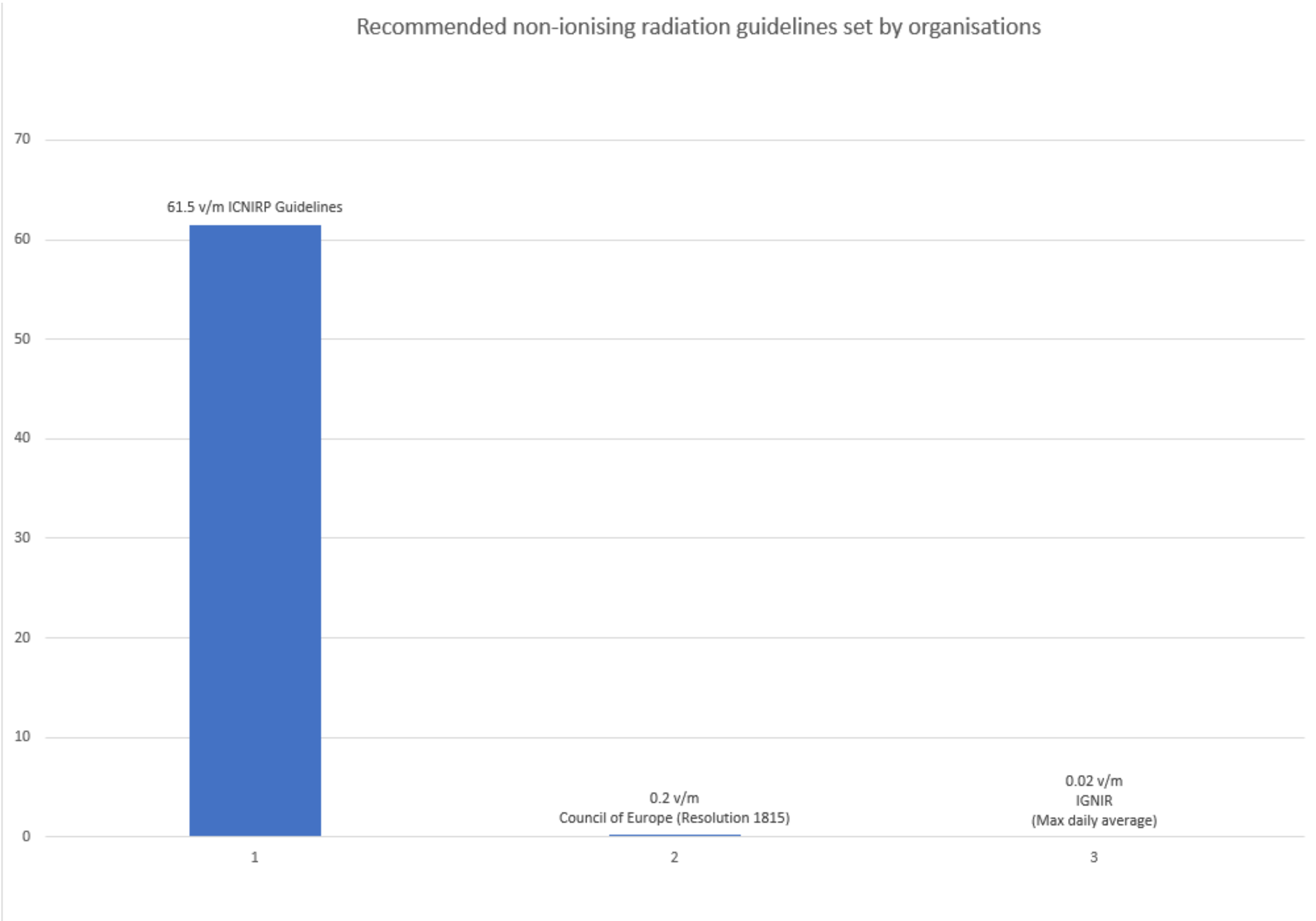
Frequency range	Metric	Type of reading	D Day	N Night	S* Sensitive*
**VLF *3 kHz – 300 kHz*	V/m	average	0.1	0.03	0.01
	nT	average	1	1	0.3
	nT	maximum	10	10	3

Frequency range	Metric	Type of reading	D Day	N Night	S* Sensitive*
ELF *15 Hz – 3000 Hz*	V/m	average	10	3	1
	nT	average	300	100	30
	nT	maximum	1000	300	100

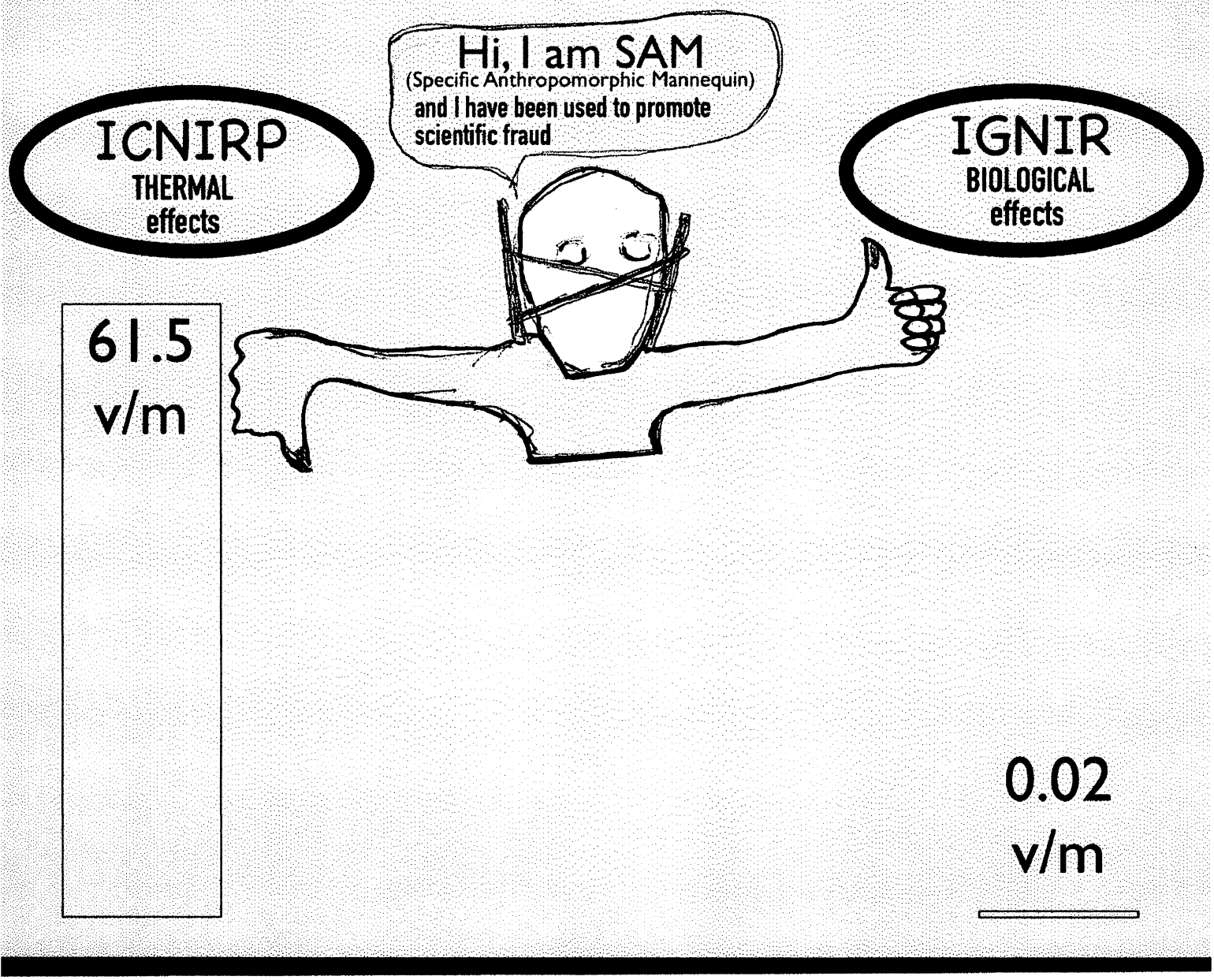
** Sensitive:*

(a) Sensitive groups include children, the elderly, fetuses, pregnant women, the ill and people with EHS.

(b) Electrohypersensitive (EHS) people can have mild, moderate or severe sensitivity.


Recommended non-ionising radiation guidelines set by organisations
70
60
50
40
30
20
10
0
61.5 v/m ICNIRP Guidelines
0.2 v/m
Council of Europe (Resolution 1815)
0.02 v/m
IGNIR
(Max daily average)
1
2
3

How electromagnetic frequency emissions are measured



ICNIRP guidelines are based on thermal heating of SAM, a plastic head. Measurement took place over 6 minutes and was based on a six foot male.

The biological effects of electro magnetic radiation (EMR) are not measured at all by ICNIRP (a private club). The biological effects of EMR have, however, been very well documented over a long period of time.

EMR is known to cause a range of effects in living organisms which is why it has been extensively studied for military use over decades. IGNIR guidelines reflect these documented effects.

PRIFYSGOL CYMRU
Y Drindod Dewi Sant
UNIVERSITY OF WALES
Trinity Saint David

LESSON PLAN

TOPIC: 5G ROLL-OUT		CLASS: PCET
DATE:	LENGTH OF LESSON: 1½HR	NO IN CLASS: 10ish

ABILITY/SPECIAL EDUCATIONAL NEEDS:
VARY

AIM OF LESSON
TO UNDERSTAND AND BE ABLE TO COMMUNICATE ABOUT THE "GLOBAL ROLL OUT" OF 5G.

LEARNING OBJECTIVES – The Learners Should Be Able To:
DEMONSTRATE/A COMMUNICATE TO OTHERS' UNDERSTANDING
① 5G IN CONTEXT OF EARLIER GENERATIONS
② REGULATORY FRAMEWORK SURROUNDING 5G.
③ ~~TO~~ THE ICNIRP AND IGNIR GUIDELINES
④ MEASUREMENT OF DEVICE RADIATION RELATIVE TO GUIDELINES.
⑤ SAFE PROTOCOLS AND CONNECTION WITH IOT + ADDICTION.

Too many Pts in 30 min

PREVIOUS KNOWLEDGE:
UBIQUITOUS MOBILE PHONE USE.
ASSUMED KNOWLEDGE OF "G"
POSSIBLE KNOWLEDGE OF ANTI-5G LOBBY

ANTICIPATED DIFFICULTIES:
PROBLEMS UNDERSTANDING THE METER.

RESOURCES/EQUIPMENT REQUIRED:
OVERHEAD PROJECTOR
COMPARATIVE SHEETS ON ICNIRP + IGNIRE

HEALTH & SAFETY:
USE OF MOBILE DEVICES EMITTING RADIATION

PROFESSIONAL STANDARDS

Please note WHEN and HOW relevant professional standards occur and are met:

(Include detail of standard, not just a reference number)

FINELY PLANNED

SIMPLE LEARNING GOALS (K1) USING ENDORSED SCIENTIFIC MEASUREMENT STANDARDS (V3) WITH A BALANCE OF APPROPRIATE TEACHING METHODS (K2) INCLUDING VISUAL, AURAL, KINEASTHETIC (K3).

EMERGENT TECHNOLOGY (VIDEO, RF METER) USED APPROPRIATELY (A2 K4) AND MEASURED AGAINST TWO DIFFERENT STANDARDS (V3).

LEARNERS HAVE OPPORTUNITY TO ASSESS THEIR OWN ABILITY IN TASKS (V2 A4) AND ALSO ASSESSED BY OTHERS TOO (A3)

CROSS-CUTTING ENHANCEMENT THEMES

Please note any cross-cutting enhancement themes are embedded in the lesson and WHEN and HOW they are met:

INCREASING KNOWLEDGE + AWARENESS OF DEVICES USED IN DAILY LIFE

IMPORTANCE OF KINAESTHETIC LEARNING

LESSON DETAIL:

STAGE	FOCUS	STRATEGY	TIME
Introduction	knowledge	Questions	3
Exploration	P. Point + video	narrative + deductive	12
Testing	RF meter	autonomous exploration and documentation	10
knowledge test	what is learned	conversation	5

INTRODUCTION	OUTLINE LESSON OBJECTIVES POLL KNOWLEDGE		~~3~~ 5
DEVELOPMENT	BACKGROUND 2G, 3G, 4G 5G	SLIDES	2
	REGULATORY FRAMEWORK PUBLIC HEALTH ENGLAND / WALES	SLIDES	2
	ICNIRP GUIDELINES	VIDEO	4
	IGNIR GUIDELINES	SLIDES + COMPARATIVE SHEET	~~5~~ 4
	HOW TO MEASURE RADIATION	Demonstrate + allow 2 others to measure. Compare levels with both guidelines	10
PLENARY / CONCLUSION	~~3~~ RECAP DEMONSTRATION DISCUSSION (OR QUIZ)		5

little more detail on the slides so I can add more information on the content, possibly which slides cover which aspect of the lesson.

ASSESSMENT STRATEGIES USED (WHEN and HOW):

- IDENTIFYING WHERE MEASUREMENTS ARE ON BOTH THE ICNIRP AND IGNIR SCALES, DURING LESSON.
- AGREEING (OR NOT) WITH PRECAUTIONARY PRINCIPLE, SIGNING PETITION.

INFORMAL LESSON EVALUATION:
(This section should be completed straight after the lesson)

TECH ISSUES. I CHECKED THE BATTERIES VERY RECENTLY!
STILL ON TIME (11 :))

HARD TO DO STANDING AT ALL, REDUCED CONCENTRATION.

ENJOYED IT, VIDEOS WERE GOOD + EFFECTIVE.
PEOPLE WERE DEPRESSED.

PGCE/PCE (PCET) LESSON ASSESSMENT FORM

Y Drindod Dewi Sant
Trinity Saint David

Student Name: Angel Garden Establishment: UWTSD - microteaching Date: 18/11/19

GRADE DESCRIPTIONS (When compared with an experienced teacher)

VG Excellent awareness, understanding and application of different approaches to the planning and delivery of effective teaching and training
G Comprehensive awareness, understanding and application of different approaches to the planning and delivery of effective teaching and training
S Awareness, understanding and application of different approaches to the planning and delivery of effective teaching and training
U needs attention through further development and improvement

Context of observation
(e.g. class, ability, number of students; topic; main activities and organisation; other features) PCET students, '5G roll-out topic'. 5 in class, mixed ability.

A SUBJECT KNOWLEDGE	VG	G	S	U
1 accuracy of knowledge of subject matter		✓		
2 understanding of context e.g. scheme of work, programme of study, team-teaching		✓		

B LESSON PLANNING AND PREPARATION	VG	G	S	U
1 detail and structure of plan		✓		
2 clarity and suitability of learning objectives		✓		
3 choice and variety of tasks		✓		
4 resources selected, prepared, organised		✓		
5 range of teaching strategies used		✓		
6 professional standards considered and recorded		✓		
7 essential skills considered and recorded		✓		

C TEACHING	VG	G	S	U
1 lesson start, e.g. outlining content, aims and objectives		✓		
2 presentation: instructing, explaining, demonstrating		✓		
3 effective questioning		✓		
4 management of tasks and working groups		✓		
5 suitability of teaching strategies/methods/approaches		✓		
6 use made of board, OHP, AV aids, ICT, other resources		✓		
7 pace of lesson, use of time		✓		
8 lesson ending, e.g. summarizing, recapping key points		✓		

D CLASS MANAGEMENT AND CONTROL	VG	G	S	U
1 presence and voice projection		✓		
2 transitions – smooth		✓		
3 awareness, vigilance and intervention		✓		
4 use of praise and encouragement		✓		
5 quality of relationships with students		✓		

E MONITORING AND ASSESSING STUDENTS' PROGRESS	VG	G	S	U
1 monitoring understanding and progress during lesson		✓		
2 assessing achievement of learning objectives		✓		
3 giving feedback and setting targets for progress		✓		

F EFFECTIVENESS	VG	G	S	U
1 in setting high expectations for work		✓		
2 in conveying enthusiasm and challenging students		✓		
3 of students' learning in this lesson		✓		
4 in meeting targets for improvement from previously observed lesson		✓		

Notes and Comments:

Clear introduction, you set the scene well in terms of what you want the learners to achieve within the session.

Clear and confident delivery style, you articulate yourself well and engage the learners from the start through questions.

Videos also effectively used within the presentation.

Objectives are generally sound but would benefit for some tightening up in places to they are measurable.

You engage with the audience throughout and encourage participation.

Try to ensure you face the class when speaking rather than the board during activities.

An interesting session Angel, thank you.

You have a clear passion for your topic and that is evident in your delivery.

TARGETS FOR IMPROVEMENT

- Try to ensure you clearly outline the objectives of your lesson at the start of the session.
- Try to make sure you reference research findings etc where possible so students know where they come from.

Consider how you manage to assess your objectives have been met.

Signed/Dated (Observer): [signature]

Signed/Dated (Student):