



# Mental Aerobics

*Mental Aerobics is a series of short exercises designed to stretch the mind and prepare students for creative thinking. These exercises are supported by elements from the dimensions of learning, the thinking skills framework and graphic organisers. The dimensions of learning (curriculum intent, sequencing of teaching and learning, making judgement, assessment and feedback) provide a framework for the activities. The thinking skills framework and the use of graphic organisers provide ready tools for students' engagement with problem-solving and encourage higher order thinking (including creative thinking).*

## AUTHOR

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## BENCHMARKS

Australian Curriculum

## CURRICULUM

English, Arts, Technology and Design

## TEACHING LEVEL

7-10, 11-12

## EXPECTED DURATION



x 4

Each activity will take approximately 10-15 mins to complete.

## EXERCISES

1. What's the problem?
2. What's the story?
3. River rescue
4. Logical sequence

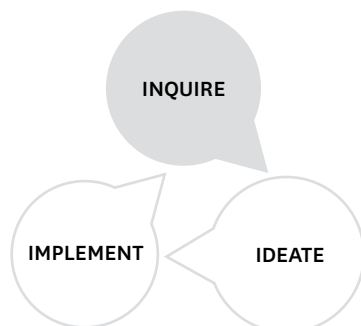
## RESOURCES FOR COMPLETION

- Computer for each student (or pairs of students if computers are limited) in class
- Internet connection
- Digital camera/s for documentation
- Pencil or pen for each student
- Blank A4 (or larger) paper or sheets of white butcher paper
- Refer to Dimensions of Learning (Robert Marzano) and Higher Order Thinking/Graphic Organisers (Eric Frangenheim)

## RESOURCES FOR DOCUMENTATION

- Document student reflections in a folio or other method preferred by the teacher
- Use [www.wordle.net](http://www.wordle.net) to draw out key words which relate to this experience
- Use [todaysmeet.com](http://todaysmeet.com) to open up discussion on activities
- Use [bubbl.us](http://bubbl.us) to open up discussion on activities

## DESIGN AND CAPABILITIES



Capabilities for creating successful learners, confident and creative individuals, and active and informed citizens.

Literacy



Numeracy



ICT capability



Critical and creative thinking



Personal and social capability



Ethical behaviour




Intercultural understanding



Visit [Design Minds](#) for more info on design phases.

Visit the [Australian Curriculum website](#) for more info on general capabilities.

# What's the problem?

 10-15 minutes

Inquire  
Ideate  
Implement



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## METHOD

Individual or small group exercise.

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## ACTIVITY

Provide each individual or group with a picture or object. These objects should be functional such as a torch, toothbrush, strainer or rubber.

Ask students to:

- Look at the picture or object they have been given and identify the problem that it is designed to solve
- Describe the problem that the object was designed to solve and discuss how this problem might be solved in a different way
- Go around the class and seek a substitute picture or object that might solve the problem

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## REFLECTION

Students are asked to record ideas through brainstorming or mind mapping in journals or on sheets of paper. Alternatively students can log on to [bubbl.us](http://bubbl.us) to map ideas.

### Prompts for reflection:

Provide students with a list of the following problem solving steps and ask students to identify which steps they used in this activity:

1. Read the question
2. Underline or circle important information
3. Convert underlined notes into points in own words
4. Identify the number of things that need to be determined in the answer
5. Determine the best method for solving the problem
6. Attempt solution and evaluate solution
7. Present solution

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## DOCUMENTATION

All research/brainstorming boards are collated into team folios. Students are given opportunity to photograph/document boards digitally.

Students set up group wiki or blog to record ideas and results. Alternatively use [bubbl.us](http://bubbl.us) to archive students' work.

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## IMAGES

Images courtesy of [http://commons.wikimedia.org/wiki/Main\\_Page](http://commons.wikimedia.org/wiki/Main_Page)



# What's the story?



10-15 minutes

Inquire  
Ideate  
Implement



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## METHOD

Small groups of four students.

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## ACTIVITY

Students work in groups of four. One student acts as recorder. The other members of the group are actively involved in the task whilst the recorder monitors the group interaction and re-focuses the group as necessary.

Each group is given four pictures. These pictures should be of everyday objects such as a pair of shoes, a highlighter, a saucepan and a bunch of bananas. Students construct a story relating to the images in the sequence in which they were presented. You may use the same four images in the same sequence presented to the class or give four different images to each group.



### Have you considered?

Using a Y chart as a graphic organiser to assist students create their story? You can make your own Y chart at <http://www.worksheetworks.com/miscellanea/graphic-organizers/ychart.html>

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## REFLECTION

Students can share and discuss each others stories and reflect on the different responses created by the different groups.

### Prompts for reflection:

Ask students to describe what the story looks like, feels like and sounds like.



### Have you considered?

Linking this activity to the Dimensions of Learning - Dimension 2 - acquire and integrate declarative knowledge. Students can use the episode pattern graphic organiser (available from [http://www.ascd.org/ASCD/images/publications/books/marzano2001a\\_fig6.5.gif](http://www.ascd.org/ASCD/images/publications/books/marzano2001a_fig6.5.gif)) to record information about their story, including:

- Setting - time and place
- Specific people
- Specific duration of the story
- Specific sequence of events
- A particular cause and effect

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## DOCUMENTATION

All stories, story boards or Y charts are collated into team folios. Students given opportunity to photograph/document boards digitally.

Students set up group wiki or blog to record ideas and results.

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## IMAGES

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# River rescue



10-15 minutes

Inquire  
Ideate  
Implement



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## METHOD

Small groups of four students.

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## ACTIVITY

Students work in groups of four. One student acts as recorder (for group dynamic). The other members of the group are actively involved in the task through discussion and listing pros and cons of specific ideas. The recorder monitors the group interaction and re-focuses the group as necessary.

Each group is given three pictures. These pictures should be of everyday objects such as a musical instrument, sponge, scissors etc. Students are instructed that a person has fallen into the river and is being swept downstream.

Using the pictures they have been given students are asked to come up with a way to use all three objects that they have been shown/given in order to rescue the person in the river.



### Have you considered?

Using a PCQ Analysis Tool to analyse the three images and record reasons for and against the use of a particular object? You can download one from [http://www.itcpublications.com/thinking\\_tool\\_tmpls\\_pcq](http://www.itcpublications.com/thinking_tool_tmpls_pcq)

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## REFLECTION

Students can share and discuss each others rescue solutions and reflect on the different responses created by the different groups.

### Prompts for reflection:

- What are the pros and cons of using each object?
- How is one idea more applicable than another?
- What were the group strengths and weaknesses when solving the problem?
- What are the opportunities for improvement?
- What are the threats to the group functioning effectively to solve the problem?

Alternatively, if you want the group to develop insight into its own problem solving processes you could use a SWOT analysis (Strengths, Weaknesses, Opportunities, Threats) to analyse how the group worked in terms of group dynamics. You can find more info about SWOT analysis at [http://ctb.ku.edu/en/tablecontents/sub\\_section\\_main\\_1049.aspx](http://ctb.ku.edu/en/tablecontents/sub_section_main_1049.aspx)



### Have you considered?

Linking this activity to the Dimensions of Learning-Dimension 4-helping students develop complex reasoning processes-problem solving. Students can use the following questions to reflect on the process:

- Identify the goal
- Identify the constraints or limiting conditions
- Determine exactly how these constraints or limiting conditions prevented you from reaching your goal
- Identify different ways of overcoming the constraints or meeting the limiting conditions
- Select the alternative that appears to be the best
- Evaluate the effectiveness of the alternative you tried. If appropriate, try a different alternative or identify additional ways of overcoming the constraints or limiting conditions

You can download a graphic organiser for this process from <http://www.pgcps.pg.k12.md.us/~elc/dolgraphicorg26.html>

# River rescue

**CONT.**

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## DOCUMENTATION

All stories, story boards, PCQ Analysis Tools or problem solving graphic organisers are collated into team folios. Students are given the opportunity to photograph/document boards digitally.

Students set up group wiki or blog to record ideas and results. Alternatively, students can log onto [meetingwords.com](http://meetingwords.com) and create a "public pad" on which to record their ideas.


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# Logical sequence

 10-15 minutes

Inquire  
Ideate  
Implement



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## METHOD

Students can work individually or in pairs.

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## ACTIVITY

The class is presented with a set of five images or objects. These images or objects should be unrelated such as a hairbrush, bucket, skipping rope, sandpaper and a CD.

Each student or pair is asked to arrange the five items in a logical sequence. There must be some logical connection between one item and the next, and a different but still logical connection between that one and the next.

Students can map out their logical sequence on a piece of paper or poster-the more creative and colourful the better! Alternatively you can use an online platform such as [bubbl.us](http://bubbl.us) to map ideas.

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## REFLECTION

Students can share and discuss each others logical sequences and reflect on the different responses created by the different pairs or individuals.

### Prompts for reflection:

- What are the associations within this sequence?
- Does another object/image contain a stronger association?
- What is the logical progression of these objects?



### Have you considered?

Linking this activity to the Dimensions of Learning-Dimension 3-extend and refine knowledge-comparing. You can download comparison tools from <http://www.pgcps.pg.k12.md.us/~elc/dolgraphicorg16.html> Students select the characteristics of the items on which they want to base their comparison and explain how the items are similar and different with respect to the characteristics selected.

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## DOCUMENTATION

All maps or posters are collated into class folios. Students are given the opportunity to photograph/document posters digitally.

Students set up group wiki or blog to record ideas and results. Alternatively, students can log onto [meetingwords.com](http://meetingwords.com) and create a "public pad" on which to record their ideas.

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