A Spotlight on Science Inquiry Skills

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### Previous experience with SIS

<table>
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<th>Importance?</th>
<th>Examples?</th>
<th>Main aspects of a Science Investigation</th>
<th>Investigation vs. Activity</th>
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SIS
Skills needed?

The Four Cs of 21st Century Skills

- **Critical Thinker**
  - Solving problems

- **Communicator**
  - Understanding and communicating ideas

- **Collaborator**
  - Working with others

- **Creator**
  - Producing high quality work
Match the SIS concepts with Four C’s

<table>
<thead>
<tr>
<th>SIS concepts</th>
<th>Resulting Skills Developed</th>
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## WHY SIS?

<table>
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<th>SIS Concepts</th>
<th>Resulting Skills Developed</th>
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<tbody>
<tr>
<td>Questioning</td>
<td>Creativity &amp; Critical Thinking</td>
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<tr>
<td>Planning</td>
<td>Collaboration</td>
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<td>Evaluating and Analysing</td>
<td>Critical thinking</td>
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<tr>
<td>Evaluating and Communicating</td>
<td>Communicating</td>
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Crystal Experiment
My Results
What is a science investigation?
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

<table>
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<th>Investigations</th>
<th>Activities</th>
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<tr>
<td>* An attempt to find the answer to a question using the scientific method.</td>
<td>* A process that involves a reaction, physical or chemical, but doesn’t follow any scientific method or procedure.</td>
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<tr>
<td>* This form of activity uses Science Inquiry Skills</td>
<td>* 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.</td>
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<tr>
<td>* The scientific method includes a question, hypothesis, variables, procedure, and an evaluation.</td>
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Process of a Science Investigation
How can you start?

- Real life problem
- Concept cartoon or picture
- Video clip
What happened?
Key Features

What will I keep the same?
Control variable

What will I change?
Independent variable

What will I measure?
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?

**In a fair test:**
Only one variable is changed, and all others are kept constant

**In a reliable test:**
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 independent variable always goes on the x-axis and the dependent variable on the y-axis.

* 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


https://www.sciencebydoing.edu.au/
THANK YOU FOR LISTENING

PLEASE ASK QUESTIONS IF YOU LIKE