



Research Investigation

Year 11 2019



Section headings

- Rationale
 - Background
 - Evidence
 - Evaluation
 - Conclusion
- 



PART 1: Rationale - Developing the research question from the claim (200-300 words)





Claim


Cloning can help endangered animals



Step 1: Break it down into key words/ phrases

CLAIM: Cloning can help endangered animals

- ▶ Cloning
- ▶ Help
- ▶ Endangered animals



Step 2: Propose questions that need to be addressed to refine key terms and narrow the focus of the claim.

- ▶ What kind of cloning?
 - ▶ What does it mean by 'help'?
 - ▶ What kind of endangered animals?
-
- ▶ NB: you may have other questions



Step 3: Do research to address the questions

Answers to questions based on research:

- ▶ What kind of cloning?


Interspecies nuclear transfer

- ▶ What does it mean by 'help'?

Restore populations

- ▶ What kind of endangered animals?

***Bos gaurus* a large wild ox on the verge of extinction**




Step 4: Draft the research question to address the claim.

- ▶ **Original claim:** Cloning can help endangered animals


Using research, construct a research question.

- ▶ **Research question:** Can interspecies nuclear transfer restore populations of *Bos gaurus*?

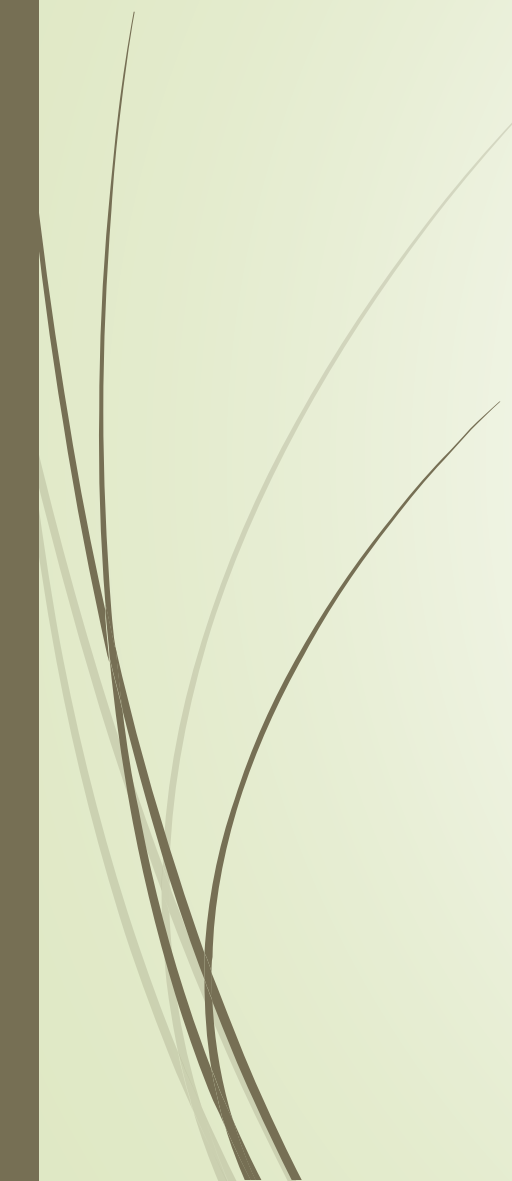


Step 5: Refine and focus the research question.

- ▶ In order to do this, you will need to ensure that there is enough research out there to properly investigate the research question and ensure your research question is specific.
 - One way to do this is to ensure that it is clear (not vague or too broad), and it can't be misinterpreted
- ▶ Research question: Can interspecies nuclear transfer restore populations of *Bos gaurus*?
 - Restore populations isn't clear so research this.
 - From sources – more than 12,000 mature individuals
- ▶ Refined research question: **Can interspecies nuclear transfer restore populations of *Bos gaurus* to above 12,000 mature individuals?**




Step 6: Present the research question to the teacher for approval.

- ▶ Once your teacher has approved your research question, you may continue with the report.
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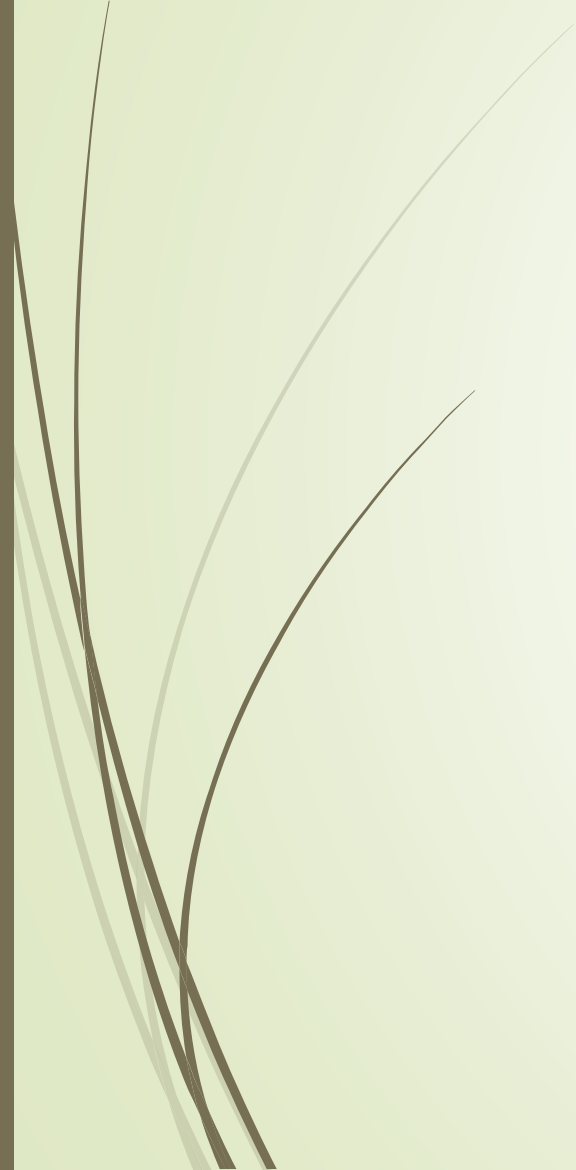


Note before continuing

- ▶ The process of how you came to the research question is what you will be putting into the rationale.
 - ▶ All sources must be referenced appropriately
- 




PART 2: Background (200-300 words)





Step 1: Identify key scientific concepts

- ▶ Research Question: **Can interspecies nuclear transfer restore populations of *Bos gaurus* to above 12,000 mature individuals?**
- ▶ Causes of *Bos gaurus* being endangered
- ▶ How does interspecies nuclear transfer work?

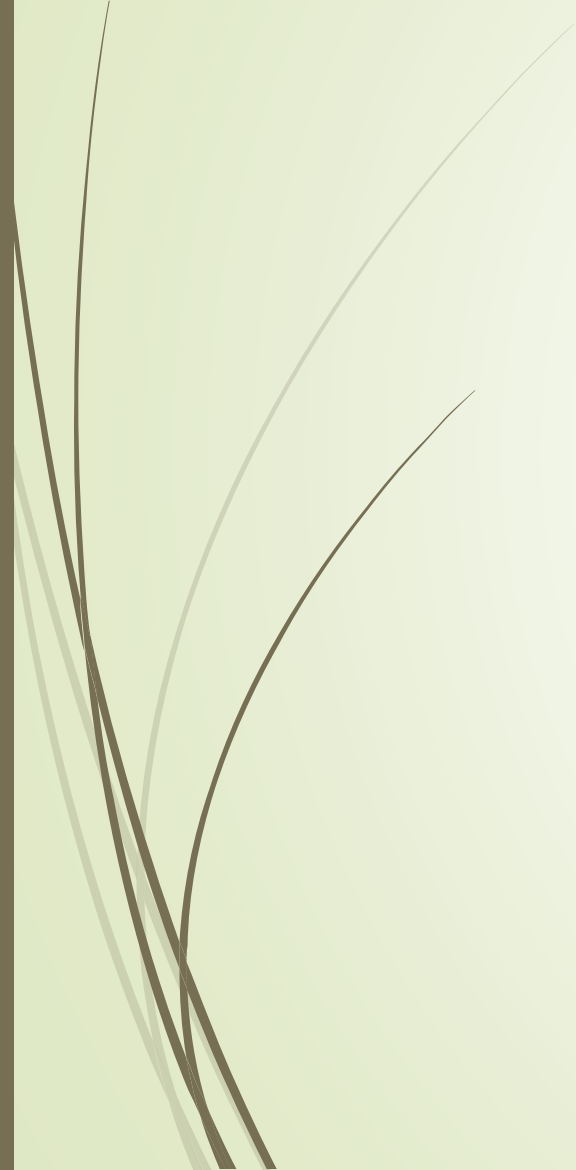


Step 2: Research key concepts and develop the argument

- ▶ Throughout the background research section it is important that the argument (can be for or against or even neutral) is being developed
- ▶ Justified scientific arguments must be evident
- ▶ Sources must be referenced appropriately



PART 3: Evidence (400-500 words)



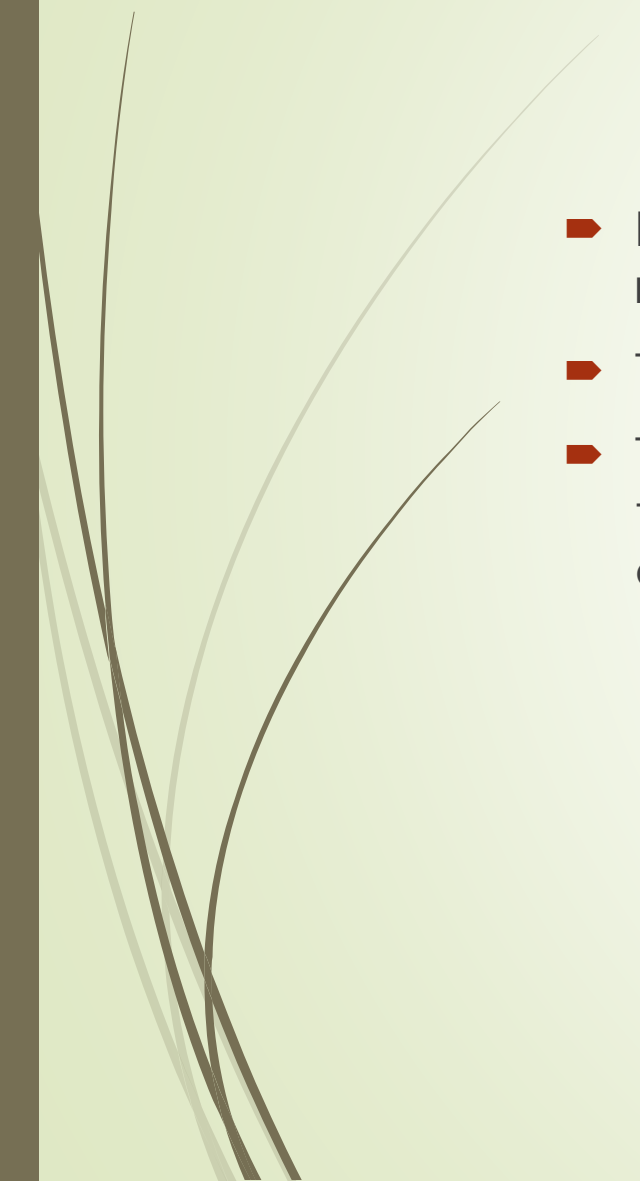


Step 1: Gather evidence to support your research question

- ▶ Evidence is in the form of qualitative and quantitative data
- ▶ Examples of qualitative data:
 - Descriptions, pictures or diagrams
- ▶ Examples of quantitative data:
 - Numbers. Can be in the form of graphs, tables, figures etc.
- ▶ It links directly to the research question
- ▶ All sources must be referenced appropriately

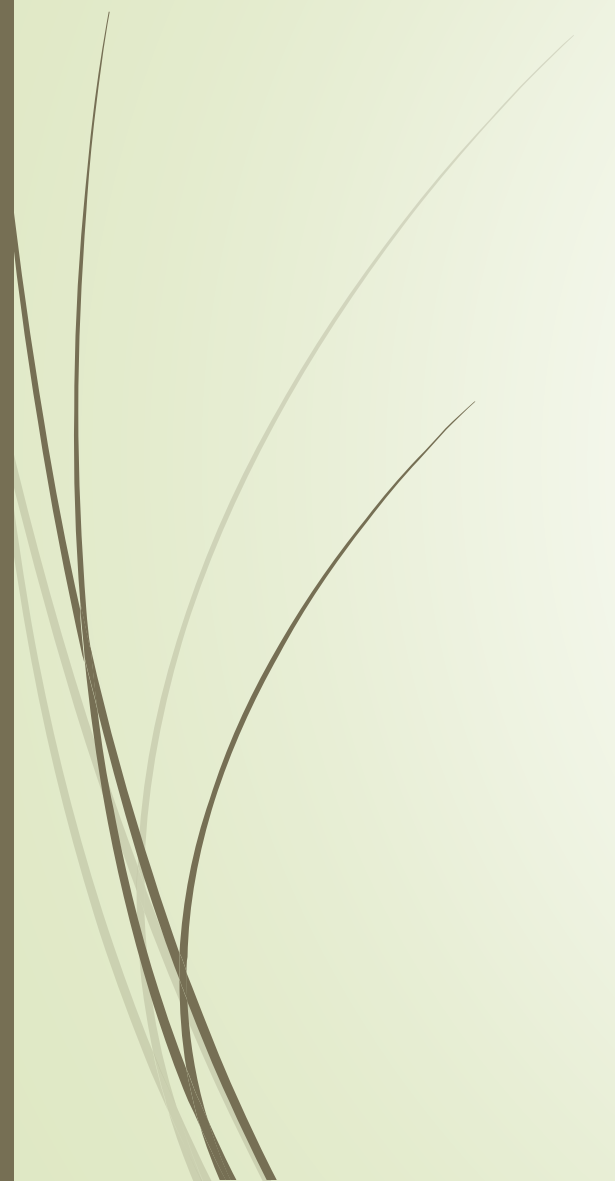


Step 2: Analyse and interpret evidence

- ▶ In order for the evidence found to have meaning you need to identify relationships between within the evidence and between the evidence
 - ▶ This must respond to the research question directly
 - ▶ This must be able to support a valid conclusion – remember you don't need to be able to say yes or no to the research question (there may be grey area, but it has to be clear)
- 



PART 4: Evaluation (400-500 words)





Step 1: Identify limitations of evidence available

- ▶ Must identify the limitations of the evidence found
- ▶ Limitations could include:
 - Amount of sources
 - Issues with how the evidence was gathered
 - Whether the evidence is specific enough to the research questions
 - Whether there are gaps within the evidence → can the research question be fully answered using the available research?




Step 2: Identify improvements and extensions to the research

- ▶ Improvements and extensions need to be logically derived from the evaluation
- ▶ This means that you need to suggest specific ways to improve the limitations you previously identified.
- ▶ Suggest (meaning it doesn't have to be detailed, just clear) It depends on the evidence found but some examples of improvements and extensions (in general) can be:
 - More trials
 - More organisms
 - Different techniques used
 - Study across multiple organisms
 - Study across multiple techniques
 - Include better control measures



PART 5: Conclusion (100-200 words)






Step 1: Identify whether or not the claim has been supported or not

- ▶ Must be logically derived from the provided evidence and analysis.
- ▶ Must be supported with justified statements
- ▶ Remember no new information.

- ▶ Identifies whether or not the research question has been answered or not



Step 2: Summarise the improvements and extensions needed

- Usually helps to support prior statement
- 



Other things you will be marked on

- Communication

- Sufficient and reliable sources



Communication



- ▶ **Fluent and concise:** The response is easily understood, avoids unnecessary repetition and meets the required length.
- ▶ **Acknowledgment of sources:** Sources of information are acknowledged through the appropriate use of referencing conventions
- ▶ **Appropriate use of genre conventions:** The use of headings and paragraphs fits the purpose of a scientific essay.



References (sources)

- ▶ **Sufficient and relevant sources:** Sources are scientific and provide enough evidence for the development of a scientific argument that responds to the research question.