MIE Brain

MIELab ATTRIBUTES FOR COMPUTATIONAL THINKERS

Reflecting
Deliberating and considering your work

SCIENTIFIC OBSERVATION

Evaluating
Observing and making judgments

Exploring
Inquiring to learn new things

Detecting
Finding patterns and not missing details

Designing
Making rules to test ideas and systems

Simplifying
Removing unnecessary detail

SCIENTIFIC METHODOLOGY

Logic
Making predictions and analysing things

Creating
Designing and building from ideas

Experimenting
Changing things to see what happens

Problem solving
Finding errors and fixing things

Persevering
Finding new approaches to keep going

SCIENCE COMMUNICATION

Collaborating
Sharing ideas and working with others

Communicating
Storytelling and sharing information

Motivation
Finding your passion and inspiration

Out-reaching
Connecting with your community

Inspiring
Motivating and exciting others

MIE LAB MAKE INTEGRATE EXPLORE

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EXPLORE

OVER-ARCHING ATTRIBUTES

Reflecting
Deliberating and considering your work

EXPLANATION

This overarching attribute will crop up throughout the MIE Brain course as it is required at each stage of science inquiry. We need to reflect on our observations, methods and results in order to carry out science robustly.

EXAMPLE

Considering whether we have accurately observed the system we want to study – have we observed at the right time of day or for the correct amount of time?

Considering whether we have set up our experiments to measure what we need to – do we need to make changes?

Deliberating our results – what do they mean?

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SCIENTIFIC OBSERVATION	EXPLANATION	EXAMPLE
Evaluating Observing and making judgments	Observing our surroundings without bias and making judgments based on what we see, not what we expect to see.	Observing the brain's structure and function
Exploring Inquiring to learn new things	Questioning what we observe, inquiring further to build on our knowledge and learn new things.	Questioning the roles of certain brain regions
Detecting Finding patterns and not missing details	Spotting similarities in what we have evaluated to find patterns and make links with existing knowledge. Not making any assumptions.	Link between brain structure, function and mental health
Designing Making rules to test ideas and systems	Creating a set of rules to perform a task, define or explain a process that we have observed.	Designing a theory to explain these observed patterns
Simplifying Removing unnecessary detail	Abstracting or seeing clearly, removing any unnecessary details to find solutions to complex problems.	Understanding the important features that determine brain function

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SCIENTIFIC METHODOLOGY	EXPLANATION	EXAMPLE
Logic Making predictions and analysing things	Analysing your surroundings and making informed predictions from your evaluations and patterns that you have observed.	Predicting the role of certain brain regions
Creating Designing and building from ideas	Creating and designing experiments to investigate your predictions and build on ideas.	Designing an experiment to test brain function
Experimenting Changing things to see what happens	Changing things in a methodical way to test and investigate your ideas. Analysing what you observe to learn new things.	Changing the task to analyse change in brain activation
Problem solving Finding errors and fixing things	Finding errors with your design or original idea, then modifying your approach to fix problems.	Observing something unexpected in an experiment
Persevering Finding new approaches to keep going	Motivating yourself when things go unexpectedly to find new approaches and keep going.	Using observations to change your approach, and try again

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SCIENCE COMMUNICATION	EXPLANATION	EXAMPLE
Collaborating Sharing ideas and working with others	Sharing your ideas with others and working together to learn new things and build on humankind's knowledge.	Working in teams on group projects
Communicating Storytelling and sharing information	Sharing the information, you have learned from your scientific methodology, telling a story to teach others.	Presenting your findings and storytelling
Motivation Finding your passion and inspiration	Finding your motivation and inspiration to investigate and follow your passion in life.	Identifying what excites and interests you
Out-reaching Connecting with your community	Connecting with your community to share your knowledge and what you have learnt from your investigations.	Getting involved with citizen science projects
Inspiring Motivating and exciting others	Motivating and exciting others to learn from your work by collaborating, communicating and engaging your community.	Lead by example, do what you love

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Lesson 1: Brain structure and function

Lesson 2: Brain health

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Reflecting
Deliberating and considering your work

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Lesson 3: Meta learning

Lesson 4: Brain health and meta learning

Exploring
Inquiring to learn new things

Logic
Making predictions and analysing things

Creating
Designing and building from ideas

Experimenting
Changing things to see what happens

Persevering
Finding new approaches to keep going

Problem solving
Finding errors and fixing things

Collaborating
Sharing ideas and working with others

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Lesson 5: Design day

Reflecting
Deliberating and considering your work

Creating
Designing and building from ideas

Persevering
Finding new approaches to keep going

Collaborating
Sharing ideas and working with others

Communicating
Storytelling and sharing information

Motivation
Finding your passion and inspiration

Out-reaching
Connecting with your community

Inspiring
Motivating and exciting others