**E+ES Module 4 – Human impacts fieldwork programming information for depth studies based on Field of Mars EEC excursion**

Information for teachers who have booked a [Field of Mars](http://fieldofmarseec.nsw.edu.au/student-learning/secondary-excursions/) **E+ES** excursion for their Year 11 students in 2019.

1. **Organisation at a glance:**

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| **Timing** | **Working Scientifically Skills**  | **Activity** | **Inquiry type** |
| **2 hours** Pre-excursion work | Questioning and predictingPlanning investigations | Watch resource videos (see following pages)Examine inquiry questionsIntroduction to worksheetExamine spatial information (Google map, Photos, Google earth tour)Field study prep quiz | Teacher guided(in class) |
| **5 hours**Excursion fieldwork | Conducting investigations | Field study excursion with Field of Mars EEC Students conduct field work and collect first hand data and informationData: 1. Human impacts 2. Weed mapping 3. Control of introduced species 4. Management 5. Abiotic factors | EEC Teacher guided(in the field) |
| Processing data and information | Process and analyse fieldwork data and informationStudents make their own investigation process analysisAssess human actions and associated environmental impacts for future management | Student guided(in the field/some in class) |
| **4 – 7 hrs**Post -excursion **depth study** work | Analysing data and informationProblem solving | Further investigate or commence a particular inquiry or area of interest inspired or prompted by the original modelled fieldwork investigation. Depth Study Inquiry questions can be simple or complex depending on your class needs:Simple example inquiry questions:1. How has human activity impacted the ecosystems of the Strangers creek valley?
2. How should the ecosystems at the Strangers creek valley study sites be managed for maximum biodiversity?

Complex example inquiry question:1. How has the Strangers creek valley changed as a result of human actions in the last: A) Century, B) Decade?
 | Teacher/Student Guided(in class) |
| **1 – 4 hrs**Depth study assessment | Communicating | Prepare and deliver a communication piece for a specific audience:For example: field study report, mock media story, management plan or funding proposal.Alternately set an open book exam with extended response questions that focus on communicating the qualitative and quantitative data as well as findings of the Depth study inquiry | Student guidedorOpen Inquiry |

1. **Specific programming information and resources**

Teachers can simply “cut and paste” from this document into their Stage 6 programming for **Modules 3, 4** and **Depth studies**.

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| **Content:**  | **Teaching and learning:** | **Timing** |
| **Module 4 (K+U):**describes human impact on the Earth in relation to hydrological processes, geological processes and biological changes EES11-11 | **FIELD OF MARS EEC PRE-EXCURSION WORK:****A series of videos (currently in production) that prepare students for the Excursion fieldwork****VIDEO 1:** Introduction to Field of Mars EEC and the E+ES excursion video resource series1. How the video series fits with the syllabus
2. Field of Mars EEC
3. EEC staff
4. How the excursion and subsequent depth study process works
5. List of videos in the series
6. Link to, and explanation of, the excursion worksheet that will be used

**VIDEO 2:** Introduction to the Strangers creek valley (the field study site):* Location
* Spatial description
* Biotic description
* Abiotic description
* Refer students to page of supporting resource links

**VIDEO 3:** Historical and contemporary human activities and their associated impacts.**POSSIBLE VIDEO 3.5**: Simple introduction to some introduced species and their associated impact at the study site:* Organism names and description
* Habitat outline and niche, native look-alikes
* Refer students to page of supporting resource links
 | 2 hr |
| **(Skills):** * develops and evaluates questions and hypotheses for scientific investigation EES11/12-1
* designs and evaluates investigations in order to obtain primary and secondary data and information EES11/12-2
* conducts investigations to collect valid and reliable primary and secondary data and information EES11/12-3
* selects and processes appropriate qualitative and quantitative data and information using a range of appropriate media EES11/12-4
* analyses and evaluates primary and secondary data and information EES11/12-5
* solves scientific problems using primary and secondary data, critical thinking skills and scientific processes EES11/12-6
* communicates scientific understanding using suitable language and terminology for a specific audience or purpose EES11/12-7
 | **VIDEO 4**: Introduction to the questioning, planning, conducting investigation processes that will be used on he excursion, as well as the likely audiences whom we may be communicating our findings to.**NOTE:** Video 4 may be split into two shorter videos**VIDEO 5**: Introduction to Biotic and Abiotic factors at the Strangers creek study site:* Introduction to the ecological niches and species that we will be focussing on at the field study sites.
* Climate data, flow charts showing how abiotic factors are important to these ecological niches.

Refer students to page of supporting resource links**VIDEO 6**: Meet an environmental consultant.What does a environmental consultant do?Who do they work for?What does their work look like (Fieldwork - data analysis - Report preparation & writing)How do they identify data sources that will allow them to address the inquiry questions.* Diff between qualitative and Quantitative data
* Discussion of what constitutes valid and reliable data
* What does it look like when they “process” data

**NOTE:** This may be split into two shorter videos and a page of supporting resource links**VIDEO 7**: Meet an ecologist Part 2. (proposed)Discussion of future management options**VIDEOS 8-10**: How to use the different Field of Mars EEC instruments and data management methods that will be used on the Excursion. Including notes on error and reliability.* Introduction to Abiotic sampling methodologies and instruments
* Basic introduction to each factor, instruments and their usage as well as possible error

There will also be separate spatial information sources: (Google map, Photos, Google earth tour) |
| **Module 4 (K+U):**describes human impact on the Earth in relation to hydrological processes, geological processes and biological changes EES11-11 | **FIELD OF MARS EEC FIELDWORK EXCURSION:**Investigation of the human actions and their associated environmental impacts at the Strangers creek study siteInvestigation of current management challenges and actions at the Strangers creek study siteInvestigation of the human actions and their associated environmental impacts at the Strangers creek study siteInvestigation of current management challenges and actions at the Strangers creek study site | 5 hrs  |
| **(Skills):** * develops and evaluates questions and hypotheses for scientific investigation EES11/12-1
* designs and evaluates investigations in order to obtain primary and secondary data and information EES11/12-2
* conducts investigations to collect valid and reliable primary and secondary data and information EES11/12-3
* selects and processes appropriate qualitative and quantitative data and information using a range of appropriate media EES11/12-4
* analyses and evaluates primary and secondary data and information EES11/12-5
* solves scientific problems using primary and secondary data, critical thinking skills and scientific processes EES11/12-6
* communicates scientific understanding using suitable language and terminology for a specific audience or purpose EES11/12-7
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| **Depth study****Content:**Teacher choses specific K + U content from Modules 3 & 4 to be covered in depth.(*other content to be included where necessary for inquiry/task context*)**Skills:(Focus on skills 1, 7 & two more)*** developing and evaluates questions and hypotheses for scientific investigation
* designing and evaluating investigations in order to obtain primary and secondary data and information
* conducting investigations to collect valid and reliable primary and secondary data and information
* selecting and processing appropriate qualitative and quantitative data and information using a range of appropriate media
* analysing and evaluating primary and secondary data and information
* solving scientific problems using primary and secondary data, critical thinking skills and scientific processes
* communicating scientific understanding using suitable language and terminology for a specific audience or purpose
 | **Suggested Depth study inquiry questions:**Simple example inquiry questions:* How has human activity impacted the ecosystems of the Strangers creek valley?
* How should the ecosystems at the Strangers creek valley study sites be managed for maximum biodiversity?

Complex example inquiry question:* How has the Strangers creek valley changed as a result of human actions in the last:

A) Century, B) Decade?**Assessable tasks:*** Construct an information report addressing the above inquiry questions
* Prepare and Environmental management plan addressing “key threatening processes at the field study site.
* Prepare a public information product (eg pamphlet, video, podcast) addressing the above inquiry questions
* Prepare a detailed timeline for the ecosystem studied: It’s past, present and future directions INCLUDING reference to the fieldwork processes
* Media story: what does the future hold for Biodiversity management at the site?
* Mock funding proposal for future management of the site
* Open book exam based on Depth study. (Students can bring their own notes, excursion worksheet, etc)

**Resources provided by Field of Mars EEC to support the depth study process*** Videos 1-12: Students Re-visit the pre-visit video resources and assessing them for their use of scientific language and terminology for the intended audience and purpose.Eg: Compare videos 3 and 3.5
* Video 13: Discussion and evaluation of the fieldwork investigation methods used on the excursion. Reliability, validity instrument accuracy, error sources, data management and statistical methods used

**Resource page on Field of Mars website:*** Research paper links
* Historical photos of the study site
* Web links
* Google earth tour and Google Maps interactive “Panospheres” ([example here](https://goo.gl/maps/dqhjvsrD6Kz))
* Historical data from study site (this will accrue from 2018 onwards)
* Links to weather observation stations nearby and climate data
* Lane Cove National Park plan of management
* Links to videos and information about the instruments and methods used on the field study.
* PDF versions of any fieldwork iPad resources
* Powerpoint presentations used by ecologists communicating the outcomes of their field surveys nearby to the general public.
* Links to environmental management and species management plans.
* Information on the use of statistics in ecological sampling
* More to be added in time
 | 8 hrstotal including assess-ment |