Stage 4 Technology mandatory – transformacase

## Summary

The transformacase program focuses on students developing knowledge and understanding of the characteristics and properties of a range of materials that can be recycled or upcycled. Transformacase is written within the material technologies context and focuses on using a variety of materials to make products to satisfy identified needs and opportunities.

## Duration

2 Weeks or 6 hours

## Outcomes

A student:

* **TE4-1DP** designs, communicates and evaluates innovative ideas and creative solutions to authentic problems or opportunities
* **TE4-2DP** plans and manages the production of designed solutions
* **TE4-3DP** selects and safely applies a broad range of tools, materials and processes in the production of quality projects
* **TE4-9MA** investigates how the characteristics and properties of tools, materials and processes affect their use in designed solutions
* **TE4-10TS** explains how people in technology related professions contribute to society now and into the future

[Technology Mandatory 7-8 Syllabus](https://educationstandards.nsw.edu.au/wps/portal/nesa/k-10/learning-areas/technologies/technology-mandatory-7-8-new-syllabus) © NSW Education Standards Authority (NESA) for and on behalf of the Crown in right of the State of New South Wales, 2017.

## Unit overview

The transformacase virtual teaching resource provides students with the opportunity to develop knowledge and understanding of the characteristics and properties of a range of materials through research, experimentation and practical investigation at home. Students are required to individually design, produce and evaluate a dual purpose pencil case and desk top stationary organiser. This project is to be accompanied by a digitally produced or printed portfolio displaying the design process taken.

## Resources overview

The resources and links listed below are referenced within the program but is not an exhaustive list of resources available. Teachers can add to these resources as needed.

### Physical resources

* Common household materials, including, but not limited to:
	+ recyclable materials such as paper, cardboard, egg cartons, milk bottles
	+ non-recyclable materials such as plastic wrap, plastic containers, straws
	+ unwanted household objects such as pegs, old clothing, Tupperware containers
* Craft construction materials such as sticky tape, glue, scissors
* Optional, computer with internet connectivity.

### Websites

* [upcycledworld.com](https://upcycledworld.com/)
* [repurpose.global/](https://repurpose.global/)
* [theupcyclemovement.com/](https://theupcyclemovement.com/) (commercial website with shop, but it has stimulus photos for product reuse)
* [www.upcyclestudio.com.au/](https://www.upcyclestudio.com.au/) (commercial website with shop, but it has stimulus photos for product reuse)

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| Content | Teaching and learning | Evidence of learning  | Adjustments and registration |
| **Lesson 1*** develop criteria to evaluate design ideas, processes and solutions, the functionality, aesthetics and a range of constraints, eg accessibility, cultural, economic, resources, safety, social, sustainability, technical
 | Identifying and definingStudents:* Read the information about the design and production process in the student worksheets. Or if internet is available watch the video clips about the design and production process.
* Outline the major aspects of a design and production process, including planning, design, construction, assembly and evaluation.
* Read design situation and brief. Reword the brief by describing exactly what needs to be done for the activity.
* Identify the project constraints.
* Read the evaluation criteria and establish a checklist of key points that will be the criteria for success to evaluate your design with.
* Brainstorm existing solutions to the design brief either individually or through virtual collaboration with the class.
 | * Students will have completed the activities on the design and production process in the work booklet.
* Students will breakdown the design situation and brief into simple steps or components
* Students will have a list which identifies the constraints of the project.
* Students will have constructed a checklist which allows them to evaluate their design based on explicit criteria.
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| **Lesson 2-3*** select from a range of materials, components, tools, equipment and processes to develop design solutions
* generate and communicate the development of design ideas, plans and processes for various audiences using appropriate technical terms and technologies including graphical representation techniques, for example:
* sketches, drawings and computer-aided designs (CAD)
* Patterns
* Models
* digital presentations
* use appropriate project management processes when working both individually and collaboratively to coordinate the production of a designed solution
 | Researching and planningStudents:* Define the meanings for recycling and upcycling and record them in your glossary.
* Research what makes a good desk tidy and pencil case. Develop a list of features for both. Compare similarities and differences.
* Select one example and conduct a plus, minus, interesting (PMI) analysis of aesthetic qualities and functional features. Use this information to help inform your design process. Substitute interesting for include – identify features that could be included a design.
* Audit your pencil case or desk drawer and list the stationary present. How will you accommodate for these items being included in the design? Measure and record overall sizes of common items.
* Collect a range of unused items around the household that could be reused or upcycled in your design.
* Use your research to create design of the transformacase, annotate the special features or requirements to hold different types of stationary and the materials used for different sections. Designs could take the form of sketches, TinkerCAD designs or a physical prototype.

Optional/additional content:* Research three different types of materials commonly found in landfill. How long does it take to breakdown? For non-biodegradable materials, what other options are currently utilised to reduce their presence in landfill?
* Conduct an audit of wastes created by your household (items thrown into the bin). Group the wastes into categories such as recyclable, green waste, non-biodegradable. Determine a way of quantifying this data, either in weight, number of items or other. Compare your household wastage with other students in your class.
* Outline three ways your household could minimise the amount of waste being produced weekly. Or, create a poster making suggestions to families of ways that household wastage could be reduced in general.
 | * Students will have a list of features of both pencil cases and desk tidies, identifying the similarities and differences between the two objects.
* Students will produce an audit of their pencil case or stationary draw.
* Students have a completed PMI diagram analysing the aesthetic qualities and functional features required for the design.
* Students can distinguish the difference between recycling and reusing materials.
* Students produce a design for the project based on need, identified criteria and materials available.

Optional/additional content* Students complete workbook activities detailing the research conducted on landfill materials.
* Students complete audits on household wastes, identifying suitable quantifiable data collection processes.
* Students produce appropriate waste reduction recommendations for families.
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| **Lesson 4*** demonstrate safe, independent and collaborative work practices in the production of designed solutions
 | **Producing and implementing****Students:*** Use the collected materials to build the design drawn in the previous activity.

**Optional/additional content:*** Identify the non-reused or recycled materials used within the project and calculate the costs associated with using these items.
* Compare the total cost of the prototype (assuming the recycled/reused items are free) with desk tidies and pencil cases bought from shops.
 | * Students produce a finished product resembling their design.
* (Optional) Students will have attempted a cost analysis and made comparisons with manufactured goods.
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| **Lesson 5*** evaluate the effectiveness and suitability of choices made during the development and production of the solution
* assess the solution against the predetermined criteria
 | **Testing and evaluating****Students:*** Evaluate the effectiveness of the design using the checklist of criteria created in the identifying and defining section.
* Evaluate the effectiveness of the materials used for the design project.
* Identify areas for improvement in the design and outline possible changes to the design to accommodate these.
 | * Students will have evaluated criteria checklist utilised appropriately.
* Based on students’ evaluations, they may have identified design improvements which could include suitability of materials chosen.
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| **Lesson 6** | * Complete the design portfolio, including pictures of draft ideas and completed prototype.
 | * Submission of a completed design portfolio and student workbook.
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## Evaluation

Evaluation of learning activities should be an ongoing process that happens throughout the delivery of this unit. Teachers should document their evaluation of learning activities throughout the program. The space provided below is to evaluate the overall unit of work.

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