

## Exercise 4.1

# Three-dimensional metamorphosis in design

The aim of this Analytical and Design Information exercise is to develop an understanding of the cognitive processes inherent in applying morphological and form analogies for generating design concepts.

### 4.1.1 - Problem Statement

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#### Background

This exercise was influenced by the works of a number of authors, including Wallschlaeger and Busic-Snyder.

#### Aim

The aim of this *Analytical and Design Information* exercise is to develop an understanding of the cognitive processes inherent in applying morphological and form analogies for generating design concepts. This includes the use of 3D progressive metamorphoses, starting with natural elements (animal or plant), or existing products, and finishing in an existing product design.

#### Procedure

1. Identify a pair of objects consisting of one animal or plant object, or one existing product, and another related, existing product. This pair should be selected on the basis of a form analogy and similar “spirit” or emotional signal or response which is evoked as shown in the typical solutions presented later. This is a key phase of the exercise which must be accomplished before proceeding further.



The middle drawing should show where the morphology of the forms is seen to be related more or less equally to the initial object and the final product.

2. For this “pair”, draw to scale 1:1 the plan, top, front and lateral views of the five successive phases showing the morphological transformation to the final product. The third (and middle) drawing in this progression should illustrate the transition point between the initial natural object or selected product, and the final related product. This middle drawing should show where the morphology of the forms is seen to be related more or less equally to the initial object and the final product.
3. And finally, based on these drawings, construct the three successive physical models (i.e., five objects in all), showing the morphological transformation to the final product.



## 4.1.2 - Learning Objectives

### Individuality ●●●●●

#### **Developing creativity and originality.**

Expressing sensitivity and originality through the selection of appropriate “pairs” of objects where the form analogy and the evocative “spirit” are clearly shown.

#### **Developing problem-solving skills.**

Identifying the characteristics (form and structure) of each component object of a selected “pair”, and then analysing and implementing a morphological transformation to highlight the related form analogy and “spirit” (image or emotional signal).

#### **Developing self-confidence and communication skills.**

Developing self-confidence in communicating visually the morphology of the form analogy for a pair of objects.

### Knowledge ●●●●●

#### **Structuring basic design elements.**

Controlling the proportions and the progressive metamorphosis of form in a design composition.

Becoming aware that a minor modification of a proportion or detail can change absolutely the perception of the character of an object. This exercise is therefore aimed at developing this very sensitive perception of proportions and details.

#### **Mastering the use of two- and three-dimensional tool.**

Materials and tools should be freely chosen, including blue modelling foam, plaster or other suitable modelling materials.

#### **Understanding the role of designers in context.**

This exercise provides an opportunity to gain an understanding of some of the symbolism and form analogies underlying the design forms of objects and products.

### Planning ability ●●●●●

#### **Promoting a methodical approach to work (process requirements and tasks).**

Developing a simple plan and timeline for carrying out this exercise, taking into consideration each phase of the procedure detailed above.

#### **Managing work time.**

The estimated time allocated to this exercise should be about 30 hours, spread over a span of three or four weeks.

#### **Encouraging teamwork and the division of tasks.**

This is meant to be a solo exercise.

### Scale of difficulty

①②③④⑤⑥⑦⑧⑨⑩

This is estimated at **8**, given the number of parameters, means and allotted time noted above.





Plate 4.1.1 A milk pot and a rose.

Two solutions to this *Analytical and Discovery* exercise are shown in *Plates 4.1.1* and *4.1.2*. Those students made a good selection of “pairs” with animal, plant and existing products as the first element in the pair. Each “pair” has a similar “spirit” or evocative emotional signal and the different stages in the metamorphosis are well controlled.

*Plate 4.1.1* highlights the form analogies between a milk pot and a rose. Both are made with thin structure and have similar scale. In terms of spirit, these two elements of the pair are fragile and elegant.

*Plate 4.1.2* highlights the form analogies between a glove and a sandal. Both are made with flexible material such as fabric, rubber or leather. In terms of spirit, these two products were conceived to protect a human being’s hands or feet.

The solution space is again very large and many different personal compositions, illustrated in *Plates 4.1.3* to *4.1.6*, are possible.

### Quality criteria

The solution outcomes should be considered in relation to the noted learning objectives including these criteria:

- Insightful selection of the objects which constitute the “pair”.
- Progressive development of the metamorphosis in a clear and controlled fashion.
- Neatness and visual impact of the models in the metamorphosis.





Plate 4.1.2 A glove and a sandal.

### Links with existing products

The history of design contains many form analogies in many different fields. Graphic designers and architects, and other design professionals, often turn to nature, culture and other areas for sources of inspiration. This reference to form analogies and similarity of “spirit” between objects is nowadays one of the important components of design work.

### Complementary exercise

- Based on the learning objective detailed above, identify an “iconic” product design currently on the market with a very strong semantic, and try to find the product or element from nature, animal or vegetable that is most related to the selected product.
- Proceed in the same way as the previous exercise and draw the five steps of the metamorphosis before making the respective model.

### Further reading

Botero, F., 2004. *Botero in Singapore*. Singapore: Singapore Art Museum.

Wake, W.K., 2000. *Design Paradigms: A Sourcebook for Creative Visualization*. New York, NY: John Wiley & Sons.





**Plate 4.1.3** Umbrella and lemon squeezer.

The metamorphosis highlights the form analogies between a “hat umbrella” and a lemon squeezer. Both have a circular shape and are made with a series of facets. In terms of spirit, these two products were profiled to channel some liquid: water for the umbrella and juice for the lemon squeezer.



**Plate 4.1.4**

Toy mouse and measuring tape.

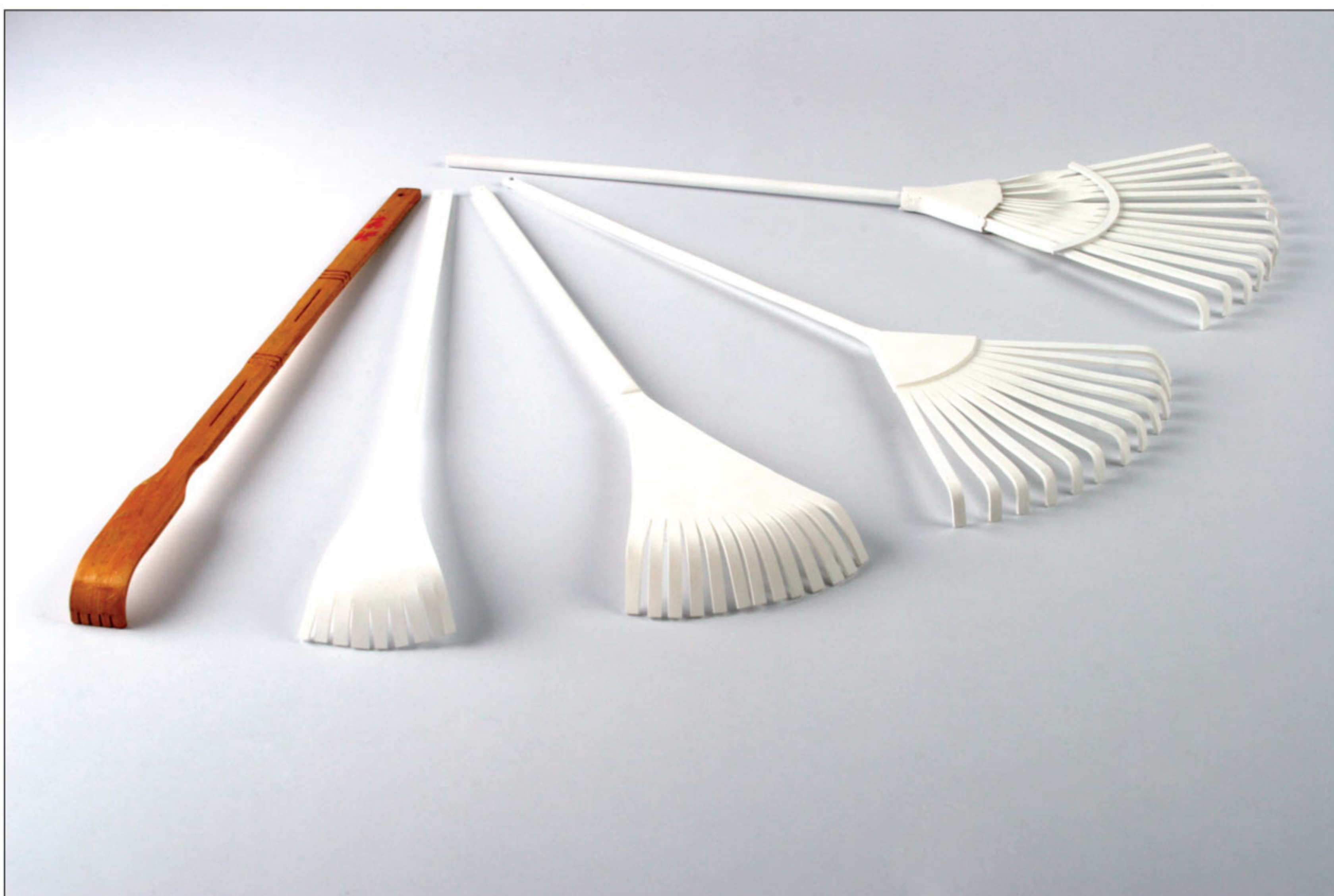
The metamorphosis highlights the form analogies between a measuring tape and a mouse. Both have a similar scale with a string for the tape and a tail for the mouse. In terms of spirit, these two products are related to some feeling of vivacity and speed.





**Plate 4.1.5** A dog (a boxer) and a small speaker.

The metamorphosis highlights the form analogies between a dog (a boxer) and a small speaker. Both are compact with a contrast between the mass of the head (for the boxer) or upper part (for the speaker) and the size of the front legs or base of the speaker. In term of spirit, these two elements bring some feeling of gaming and the illusion that sound emanates from both of them.



**Plate 4.1.6** A rake and a scratching tool.

The metamorphosis highlights the form analogies between a rake and a scratching tool. Both have two similar elements: a stick with a series of curvy pieces at one end. In terms of spirit, these two products were designed to catch, collect or scrape something. They are also related to manual activities that have existed since the early ages.