

Scale Free Network: Micro Draw

Educator Notes Years Three to Ten

These education notes have been provided to support your students' participation in the *Scale Free Network: Micro Draw* workshop. It is intended to generate ideas, discussion and classroom activities relating to science, art and their intersection before, during and after their visit to the Ipswich Art Gallery. For further information please contact the Gallery at: info@ipswichartgallery.qld.gov.au

Workshop Summary

Throughout the *Micro Draw* workshop, students work with a visual artist and microbiologist to investigate the connections between art and science. In the first half of the session, students look at slides and microorganisms through microscopes from different fields of scientific research, such as microbiology, geology, water ecology, parasitology and botany as well as their own special objects. They are then given the opportunity to create a unique artistic response to their observations through individual and collaborative drawing and sculpture making activities.

Key Discussion Words

Experiment	Microorganisms	Atoms	Cell	Art
Observation	Structural	Scale	Virus	Imagination
Magnification	Molecule	Science	Nuclear	Creation
Investigation	Reasoning	Measure	Biology	Drawing
Nature	Microscope	Classification	Ecology	Composition

Curriculum Links

The themes and activities explored in *Micro Draw* workshop can be adapted to the Essential Learning for years K-7 and the Australian Curriculum. Subject areas include Visual Arts and Science.

Science

Science understanding:

- comparing, sorting and classifying objects and materials
- understanding the nature of objects and materials

Science inquiry skills:

- explore, be curious and wonder
- ask questions and begin to investigate
- make and share observations

Science as a human endeavor:

- recognize aspects of science in everyday life

Visual Art

Making and Responding:

- explore visual elements (colour, texture, line and shape), concept, process and form to express ideas through images and objects.

Pre and Post Visit Discussion and Activities

Discussion and activities in the classroom about art and science and their intersection is recommended to enrich your students visit to *Micro Draw*. Please use the following suggested questions to provoke student's individual and collaborative investigation into the field:

- Identify: Photocopy the images of different types of cells onto over-head transparency sheets. Place one image at a time on the over-head projector and ask students to guess what sort of organism or thing the image comes from. Ask students if the images remind them of anything they have seen before (at home, on holidays, in nature). What is familiar about the images? What is unfamiliar?
- Experiment: If you have access to a microscope, you can make your own sugar and salt crystals to look at under a microscopic lens. Dissolve a teaspoon of sugar in 2-3 tablespoons of warm water. In a separate container, dissolve a teaspoon of salt into 2-3 tablespoons of warm water. Place a drop of each solution onto a glass slide. Label your slides and let them dry. Look at the slides under a microscope. What are the types of crystals you can see? Which crystals have square shaped edges? Which crystals have triangle shaped edges?
- Sculpt: Create a 3D cell or molecular structure using straws, clay or Blu Tack- don't forget to include all the different organelles inside the sculpture!
- Explore: Ask students to collect some leaves or flowers with a partner and talk about how it feels, smells and looks. What are the similarities and differences between these botanic forms? Draw a labeled diagram of your favorite one.
- Explore: Ask students to select two everyday objects from their home or classroom. Look at them closely – what do you think the molecular structure of these objects would look like under a microscope? Draw your predictions. Look up your predictions on the internet to see how your prediction compares!

Key Words Defined

Organism: An individual and complete living thing that can reproduce, grow and live by itself. Examples of organisms are a virus, bacterium, protest, fungus, plant or an animal.

Microorganism: An organism that is so small it cannot be seen with the human eye and can only be viewed under a microscope.

Atom: The most basic building block of ordinary matter. Atoms are made up of particles called protons, electrons and neutrons.

Magnification: the act or process of enlarging something under a microscope so that its physical appearance is bigger.

Cell: The basic structural, function and biological unit of all living things. Cells are made up of a nucleus, chromosomes, mitochondria, cytoplasm and membrane.

Nucleus: The 'brain' of a cell which controls its genetic material, reproduction and growth.

Molecule: The smallest particle of a chemical compound. Molecules are made up of atoms and are held together by chemical bonds.

Experiment: A scientific process which tests a hypothesis or makes a discovery.

Virus: An infective agent that invades and multiplies within other living cells.

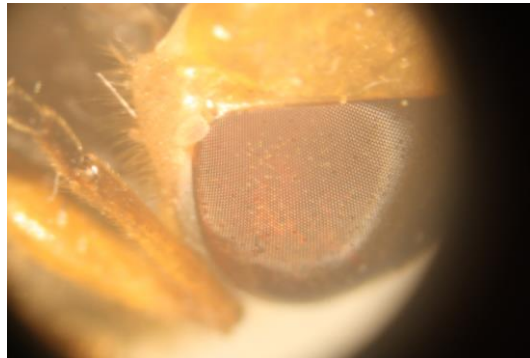
Further Information and Links

- *Synapse: Art Science Collaborations* (www.synapse.net.au)
A comprehensive database of collaborative projects between artists and scientists in Australia including residencies, research, publications and exhibition projects.
- *Scale Free Network Flickr stream:*
(<http://www.flickr.com/photos/scalefreenetwork/collections/72157623270821468/>)
A visual archive of previous Scale Free Network workshops.
- *The University of Utah 'Genetic Science Learning Centre' website:*
(<http://learn.genetics.utah.edu/content/begin/cells/scale/>)
A guide to scale and magnification.
- *Ernst Haeckel artworks:* (http://legacy.mblwhoilibrary.org/haeckel/wall_charts.html)
Ernst Haekel was a German biologist, naturalist, philosopher, professor and artist. He discovered and name thousands of specimens and published many detailed artworks illustrating micro forms and animals.
- *National Geographic's 'Best Microscopic Images 2011:'*
(<http://news.nationalgeographic.com.au/news/2011/10/pictures/111006-nikon-small-world-microphotography-competition-science/>)
- *Micropolitan Museum:* (<http://www.microscopy-uk.org.uk/micropolitan>)
A website dedicated to microscopical and macro photography.

Workshop Sample Images



Children investigate biological structures under the microscopes.



A close up of a cellular structure through a microscope.



A collaborative artwork created in the workshop session.



Children create a collaborative artwork.



Children observe cellular and molecular structures under the Microscope.



Children create a collaborative drawing inspired by the movement of microorganisms in a droplet of water.

Ipswich
ART Gallery

scale
free
network
art-science collaborative