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.

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 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 organism
  - → 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.