STATE
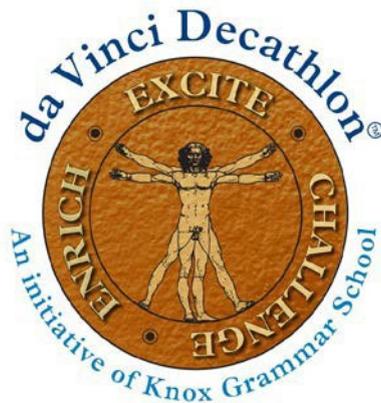
DA VINCI DECATHLON 2022

CELEBRATING THE ACADEMIC GIFTS OF STUDENTS

IDEATION – ANSWER BOOKLET

TEAM NUMBER _____

| 1	2	3	4	Total	Rank
/15	/10	/25	/10	/60	

IDEATION CHECKLIST

To ensure that your team is on track and has completed all of the required tasks for the challenge please note the following checklist.

TASKS	COMPLETE – PLEASE TICK
a. Empathise - Research form (15 marks)	
b. Define (10 marks)	
c. Ideate (25 marks)	
d. Prototype (10 marks)	

1. EMPATHISE

What is the problem?

- Define the challenge and explore the human context (15 marks)
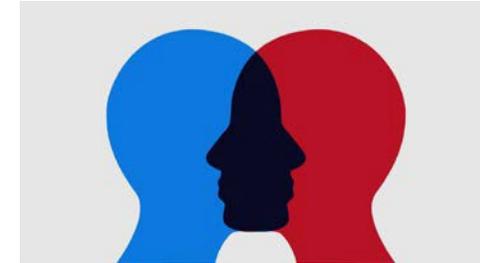
Research is imperative when identifying problems and solutions. Without knowledge of the context and consideration of the human context, it can be very difficult to identify a problem or challenge on which you will focus.
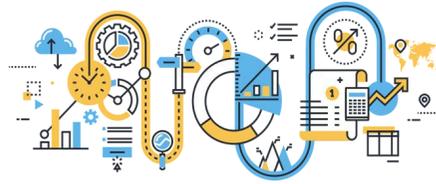
This section will guide you through an examination of the research material that has been provided for this topic.
In the box below, identify what you consider to be **KEY FACTS** from the research provided. Use the headings to guide your research.

Factors contributing to the issue (At least TWO) – 4 marks	Consequences if not addressed (At least TWO) – 4 marks	People and perspectives – Identify the different perspectives – 3 marks	Two barriers to addressing the issue and why they are a barrier – 4 marks

2. DEFINE

Why is it important? (10 marks)
- Understand and create a point of view

The consideration of ethics distinguishes us as humans from other organisms. Ethical people have what philosopher Thomas Aquinas called a *'well-informed conscience'*. They live what Socrates called *'an examined life'* – a life particularly associated with being human. Here, you must identify the problem in a vision statement. This is your team's vision for what you would like to achieve. It may be that you want to 'reduce' or 'improve', 'increase' or decrease'.

> **Vision Statement: What does the team want to achieve? (5 marks)**

> **Why is this vision statement important to address? Write the relevant points from the research here to show you have based your vision statement on your understanding of the problem. (5 marks)**

3. IDEATE

How do we solve it? (25 marks)

Create **3 POSSIBLE** solutions that will facilitate your vision statement. In other words, how will you make this a reality? They need to be **3 DIFFERENT** ideas. Be bold, be creative.

Possible Solution 1 (2 marks)	Possible Solution 2 (2 marks)	Possible Solution 3 (2 marks)
Reflect and Evaluate: complete this once you have brainstormed your solutions		
What are some positive consequences of this solution? (1 mark)	*What are some positive consequences of this solution?* (1 mark)	*What are some positive consequences of this solution?* (1 mark)
What are some negative consequences of this solution? (1 mark)	*What are some negative consequences of this solution?* (1 mark)	*What are some negative consequences of this solution?* (1 mark)

REFLECT & EVALUATE Cont.

Using the table above, select one solution for which you will develop a prototype.

Write your chosen solution here (2 marks)

Justify why you have selected this solution (4 marks)

IMPLEMENTATION (3 marks)

WHEN?

WHERE?

WHO?

DISSEMINATION (4 marks)

How will you get people to adopt your idea?

How will you measure your success?

4. CREATE

PROTOTYPE (10 MARKS)

A prototype is a simple experimental model of a proposed solution used to test or validate ideas, design assumptions and other aspects of its concept quickly and easily. Please create a mind map or a storyboard or poster as a model of your solution on the following pages.

ASPECT	LIMITED	SOUND	EFFECTIVE	OUTSTANDING	MARK
a	0 - 1	2-3	4	5	
Clarity and communication of ideas	0 - 1	2-3	4	5	
				TOTAL	/10

PROTOTYPE

PROTOTYPE

**END OF
PAPER**

STATE

DA VINCI DECATHLON 2022

CELEBRATING THE ACADEMIC GIFTS OF STUDENTS IN YEARS 5 & 6

IDEATION

TEAM NUMBER _____

1	2	3	4	Total	Rank
/15	/10	/25	/10	/60	

Complete the above table with question numbers and marks as required.

IDEATION

PATTERNS

BACKGROUND

A pattern is a regularity in the world, whether in nature, human design or abstract ideas. Patterns may be predictable, although very complex patterns often require very sophisticated tools to predict them. Over time, humans have observed the patterns in nature and become skilled at drawing meaning from them, whether that be through religion or through science.

One pattern becoming increasingly clear is that of climate change. The steady release of greenhouse gasses since the industrial revolution has led to a rise in global surface temperatures of 1.19˚C since 1880. Although the change might seem small, the impact on global weather patterns is profound, and the rate of damage is only increasing.

RECENT TEMPERATURE TRENDS (1990-2020)
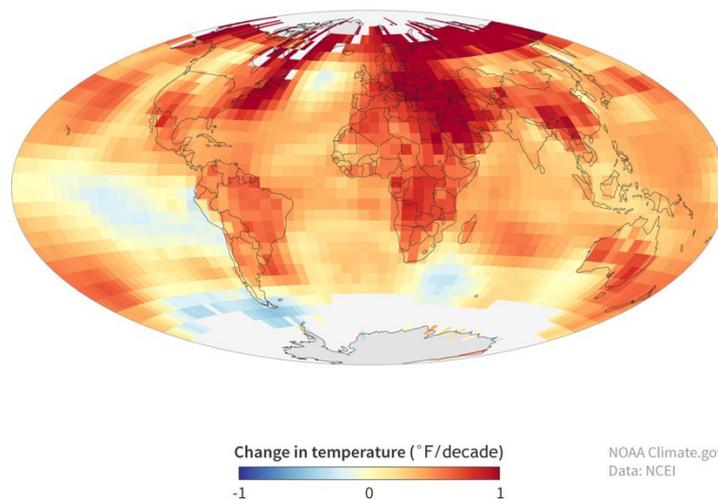
Global temperature rise has led to a pattern of increasingly dangerous and damaging extreme weather events. The number of climate related disasters has tripled in the last thirty years, with more than 20 million people displaced each year by climate change.

The 2019-2020 bushfire season in Australia, known also as the Black Summer, was one of the most destructive on record. 18.6 million hectares of land were burnt, 5900 buildings were destroyed, 34 people were killed and more than 3 billion vertebrate animals were impacted. The Australian Academy of Science commented that "the scientific evidence shows that as the world warms due to human induced climate change, we experience an increase in the frequency and severity of extreme weather events." The pattern is becoming increasingly clear.

Similarly, floods and droughts have become more intense. The University of Melbourne found that rainfall in Northern Australia is the most intense it has been in 800 years, and that droughts today are more severe than any recorded in the last 400 years. Worse still, these

patterns are linked. Droughts increase evaporation, reduce moisture in the soil and dry out vegetation, fuelling more intense and widespread bushfires.

THE PROBLEM

Droughts in particular have a profound effect on Australia. The CSIRO's 2016 *State of the Climate* Report predicts that southern continental Australia will spend significantly more time in drought as the country develops a more arid climate. When they occur, droughts impact the lives of millions. One in seven Australian jobs are dependent on farming, which requires rainfall in order to feed livestock and grow produce.

From 2017 to 2019, a drought occurred across the country. $53 billion dollars' worth of economic activity was lost, and hundreds of families lost farms and their livelihoods. The pattern of droughts, however, is only becoming stronger.

Farmers, workers and the government need ideas not only to reduce the chances of droughts occurring, but also to manage the consequences when they do. Organisations like the Murray Darling Basin Authority attempt to manage water use by farms, to ensure that eco-systems are preserved and that there is excess supply for when droughts do occur.

However, technology and procedures to conserve, manage and create water are still only just developing. With the pattern of droughts becoming worse, we will need to see further development of these tools to preserve the wellbeing of our farmers, communities and country.

DESIGN CHALLENGE

Your challenge is to develop a tool, technology, law or policy for use by the Australian Government in order to manage droughts. You should consider the different needs of farmers and communities, as well as those living in cities and in the country. You will develop a 3-year plan that incorporates your idea to **conserve**, **increase** or **support** access to water and those affected by drought. Remember, this issue is complex! The best solutions will only address one or two problems whilst aiming to support the community overall.

Your task is to **decide, explain and justify** your proposal in relation to the government's need to protect farmers and the environment. Remember that whilst this may be a **core** goal, you must balance this outcome with the requirements of **society and your community,** so the government presents a holistic strategy.

Your solution can include multiple mediums and should be creative and innovative; think of how technology, policies, laws, regulation, advertising, and education can work together in order to balance the competing needs of the Australian government. To assist you with this, additional stimulus material can be found at the end of this task.

PROCESS

Please carefully read the marking criteria below for guidance on what to include in the answer booklet, and where to do so.

The following headings will provide a structure for your work:

EMPATHISE (ETHICAL DECISION-MAKING FRAMEWORK) (15 MARKS)

This section involves evaluating what 'ought to be done' and so considers what is right, what is fair, benefits, consequences, and obligations we have to others. When reaching a final decision on what to do, this section should help to develop a belief in what the right thing to do is.

DEFINE (DESIGN BRIEF) (10 MARKS)

In this section, you identify the problem and then outline possible ethical issues, evaluate potential challenges, consider your research and identify possible solutions.

IDEATE (REFLECTION) (25 MARKS)

This section allows you to reflect on those potential solutions, and then consider whether or not they are reasonable. Consider how well society is able to implement each solution. You should reflect on the costs and benefits of each solution and use this to suggest a favourite solution.

CREATE (PROTOTYPE) (10 MARKS)

Finally, this section allows you to design a method to convince and inform others about your solution. Some possible forms include a storyboard, mind map, diagram, model, narrative or any other effective presentation. Your audience should be able to identify how others will learn about your solution through your chosen form.

MARKING CRITERIA

EMPATHISE – THE HUMAN CONTEXT (15 MARKS)

QUESTIONS	LIMITED	SOUND	OUTSTANDING	TOTAL
1: At least two realistic factors	0	2	4	
2: Identifies realistic consequences	0	2	4	
3: Identifies a wide range of different perspectives	0	1-2	3	
4: Identifies and briefly explores barriers to success	0	2	4	
			Total	/15

DEFINE (10 MARKS)

ASPECT	LIMITED	SOUND	EFFECTIVE	OUTSTANDING	TOTAL
Vision Statement: Depth, sophistication and achievability	0-1	2-3	4	5	
Why it matters, challenges, ethical issues and the vision	0-1	2-3	4	5	
				Total	/10

IDEATE (25 MARKS)

ASPECT	LIMITED	SOUND	EFFECTIVE	OUTSTANDING	TOTAL
Ideation: Ideas	0-1	2-3	4	10	
Implementation: Who, When, Where?	0-1	2-3	4	10	

Dissemination: How will the ideas be spread?	0-1	2-3	4	5	
				Total	/25

PROTOTYPE (10 MARKS)

ASPECT	LIMITED	SOUND	EFFECTIVE	OUTSTANDING	TOTAL
Originality and creativity	0 - 1	2-3	4	5	
Clarity and communication of ideas	0 - 1	2-3	4	5	
				Total	/10

TOTAL: /60

STIMULUS MATERIAL

By Paul Conrad, Published by United Nations Development Program, 18 September 2019; available at https://www.undp.org/blog/innovations-digital-technology-help-prepare-drought

"Climate Change Early Warning and Preparedness Specialist, UNDP

As we mark World Day to Combat Desertification and Drought, let's explore how Innovations in digital technology, along with some harsh lessons from past disasters, are improving the way we predict droughts.

A few years ago, I was working with a small island village off the coast of Cambodia, which was facing the early phases of a drought. The local well, along with nearby wells and reservoirs on the mainland had recently gone dry, forcing villagers to ship in fresh water from outside the region, at great expense. This was starting to have a major impact on the health and livelihoods of the villagers, especially the poor, elderly and vulnerable most.

This water shortage in this community was because of the 2015-2016 El Niño, which caused the worst drought that Cambodia had faced in more than 50 years. More than 90,000 families were affected. Livestock and crops were killed, resulting in increased vulnerability, poverty, and suffering. But it didn't have to be like this. All indications from mid-2015 onwards were that severe drought was a strong possibility. However, it took until mid-June 2016 for major response and recovery operations to take place in Asia.

At the same time, countries such as Kenya successfully used their existing safety nets to deliver timely aid in response to forecasts. Other countries in Eastern Africa were also able to prepare. And because they had plans to address the extreme weather, El Niño had relatively less impact compared to what it had in the past in the region. In Eastern Africa, there was reliable data to suggest what was coming. As a result, evidence-based decision making was possible, and UNDP played a significant role in this process by developing an El Niño Strategy.

In many Asian countries drought has typically been viewed as something to react to rather than prepare for, which fails to meaningfully address underlying vulnerabilities. In Cambodia this mindset, combined with lack of reliable data, meant there was minimal preparation. Had humanitarian agencies in Cambodia been presented with enough credible data in 2015, their preparation and response may have been different.

Whether it is systems to warn about floods, tsunamis, landslides or glacial outbursts, UNDP has been involved in disaster early warning for many years, helping countries to protect lives and livelihoods evidence-based decision making, including in the areas of migration, conflict and extremism. As UNDP places a renewed focus on early warning and preparedness, better access to data is becoming an increasingly important priority.

DATA MANAGEMENT

Decision-makers need a broad range of reliable data, so they can prepare for slow-onset disasters. Often information may be held across a broad range of sectors and departments. Data needs to be aggregated in one place to provide an accurate picture. UNDP's Early Warning and Preparedness Service Offer is being used by several countries to improve shared databases – between different parts of government – and between countries to develop a regional picture and improve early warning systems.

CROWD SOURCED DATA

There is a lot of power behind social, crowd-based information, which can bring voices of people from communities directly at risk to the forefront. The aggregation of crowd-generated text messages, social media feeds, or recent imagery to develop data sets or geographic data and maps can provide near real-time, interactive information on events as they unfold. UNDP is supporting several crowd-sourcing platforms around the world.

COLLECTIVE INTELLIGENCE

Promoting information at all levels and across all sectors builds collective intelligence to ensure that decisions are not made in isolation. This ensures that information to support preparedness and response action, such as such as community contact details, health centre information, or even national drought related data is accessible and usable by everyone. UNDP can promote this by helping to put in place tools, such as websites that increase transparency and allow for information to be shared freely.

In Asia at least, there is a need to shift from a culture of a reacting to drought to developing policies that promote preparedness. The experience of so many communities in Cambodia shows the devastating effects of drought. It is my hope that improved data access will enable swifter, informed anticipatory actions so people can better prepare for such disaster."
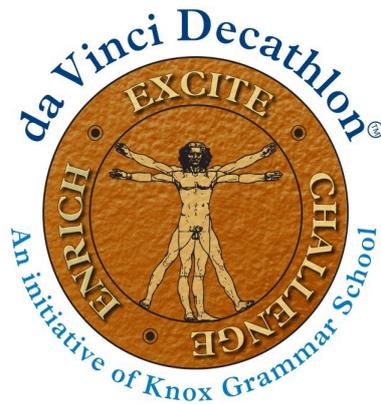
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DA VINCI DECATHLON 2022

CELEBRATING THE ACADEMIC GIFTS OF STUDENTS
IN YEARS 5 & 6

da Vinci Decathlon
EXCITE
ENRICH
CHALLENGE
An initiative of Knox Grammar School

IDEATION SOLUTIONS

TEAM NUMBER _____

1	2	3	4	Total	Rank
/15	/10	/25	/10	/60	

Complete the above table with question numbers and marks as required.

MARKING GUIDELINES

As this is a creative paper, no specific solutions are required. Instead, please keep the following in mind as a marker:

> The team's task is to **decide, explain and justify** their proposal in relation to the goals of the Australian Government. They do not need to solve the overall problem, and the best solutions will focus on a few small issues and address them in depth.

> Is the team's solution **innovative**? Does it propose new **practices, methods or techniques** for the management drought and water shortages. Is it **realistic**? Does the team consider the possible **limitations** and **constraints** that they may face, both technological, social and fiscal? **Who** is involved? Are there **contingency plans**?

> The best solutions will combine a mix of traditional and established practices with new and innovative designs. They will consider and **balance** the range of objectives for the government, including **research, policies** and **technology**. They will be **realistic**, but also **forward thinking**. They will consider a **range** of possibilities and consequent **contingency plans** but also present a **preferred approach**.

Although a somewhat rigid set of marking criteria is provided, it may be useful to consider the response holistically. The foundation of the task is the team's ability to innovate and consider a broad range of possibilities, and so an unrefined but creative and analytical response should be rewarded.

Teams that demonstrate a depth of thought in their answers should be awarded the highest marks. It may thus be valuable to pilot mark a variety of responses in order to understand the range of sophistication in the submitted responses.

Detailed criteria can be found in the question paper.