



Manchester Metropolitan University
Field Course in Tropical Ecology
Ecuador 2019



This handbook belongs to: _____

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Introduction

This handbook's purpose is to provide you with some of the essential information you need for this field course. The Field Course Risk Assessment and the Faculty of Life Sciences Second Year Handbook also provide essential information. **Make sure you bring this handbook with you, you'll need it!**

Keep in mind that you have elected to attend a field biology course in a developing tropical country. The weather will be hot, the food will be simple, and the living and travel conditions will be challenging. You should expect to work hard and expect very little to be handed to you. With the proper frame of mind you will not only learn a lot of biology but will have a once in a lifetime experience.

This field course is about biodiversity in neotropical forests. To examine biodiversity you will be visiting two areas of Ecuador. The first will be Bellavista, a private reserve situated in cloudforest. The second is San José de Payamino, in Amazon rainforest. Both are within the Tropical Andes Biodiversity Hotspot, but very different from each other (the living conditions will be very different, too!).

Biodiversity can be thought of at several different levels. The level that we are most aware of is the diversity of species within ecosystem. Biodiversity can also be examined within species (for example, genetic or phenotypic diversity) or among ecosystems (for example, comparing cloud forest to rain forest or two different types of rainforest). We will learn to appreciate different levels of biodiversity during this field course. By the end of this course you should be able to:

- ✓ Discuss the definition and properties of cloudforest and rainforest
- ✓ Discuss the definition and formation of species
- ✓ Define how biodiversity can be measured and compared
- ✓ Discuss the main theories of the origin and maintenance of biodiversity
- ✓ Design a field experiment

An important part of this field course is also the experience you will have travelling to remote parts of the world and experiencing other environments and cultures.



Overseas field courses such as this one are always exciting and do contain elements of risk (as defined by the British Standards Institute, this field course is an Adventurous Activity to a Remote Location). These dangers, however, can be avoided or mitigated by learning to recognise them. The biggest danger about any place is not knowing what the risks are or where they are – we generally don't take notice of the dangers of Manchester, for instance, because we automatically avoid them. If you are to take heed of one piece of safety advice, it would be that if you do not understand something or are unsure of anything, **STOP and ASK** one of the staff members. Many of them know these areas very well and speak the language.

Please also bear in mind, that you will NOT have access to internet at any point at the field sites. You will not be able to access wifi or have any reception at the Bellavista Cloudforest Reserve and you will not have wifi or have any phone reception for miles around at the Timburi Cocha Research Station.

Both field sites are remote, meaning that we will be living and working in places to which access is difficult or limited. The Bellavista Cloudforest Reserve in the cloudforest is an ecotourism lodge that also maintains a basic research station. We will be staying at the latter. Bellavista is located on the Western side of the Andes, just a couple of hours from Quito off a main highway. The station has dormitories with bunkbeds, flush toilets, showers, and a dining room. Access is by vehicle (coach in our case) and while the location is relatively remote, communications are reasonably good if there is an emergency.

The Timburi Cocha Research Station in Payamino site is located deep in the rainforest. To get there, we travel to the oil town of Coca and stay overnight. The next morning we travel by “ranchera” (a sort of truck) to the centre of the indigenous village that owns the land and take canoes upriver for the last 20 minutes of the journey. The Timburi Cocha field station has grass-roofed, open sided buildings and the sleeping area has a raised floor. There are composting (long drop) toilets and a sort of shower (a pipe of water that is pumped straight up from the river – so cold, brown water is standard). There is no direct access to the station by road, no modern communications, and very little privacy!



In both locations, communications are limited and can easily become disrupted.. In fact, they are reserved for emergencies. You won’t be able to text your family or facebook your friends. It is easy to feel cut-off or overwhelmed. If you experience any problems or feel stressed or pressured at all by the conditions, please do not hesitate to speak to a member of staff. All the staff have experience working in remote environments and have had to start somewhere.

Insurance: During the field course, you will be covered by the university insurance policy. **Be sure to read this policy - it’s at the back of this handbook and on the web.** Take note that if taking expensive equipment (laptops etc), the excess can be high and thus end up not covering replacement costs.

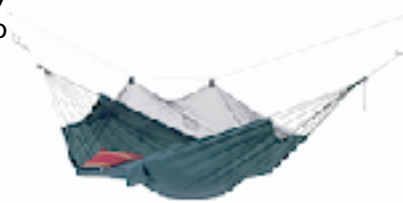
Staff and Researchers

Person	Role
Prof. Richard Preziosi	MMU Field course coordinator
Alejandra Zamora Jerez	MMU Field course staff
Xaali O’Reilly Berkeley	MMU Field course staff
Thomas Hughes	MMU Field course staff
Dr Kris Pathmanathan	Field course medic
Javier Patiño	Research station manager



Kit List

1. **Personal torch** with plenty of spare batteries & a spare bulb. It's a good idea to get a very good torch - **this will be the most important tool you use in the field and in camp**. Get a torch capable of illuminating at least **70 lumens**. LED Lenser torches are good quality and value for money or you can go upmarket with a Surefire L1 LED torch. **Head torches** are also very handy!
2. **Money for buying food in Quito & Coca** - meals are provided at the field sites
3. **Hammock with mosquito net (optional)** - the 'Amazonas Mosquito Traveller' comes with an inbuilt net. You will also need at least 6 metres of hammock rope to hang it from the rafters - ensure it has a tensile strength of >300lbs, suitable for carrying human weight. Alternatively, there are mattresses at the research station, but please let Xaali know in advance of the field course if you intend to use one.
4. **Lightweight windbreaker or raincoat** (disposable is ok)
5. **Two pairs of shoes** (something that will dry easily is best - avoid natural fibres) and a pair of sandals - no need to take hiking boots as you will wear wellies in the jungle
6. **Duplicate sets of lightweight, easily washable, fast-drying field clothes** (long trousers and long sleeves). Synthetic fibres (e.g. nylon) will dry much faster than natural fibres such as cotton. You will do your own laundry, therefore pack sufficient sets of socks, underwear, etc to space washings according to your energy level. In the forest, you should wear clean clothes every day to prevent getting botflies and ticks.
7. At least one **set of casual**, evening clothes & you may want a fleece for cool evenings
8. A **sunhat** with ties to hold it onto your head - important for the canoe ride!
9. It gets cool in the evening - especially in the cloud forest. Therefore, you may want to bring a blanket, sleeping bag or buy these in the markets at Quito
10. **Rubber boots** (or wellies/gum boots). Unless you have unusually large / small feet, these are easier to get in Quito before heading to the field
11. **Sunglasses** (please ensure they have high UV protection)
12. **Bathing suit** and quick-drying travel **towel**
13. Durable, waterproof **field diary with lots of pencils**
14. A **day pack** (e.g. small rucksack) + 1 litre **water bottle**
15. One box of large heavy duty **zip seal bags** (brand not important) or dry-bags. You can pack daily sets of clothes in these so they stay dry until you use them
16. **Binoculars** (if you have them)
17. **Silica gel packs** can be a good idea if you plan to bring electronic equipment such as cameras, laptops, iPods, kindles etc. They can be sealed in ziplock bags/tupperware boxes with silica packs to prevent humidity damage
18. **USB stick** & a couple of **plug adaptors** - Ecuador uses US style plugs
19. **SPF 30+ waterproof sunscreen** - make sure to bring enough
20. **Biodegradable fabric wash** for laundry along with biodegradable toiletries - soap, body wash, shampoo and toothpaste (yes, biodegradable toothpaste exists!)
21. **Insect bite cream** - Anthisan seems to work well or Tiger Balm
22. **DEET-based insect repellent** - studies have shown 50% DEET gives maximum protection, don't waste your money on higher strengths. Note that DEET is toxic to not only insects but also to animals like frogs - remember this when handling insects/animals!



23. Any other **personal toiletries** such as alcohol hand gel and talc (don't assume you can buy everything in Ecuador)
24. You may wish to bring snake chaps or boots. Most people (including local guides) simply wear their rubber boots to deal with both mud and snakes at the same time. Whether you use chaps is a personal comfort level decision
25. **Personal medical supply** (see below)

Medical Kit List

A fully-qualified doctor will be coming with us, along with a comprehensive medical supply. Nevertheless, having your own personal supply is very important and ensures there's plenty to go around. This list is provided to ensure that your personal kit given to you by occupational health is complete as sometimes items are forgotten:

1. **Antimalarials** - most important! You must have enough supply to cover the length of time in the malarial zone, plus enough for the duration before and after, depending on the type of antimalarial you are given. *E.g.* Malarone is to be taken 2 days before, during and 7 days after being in a malarial zone
2. **Medical Travel Pack** - also important! In the unlikely event of injury this can be taken to hospital with you to ensure you have access to your own clean needles etc
3. **Yellow Fever Certificate** (carry this with you - sometimes required at airport customs)
4. Iodine solution and neutralising powder - handy for sterilising water bottles
5. **Antihistamines** - for reducing itchiness/inflammation of bites
6. **Box of Dioralyte sachets** - for rehydration after diarrhoea
7. **Bottles of DEET + Permethrin** - to repel insects
8. Imodium (Loperamide Hydrochloride) - for diarrhoea
9. **Paracetamol and ibuprofen**. There will NOT be enough of this in the course medical kit.
10. Any **personal medications** you take regularly + prescriptions

If you have any known medical conditions – big or small – please let a member of staff know PRIOR to the field course. This information will be kept confidential, but it is very important that the medic knows any pre-existing conditions and medications being taken. Please be assured that we give mental health issues with the same consideration that we treat physical conditions.

Health and Safety

1. In Manchester you should have met with your doctor and have obtained all necessary inoculations, malaria prophylactics and a personal medical travel kit (as mentioned above). If you have not done this or do not have these you must tell us immediately!
2. Women going into the field often take the pill back-to-back to avoid the inconvenience of having their period in the field - be aware that this does not always work and take sufficient supplies in case it does not
3. Personal hygiene is important in the field and you need to bathe or shower daily. Talcum powder or anti-chaffing cream is recommended, especially for men. Crotch rot is only funny when someone else has it!
4. Health and safety will be discussed on site as we arrive at each location and will be reviewed on a daily basis
5. You are required to have read the general risk assessment for this field course



Behaviour

- You are required to abide by the university's code of conduct at all times while on this field course
- In general you should remember that you are a visitor to a foreign country and that **YOU MUST act with proper decorum**
- If anyone's behaviour is viewed to endanger themselves or others, the field course coordinator reserves the right to remove that person from the field course and return them to the UK

Photographic Supplies



It is highly recommended that you bring a digital camera as you will be see many interesting things during the course. Be sure to bring the charger and a way to download photos – leads and card readers are hard to come by in the field... It is also a good idea to bring something air-tight to store it in, along with silica gel to prevent humidity damage. **Don't forget to bring US-style adapters!**

Luggage

Your baggage allowance will be determined by the airlines you are flying with – make sure to check this beforehand, as excess baggage charges can easily surpass £100 on such long trajectories.

We will give you some kit to take out so please leave a bit of space. Remember that you will personally be lugging your bags so only bring what you can carry! And wheels don't fair well though jungle...

You may wish to lock your bags, but make sure to use TSA approved locks if you are flying through the USA, or they may cut the locks off your bags in order to inspect them.

Make sure to keep medicines, spare glasses, electronic items and any other irreplaceable items in your carry-on bag. Generally your toothbrush and a spare set of underwear is a good idea in case your luggage gets lost or delayed (this is not uncommon), or one of your flights is delayed and you miss a connection.

Make sure to check the airline AND airport restrictions about what you can take in carry-on and checked baggage. Make sure you abide by these regulations. For example, you cannot take liquids over 100 ml in carry on luggage so pack your sunscreen, etc. in checked luggage. Also, every year someone on this course has their pocket knife taken from them at security because they forgot to put it in their checked bag. Some airlines also have issues with batteries. **Make sure to check restrictions!**

Assessment

In the cloud forest you will carry out group projects (undergraduates) or individual (masters students) on biodiversity and ecology. You will give short group presentations on these projects (**20%**). In the rain forest you will complete an independent research project. At the end of the course you will give both an oral presentation (**20%**) on the work you have done. You will hand in your report (**40%**) after the field course. *Please bear this in mind if you are travelling afterwards!* There will also be a quiz at the end of the field course (**10%**).

Bellavista Cloud Forest	Group presentation	20%
Payamino Rainforest	Oral presentation	20%
	Written report	40%
Other	Quiz	10%
	Contribution	10%

Finally, because all field courses depend on the positive contribution of everyone involved, there is also a mark assigned for your contribution to the overall success of the field course (**10%**).

Schedule

Day	Morning	Afternoon	Evening
Thursday, 27 June 2019	Meet at <i>Hostal Posada del Maple</i> at 16:00 for intro talk. Stay at <i>Hostal Posada del Maple</i> .		
Friday, 28 June 2019	Coach to Delavista	Orientation talk and walk	Biodiversity
Saturday, 29 June 2019	Walking tour of cloud forest	Bromeliads , Bromeliad biodiversity survey	Measuring biodiversity
Sunday, 30 June 2019	Bromeliad sampling	Bromeliad sampling	Bromeliad sampling
Monday, 1 July 2019	Bromeliad sampling / analysis	Sampling and analysis	Analysis and presentations
Tuesday, 2 July 2019	Coach to Quito	Free (do washing)	Free / <i>Hostal Posada del Maple</i>
Wednesday, 3 July 2019	Coach to Coca		<i>Hotel Rio Napo</i>
Thursday, 4 July 2019	Ranchera / canoes to Payamino		Orientation talk and walk
Friday, 5 July 2019	H&S talk and walking tour	Experimental design , Sampling methods	Individual project design
Saturday, 6 July 2019	Field work	Field work (possible cave trip)	Field work
Sunday, 7 July 2019	Field work	Field work (possible lagoon trip)	Field work
Monday, 8 July 2019	Field work	Field work	Field work
Tuesday, 9 July 2019	Field work	Field work	Field work
Wednesday, 10 July 2019	Field work / analysis	Field work / analysis	Field work / analysis
Thursday, 11 July 2019	Field work / analysis	Field work / analysis	prepare talks
Friday, 12 July 2019	Individual presentations	Individual presentations	Pack up
Saturday, 13 July 2019	Canoe and Ranchera to Coca		Quiz!, <i>Hotel Rio Napo</i>
Sunday, 14 July 2019	Travel to Quito by coach		Course ends

Please note that this can change due to unforeseen circumstances or because the staff deem it best to make changes.

Contact Info

NB - In Quito, taxi drivers won't necessarily know where things like specific hotels are. Streets in Quito can be very long, so addresses are given with two intersecting streets names.

Hostal Posada del Maple

Juan Rodríguez E8-49
(entre Av. 6 de Diciembre y Av. Diego de Almagro)
Quito. Tel. (+593) 2-222-5965
admin@posadadelmaple.com

Bellavista Cloud Forest Reserve

Tel. (+5932) 222-2313 or 290-1536
www.bellavistacloudforest.com
info@bellavistacloudforest.com

Hotel Rio Napo

Bolivar 7606 y Napo
Coca. (+593) 6-288-0872
hotel_rio_napo@hotmail.es

Payamino Research Station

Located just a few miles west of the junction
of the Pashiyacu and Payamino Rivers
[no phone or signal!]

Heritage Inn

Tamayo N24-48, entre Wilson y Foch
Quito. (+593) 99-944-3931
info@heritageinn.com.ec

British Consulate in Ecuador (Quito)

– Embajada Británica

Tel. (+5932) 297-0800

Quito

1. In Ecuador, **you are required by law to always carry identification** (aka your passport), so make sure to carry this with you (in a [safe place](#)).
2. **Toilet paper must never be flushed anywhere in Ecuador (other than the airport) as it clogs the system** - bins for toilet paper are provided in bathrooms instead. Make sure you use them to avoid the embarrassment of having to tell us you've blocked the toilet!

We start in Quito in the evening on June 27th and stay the night at the Hostal Posada del Maple in Quito, before getting a coach the next morning to the Bellavista Cloud Forest Reserve.

Cloudforest

Our stay in the cloudforest will be brief but will be an intense introduction to biodiversity, survey techniques, and field research. We will learn to measure biodiversity, define a tree, to tell bryophytes apart, and classify invertebrates into the major orders.

Our activities will be centred around a specific system of great importance to the neotropical cloudforest: epiphytic tank bromeliads.

Bromeliaceae is a large group of neotropical plants, many of which share a similar morphology: long strap- or grass-like leaves arranged in a rosette pattern around a central cavity. This central cavity (or tank) and the leaf axes form *phytotelmata* – plant cavities that accumulate water. Both in the cloudforest and in the rainforest, we will see that the vast majority of bromeliads in these ecosystems are *epiphytic*, meaning they grow on other plants.

Bromeliads therefore form miniature oases in the cloudforest canopy, offering shelter and a relatively stable supply of freshwater to the myriad minibeasts that inhabit these ecosystems.

We will be collecting bromeliads and taking them apart to sample the invertebrate diversity within them. Additionally, uniquely this year, this exercise will contribute to a larger research project currently underway to understand the effect of bromeliad genetics on their associated communities.

You will carry out this work in small group projects of 3-5 people. Every group will use the same sampling methods to look at a different aspects of measuring biodiversity within bromeliads. On the last night in Bellavista, you will present your results as a group, which will comprise 20% of the mark of the field course.



Rainforest: Payamino

We will start with a short tour of the station facilities and the surrounding area. After an important health and safety briefing and unpacking we will begin...

Independent Projects!

Your main activity in the rain forest is to design and carry out your project. We have some literature with us but this is limited and internet access is not available for downloading papers. Therefore, if you already have an idea of what you want to do, please bring relevant papers with you.

Don't forget a USB stick - when you're sharing the laptops to do your reports, you can save work on a USB rather than having to use the same laptop each time.

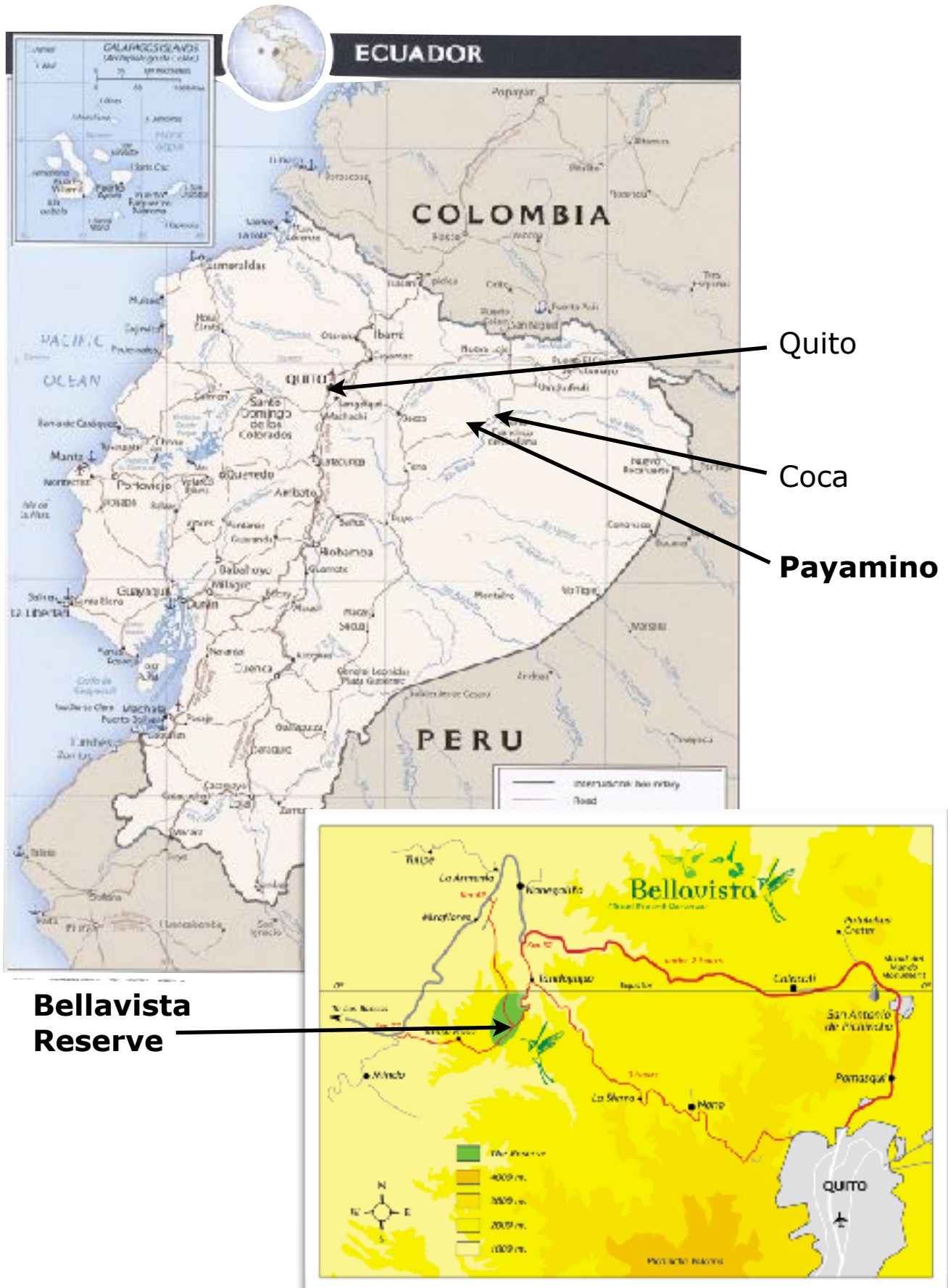
For your rainforest project you need to:

- 1) Identify your research question and hypothesis
- 2) Design your experiment
- 3) Work out logistics (e.g. equipment, data recording sheets, control etc.)
- 4) Carry out the experiment (perhaps think of doing a pilot beforehand)
- 5) Analyse your data
- 6) Interpret your results
- 7) Communicate your results in a written report (40% of the unit)
- 8) Communicate your results orally in a presentation (20% of the unit)

That seems like a lot to do... and it is! Don't worry, we will keep track of where you are and how things are going. If you look at the schedule it includes an outline of what we expect you to be doing on your project (remember, it's a guide and you can't follow it rigidly, science doesn't work that way!)



Maps



English - Spanish

Misc.		Wildlife	
Hello / Bye	Hola / Adiós	bird	pájaro or aves
Thank you (very much)	(Muchas) gracias	monkey	mono
Good morning	Buenos días	frog / toad	rana / sapo
Good evening or night	Buenas noches	tree / plant / leaf	árbol / planta / hoja
Pleasure to meet you	Mucho gusto	insect / ant	insecto / hormiga
My name is...	Me llamo... [<i>meh yah-moh</i>]	snake (viper)	serpiente (culebra)
You're welcome	De nada	butterfly / moth	mariposa
Yes / No / Please	Si / No / Por favor	spider	araña
I'm sorry	Lo siento	dog / cat / jaguar	pero / gato / tigre
I don't understand	No entiendo	Food & Drink	
I need a doctor	Necesito un médico	breakfast / lunch	desayuno / almuerzo
boy / girl	niño / niña	dinner / the menu	cena / la carta
woman / man	mujer / hombre	chicken / eggs	pollo [<i>poy-oh</i>] / huevos
the toilet	el baño [<i>ell ban-yoh</i>]	(meat) beef	(carne) de vaca
good / bad	bueno / mal	(meat) pork	(carne) de chanco
with / without	con / sin	fish (tuna) / ham	pescado (atún) / jamón
more / less	más / menos	lentils / rice / beans	lenteja / arroz / frijoles
today / tomorrow	hoy / mañana	bread / butter	pan / mantequilla
now / later	ahora / mas tarde	salt / pepper / sugar	sal / pimienta / azúcar
hot / cold	caliente / fría	potato / chips	papa / papas fritas
Questions		apple / passion fruit	manzana / maracuya
How are you?	¿Cómo estás?	pineapple / avocado	piña / aguacate
How much? (\$)	¿Cuánto es?	(orange) juice	jugo (naranja)
Why / What?	¿Por qué / Qué?	coffee / tea / milk	café / té / leche
When / Where is?	¿Cuándo / Dónde está?	water / beer / rum	agua / cerveza / ron
Do you have...?	¿Tiene...?	wine (red / white)	vino (tinto / blanco)
Do you know...?	¿Sabe...?	fermented yuca drink	chicha

English - Kichwa

(For any gaps, try to find out the words & fill them in!)

Misc.		Wildlife	
Good morning	Ali puncha	bird (tucan)	pishku (sikwanda)
Good afternoon	Ali chishi	monkey	munu
Good evening/night	Ali tuta	frog / toad	sapu
Thank you (v much)	(Ashka) pagarachu	forest / tree / flower	sacha / yura / sisa
Yes / No / Please	Ari / Mana / Jau man	ant (bullet) / beetle	añanku (yuturi) / katsu
My name is...	Ñuka pashuti kani...	snake / bat	machakuy / tutapishku
You're welcome	Mano imachu	butterfly or moth	pimpilitu
Excuse me/Sorry	Kishpichiwai	spider / mosquito	araña / chuspi
I'm fine	Ñukaka allimi kani	dog / cat / jaguar	allku / misi / puma
"learned person, scientist"	amawta	Food & Drink	
woman / man	warmi / kari	breakfast / lunch	tutamandupina /
child/baby	wawa	I eat / you eat	mikuni / mikunki
bathroom	armana aku	chicken / eggs	atalpa / lulun
good / bad	ali / manali	(meat) beef/cow	(aycha) wakra
with / without		(meat) pork/pig	(aycha) kuchi
more / few	ashta / asha	fish	challua
today / tomorrow	/ kaya	lentils / rice / beans	/ /
now / later		bread / soup / cheese	tanta / api / kizu
hot / cold	rupa / chiri	salt / pepper / sugar	kachi / /
Questions		potato / chips	/
How are you?	Imanata kangui?	apple / passion fruit	/
How much? (\$)	Mashnapa?	pineapple / avocado	chiwilla /
Why / What?	Ima rasha / Ima?	maize	sara
When / Where?	Imauras / Maibi?	coffee / tea / milk	/ / ñuñu
Do you have...?		water / beer / rum	yaku / cerveza / ron
Do you know...?		wine (red / white)	(puka / yurak)
What's your name?	Ima shuta cangui?	'chicha'	asua

An important note on hygiene in Payamino

It is very easy to assume that you are all hygienic individuals who know how to look after yourselves. However, when you are in an unfamiliar environment, remote areas, or very basic conditions, it is very easy to become complacent about hygiene, as we can afford to think most things are relatively clean in the environment we're used to.

In the field, we will be in an unfamiliar remote environment, in conditions far more basic than what most of us are accustomed to (unless your student house is *that* bad) and with at least 40 other people in close proximity. In these conditions it is very easy for things to get out of hand.

So, a few easy things we can all do to avoid any outbreaks amongst the group:

- **Wash your hands.** After the toilet, when you wake up, before you sleep, after field work, after going in the river, ... just wash them a lot. We will have washing stations with bleached water and alcohol hand gel outside the compost toilets and in front of the dining hut. Remember that any tap water comes straight from the river.

- **Don't share your water bottle, cups, drinks, etc.** We cannot stress this enough. Whether you are ill or not, just because you would use the same cup as your best friend in Manchester does not mean you should in the jungle. All our immune systems cope with things in different ways and many people's will be out of whack in this alien environment. You could have something not affecting you that makes someone else sick, or you may not know you're ill yet, and sharing eating/drinking utensils is a fantastic way of spreading germs, *especially* as we will be so many people cramped in one station.

- **Keep sleeping, eating, and excreting areas clean and tidy.** It is surprisingly easy for a bit of mess to get out of hand and full of wildlife.

On the 2016 field course, 21 of 24 students fell ill with projectile vomiting and serious diarrhoea. They were weak, in pain, some students fainted and one was temporarily evacuated. We were sending staff to the city at 3 AM for drips and antibiotics. None of the eight members of staff became ill, nor did any cooks or guides – who all eat the exact same food as the students at the same time and drink from the same water source. However, a casual survey post-*Vompocalypse* revealed that many students had not been washing their hands before eating, or after being in the river, or after relieving themselves. Additionally, the student dorm was not kept hygienically, littered with bottles and snack wrappers. People had been sharing water and alcohol. Due to this, most students spend a chunk of the field course too ill to work or make the most of being halfway across the world in the rainforest. The teaching staff turned into full-time carers. The Shaman

offered to hit the sickened students with giant nettles because the local community believed the field course to be cursed!

A carefully aimed stool sample was sent to Coca to be analysed and showed that the infection was bacterial. It is highly likely, given the circumstances and who fell ill, that the *Vompocalypse* was due to lack of a rigorous hygiene regime. We can urge you to be clean and sensible but ultimately we can't do anything to enforce this, so please take it upon yourselves to be very careful and be even cleaner than you would be in Manchester.

