# Deconstruction and Design

Science Inquiry Skills section of the subject outline specifies:

Deconstruct a problem to determine the most appropriate method for investigation.

Elaboration

This indicates that the deconstruction includes the determination of an appropriate method, explaining how the method will provide data to complete the investigation. If the students do not provide an appropriate method, then they have not fully deconstructed.

If the students simply brainstorm or research the problem, then they have only partially deconstructed the problem.

Frequently Asked Questions

Does ‘deconstruction’ mean that it must include a design?

* To be assessed against the specific feature IAE1, it needs to include a design.

Can a deconstruction *not* be followed by designing a procedure?

* If the students brainstorm or research the problem without determining a method, this would be a partial deconstruction only. The evidence can be assessed against specific feature KA2.

What may a partial deconstruction include?

* When student brainstorm ideas and come up with possible factors that might affect an investigation, what factors may need to be controlled, what factors may not be able to be controlled, they have partially deconstructed a problem. The absence of an investigation design denotes partial deconstruction.

Can students deconstruct and/or design an investigation as a group?

* Yes, but only for one practical investigation, assuming there are two design practical investigations included in the LAP. For one practical investigation, students must provide evidence of their own ability to deconstruct and design.

What is the best way to present evidence of the deconstruction?

* There is no specified format. Tables and flow diagrams provide a concise way to provide this kind of information.
* **Stage 2**: Evidence of deconstruction (where applicable) should outline the deconstruction process, the method/procedure chosen as most appropriate, and a justification of the plan of action, to a maximum of 4 sides of an A4 page. This evidence must be attached to the practical report. The justification may be in the form of annotations, for example in textboxes or different coloured text.

The flow chart at the end of this document provides additional support in the deconstruction of a problem.

Assessment section of the subject outline specifies

One practical investigation should enable students to deconstruct a problem to investigate a question or hypothesis for which the outcome is uncertain.

One practical investigation should enable students to design their own procedure and justify their plan of action. This may include providing evidence of how the procedure has been developed. In order to manage the process efficiently, students could individually design investigations and then conduct one of these as a group, or design hypothetical investigations at the end of a practical activity.

Questions

Does the practical investigation, for which the outcome is uncertain, have to be in the same or a different practical investigation from the investigation in which the students deconstruct and design their own investigation?

* They may be the same investigation or they may be different practical investigations.

Can a deconstruction and design lead to a certain or known outcome?

* Yes, but not in both practical investigations. At least one must have an outcome that is uncertain. It is difficult to design an investigation with a known outcome without copying an existing method.

Can the design of an investigation involve a known method with a different independent variable?

* This would not provide suitable evidence for IAE1.

When students write the report of their deconstruction/design investigation, do they need to write out the Materials and Method sections again?

* Yes. The subject outline specifies the components of a practical investigation report. Any report must include all these elements.

The method included in the report may be different from the method in the deconstruction/design component. It must be clear what method was used to obtain the results in the report.

Can a deconstruction or design be completed as a group activity?

* Provided that the students are undertaking two investigations which involve deconstruction and design, one of them may involve working as a group for the deconstruction/design component.

If only one of the practical investigations involves deconstruction/design, each individual student must provide evidence of their ability to deconstruct and design an investigation.

Options for the composition and order of components in a practical task.

There is a variety of options to incorporate deconstruction and/or design in practical investigations.

This table summarises the options:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Option | Deconstruct  before practical | Design before practical | Completion  Practical (method supplied by teacher or another student) | Implementation of method | Deconstruct after practical | Assess  IAE1 | Assess KA2 |
| 1 | X | X | ✓ | Individual or group | ✓  Including design | ✓  if individual design | Maybe |
| 2 | ✓ | ✓ | Student implements own method | Individual | X | ✓ | Maybe |
| 3 | ✓ | ✓ | ✓ | Individual or group | X | ✓  if individual design | Maybe |
| 4 | X | X | ✓ | Individual or group | X | X | X |
| 5 | ✓  Partial\* | X | ✓ | Individual or group | X | X | ✓ |
| 6 | X | X | ✓ | Individual or group | Partial\* | X | ✓ |

*\*Note: Partial deconstruction = deconstruction without design*

Options for the structure of a task as summarised in table above:

1. a. Completion practical implemented by individual or group

b. Report (individual)

c. Deconstruction with design

*Recommendation:* Assess IAE1.

2. a. Deconstruction and design (individual)

b. Implementation of own design practical

c. Report (individual)

*Recommendation:* Assess IAE1.

3. a. Deconstruction and design (individual or group)

b. Completion practical (maybe provided by the teacher or selected from the class/group) and implemented by individual or group

c. Report (individual)

*Recommendation:* If a group design, do not assess IAE1.

If an individual design, IAE1 may be assessed

4. a. Completion practical implemented by individual or group

b. Report (individual)

*Recommendation:* Do not assess IAE1 or KA2.

5. a. Partial deconstruction (i.e. Deconstruction without design)

b. Completion practical implemented by individual or group

c. Report (individual)

*Recommendation:* May assess KA2 if individual partial deconstruction

Do not assess IAE1.

6. a. Completion practical implemented by individual or group

b. Report (individual)

c. Partial deconstruction (i.e. Deconstruction without design)

*Recommendation:* May assess KA2 if individual partial deconstruction

Do not assess IAE1.

Practical Report

Evidence of deconstruction (where applicable) should outline the deconstruction process, the method/procedure chosen as most appropriate, and a justification of the plan of action, to a maximum of 4 sides of an A4 page. This evidence must be attached to the practical report. It is not included in the word count.

Suggested formats for the summary sheet include flow charts, concept maps, tables, or notes.

* Is the summary of the deconstruction and design included in the word count for the report?

No

* What could be included in the evidence of deconstruction?

Students should list some factors that could be investigated, how they could measure changes in these variables, other factors can be controlled or not controlled, why they have selected their independent variable and some justification for the various steps in their procedure. Students could describe expected results. The justification may be in the form of text box annotations or text of a different colour.

* When students write the report of their deconstruction/design investigation, do they need to write out the Materials and Method sections again?

Yes. The subject outline specifies the components of a practical investigation report. Any report must include all these elements. These elements of the report refer to what the students actually did during their investigation.

If the method has been modified after advice from the teacher, the method in the report will be different from their original design.

If the student implemented the design of another student in the group or class, this is the method that must appear in the report.

**DECONSTRUCTING A PROBLEM AND DESIGNING PRACTICAL INVESTIGATIONS**

Suggest how to investigate **one** prioritised component and consider potential solutions that may be found by this investigation. [Design]

How will the other factors be controlled or are there factors that may not be able to be controlled?

Design: aim, hypothesis/ investigable question, independent and dependent variables, factors controlled/uncontrolled, method, results table etc.

Determine if the problem is solved: what would be observed and what would be measured?

Deconstruction leads to design of an appropriate method.

Partial Deconstruction

Prioritise the components- how is each one related to the problem? Which component(s) are likely to enable a solution(s) be found? Can they be investigated/tested?

Investigate the smaller parts and consider their impact and importance to the problem.

Conduct Investigation\* and write an individual practical report as per SO requirements. Analyse data, link to the science, evaluate method, identify sources of uncertainty and their effect on data and consider the limitations of the conclusion(s) drawn.

Note: Teacher determines the problem. This provides opportunity for students to investigate a hypothesis or an investigable question for which the outcome is uncertain.

**1**1

\*Students may or may not do the method they designed.

Which component will influence the outcome the most?

Refine ideas.

Which components will have an impact on the solution?

Specify and simplify the problem

Breakdown into smaller parts (components)

Brainstorming

**3**

What is the problem?

The Problem

**2**