Curriculum Hack EC17

3 Interdisciplinary Units

Schoolhouse
Centre for Educational Innovation

Curriculum Hack EC17 | Introduction

At EC17 we collaborated with hundreds of teachers to create interdisciplinary units of work, focusing on years 7-10.

We believe interdisciplinary work is important because it encourages students to see the linkages between subjects, and to tackle big, interesting, complex challenges. Interdisciplinary units are often project-based – bringing to bear not just one disciplinary perspective but many. They examine and explore a problem from many sides. Consequently, students learn to be more creative and critical in their thinking – developing a sophistication and fluidity that will serve them well.

In talking to those who attended EC17, more high school teachers are starting to experiment with interdisciplinary projects. Unfortunately, they are often met with resistance, and most of these projects happen 'outside of the timetable'. This is particularly frustrating when these teachers describe the amazing experiences that students take away from such projects.

Three 'plan-spirations' are presented here, built during the two day conference. They are somewhere between inspiration and unit plan, each suggesting an explorations that takes place over the course of a term and brings different subjects. Rather than being a dedicated 'full-on' period, these are designed to fit in amongst other activity happening within the timetable – and to work toward clearly defined ACARA curriculum objectives. All this doesn't mean that running them will be easy – it still requires a level of preparation, communication and integration that is we;; beyond what is typically happening in Australian high schools. But it should be achievable with even a handful of dedicated teachers.

- The activities presented in each project are by no means an exhaustive set of ideas and connections, they are only a starting point
- It is not critical that you do all the subjects listed, and it's not critical that each student does all subjects.
- Each unit is intended to culminate in a summative assessment that can be marked by multiple teachers.
- It is not anticipated that these units will deliver wholly against the objectives listed; in many instances this could be complementary to other units.
- These activities could be done by students working individually, but would most likely be most effective in groups.

We think they have the potential to be exciting and engaging projects. If you use them, we'd love to hear how develop them further. For more of these kind of interesting ideas, join the conversation at the Progressive Educators Network (PEN), @ProgEduNet on Facebook or Twitter.

All the best,

Brett Rolfe
Director | The Schoolhouse Centre for Educational Innovation

PLAN-SPIRATION 1 | Diaspora: Becoming an Interplanetary Species

Driving question: What will it be like for humans to become an interplanetary or interstellar species?
Developed for Year 10 students.

In this ten-week unit, students explore the idea that in the future, humans will spread beyond the Earth – to Mars and other planets in the Solar System, or beyond, into the depths of interstellar space. A perennial topic of science fiction, recent years have seen increasing mainstream discussion of this topic with a renewed interest in space exploration; the pioneering work of Elon Musk; and popular fictional accounts such as Andy Weir's 'The Martian'.

Over the course of the unit, students are introduced a range of different constraints and considerations that will have an impact on our post-Earth future. They develop a number of different possible future scenarios, and identify one to work on in some depth. As a result they design a vehicle or colony, and write a narrative account of the experience of interplanetary humanity.

Subjects included are English, Maths Science, History, Geography, Civics & Citizenship, Economics & Business, Health & PE and Design & Technologies.

<table>
<tr>
<td rowspan="4" style="writing-mode: vertical">WEEKS 1 & 2</td>
<td colspan="3">Students begin to explore the concept of an interplanetary diaspora – the spread of humans beyond Earth. They build an understanding of the interstellar context within which we exist, and experience several different possible post-Earth futures through fiction. Students also draw parallels between the migration of humans beyond Earth and recent international migrations to encourage more nuanced and critical thinking about the human experience of migrating off-planet.</td>
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<tr>
<td>SCIENCE</td>
<td>ENGLISH</td>
<td>HISTORY</td>
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<td>Understand the larger interstellar environment and how we might become interplanetary
The universe contains features including galaxies, stars and solar systems, and the Big Bang theory can be used to explain the origin of the universe ACSSU188</td>
<td>Read, watch, listen to fictional accounts of interplanetary diaspora
Evaluate the social, moral and ethical positions represented in texts ACELT1812 | Compare and evaluate a range of representations of individuals and groups in different historical, social and cultural contexts ACELT1639</td>
<td>What can we learn from recent migrant experiences that can inform how we approach interplanetary migration?
The waves of post-World War II migration to Australia, including the influence of significant world events ACDSEH144 | The impact of changing government policies on Australia's migration patterns, including abolition of the White Australia Policy, 'Populate or Perish' ACDSEH145 | The contribution of migration to Australia's changing identity as a nation and to its international relationships ACDSEH147</td>
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WEE	As they discuss possible future scenarios, students explicitly consider a number of different factors that will influence how they envisage the interplanetary future. They conduct research into what makes planets suitable for habitation, and recent astronomical data on the likely frequency of

'Earth-like' planets. Using basic physical laws they begin to grasp the complexities involved in moving interplanetary and interstellar distances – and similarly the timeframes involved. Consequently they also develop an understanding of the financial implications of operating at these timescales.

SCIENCE	MATHS	SCIENCE	MATHS
Consider the qualities of planets that would make them suitable for habitation	Anticipate the potential for 'liveable planets'	Anticipate the challenges with interplanetary propulsion and navigation	Explore the implications of interplanetary and interstellar timescales on financial interest
Global systems, including the carbon cycle, rely on interactions involving the biosphere, lithosphere, hydrosphere and atmosphere ACSSU189	Evaluate statistical reports in the media and other places by linking claims to displays, statistics and representative data ACMSP253	Energy conservation in a system can be explained by describing energy transfers and transformations ACSSU190	The motion of objects can be described and predicted using the laws of physics ACSSU229	Connect the compound interest formula to repeated applications of simple interest using appropriate digital technologies ACMNA229

WEEKS 5 & 6

Students develop a range of possible future scenarios, and explore their statistical likelihood. They consider the implications of off-world population from a governance perspective, and from an economic perspective. They also consider the possible evolutionary implications of living on other planets of long-term interstellar travel. By the end of this period, students should have identified a particular scenario that they will pursue for the rest of the unit.

MATHS	CIVICS & CITIZENSHIP	GEOGRAPHY	ECONOMICS & BUSINESS	SCIENCE
Map and explore a 'tree' of possible future outcomes with probabilities	What would the role of the Australian government be?	What role would governments and NGOs play at an interplanetary scale?	How will a new interplanetary economy function and differ from now?	Consider the evolution of humans once we leave Earth – in transit and on other planets
Describe the results of two- and three-step chance experiments, both with and without replacements, assign probabilities to outcomes and determine probabilities of events. Investigate the concept of independence ACMSP246	Use the language of 'if…then, 'given', 'of', 'knowing that' to investigate conditional statements and identify common mistakes in interpreting such language ACMSP247	The Australian Government's role and responsibilities at a global level, for example provision of foreign aid, peacekeeping, participation in international organisations and the United Nations ACHCK091	The role of international and national government and non-government organisations' initiatives in improving human wellbeing in Australia and other countries ACHGK081	Develop questions and hypotheses about an economic or business issue or event, and plan and conduct an investigation ACHES055	Generate a range of viable options in response to an economic or business issue or event, use cost-benefit analysis and appropriate criteria to recommend and justify a course of action and predict the potential consequences of the proposed action ACHES058	Apply economics and business knowledge, skills and concepts in familiar, new and hypothetical situations ACHES059	Transmission of heritable characteristics from one generation to the next involves DNA and genes ACSSU184	The theory of evolution by natural selection explains the diversity of living things and is supported by a range of scientific evidence ACSSU185

WEE

Students further extrapolate around their chosen scenario. They consider the challenges of providing adequate and sustainable food; of ensuring a suitably ethical government, and of nurturing the wellbeing of humans as they spread out beyond the Earth.

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DESIGN & TECH	CIVICS & CITIZENSHIP	HEALTH & PE	GEOGRAPHY
Develop a plan for feeding people, in transit or at destination Investigate and make judgments on the ethical and sustainable production and marketing of food and fibre ACTDEK044	Investigate and make judgments on how the principles of food safety, preservation, preparation, presentation and sensory perceptions influence the creation of food solutions for healthy eating ACTDEK045	**How will our society/democracy work as an interplanetary species?** The challenges to and ways of sustaining a resilient democracy and cohesive society ACHCK094	**How will we ensure wellbeing and community?** Plan, implement and critique strategies to enhance health, safety and wellbeing of their communities ACPPS096	Plan and evaluate new and creative interventions that promote their own and others' connection to community and natural and built environments ACPPS097	**How could we measure our wellbeing as an interplanetary species?** Different ways of measuring and mapping human wellbeing and development, and how these can be applied to measure differences between places ACHGK076

WEEKS 9 & 10

Finally, having imagined their future scenario in some detail, they produce two final pieces of work. The first is the high level conceptual design of either the interplanetary or interstellar vessel that we will use, or the colony we will build at our destination. The second piece of work is a narrative – in written, visual or audio-visual form – that documents the human experience or interplanetary diaspora.

DESIGN & TECH	ENGLISH
Design the interplanetary transit vessel or the end destination colony Critically analyse factors, including social, ethical and sustainability considerations, that impact on designed solutions for global preferred futures and the complex design and production processes involved ACTDEK040	Explain how products, services and environments evolve with consideration of preferred futures and the impact of emerging technologies on design decisions ACTDEK041	Investigate and make judgments, within a range of technologies specialisations, on how technologies can be combined to create designed solutions ACTDEK047	**Document the experience of an interplanetary migrant or colonist** Create imaginative texts that make relevant thematic and intertextual connections with other texts ACELT1644	Create literary texts with a sustained 'voice', selecting and adapting appropriate text structures, literary devices, language, auditory and visual structures and features for a specific purpose and intended audience ACELT1815

PLAN-SPIRATION 2 | Come and Play: Developing a game for new Australians

Driving question: How could a game be developed to improve the wellbeing of a groups of Australian migrants?
Developed for Year 10 students.

In this ten-week unit, students explore the experiences and needs of different groups that have migrated to Australia – with the goal of building a game for one of those communities that will actually contribute to the community's wellbeing. As part of their research into different migrant experiences, they will identify areas of concern of need within current migrant populations. As a result, they will choose to focus on a particular group – perhaps a regional demographic such as recently arrived Sudanese refugees, or a 'sub-group', such as young children of first generation immigrants.

The students' focus will be a particular need affecting wellbeing that they have identified within that group. Over the remainder of the unit they will work to produce a game to address this need – perhaps by educating, connecting, or encouraging positive ways of thinking. Where feasible it would be desirable to have the games played by members of the target communities.

Subjects included are English, History, Civics & Citizenship, Health & PE, Design & Technologies and Visual Arts.

	Students build their knowledge on immigration to Australia since WWII, with a focus on the experience of different migrant groups.		
WEEKS 1 & 2	HISTORY	ENGLISH	CIVICS & CITIZENSHIP
	Learn about the experiences of different groups of recent migrants to Australia The waves of post-World War II migration to Australia, including the influence of significant world events ACDSEH144	The impact of changing government policies on Australia's migration patterns, including abolition of the White Australia Policy, 'Populate or Perish' ACDSEH145	The impact of at least ONE world event or development and its significance for Australia, such as the Vietnam War and Indochinese refugees ACDSEH146	The contribution of migration to Australia's changing identity as a nation and to its international relationships ACDSEH147	Read, watch or listen to accounts of migrant experiences in Australia Analyse and evaluate how people, cultures, places, events, objects and concepts are represented in texts, including media texts, through language, structural and/or visual choices ACELY1749	Compare and evaluate a range of representations of individuals and groups in different historical, social and cultural contexts ACELT1639	Evaluate the social, moral and ethical positions represented in texts ACELT1812	Explore Australia's legal and civic structures for encouraging and discouraging migration within the international context The Australian Government's role and responsibilities at a global level, for example provision of foreign aid, peacekeeping, participation in international organisations and the United Nations ACHCK091	How Australia's international legal obligations shape Australian law and government policies, including in relation to Aboriginal and Torres Strait Islander Peoples ACHCK092	The challenges to and ways of sustaining a resilient democracy and cohesive society ACHCK093
WEEK 3	Students identify a particular group of migrants to study. Ideally this will be a group to which the students have some access, but this is not necessary. The students explore the wellbeing of this community, identifying factors that are negatively impacting on the group's wellbeing.		

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	HEALTH & PE	
	Understand the factors that influence the wellbeing in a particular migrant community	
	Evaluate factors that shape identities and critically analyse how individuals impact the identities of others ACPPS089 | Critique behaviours and contextual factors that influence health and wellbeing of diverse communities ACPPS098	
WEEKS 5 & 6	Students develop strategies in response to their research, identifying ways that the wellbeing of the community they are focusing on could be improved.	
	HEALTH & PE	
	Develop strategies to enhance wellbeing in a particular migrant community	
	Propose, practise and evaluate responses in situations where external influences may impact on their ability to make healthy and safe choices | Propose, practise and evaluate responses in situations where external influences may impact on their ability to make healthy and safe choices ACPPS092 | Plan, implement and critique strategies to enhance health, safety and wellbeing of their communities ACPPS096 | Plan and evaluate new and creative interventions that promote their own and others' connection to community and natural and built environments ACPPS097	
WEEKS 7 & 8	Students identify some way in which a playable experience (from a board game to a digital game to a physical game) could help the community they are focusing according to the strategies developed. Using design thinking processes, they develop a game to do this.	
	DESIGN & TECH	
	Use design thinking methodology to create a prototype game	
	Develop, modify and communicate design ideas by applying design thinking, creativity, innovation and enterprise skills of increasing sophistication ACTDEP049 | Work flexibly to effectively and safely test, select, justify and use appropriate technologies and processes to make designed solutions ACTDEP050	
WEEKS 9 & 10	Students build the game, writing the required rules and so on, and constructing the other elements of the game.	
	ENGLISH	VISUAL ARTS
	Write the rules ad content for your game in a suitable way for your audience	Create a game with aesthetic appeal for your audience
	Create literary texts with a sustained 'voice', selecting and adapting appropriate text structures, literary devices, language, auditory and visual structures and features for a specific purpose and intended audience ACELT1815 | Use a range of software, including word processing programs, confidently, flexibly and imaginatively to create, edit and publish texts, considering the identified purpose and the characteristics of the user ACELY1776	Conceptualise and develop representations of themes, concepts or subject matter to experiment with their developing personal style, reflecting on the styles of artists, including Aboriginal and Torres Strait Islander artists ACAVAM125 | Manipulate materials, techniques, technologies and processes to develop and represent their own artistic intentions ACAVAM126

PLAN-SPIRATION 3 | Making the school community more liveable

Driving question: How can we make the school and the local community more liveable, sustainable and supporting of wellbeing?
Developed for Year 7 students.

In this ten-week unit, students explore what it means for a place to be liveable and sustainable – and the implications this has for wellbeing. They they examine the school and potentially the local community to identify areas of convers around liveability or sustainability. These then become areas around which they ideate, developing potential solutions to improve their school and community. The resulting solutions are 'pitched' to experts and stakeholders – ideally with the outcomes that effective solutions may be implemented to improve the school and community.

Subjects included are English, Science, Geography, Health & PE, Design & Technologies, and the Sustainability cross-curriculum priority.

WEEKS 1 & 2	Students establish a framework for considering the sustainability and liveability of places, and some of the factors that affect these qualities.		
	SCIENCE	SUSTAINABILITY	GEOGRAPHY
	Understand the global context of our sustainable actions Global systems, including the carbon cycle, rely on interactions involving the biosphere, lithosphere, hydrosphere and atmosphere ACSSU189	Understand what makes the school more or less sustainable Sustainable patterns of living rely on the interdependence of healthy social, economic and ecological systems. OI.3 | World views that recognise the dependence of living things on healthy ecosystems, and value diversity and social justice, are essential for achieving sustainability. OI.4 | World views are formed by experiences at personal, local, national and global levels, and are linked to individual and community actions for sustainability OI.5	Understand the factors that influence the liveability of the school and the surrounding community Factors that influence the decisions people make about where to live and their perceptions of the liveability of places ACHGK043 | The influence of accessibility to services and facilities on the liveability of places ACHGK044 | The influence of social connectedness and community identity on the liveability of place ACHGK046
WEEKS 3 & 4	Students examine their school and the local area, identifying ways that the school's or liveability could be improved; or that the wellbeing of the school community might be improved.		
	GEOGRAPHY		HEALTH & PE
	Develop strategies to improve the liveability of the school and surrounding community Strategies used to enhance the liveability of places, especially for young people, including examples from Australia and Europe ACHGK047		How can we improve wellbeing of the school community? Investigate and select strategies to promote health, safety and wellbeing ACPPS073 | Plan and implement strategies for connecting to natural and built environments to promote the health and wellbeing of their communities ACPPS078
W EE	Students consider the school from a sustainability perspective, identifying ways that it's sustainability may be improved.		

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	SUSTAINABILITY
	Design actions to make the school more sustainable
	The sustainability of ecological, social and economic systems is achieved through informed individual and community action that values local and global equity and fairness across generations into the future OI.6	Actions for a more sustainable future reflect values of care, respect and responsibility, and require us to explore and understand environments OI.7	Designing action for sustainability requires an evaluation of past practices, the assessment of scientific and technological developments, and balanced judgements based on projected future economic, social and environmental impacts OI.8	Sustainable futures result from actions designed to preserve and/or restore the quality and uniqueness of environments O1.9
WEEKS 7 & 8	Students use design thinking to develop concrete. Implementable solutions that deliver against the strategies they have developed.
	DESIGN & TECH
	Use design thinking to develop design solutions based on actions and strategies
	Develop, modify and communicate design ideas by applying design thinking, creativity, innovation and enterprise skills of increasing sophistication ACTDEP049	Work flexibly to effectively and safely test, select, justify and use appropriate technologies and processes to make designed solutions ACTDEP050
WEEKS 9 & 10	Students develop and deliver presentations, making the case for the design solutions they have developed.
	ENGLISH
	Pitch your ideas to experts and decision makers (proposal and presentation)
	Use interaction skills when discussing and presenting ideas and information, selecting body language, voice qualities and other elements, (for example music and sound) to add interest and meaning ACELY1804	Plan, rehearse and deliver presentations, selecting and sequencing appropriate content and multimodal elements to promote a point of view or enable a new way of seeing ACELY1720

Further Inspiration

During the EC17 conference we had lots of great topics suggested – unfortunately time only permitted us to explore a few in any detail. Here are some of the others that we think would make fantastic interdisciplinary units;

- How might we use 21C technology to solve 20C problems?

- In 2018, where will we source clean water?

- Does music influence society or does society influence music?

- Create a school political party and develop an election campaign.

- Get students to plan a revolution.

- Choose a cultural artifact and build a backstory to that artifact.

- Create a virtual reality tour of your school in Minecraft

- Design resources to help younger students learn a language.

Acknowledgements

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