Cheat Sheet

USING SCIENTIFIC SKILLS IN DAILY LIFE

Science is everywhere- in the air, our food, and even in our bodies! Find out how scientific skills can be applied in our daily life, and attain tips on how to search for credible information.

Definition

Scientific skills are a set of thinking skills that scientists use to solve problems[1][2] and obtain results[2]. These skills are not only used in Science, but also in our everyday life.

Types of Scientific Skills

Processing[3]

Collecting and presenting information

Observing, measuring

Engaging[4]

Engaging with a problem

Formulating hypothesis, predicting, generating possibilities

Reasoning / Critical thinking[5]

Solving problems and applying knowledge in new situations

Comparing, classifying, inferring, analysing, evaluating

1 Liston, M. National Centre for Excellence in Mathematics and Science Teaching and Learning, Research and Resource Guides, Volume 4 #10 (2013). 'Science Process Skills in Primary Science'. http://www.nce-mstl.ie/_fileupload/Scientific%20process%20skills%20Maeve%20Liston%20-%20RRG%20%2310.pdf

2 özgelen, S. Eurasia Journal of Mathematics, Science & Technology Education, 8(4) (2012). 'Students' Science Process Skills within a Cognitive Domain Framework'. http://www.ejmste.com/v8n4/eurasia_v8n4_ozgelen.pdf

3 4 5 Curriculum Planning and Development Division, Ministry of Education (2012). 'Lower Secondary Science Syllabus'. http://www.moe.gov.sg/education/syllabuses/sciences/files/science-lower-secondary-2013.pdf

fb.com/sgsure
www.nlb.gov.sg/sure

Source — Look at its origins. Is it trustworthy?

understand — Know what you're reading. Search for clarity.

research — Dig deeper. Go beyond the initial source.

evaluate — Find the balance. Exercise fair judgement.

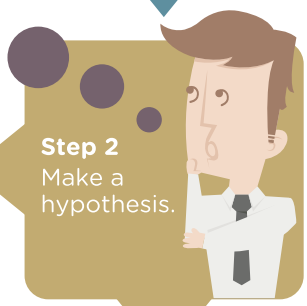
s.u.r.e. Source · Understand · Research · Evaluate

The Scientific Method

When scientists carry out their investigations, they follow a process known as the Scientific Method. During this process, they pick up various scientific skills.

The Scientific Method

Step 1
Ask a question and gather more information about it.



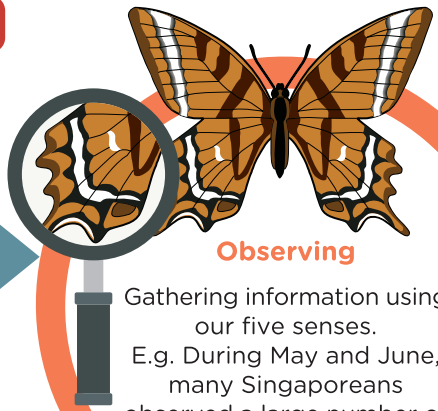
Step 2
Make a hypothesis.

Step 3
Carry out an experiment and record your results.

Step 4
Analyse your results.

Step 5
Make conclusions.

Skills learned



Observing

Gathering information using our five senses.
E.g. During May and June, many Singaporeans observed a large number of tropical swallow tail moths flying around us.

Skills learned

Hypothesizing

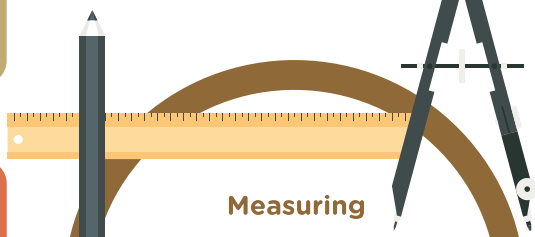
Making a guess based on what you know.
E.g. People had hypothesized that the numerous sightings of the tropical swallow tail moths in Singapore during May and June were due to the clearing of the moths' home forests[6].

Classifying

Grouping things based on their similarities.
E.g. Scientists had classified the tropical swallow tail moth as an insect species, in the *Lyssa* family.

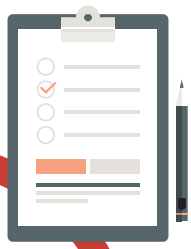
Comparing

Looking at how similar or different things are.
E.g. Compared to other types of moths present in Singapore, the tropical swallow tail moth has the second largest wingspan, after the Atlas moth[8].



Measuring

Finding out the size, weight etc of something.
E.g. Scientists had measured the moth and found out that its wingspan can be up to 16 cm[7]!



Evaluating

Making judgments based on evidence.
E.g. Experts evaluated that the appearance of a large number of moths in Singapore was due to the heavy flowering as a result of high rainfall[9].

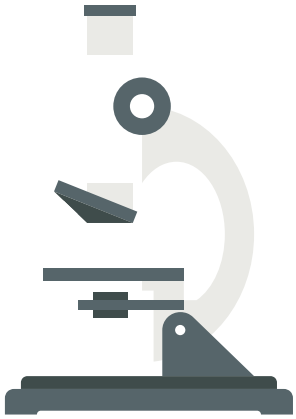
6 Jeyaseelan, T.D, Stir Fried Science, Science Centre Singapore (2014). 'Lyssa Zampa Sightings'. http://blog.science.edu.sg/index.php/2014/07/on-a-fast-fade-lyssa-zampa-sightings/

7 8 David Ee, The Straits Times (2014). 'Five things you should know about the Lyssa zampa moth'. http://www.straitstimes.com/news/singapore/more-singapore-stories/story/five-things-you-should-know-about-the-lyssa-zampa-moth-2

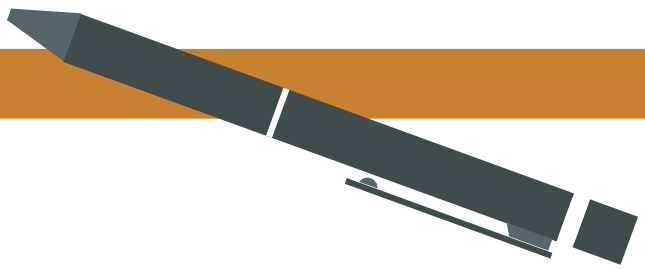
9 Carolyn Khew, My Paper (2014). 'Moths come out to enjoy the weather'. http://mypaper.sg/top-stories/moths-come-out-enjoy-weather-2014052

Researching

Researching is also an important step in scientific discovery since trustworthy information can help you to form your hypothesis and interpret your results. Here are some tips to help you look for trustworthy sources of information:



Evaluation criteria	What it means
WRITER (AUTHORITY)	Does the writer have the necessary experience / educational background to write about this topic?
RIGHT OR WRONG (ACCURACY)	Is the content supported by evidence and other sources of information, or does it consist of mostly personal opinion?
COVERAGE	Are you the targeted audience of the article? Or is it meant for some other type of audience?
AGE ONLINE (CURRENCY)	How current is the article? Has the information been updated frequently?
BALANCE (OBJECTIVITY)	What is the writer's purpose of writing the article? Is there any bias in his writing?



Resources

There are many useful websites made by local organisations which offer information on Science in Singapore. Here is a list of resources you may find useful in your research on Science.

Topic	Source	URL	Details
Biodiversity and conservation	National Parks Board (NParks)	https://florafaunaweb.nparks.gov.sg/ http://www.nparks.gov.sg/cms/index.php?option=com_content&view=article&id=88&Itemid=172#no5	It contains detailed information on the plants and animals that can be found in Singapore and their status (e.g. whether they are endangered or not). It also provides worksheets for teachers to use during learning journeys.
Biodiversity and conservation	Wildlife Reserves Singapore (WRS)	http://education.wrs.com.sg/	It consists of interactive games and videos on the loss of animal species and ways on how to protect the environment.
Pollution, haze and weather	National Environment Agency (NEA)	http://www.nea.gov.sg/psi/	It contains information on pollution, such as the haze, and infographics that explain how the PSI system works. It also contains information on other weather conditions like the El Nino phenomenon.
Energy and the environment	National Environment Agency (NEA)	http://www.nea.gov.sg/cms/ccird/E2%20Singapore%20(for%20upload).pdf	This document explains the causes of climate change in Singapore and what some organisations in Singapore are doing to save energy. It also contains tips on how everyone can help to save energy.
Health and diseases	Health Promotion Board (HPB)	http://www.hpb.gov.sg/HOPPortal/	It contains information on various types of diseases, guides on healthy living and even games to educate children on health.
Food safety	Agri-Food and Veterinary Authority of Singapore (AVA)	http://www.ava.gov.sg/FoodSector/FoodSafetyEducation/index.htm	It contains information on how to maintain food safety, and even tips on how to look out for unsafe chemicals added into food.
Sources of water	Public Utilities Board (PUB)	http://www.pub.gov.sg/products/Pages/default.aspx	It contains information on the sources of water in Singapore, such as the four National Taps, and how water is treated before they can be used.

Sources

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