UNIT Topic/ TitlE: Satellite Imagery & GPS Tracking versus the right to privacy

Year Level: **7** learning area: **geography**

Time Frame: **12 lessons, 1 school term**

**RATIONALE –** Explain why you think it is important to teach this topic.

In an increasingly digital age, it is essential that students are immersed into the geographic technologies that are currently in use, and that are constantly emerging. There is a wide range of satellite and GPS (Global Positioning System) technologies available to the general public, and in some cases these technologies are replacing traditional maps and charts. Students not only have a working knowledge of mapping technologies, but also the ethical issues that these technologies give rise to. For example: journalists use satellite images to find and photograph celebrities, often without permission. Militaries worldwide track and photograph one another’s operations using satellites and GPS systems and parents place GPS tracking devices in their children’s cars and mobile phones. As a result, personal privacy is often compromised. Students need to be able to consider the societal worth of some types of satellite imagery versus the infringement upon person privacy that they cause, and whether or not it is acceptable for satellite imagery to be traded internationally the same way goods and services are traded (for profit).

It is important to include this topic in the curriculum as schools evolve into the digital age. Students will be using satellite imagery and GPS in mathematics, science and the humanities. Mapping programmes are often free of cost and easily accessible to students on devices that they already have (Smartphones, iPods, iPads etc). As such, it is essential that students have been guided through the ethical issues of using mapping and tracking technologies before they are provided with these technologies in an educational setting. Students should be made aware of how to protect their privacy (and their family’s privacy), and how to protect their personal information both while using mapping technologies themselves, and viewing the images created by others.

Through empirical knowledge and ethical discussions, this topic will create a lifelong understanding of the need to protect our own information, and the information of others. It is hoped that students will discover that even though a mapping programme is free of financial cost, it often costs us our privacy, and that they will make ethical decisions on how, when or if they should use a particular programme.

**AIM –** Explain the overarching educational aim of this unit of work.

To help students use mapping and tracking technologies in a rational, needs-based manner, and to make ethically sound choices when deciding which satellite images to use so that the right to personal privacy is not compromised.

**GUIDING QUESTIONS –** Develop one or two guiding questions that will help to direct the study *and* deal with both the ethical and empirical components of the topic.

**EMPIRICAL FOCUS:** How are satellite imagery and GPS tracking used in society?

**ETHICAL FOCUS**: Is our right to privacy more important than having satellite images and GPS tracking technology available to us? Why/Why not?

**ETHIC MODEL:**

Equal Consideration (for all parties):

Does everyone have the same right to privacy?

Thinking:

How can we ensure that everyone’s rights (both to information and to privacy) are protected?

Harm:

Are satellite imagery & GPS tracking harming people? If we don’t use satellite imagery and GPS tracking, are we doing more harm?

Information:

How can we decide between what information we need/want, and what information we should not have? How can we protect ourselves against others using our personal information?

Circumstances:

Is it ever OK to invade someone’s privacy using satellite and GPS technology? Why/Why not?

**EMPIRICAL UNDERSTANDINGS –** Briefly describe the *empirical understandings* (scientific/social) you will need to develop through this unit.

The following are descriptions of how the empirical aspect of this unit of work will develop. Students will gain scientific, geographic and current event knowledge in order to participate effectively in the ethical inquiry sessions. The unit requires students to know how satellite imagery and GPS tracking work, how extensively each is used, the legal and privacy issues these technologies raise, the positives and negatives of using this technologies and how to protect their own privacy moving forward. Throughout the unit, there are ethical action activities to complete and ethical commitments that I’d like students to make after discovering how these technologies are being used currently.

**Extent & Seriousness**

A large percentage of students in Year 7 will either have a mobile phone of their own, or have access to one. They have computers at home, computers at school and access to the internet on their mobile phones. Eighty percent of phones are equipped with GPS, and the United States of America has introduced legislation that will ensure that 100% of mobile phones will be equipped with GPS by the year 2014. With increasing access to digital mapping and GPS tracking, come personal privacy issues. In order to get directions and street views created by Google Earth, an address needs to be input. By sharing this information, all residents at an address are placed at some type of risk of having their privacy compromised. Whether this is simply by having their address shared publically or having their image displayed by a Google Earth satellite, personal privacy is a right that all humans have. There is also the potential for the misuse of satellite images by world militaries, cyberbullies and hackers.

Having said this, satellite imaging and GPS tracking are primary used in positive manners to assist people in living more safely, protecting our environment, helping those affected by natural disasters, and by adding to recreational activities. These technologies are widely used now and will continue to be widely used into the future.

It is also essential that students have a sound knowledge of how these technologies work, and how they are applied and used in society currently, and into the future.

**Causes**

As technology has advanced, imaging and tracking that was once solely the domain of militaries and governments is now available to the general public. There are only small restrictions that apply to consumer purchased GPS units (regarding how powerful and accurate they may be), and most are inexpensive, or provided as free software on mobile phones. As such, the general public both demands and requires that advancing technology be available to them.

The quest for information has driven the availability of GPS tracking and satellite imaging technology. Satellite images are available for free on the internet, and many maps are created using satellite imagery. The space race that began in the mid-20th century drove the creation of the first satellite (Sputnik) that has now evolved into a multitude of satellites in space.

**Effects**

The effects of having GPS tracking and satellite imagery available to the general public include spying, legal issues, privacy breaches, and the sale of military secrets on the international market. There are also issues that affect young people (primarily) such as cyberbullying and the ability to track their location using their phones or cars, fitted with GPS devices.

There are positive effects too of these technologies being more readily available. These include better weather prediction, natural disaster management and assistance, transparency for military operations and peace of mind for families who wish to keep their elderly relatives and children safe.

**Possible Solutions**

GPS tracking and satellite imagery will remain at the forefront of mapping and tracking technology. As such, it is essential that our solutions are based around education and the protection of personal information. We need to know what information we can use publically, which images we should and shouldn’t use and whether or not we should use tracking technologies at certain times. Different parties have different views of privacy. For example: a country’s military would feel that satellite images of their bases and operations is an invasion of national security, while the citizens of that military’s country would feel safer knowing that they are protected by an active military. By enhancing and deepening the understanding we have of our right to privacy versus our need for information, advancing technologies are balanced with ethical usage.

**ASSESSMENT –** Indicate briefly how you would go about assessing the development of students’ knowledge, skills and values in relation to your unit of work.

**NOTE – See final 2 pages of this booklet for detailed grading criteria**

**Assessment Pieces**

1. Contribution to ethical discussions
2. Respects others views
3. Listens to others views without interrupting
4. Contributes own thoughts and opinions
5. Develops ability to link facts with opinion
6. Accepts differing viewpoints regarding own opinion without taking offense

Modify this rubric to allow students to grade one another anonymously (draw name out of ‘hat’ before lesson). In one lesson, have students grade themselves:

<http://download.intel.com/education/common/en/resources/AP/library/discussion_rubric_elementary.pdf>

1. Completion of tasks to gain empirical knowledge in this unit, and completing all homework and reflection tasks. All work for this unit will be handed up in students’ Unit of Inquiry Folders. The pieces that need to be included are:

* Webquest answers (Lesson 2)
* Critique of Google Earth view of your house (Lesson 4)
* Article Review (legal issues) in class (each group member needs a copy) (Lesson 6)
* Ethical Action Homework – safeguards for our home computers/phones (Lesson 6)
* Satellite Imagery for Good responses (Lesson 8)
* Weather report homework (Lesson 8)
* GPS Treasure Hunt Passport (Lesson 10)
* **OUT of 10 – 1 point for each piece included (7 points), 1 bonus point if all pieces are included, 1 point for group work during the Article Review, 1 point for pair work in the Webquest**

Important Teacher Notes: Students choose 4 of these pieces to be graded. These grades contribute to their overall grade for the unit. However, all pieces need to be collated into a folder and must be handed in at the end of the unit with all pieces included to get the 10 points allocated in this section. These will be shown to parents at Parent/Teacher Interviews.

1. Display at School Open Night: “Satellites and GPS Tracking: You decide”

Working in groups of 4, students will choose 2 opposing viewpoints from the unit of work and create a display showcasing those viewpoints. Students will have 2 lessons of SOSE time and 2 lessons of Art time to complete their displays.

Ideas

* Navigation ability of a mobile phone versus Parents tracking their children’s phones with a GPS locator
* Satellite pictures of natural disasters for assistance versus Invasion of personal privacy on own property
* GPS locator on your mobile phone that prevents it from being stolen versus Parents tracking their children’s location with the same GPS locator
* Satellite imagery for weather predicting versus selling satellite images of military bases
* Tracking Alzheimer’s/dementia patients – both sides – safety versus invasion of privacy

Displays must include an ethical issue and empirical knowledge to show that students understand the aim of this unit of work.

**SEE RUBRIC ON FINAL PAGE OF THIS BOOKLET**

**SACSA SOSE Standards Covered**

**Band: Middle Years - Grade: 7**

Outcome 3.5 – Interprets and represents data about natural and built environments, resources, systems and interactions, both global and local, using maps, graphs and texts.

1. Describes significant features of places in geographical terms (eg grid references, latitude and longitude, climate zones)
2. Demonstrates an awareness of relationships in natural features (eg mountain ranges, rivers, oceans)

Outcome 3.9 – Demonstrates responsible and respectful participation in group discussion and, in a team, plans and negotiates social action to enhance human rights in community contexts.

1. Debates individual rights and community responsibilities (eg in relation to student rights and responsibilities)

Outcome 4.9 – Researches and engages with others to enhance ethical behaviour in relation to the human rights of individuals and groups, within and across groups, cultures or countries

1. Inquires into ways that school community members recognise the rights and responsibilities of different groups in the community
2. Understands the purpose and process of changing rules and laws
3. Recognises that respect and acceptance contribute to democracy

Outcome 4.10

Analyses differences between political, legal and social systems and people’s rights and responsibilities, using personal and other examples

1. Investigates rights and responsibilities of citizens in Australia

Outcome 3.12

Recognises that individuals, groups or systems hold different views, values and beliefs, and identifies those which contribute to the common good.

1. Researches factors that contribute to effective decision making

Outcome 4.12

Participates in activities to demonstrate how ethical practices can be undertaken at school, in the community, and within business and government systems.

1. Debates an issue of concern in the school, taking into consideration a wide range of perspectives (eg staff, students, parents, caregivers and the wider community)

**NOTE**: This unit of work will link directly to the Geography standards of the Australian Curriculum

**Cross Curricular Application of this Unit**

**English:**

Australian Curriculum Standards – ACELT1805, ACELY1719, ACELY1720, ACELY1722, ACELY1723, ACELY1728

**Science:**

Australian Curriculum Standards – ACSHE119, ACSHE120, ACSHE121

**Health & PE:**

SACSA Standards

3.1 Demonstrates a range of specialised individual and team movement skills that enhance their sense of personal and group identity.

3.2 Develops, through participation in health-related fitness activities, an understanding of those activities’ appropriateness and effectiveness.

**Art: (possible links to Design & Technology too)**

SACSA Standards

3.1 Uses thought, imagination, research and experimentation to create/re-create arts works within each arts form that convey meaning about issues within their community.

Sequence of ideas / lessons (insert pages as required)

**Lesson Planning Template**

|  |  |  |
| --- | --- | --- |
| **Lesson No.** | **Empirical Lessons** | **Ethical Discussion** |
| 1 | Brainstorm session: What is a satellite? What do we use satellite imaging and GPS tracking for? Good uses, not so good uses. |  |
| 2 | How does satellite imaging and GPS tracking work? |  |
| 3 |  | Stimulus – article about French man suing Google Earth  Is one person’s right to privacy more important than information that helps the majority of people? Why/why not? |
| 4 | Using Google Earth and Google Maps, find your address. Zoom in and critique how much detail there is in the picture. Are there any things you wouldn’t want others to see in the picture? etc |  |
| 5 |  | Stimulus: GPS tracking for Alzheimer’s patients  Is a person’s right to privacy more important than their safety? Why/why not? |
| 6 | Protecting ourselves: review of Child Protection Curr. Lessons covering online privacy. Considering those who share our details (addresses, phone numbers etc). The legality of taking pictures of others. |  |
| 7 |  | Your phone and your car: is it OK for parents to install GPS tracking devices on their children’s phones and cars? Why/why not? |
| 8 | Using Technology for good: The ways that satellite imagery and GPS tracking are used to help society (natural disasters etc) |  |
| 9 |  | Military bases: is it OK to use satellites to take photographs of them, and is it OK to sell those photos? Why/why not? |
| 10 | GPS Treasure Hunt – reflection: are there any privacy issues in this activity? Why/Why not? |  |
| 11 | Prepare displays for School Open Night | |
| 12 | Prepare displays for School Open Night | |

NOTE: Empirical lessons may be held in the same week as ethical discussions to fit this unit into one school term

**LESSON NOTES:** Possible answers to ethical questions are given in red. These are by no means an exhaustive list of responses, but are provided to prepare the teacher for what students may say. Empirical responses have also been noted (in blue).

**Lesson 1**

What is a satellite?

Technically, a satellite is any object that orbits around a planet or a star. The moon is an example of a natural satellite. However, the satellites that we are talking about in this unit are manmade machines that are launched into space for photographic or communication reasons. The satellites are programmed to orbit the earth. They are equipped with antennae, radio transmitters and receivers. They are often powered by solar power, but there are a few that use nuclear power.

Source: <http://www.universetoday.com/60074/what-is-a-satellite/>

Brainstorming lesson on how satellite imaging and GPS tracking are used

**Satellite Imaging**

Weather reports (meteorology), geology, forestry, agriculture, education, regional planning, intelligence, warfare, biodiversity conservation, seismology, oceanography, vulcanology – and whatever else the students come up with

**GPS Tracking (What is GPS – Global Positioning System)**

Trip and holiday planning, tracking cars, phones, children, elderly family members, pets, Geocaching, disaster relief and emergency services, robotics, navigation, map making, surveying tectonics, military – and whatever else the students come up with

**Lesson 2 – In the computer room**

How do satellite imaging and GPS tracking work?

Web Quest using the following websites to answer all the questions, in pairs. Whoever operates the computer for Satellite Imaging, will write for GPS tracking. Please work well in your pairs.

**Satellite Imaging**

<http://www.gma.org/surfing/sats.html>

<http://landsat.gsfc.nasa.gov/pdf_archive/How2make.pdf>

<http://science.howstuffworks.com/satellite1.htm>

<http://www.crsol.com/weather_routing_toolkit/idtoolkit/resources/content/how_to_read_satellite_image_how.htm>

<http://mapmaker.meteor.wisc.edu/~jbrunner/ackerman/satellite/satellitebkgrnd.html>

How is a satellite image made? Don’t copy and paste please – read 2 descriptions and write your own description of how this occurs: Use GMA & Landsat sites

The common misconception is that satellite images are photographs. They are collections of digital information, and humans convert that information into pictures. “Some of the data can be enhanced to look like photographs. Bright colours (false colours) are often added to enhance the contrast, make details stand out, or allow us to see what was recorded in the wavelengths beyond our visual range. The false colours do not necessarily correspond to the colours we expect to see. For example, a field of wheat might look pink; clear water may appear black.” – from GMA sats site.The information is collected by remote sensing. "Remote sensing is the science (and to some extent, art) of acquiring information about the Earth's surface without actually being in contact with it. This is done by sensing and recording reflected or emitted energy and by processing, analysing, and applying that information.” – Canadian Center for Remote Sensing (Landsat site)

What are the three types of satellite images, and what are they used for? Use CRSOL site

1. Infra Red – measures temperature (also called thermal imagery) of clouds, sea surfaces and land. Used in contrast with Visible Light
2. Visible Light – use the sun’s light to show weather conditions – identify cloud, fog. Used in contrast with Infra Red
3. Scatterometer or QuickSCAT – determining wind speed and wind direction, and the movement of pressure systems and fronts in real time

Find the names of 3 satellites that take pictures of the earth (currently in use) – Use GMA site

Topex/Poseidon, SeaWIFS, NAVSTAR, Space Shuttle

Find two disadvantages to Infra Red and Visible Light satellite imagery (used for interpreting weather) – Use Mapmaker site

Infra Red – hard to distinguish between thick clouds and thunderstorms, clouds appear blurred

Visible Light – Only useful in daylight hours, hard to tell clouds from snow in winter

When a satellite is orbiting the earth, what is its nearest point to earth called, and what is it farthest point from earth called? Use how stuff works site (you will also need to be able to pronounce these words)

Nearest = Perigee (Pear-i-jee), Farthest = Apogee (Ap-oh-jee)

**GPS Tracking**

<http://www.colorado.edu/geography/gcraft/notes/gps/gps_f.html>

<http://en.wikipedia.org/wiki/Gps>

How many satellites make up the Global Positioning System? 24 (Colorado site)

The most accurate GPS systems in the world are accurate to what distance? What are they called? Precise Positioning Service – accurate to 200 nanoseconds (Colorado site)

What are the three segments of the GPS positioning process, and what does each segment do? (Colorado Site)

Space Segment – The 24 satellites. They send radio signals from space

Control Segment – A system of tracking stations located around the world. Monitor stations measure signals from the satellites. They adjust time and positioning.

User Segment – All the GPS receivers and users in the world. They receive and interpret satellite signals from space.

How many satellites are needed to get a GPS coordinate and how is it listed? (Colorado site)

4 – X,Y,Z (which are position) and time

Find the section of the Wiki page called “Basic Concept of GPS”. Write down how GPS works in your own words. (Below is a direct quote from the Wiki page) A GPS receiver calculates its position by precisely timing the signals sent by GPS satellites high above the Earth. Each satellite continually transmits messages that include

* the time the message was transmitted
* satellite position at time of message transmission

**Lesson 3 – DISCUSSION PLAN**– Big Question – Is one person’s right to privacy more important than the general need for navigation, weather predicting and mapping?

Stimulus: <http://www.huffingtonpost.com/2012/03/01/google-street-view-lawsuit_n_1315197.html>

Question 1: Do you ever take photos of yourself, your family or your friends?

Question 2: If your friends and family ask you not to, do you not take the photo, or do you do it anyway? Why? Because I want to have those memories, they don’t really mean no, it’s my family – it doesn’t count, no I don’t do it – they asked me not to

Question 3: Whose right is it to choose whether or not to have their photo taken? Why? Each person’s, mine if I have the camera, theirs if they have the camera

Question 4: If you take the photo anyway, are you abusing their right to choose their level of privacy? Why/Why not? No – it’s my family and friends, they do it to me, they like seeing the photos afterwards, yes they should choose who takes pictures of them

Question 5: How would you feel if you found out someone had taken a photo of you without you knowing they’d done it? I wouldn’t mind if it were my family and friends, Mum does it all the time, I would be angry, I would be upset and want them to delete it, if it was a happy occasion, I’d be glad

Question 6: Why would you feel that way? I didn’t say they could take it, I looked terrible, I am glad I have the photo memories of that day, I don’t like that someone did something to me without me knowing

Question 7: How would you feel if you found out your photo was on the Google Earth picture of your house? Why would you feel that way? I would be worried about who would see it, I would worry about how people would use it, I’d be upset that I didn’t know it had been taken, I wouldn’t mind, its just map software

Question 8: What if you were doing something illegal or something that you thought no-one else could see in that picture? Does that change how you’d feel about it? Why/Why not? Yes it changes it – I got caught as a result, it makes me feel like my privacy was invaded, I am angry that it made me get caught

Question 9: If you are at home, should you have privacy from things like satellite photography? Why/Why not? Yes – it is your private property, no – I like having maps available to me, depends what you are doing

Question 10: Is your right to privacy more important than having tools like GPS navigation available to you? Why/Why not? If you aren’t doing things you shouldn’t be doing, it shouldn’t matter, yes I like having that technology so privacy doesn’t matter, if I wasn’t getting in trouble for something then I don’t mind having the technology

**Lesson 4 – in computer room**

<http://www.gpsvisualizer.com/geocoding.html>

<https://maps.google.com/>

Google Earth – on the desktop of computers

Using Google Earth and Google Maps, find your address. Using street view, zoom in and critique how much detail there is in the picture. Are there any things you wouldn’t want others to see in the picture? Use the GPS Visualiser website and write down the GPS coordinates of your address.

End of lesson question time: Did you give your address to someone else to look at, or did you look at someone else’s address? Why did you do that? Did you consider the other people that share the address you looked at? We need to consider everyone’s privacy and protect their information online.

**Lesson 5 – Discussion Plan:** BIG Question: Is a person’s right to privacy more important than their safety? Why/why not?

Stimulus: <http://www.dailymail.co.uk/health/article-2218582/Shoes-built-GPS-track-Alzheimers-patients-sale-UK.html>

Question 1: Does anyone in the class have relatives with Alzheimer’s or dementia? They are conditions that make you lose your short term memory, sometimes for hours at a time. They are predominantly found in older people.

Question 2: If you lost your memory for 3 hours every day, would you wear those shoes so that your family knew where you were? Why/Why not? I would not – they don’t need to know where I am all the time, I would – they’d worry about me

Question 3: Do you think that these shoes increase people’s safety? Why/Why not? Yes they do. If people can’t remember where they are, at least someone knows, no – it doesn’t stop them walking out onto a road, off a cliff etc

Question 4: If you found out one of your grandparents had Alzheimer’s, would you want them to wear the shoes? Why/Why not? I would – I would want to be able to find them and bring them back safely if they were lost, I would not – they are adults they have the right to be wherever they want to be

Question 5: Do you think that the Alzheimer’s patients would want to wear the shoes? Yes – if they chose to do that when they were thinking clearly, no – their privacy is invaded, I don’t know – I don’t know if they can choose once they have the disease

Question 6: What reasons can you think of that they may not want to wear the shoes? Privacy, scared, expense, ugly, embarrassed

Question 7: If you found out that your parents had GPS locators in all of your clothing, how would you feel about that? Why/Why not? I would be angry – they shouldn’t have done that without asking, I would feel safe, I wouldn’t like that – it means they’re watching me all the time

Question 8: When you asked your parents about it, they said it was to make sure you were safe. Does that change how you feel about it? Why/Why not? Yes – it made me feel like they cared about me, no – they’re still spying on me

Question 9: Is keeping someone safe a good reason to track them using GPS technology? Why/Why not? Yes – if it saves even one person, its good, no – it is invading their right to privacy, I don’t know – depends on the situation

Question 10: Is privacy more important than safety? Why/Why not? I think it is for old people and kids, it isn’t – privacy is more important, everyone should be able to choose where they go and what they do without someone watching

**Lesson 6** – Review of Child Protection Curriculum regarding online safety and information sharing (1st half). The legality of taking pictures of others (2nd half). Child Protection Curriculum Aims for South Australia: <http://www.decd.sa.gov.au/literacy/files/links/CP_ENGLISH.pdf>

Child Protection Curriculum: Review of cyberbullying, which information we should and shouldn’t share online, discuss who else needs us to keep information private (our families, our school, other groups we belong to) and why they need us to do that.

Legal Issues: Is it legal to take pictures of someone else, or track them with GPS without them knowing or consenting? In small groups, review these articles to find out if it is legal to take pictures of someone or track them with GPS without their permission. Write your answers down (everyone in the group writes). Report to the class.

<http://usatoday30.usatoday.com/tech/columnist/kimkomando/2008-04-17-public-photography_N.htm>

<http://satviz.com/is-it-legal-to-put-a-gps-tracking-device-on-someones-car/>

<http://cellphones.lovetoknow.com/Using_GPS_to_Locate_a_Cell_Phone>

<http://www.zdnet.com/google-microsoft-and-nokia-launch-one-stop-hide-from-maps-service-in-germany-7000006232/>

<http://www.theblaze.com/stories/are-google-and-apples-new-3-d-aerial-maps-a-privacy-invasion/>

<http://stopthedrugwar.org/chronicle/736/fulltext#2>

<http://entertainment.howstuffworks.com/paparazzi.htm> (look at all pages)

HOMEWORK: (Ethical Action) Take home instructions for adding safeguards to your home computer and discuss these with your family. Try to make everyone’s computers and phones safer tonight. Write a few paragraphs about how this activity went, and what you did.

**Lesson 7** – BIG Question: Is it OK for parents to install GPS tracking devices on their children’s phones and cars? Why/why not?

Stimulus: <http://satviz.com/is-it-legal-to-put-a-gps-tracking-device-on-someones-car/> (article from lesson 6)

Question 1: Who has a mobile phone? Do you own it? Yes I own it, no – my parents own it

Question 2: What is it that means you own something? That I’ve paid for it, that it was given to me, that I was told it was mine, that I chose it

Question 3: Most young people can’t afford to buy their own car. That means their parents own it. Does that mean the parents can do as they please with that car? Why/Why not? Yes – they paid the money they choose, no – they gave it to me it’s mine, they pay the insurance so they choose

Question 4: If you find out that your parents have put a GPS tracking device on your car, how do you feel about that? Why do you feel that way? I feel a bit annoyed but they own the car so they can do that, I feel safe because they can help me if I need it, I feel angry because they’re spying on me

Question 5: Your parents tell you that they are concerned for your safety and that they’d like to be able to help you as soon as possible if you were ever in trouble. Is this a good reason to track you with GPS? Why/Why not? Yes – my city isn’t safe, yes I like that they will help me no matter what, no – they are spying on me, no there is no need for them to do that

Question 6: Same issue – most children can’t afford to pay a mobile phone bill. That means that their parents own the phone because they pay the bill. Does that mean your parents have the right to track the phone with GPS? Why/Why not? No they cannot do that, my privacy is more important, they are spying on me, yes I like that they know where I am, I like that they can track my phone if its stolen

Question 7: Since your parents own the phone, does it mean they can look at anything that is on your phone at any time? Why/Why not? No – it’s my phone, ownership doesn’t matter, they cannot look at what is on my phone its private, they can look – there isn’t anything on there they can’t see, they can look but they won’t find anything – I hide it

Question 8: Your parents give you the same reason as they did for tracking your car – your safety. Does that make you feel safe, or does it make you feel like your privacy is being invaded? Why/Why not? It’s not the same – they are looking at my personal calls and texts, how does looking at my texts make me safer?, yes – I’d like them to know if someone was sending me bad texts, I feel a bit like my privacy is being invaded but I shouldn’t have things on my phone I wouldn’t want them to see

Question 9: Would you want to be able to track your child’s phone and car with GPS to keep them safe? Why/Why not? Yes – I want them to be safe, No – they should have privacy, sometimes – if I’m not sure they’re with the right friends or in safe places

**Lesson 8 – Using technology for good (in computer room)** – How satellite imagery is used to do great things for the environment and for humans.

In pairs, look over the following images:

<http://www.satimagingcorp.com/svc/hurricane_mitigation.html> (Hurricane tracking and preparations)

<http://www.universetoday.com/24868/satellite-images-of-2009-australian-bushfires/> (bushfires)

<http://news.mongabay.com/2011/0315-satellite_pictures_japan_google.html> (tsunami & earthquake)

<http://www.huffingtonpost.com/2012/08/06/amazon-deforestation-nasa-photos_n_1748759.html> (Amazon rainforest depletion)

<http://www.universetoday.com/97380/satellite-view-of-guatemalan-volcano-erupting/> (volcano)

For each of the images, figure out these things:

1. Where in the world the photos are taken?
2. What event has occurred?
3. What features can you see in the images that tell you about the event that has occurred?
4. How does satellite imagery help humans both during and after these events occur?

Now – find a satellite image of the weather forecast for our city and print it out.

HOMEWORK: (Current Event engagement) Watch the weather tonight and see if you can understand what is happening. Write a few paragraphs about the weather report and the image you printed out and whether or not they matched.

**Lesson 9 – Military Bases** – BIG Question: Is it OK to use satellites to take photographs of them, and is it OK to sell those photos? Why/why not?

Stimulus: <http://www.digitalglobe.com/industries/defense-and-intelligence>

<http://news.discovery.com/tech/satellite-images-reveal-secrets-111212.html>

<http://www.haaretz.com/news/middle-east/new-satellite-imagery-shows-iran-covering-up-building-iaea-wants-to-visit-says-u-s-think-tank-1.460626>

Question 1: Are military bases and operations supposed to be secret? Why/Why not? Yes they are supposed to be secret so that no other countries know what we have or what we’re doing, but the people pay for it with taxes, they should know what’s there, I guess they’re supposed to be secret

Question 2: Should military bases be secrets that only the country they are in knows about? Why/Why not? Yes – so we have the upper hand if we go to war, no – then everyone has the same stuff, I don’t know – maybe other countries would then develop weapons they otherwise wouldn’t have

Question 3: Do you think that military bases should be off limits to satellite photography? Why/Why not? Yes – it keeps our military safe, yes – only use it for other stuff, no – satellites should take pictures of everything

Question 4: I got these pictures just by doing a Google search for pictures taken by satellites of military bases. Should it be that easy? Why/Why not? It shouldn’t be that easy – the images should be protected somehow, yes that is fine – we should all know what buildings are where

Question 5: If we decided that it is OK to photograph them, should we make it a law that those photographs have to stay private (to the country that took them)? Why/why not? Yes – that is a good idea, no – everyone should know all military things, yes – to keep us safe

Question 6: If a country has paid to launch a satellite, should they be able to use it to photograph whatever they want to photograph? Why/Why not? Yes – its their money, no – they shouldn’t use it to spy on other countries

Question 7: If a country has paid to launch the satellite to take photos, should they be able to sell the photographs to whoever wants to pay for them? Why/Why not? Yes – they used money to put the satellite into space, they should be able to make money from it too, No – they should not sell the images at all – it makes everyone unsafe

Question 8: Do you think that they money they get from the satellite imagery is ever used for ‘good’ things? Why/Why not? Yes – it helps develop better defence and troops, No – it is used for building more weapons that makes everyone unsafe

ETHICAL ACTION: We commit to not using satellite images to spy on others, because we wouldn’t want that to happen to us.

**Lesson 10 – GPS Treasure Hunt**

This will take time to set up. The teacher will need to hide the “treasures” around the school and note the GPS coordinates of all treasures. Alternatively, each station the students find will give them the GPS coordinates for the next location. Each location will have a stamp or stickers inside it that must be stamped or stuck onto a “GPS Passport” that they students take with them to prove they found all locations. Students must also leave cards with their names on them inside each box to show they found them.

Ideally, there should be 2 separate treasure hunts so that the entire class can be out hunting at the same time, without overlapping or cheating by using others locations to find the treasures.

If 2 treasure hunts are given, the class could be divided into 2 teams. One team completes one hunt with a GPS unit, and the other with a map of the school. Then, they switch over – switch methods and switch hunts. This could be timed for some competition, or done as a comparison exercise – which method was better (GPS or maps)?

This activity can be done with any handheld device that has GPS included on it. Ideally, the school will have a set of GPS devices for this lesson.

**Example of GPS Passport**

Get a sticker/stamp from every station to prove you were there. Also, leave your names in the box so that your teacher can see you’ve visited each station. Each station will have the coordinates for the next station inside it.

|  |  |  |
| --- | --- | --- |
| STATION 1 | STATION 2 | STATION 3 |
| STATION 4 | STATION 5 | STATION 6 |
| STATION 7 | STATION 8 | STATION 9: Bring the final prize back to class |

**Lessons 11 & 12** – Preparing displays for School Open Night. Everyone chooses a partner, then teacher pairs 2 sets of partners up to form a group of 4. Two lessons plus Art NIT time to prepare. Topics and assignment are outlined in “Assessment” section. The purpose of the displays is to provide people who view them with two opposing viewpoints about the use of GPS tracking and satellite imaging, versus our right to privacy.

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APPENDICES:

Rubrics & Grading for this Unit

It is intended that this unit be graded as an overall term of work, with some pieces graded individually throughout the term, that contribute to the final grade. That way, students are provided with feedback constantly, but are also considering how to put together an entire term’s worth of work. It is hoped that this will encourage participation and collaboration, with many opportunities for students to develop and improve in order to increase their grade through the term.

The weighting for grading the unit is as follows:

4 Ethical Discussions: worth 10 points each = 40 points

4 graded pieces of term work (student selected): worth 5 points each = 20 points

1 Folder of all term work collated: worth 10 points

1 Display at School Open Night: worth 30 points

TOTAL POINTS FOR UNIT = 100 points

Ethical Discussion grading: Students use a rubric to grade one another anonymously (5 points) and the teacher moderates this grade with their own observations during discussions (5 points). Rubric to be modified for use:

<http://download.intel.com/education/common/en/resources/AP/library/discussion_rubric_elementary.pdf>

Graded Pieces of Term work: (5 points each for a total of 20)

Is the piece completed? (1 point)

Are the answers correct? (3 points – All = 3 points, Most = 2 points, Few = 1 point)

Was the work handed in on time? (1 point)

**1 Folder of all term work**: (10 points)

1 point for each piece included (7 points) – detailed in “Assessment” section

1 bonus point if all pieces are included

1 point for group work during the Article Review (teacher observation)

1 point for pair work in the Webquest (teacher observation)

**1 Display at Open Night**: (30 points)

Grading rubric on next page

NOTE: This unit has been designed with a high level of student participation and engagement in mind. It is impossible to get zero for any section (unless no work is handed in at all), and students have many opportunities to see the rubrics and grading expectations, so that they have every chance to succeed.

**STUDENT NAME:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CATEGORY** | **5 points** | **4 points** | **3 points** | **1-2 points** |
| Required Elements | The display includes all required elements as well as additional information. | All required elements are included in the display. | All but 1 of the required elements are included in the display. | Several required elements were missing. |
| Use of Class Time & Group Work | Used time well during each class period. Focused on getting the project done. Never distracted others. | Used time well during each class period. Usually focused on getting the project done and never distracted others. | Used some of the time well during each class period. There was some focus on getting the project done but occasionally distracted others. | Did not use class time to focus on the project OR often distracted others. |
| Knowledge Gained | Student can accurately answer all questions related to facts in the display and processes used to create the display. | Student can accurately answer most questions related to facts in the display and processes used to create the display. | Student can accurately answer about 75% of questions related to facts in the display and processes used to create the display. | Student appears to have insufficient knowledge about the facts or processes used in the display, or very limited knowledge. |
| Empirical Data | Has used facts taken from the empirical lessons throughout the unit to clearly explain their chosen aspect in the display | Has used facts taken from most of the empirical lessons throughout the unit to clearly explain their chosen aspect in the display | Has used facts taken from some of the empirical lessons throughout the unit to clearly explain their chosen aspect in the display | Has used facts taken from one or two of the empirical lessons throughout the unit to clearly explain their chosen aspect in the display, or has not used facts from the unit at all |
| Ethical Issue | Has extensively used concepts from one of the ethical discussions in the unit, and has incorporated other discussion material to clearly explain their chosen aspect in the display | Has extensively used a good range of concepts from one of the ethical discussions in the unit to clearly explain their chosen aspect in the display | Has used a few concepts from one of the ethical discussions in the unit to clearly explain their chosen aspect in the display | Has used a single concept from one of the ethical discussions in the unit to clearly explain their chosen aspect in the display, or has only generally referred to ethical discussions in the display. |
| Attractiveness | The display is exceptionally attractive in terms of design, layout, and neatness. | The display is attractive in terms of design, layout and neatness. | The display is acceptably attractive though it may be a bit messy. | The display is distractingly messy or very poorly designed. It is not attractive. |