S **Substitute** one thing for another

C **Combine** with other functions, materials or things

A **Adapt** the design so it can be used for some other purpose

M **Modify**, Magnify, Minimise elements of its design

P **Put** the design to other uses

E **Eliminate**, Elaborate, Enhance some part of the design

R **Rearrange,** reverse sections or move parts around

Design and Technology (Stage 6)

Introduction

The SCAMPER* technique provides students with a scaffold for thinking of different ways existing designs could be improved. Each letter of the acronym represents a different way of approaching the task. SCAMPER provides students with a tool that they can utilise to further improve their own designs, including their Major Design Project.

* The SCAMPER system was developed by the theorist, Robert Eberle.

Syllabus outcomes

P1.1 Examines design theory and practice, and considers the factors affecting designing and producing in design projects.

P3.1 Investigates and experiments with techniques in creative and collaborative approaches in designing and producing.

H1.1 Critically analyses the factors affecting design and the development and success of the design projects.

H3.2 Uses creative and innovative approaches in designing and producing.

In these notes you will find

Note: SCAMPER worksheets including blank template, best reproduced at A3.

SCAMPER

Overview

In this activity students learn about the SCAMPER technique through a teacher-lead discussion based on examples of improvements made to single-use water bottles. Students then work in small groups using SCAMPER to **generate their own ideas** about **improving existing designs** for everyday products such as coffee cups, pens, door handles, singlets, torches, and green shopping bags. The focus of the activity should be on broad, lateral thinking. The goal is to generate numerous and varied ideas within a small timeframe, with limited evaluation in the initial stage. This is a **collaborative activity** where some of the most creative solutions are often produced when various minds are at work; students should be encouraged to expand on each other's ideas. Students **list ideas** and **highlight their benefits**, then select one or two of their design improvements to develop into an **annotated sketch**. The activity concludes with **student presentation** and **class discussion**.

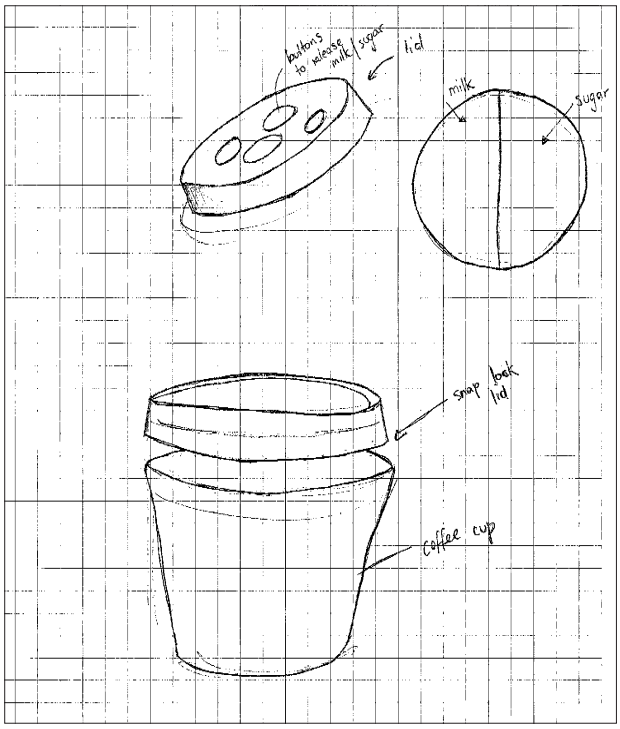
Introducing SCAMPER (teacher-led discussion)

To begin the discussion students are asked to consider both successful aspects and short comings of a single-use water bottle in terms of 'factors affecting designing and producing'. (The bottled water sold at the canteen would provide a good example.) The teacher then explains the SCAMPER technique and gives examples of some existing design improvements for the single-use water bottle. Students are asked to discuss what the benefit of each improvement is.

Note 1: other everyday products could also be used as the basis for the discussion, eg mobile phones, watches or MP3 players such as iPods.

Note 2: the SCAMPER technique notes over the page will assist in explaining the technique and include examples of existing water bottle design improvements.

Takeaway coffee cup.



Annotated sketch of design improvements. Student work from SCAMPER workshop — DesignTECH seminars 2011.

SCAMPER

The SCAMPER technique

S **Substitute** one thing for another.

Related questions: What kind of alternate material can I use? What part of the design could be substituted for something else?

Examples: Material substitution such as stainless steel and BPA free plastics.

C **Combine** with other functions, materials or things.

Related questions: What could be added to the design to make it different?

Examples: Berocca Twist 'n' Go which combines vitamins and water, water bottles which have built-in straws or filters.

A **Adapt** the design so it can be used for some other purpose.

Related questions: What aspects of the design can be adjusted so it fits another purpose?

Examples: Water bottles that have handles so they can be used as hand-weights, or the LightCap 300 which has a solar powered light in the lid of the bottle so it also functions as a light.

M **Modify**, Magnify, Minimise elements of its design.

Related questions: What if I exaggerate or modify a component? How can I make it larger or stronger? How can it be made smaller or shorter?

Examples: 1.25 L bottles rather than 1 L bottles, Top Stop bladder pack bottle which is the size of a train ticket when empty.

P **Put** to other uses.

Related questions: Who else might be able to use this design? What else could it be used for other than its original purpose?

Examples: Water bottles flatten to make tongs, bottles that have been used to create artworks.

E **Eliminate**, Elaborate, Enhance some part of the design.

Related questions: What can be removed? What can be expanded or developed upon further?

Examples: Evian's collaborations with fashion designers to create limited addition water bottles. Logos being enhanced to form part of the bottles form, eg Gatorade.

R **Rearrange**, Reverse sections or move parts around.

Related questions: How can the layout or pattern be changed? Can any components be interchanged? What can be turned around?

Examples: Camelbak bladder packs, which have its opening at various points not just the top.

SCAMPER

Student activity

The student activity is designed to give students experience in using this technique to improve existing designs. It also encourages creative and collaborative approaches to designing.

1. Students are organised into small groups (3 to 5 students per group).
2. Each group is given a different everyday product such as a coffee cup, pen, doorhandle, singlet, torch or a green bag and have to improve on the existing design.
3. Groups are also given a SCAMPER worksheet to help prompt and structure their brainstorming.
4. Students then have ten minutes to generate as many ideas as possible, following the SCAMPER acronym and list the benefits of each improvement.
5. At the end of ten minutes students select one or two of their design improvements and produce an annotated sketch of their improved product.
6. The activity concludes with each group presenting their product improvements, the benefits of these and their supporting sketches.
7. Other groups have the opportunity to give feedback and suggest further improvements.

Further development and application

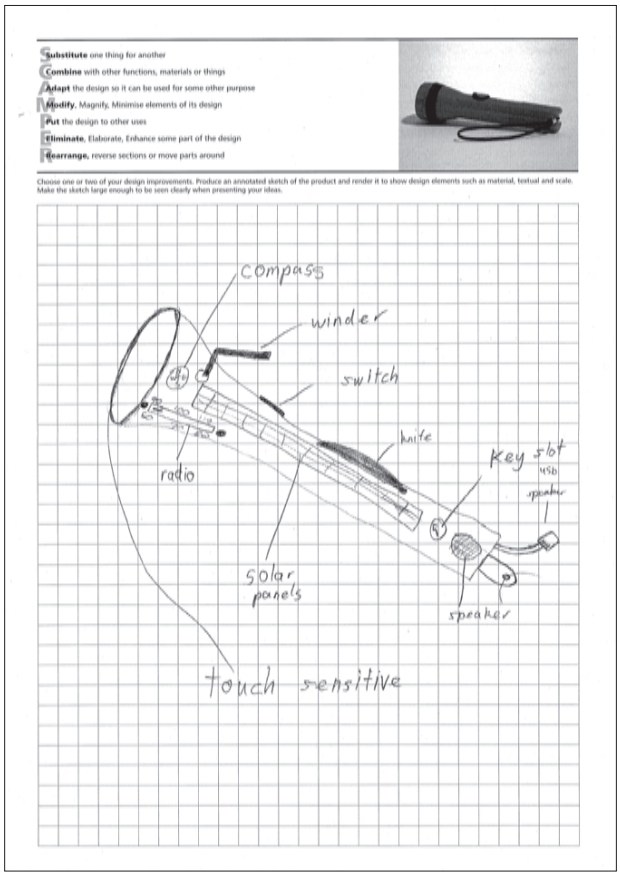
This SCAMPER activity could be developed further through students evaluating their ideas and incorporating feedback from the group discussion, selecting the most appropriate idea and justifying their choice. The selected idea could be refined into a final design.

The SCAMPER technique can be applied to a student's own designs to improve upon them. It can be used at different stages of the design process and in conjunction with other Cognitive Organisers.

This technique is useful to assist with idea generation in the early stages of the design process but it is also a valuable tool for students who encounter problems realising their design project.

SCAMPER can also be used as a form of peer evaluation where students do a SCAMPER of another student's work giving the student feedback and providing a new perspective on the project.

Example of a student's work



From SCAMPER workshop — DesignTECH Seminars 2011.

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S **Substitute** one thing for another

C **Combine** with other functions, materials or things

A **Adapt** the design so it can be used for some other purpose

M **Modify**, Magnify, Minimise elements of its design

P **Put** the design to other uses

E **Eliminate**, Elaborate, Enhance some part of the design

R **Rearrange,** reverse sections or move parts around

Design Brief

In 10 minutes, list a range of possible design improvements and their benefits for your product. Produce an annotated sketch of one or two of these ideas to present to the group.

PRODUCT: COFFEE CUP

Substitute one thing for another

Questions: What kind of alternate material can I use? What part of the design could be substituted for something else?

Your improvement:	Benefit:

Combine with other functions, materials or things

Questions: What could be added to the design the design to make it different?

Your improvement:	Benefit:

Adapt the design so it can be used for some other purpose

Questions: What aspects of the design can be adjusted so it fits another purpose?

Your improvement:	Benefit:

Modify, Magnify, Minimise elements of its design

Questions: What if I exaggerate or modify a component? How can I make it larger or stronger? How can it be made smaller or shorter?

Your improvement:	Benefit:

Put the design to other uses

Questions: Who else might be able to use this design? What else could it be used for other than its original purpose?

Your improvement:	Benefit:

Eliminate, Elaborate, Enhance some part of the design

Questions: What can be removed? What can be expanded or developed upon further?

Your improvement:	Benefit:

Rearrange, Reverse sections or move parts around

Questions: How can the layout or pattern be changed? Can I interchange any components? What can be turned around?

Your improvement:	Benefit:

S **Substitute** one thing for another

C **Combine** with other functions, materials or things

A **Adapt** the design so it can be used for some other purpose

M **Modify**, Magnify, Minimise elements of its design

P **Put** the design to other uses

E **Eliminate**, Elaborate, Enhance some part of the design

R **Rearrange,** reverse sections or move parts around

Choose one or two of your design improvements. Produce an annotated sketch of the product and render it to show design elements such as material, texture and scale. Make the sketch large enough to be seen clearly when presenting your ideas.

S **Substitute** one thing for another

C **Combine** with other functions, materials or things

A **Adapt** the design so it can be used for some other purpose

M **Modify**, Magnify, Minimise elements of its design

P **Put** the design to other uses

E **Eliminate**, Elaborate, Enhance some part of the design

R **Rearrange,** reverse sections or move parts around

Design Brief

In 10 minutes, list a range of possible design improvements and their benefits for your product. Produce an annotated sketch of one or two of these ideas to present to the group.

PRODUCT: GREEN BAG

Substitute one thing for another

Questions: What kind of alternate material can I use? What part of the design could be substituted for something else?

Your improvement:	Benefit:

Combine with other functions, materials or things

Questions: What could be added to the design the design to make it different?

Your improvement:	Benefit:

Adapt the design so it can be used for some other purpose

Questions: What aspects of the design can be adjusted so it fits another purpose?

Your improvement:	Benefit:

Modify, Magnify, Minimise elements of its design

Questions: What if I exaggerate or modify a component? How can I make it larger or stronger? How can it be made smaller or shorter?

Your improvement:	Benefit:

Put the design to other uses

Questions: Who else might be able to use this design? What else could it be used for other than its original purpose?

Your improvement:	Benefit:

Eliminate, Elaborate, Enhance some part of the design

Questions: What can be removed? What can be expanded or developed upon further?

Your improvement:	Benefit:

Rearrange, Reverse sections or move parts around

Questions: How can the layout or pattern be changed? Can I interchange any components? What can be turned around?

Your improvement:	Benefit:

S **Substitute** one thing for another

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A **Adapt** the design so it can be used for some other purpose

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R **Rearrange,** reverse sections or move parts around

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E **Eliminate**, Elaborate, Enhance some part of the design

R **Rearrange,** reverse sections or move parts around

Design Brief

In 10 minutes, list a range of possible design improvements and their benefits for your product. Produce an annotated sketch of one or two of these ideas to present to the group.

PRODUCT: DOOR HANDLE

Substitute one thing for another

Questions: What kind of alternate material can I use? What part of the design could be substituted for something else?

Your improvement:	Benefit:

Combine with other functions, materials or things

Questions: What could be added to the design the design to make it different?

Your improvement:	Benefit:

Adapt the design so it can be used for some other purpose

Questions: What aspects of the design can be adjusted so it fits another purpose?

Your improvement:	Benefit:

Modify, Magnify, Minimise elements of its design

Questions: What if I exaggerate or modify a component? How can I make it larger or stronger? How can it be made smaller or shorter?

Your improvement:	Benefit:

Put the design to other uses

Questions: Who else might be able to use this design? What else could it be used for other than its original purpose?

Your improvement:	Benefit:

Eliminate, Elaborate, Enhance some part of the design

Questions: What can be removed? What can be expanded or developed upon further?

Your improvement:	Benefit:

Rearrange, Reverse sections or move parts around

Questions: How can the layout or pattern be changed? Can I interchange any components? What can be turned around?

Your improvement:	Benefit:

SCAMPER

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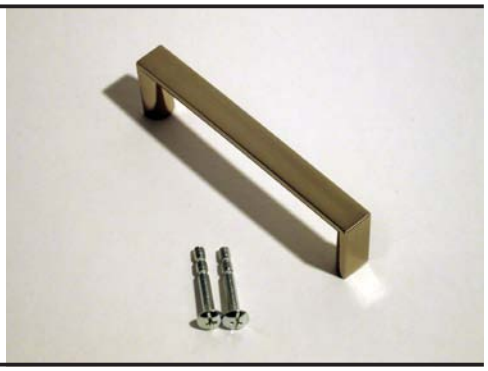

Choose one or two of your design improvements. Produce an annotated sketch of the product and render it to show design elements such as material, texture and scale. Make the sketch large enough to be seen clearly when presenting your ideas.

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P **Put** the design to other uses

E **Eliminate**, Elaborate, Enhance some part of the design

R **Rearrange,** reverse sections or move parts around

Design Brief

In 10 minutes, list a range of possible design improvements and their benefits for your product. Produce an annotated sketch of one or two of these ideas to present to the group.

PRODUCT: PEN

Substitute one thing for another

Questions: What kind of alternate material can I use? What part of the design could be substituted for something else?

Your improvement:	Benefit:

Combine with other functions, materials or things

Questions: What could be added to the design the design to make it different?

Your improvement:	Benefit:

Adapt the design so it can be used for some other purpose

Questions: What aspects of the design can be adjusted so it fits another purpose?

Your improvement:	Benefit:

Modify, Magnify, Minimise elements of its design

Questions: What if I exaggerate or modify a component? How can I make it larger or stronger? How can it be made smaller or shorter?

Your improvement:	Benefit:

Put the design to other uses

Questions: Who else might be able to use this design? What else could it be used for other than its original purpose?

Your improvement:	Benefit:

Eliminate, Elaborate, Enhance some part of the design

Questions: What can be removed? What can be expanded or developed upon further?

Your improvement:	Benefit:

Rearrange, Reverse sections or move parts around

Questions: How can the layout or pattern be changed? Can I interchange any components? What can be turned around?

Your improvement:	Benefit:

SCAMPER

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C **Combine** with other functions, materials or things

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E **Eliminate**, Elaborate, Enhance some part of the design

R **Rearrange,** reverse sections or move parts around

Design Brief

In 10 minutes, list a range of possible design improvements and their benefits for your product. Produce an annotated sketch of one or two of these ideas to present to the group.

PRODUCT: SINGLET

Substitute one thing for another

Questions: What kind of alternate material can I use? What part of the design could be substituted for something else?

Your improvement:	Benefit:

Combine with other functions, materials or things

Questions: What could be added to the design the design to make it different?

Your improvement:	Benefit:

Adapt the design so it can be used for some other purpose

Questions: What aspects of the design can be adjusted so it fits another purpose?

Your improvement:	Benefit:

Modify, Magnify, Minimise elements of its design

Questions: What if I exaggerate or modify a component? How can I make it larger or stronger? How can it be made smaller or shorter?

Your improvement:	Benefit:

Put the design to other uses

Questions: Who else might be able to use this design? What else could it be used for other than its original purpose?

Your improvement:	Benefit:

Eliminate, Elaborate, Enhance some part of the design

Questions: What can be removed? What can be expanded or developed upon further?

Your improvement:	Benefit:

Rearrange, Reverse sections or move parts around

Questions: How can the layout or pattern be changed? Can I interchange any components? What can be turned around?

Your improvement:	Benefit:

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E **Eliminate**, Elaborate, Enhance some part of the design

R **Rearrange,** reverse sections or move parts around

Design Brief

In 10 minutes, list a range of possible design improvements and their benefits for your product. Produce an annotated sketch of one or two of these ideas to present to the group.

PRODUCT: TORCH

Substitute one thing for another

Questions: What kind of alternate material can I use? What part of the design could be substituted for something else?

Your improvement:	Benefit:

Combine with other functions, materials or things

Questions: What could be added to the design the design to make it different?

Your improvement:	Benefit:

Adapt the design so it can be used for some other purpose

Questions: What aspects of the design can be adjusted so it fits another purpose?

Your improvement:	Benefit:

Modify, Magnify, Minimise elements of its design

Questions: What if I exaggerate or modify a component? How can I make it larger or stronger? How can it be made smaller or shorter?

Your improvement:	Benefit:

Put the design to other uses

Questions: Who else might be able to use this design? What else could it be used for other than its original purpose?

Your improvement:	Benefit:

Eliminate, Elaborate, Enhance some part of the design

Questions: What can be removed? What can be expanded or developed upon further?

Your improvement:	Benefit:

Rearrange, Reverse sections or move parts around

Questions: How can the layout or pattern be changed? Can I interchange any components? What can be turned around?

Your improvement:	Benefit:

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Design Brief

In 10 minutes, list a range of possible design improvements and their benefits for your product. Produce an annotated sketch of one or two of these ideas to present to the group.

PRODUCT: _____

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Rearrange, Reverse sections or move parts around

Questions: How can the layout or pattern be changed? Can I interchange any components? What can be turned around?

Your improvement:	Benefit:

SCAMPER

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