A Spotlight on Science Inquiry Skills

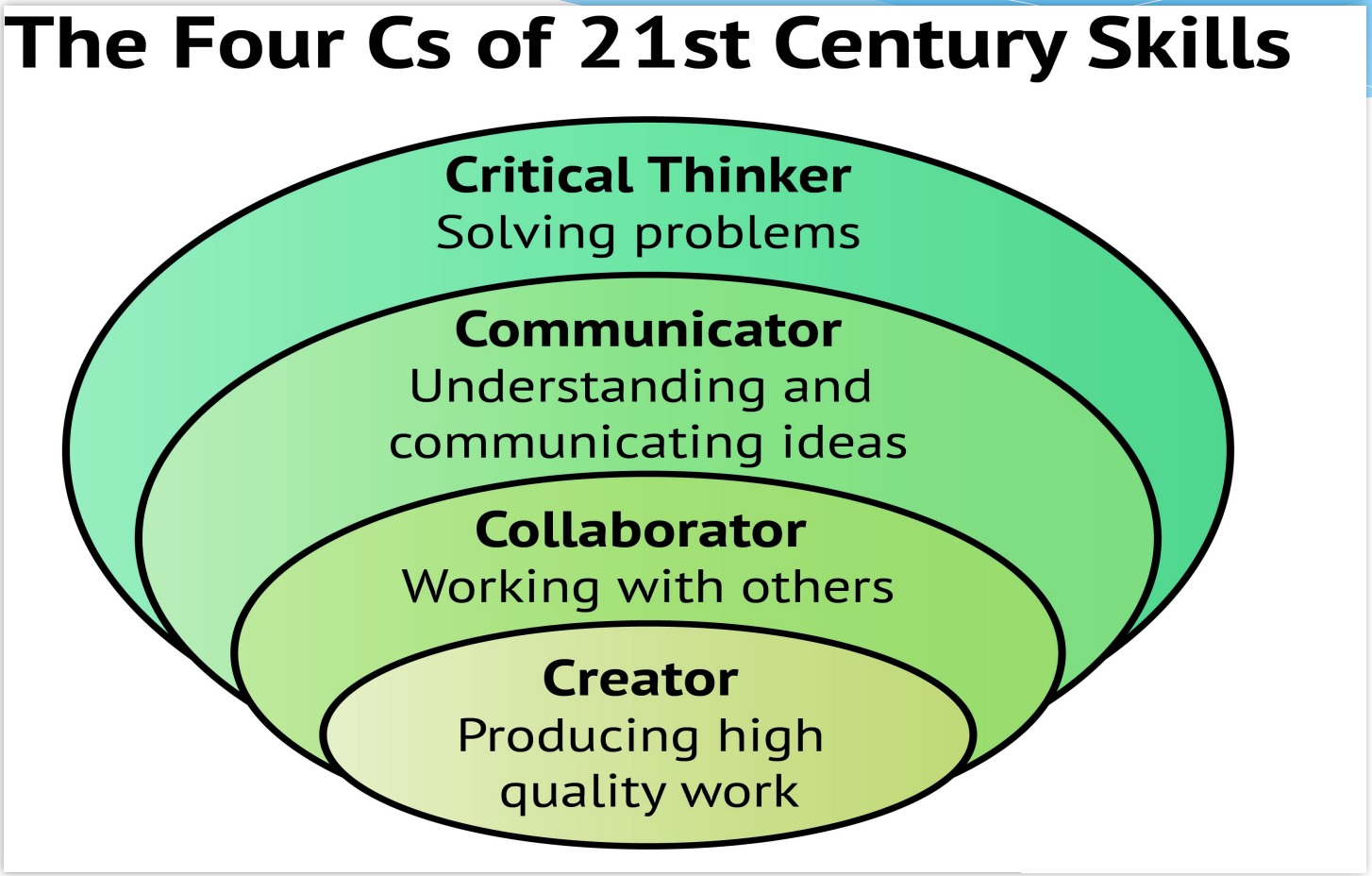
Dr. Tejinder Kaur
Senior Teacher
Wanneroo Secondary College

Previous experience with SIS

SIS

Importance?	Examples?	Main aspects of a Science Investigation	Investigation vs. Activity

Skills needed?



Activity Time

Match the SIS concepts with Four C's

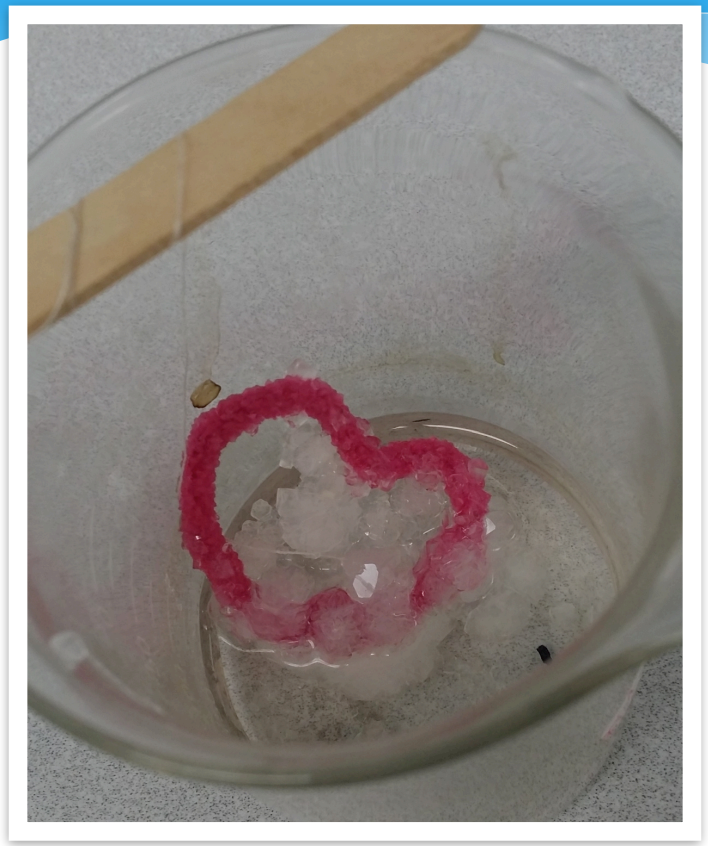
SIS concepts	Resulting Skills Developed

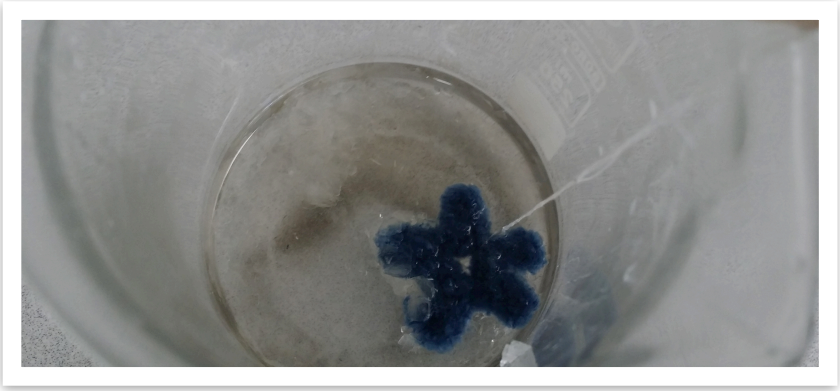
WHY SIS?

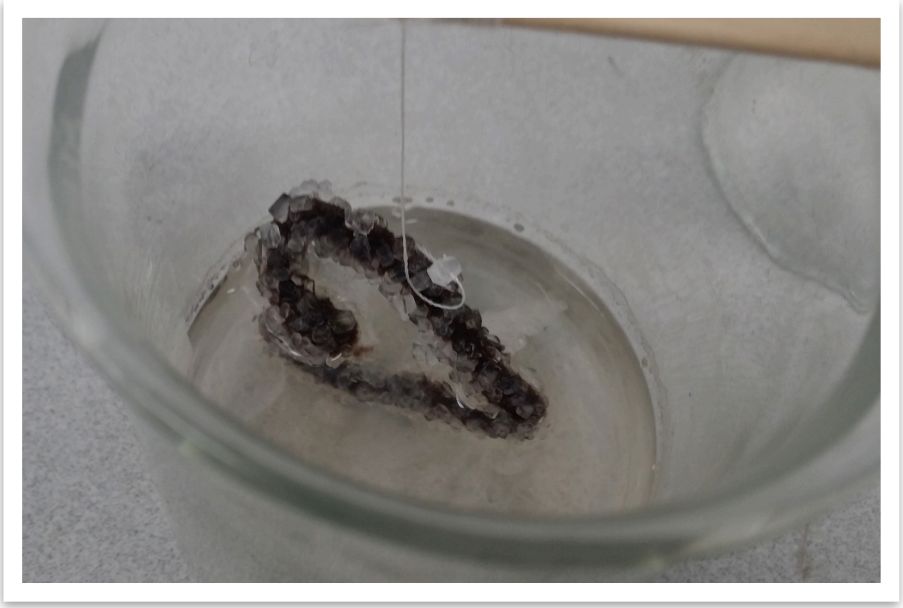
SIS Concepts	Resulting Skills Developed
Questioning	Creativity & Critical Thinking
Planning	Collaboration
Evaluating and Analysing	Critical thinking
Evaluating and Communicating	Communicating

Crystal Experiment

My Results





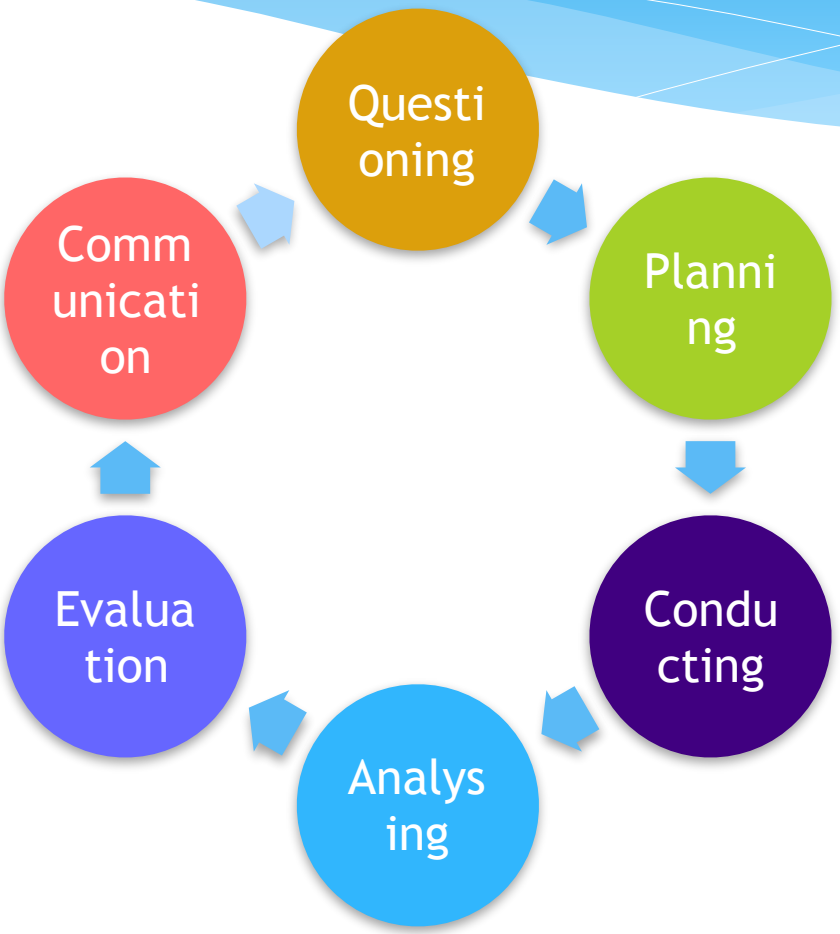


What is a science investigation?

Investigation is:

* **Scientific investigation** is a quest to find the answer to a question using the scientific method.
* In turn, the **scientific method** is a systematic process that involves using measurable observations to formulate, test or modify a hypothesis.
* Finally, a **hypothesis** is a proposed explanation for some observed phenomenon, based on experience or research.

Science Inquiry Skills (SIS)



Investigations vs. Activities

Investigations

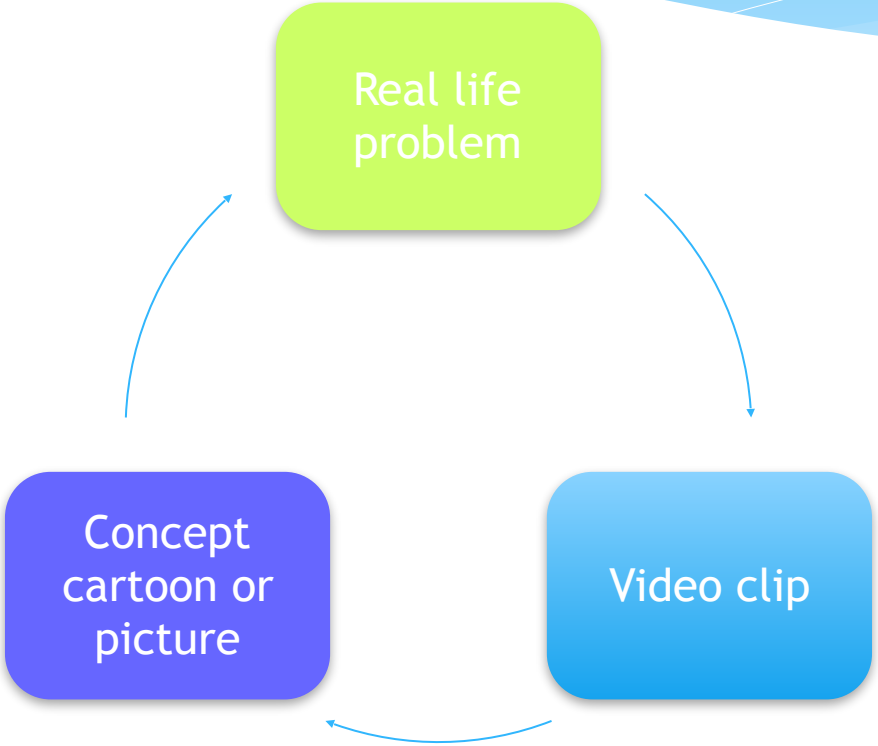
* An attempt to find the answer to a question using the scientific method.
* This form of activity uses Science Inquiry Skills
* The scientific method includes a question, hypothesis, variables, procedure, and an evaluation.

Activities

* A process that involves a reaction, physical or chemical, but doesn't follow any scientific method or procedure.
* An activity by itself without guidance is not a good inquiry, it needs to make a connection to meaningful content as well as address a problem or question.

Process of a Science Investigation

How can you start?



What happened ?

Key Features

What will I keep the same?

Control variable

What will I change?

Independent variable

Is it a fair test?

What will I measure?

Dependent variable

Questioning and predicting

1) Identify the question being studied
2) Make an educated guess of the result
3) From this establish a hypothesis

Writing a hypothesis:

* The hypothesis is a statement, not a question.
* Keep the variables in mind
* Ensure the hypothesis is testable
* Make it clear and specific
* Eg) Increasing the temperature of the HCl acid will increase the amount of Carbon Dioxide produced in a unit time.

Planning and conducting

Experimental processes involve:

* Independent and dependent variables
* Controlled variables
* Constructing a fair test
* Ensuring reliable test
* A physical control

* **What is the difference between a reliable test and a fair test?**

<u>In a fair test:</u>
Only one variable is changed, and all others are kept constant

<u>In a reliable test:</u>
Trials are repeated to increase reliability of the experimental data

Processing and analysing

The students should be able to design and construct tables and graphs to represent and interpret data.

Graphs should contain:

* Appropriate Scales
* Accurate title
* Labels for each axis
* Units for each axis label

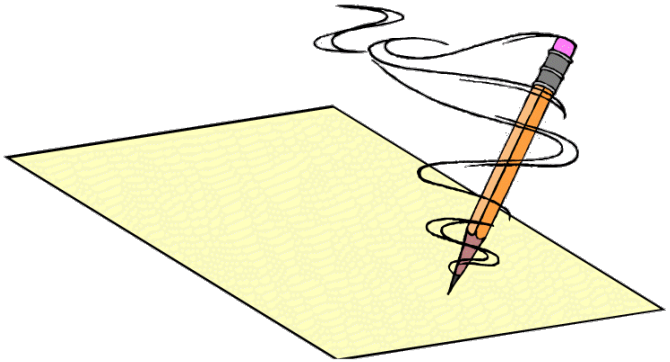
* **TIP:** When constructing a graph, the <u>independent variable always goes on the x-axis</u> and <u>the dependent variable on the y-axis.</u>
* Use scientific understanding and science laws learnt in class or in the textbook to explain the trends or patterns noted.

Evaluating and communicating

* Report writing
* Suggesting improvements in the method of experiments.

Writing an evaluation:

It involves identifying problems, how to improve the investigation and thus leading to other ideas and investigations



Good Websites with examples

http://science.wonderhowto.com/how-to/best-investigatory-projects-science-16-fun-easy-ideas-kickstart-your-project-0147689/

*https://www.**sciencebydoing**.edu.au/*


THANK YOU FOR LISTENING
PLEASE ASK QUESTIONS IF YOU LIKE
TROLL_ME