SCITEC SPRINTS

Art

Provocation: Begin with the whakatauki: "Toitū te marae a Tāne, toitū te marae a Tangaroa, toitū te tangata" (If the land is well and the sea is well, the people will thrive).

Objective: To use art as a medium to explore and express scientific concepts, fostering a deeper understanding and appreciation of the interconnectedness of the natural world and our relationship with it.

Materials:

1. Art supplies (paint, brushes, canvases, paper, clay, etc.)
2. Natural materials (leaves, twigs, shells, etc.)
3. Reference images of various ecosystems (forests, oceans, etc.)
4. Science resources (books, articles, videos on environmental science)
5. I-Pads for photography

Introduction:

1. **Discuss the Whakatauki:**
    - Explain the meaning and significance of the whakatauki.
    - Engage students in a discussion about how the health of the environment impacts human well-being and vice versa (I think the latter should be the emphasis – i.e. since the whakatauki is spoken from the perspective of humans being part of the environment, and many Westernised (particularly capitalist) world views generally promote that the environment is a tool/resource for humans to use. In essence the environment should be the focus, and then how we connect with it/impact it, rather than the other way around?

2. **Provocation Activity:**
    - Show images or videos of pristine natural environments and those affected by pollution and climate change.
    - Walk students around the school grounds to connect them with the environment
    - Ask students to reflect on their feelings and thoughts about the images.

Main Activity: Produce an artwork that reflects environmental science and their feelings towards it. Get students to plan their art, record how it comes together and complete with a paragraph that explains the scientific concept that underlies their project.

Options include;

1. **Ecosystem Collage:**
    - Students create a collage using natural materials and art supplies to represent a healthy ecosystem (forest, ocean, etc.).
    - Discuss the components of the ecosystem and their roles.

2. **Environmental Impact Sculpture:**
    - Using clay or recyclable materials, students sculpt a piece that represents human impact on the environment (e.g., a polluted river, deforestation).
    - Accompany the sculpture with a short written explanation of the impact depicted.

3. **Science-Inspired Painting:**
    - Students choose a scientific concept related to the environment (e.g., the water cycle, photosynthesis) and create a painting that illustrates this concept.
    - Encourage the use of colors and textures to convey different aspects of the concept.

4. **Nature Journaling:**
    - Take students outside to observe their local environment.
    - Have them photograph and note their observations in a nature journal.
    - Later, use these as inspiration for a larger piece of art.

Conclusion:

1. **Gallery Walk:**
    - Set up the classroom as an art gallery.
    - Students walk around, observe each other's work, and leave positive feedback or questions on sticky notes. This could be in relation to how it might be 'celebrated' at Scitec.

2. **Reflection:**
    - Have a class discussion about what they learned through the art activities.
    - Discuss how art can be a powerful tool to express scientific concepts and promote environmental awareness.

SCITEC SPRINTS

Science

Provocation: What we're putting down our drains impacts on our environment.

https://youtu.be/3YboODRiFTE

But we need to clean things at home. So how to do we know what we should and shouldn't use to do this?

Objective: Use this provocation as an example for students to design a project around testing how "nasty or not" different household cleaning products are.

Explain how the provocation is the "big question" they are trying to answer.

Materials:

- 5 x household cleaning projects
- pH strips
- containers to conduct their experiments in
- mock science boards to plan their project and record results
- lab coats
- rubber gloves
- White board to graph results

Challenge; Students have to determine from the outset how they are going to conduct their experiment. Discuss things like controls, variables, blind testing, working individually or collectively, gathering results, analysing data, presenting results

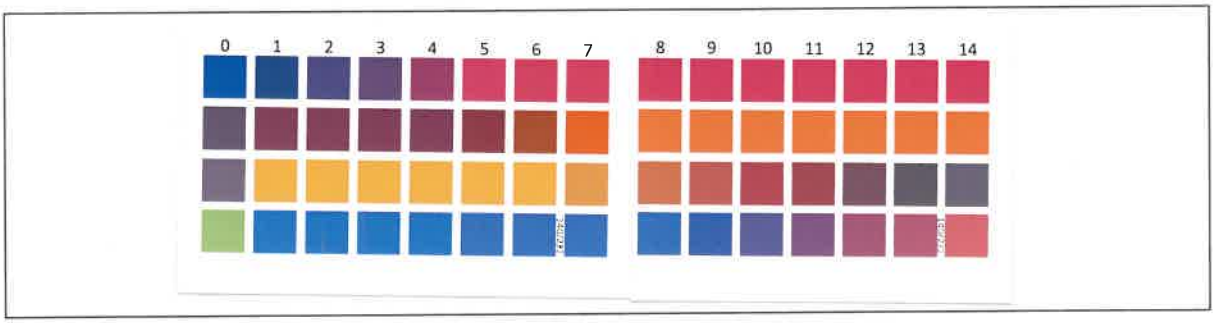
Outcome: Get students to discuss the different results, what do they know now about the different cleaning product that they didn't know before, what will they do with this information, will it change behaviours, what could they do to build on this information or what would they do differently next time?

CAWTHRON | Scitec Student Science Fair Te Hāpai Mauri

pH Test Strip Results Sheet

Instructions:

- Hold the pH test strip by the end without the coloured squares.
- Dip the coloured squares into the solution and hold for 2 seconds.
- Shake off the excess water on to a tissue.
- Wait for 5 seconds.
- Compare the colours on the squares of the test strip with the colour key below to determine the pH.
- Record the result in your data table.



Chemical / Control	Place Test Strip Here	pH

SCITEC SPRINTS

Technology

Provocation: Get students thinking about all the ways technology makes lives easier. Ask them to think about how these technologies might have started with an idea – but where did the idea come from?

Often it comes from identifying problem they are trying to fix.

Eg

- the phone allows for easier, quicker communication
- the light bulb was for cleaner, safer more reliable light
- the car was to get people from A to B quicker than horses
- a compass was developed because ancient mariners couldn't rely on stars for navigation during the day or on cloudy nights

This is the basis for a Scitec Technology project where you come up with a technology that might help, fix or solve a problem in everyday life.

But because this is a Scitec Sprint – we're going to short-circuit the process by giving you the problem and some ideas for designing a solution to the problem.

Objective: Choose from two robotic hand designs to

https://www.sciencebuddies.org/stem-activities/build-a-robot-hand

https://www.youtube.com/watch?v=_-cTge2mZLs

Materials:

- Straws
- String
- Carboard tubes
- Tweezers
- Paper clips
- Small rubber bans
- Scissors
- Needle
- Mock science board
- Treasures (ping pong balls with numbers or just a range of different items??)
- Oven trays

Challenge; We have a tray full of treasures but the treasure is coated in a dangerous chemical that will immediately turn you into a zombie if it touches your skin. The students' mission is to design a robotic hand that will pick up as many treasures as possible in the space of two minutes.

First they will need to daw their prototype on their mock science board before constructing it. They also need to think about how are they going to measure the outcomes and record the results?

Outcome: Get students to discuss the different results. What have they learned about design? What designs worked best and why? What would they do differently next time?

What kind of problems would they live to solve with technology?

Background: We often use technology to help, fix or solve a problem that emerges in everyday life.

In this scenario, there is a tray full of objects that you must collect but they are all coated in a dangerous chemical that will turn you into a zombie the minute it touches your skin.

You need to create something that mimics hand movement, allowing you to pick up as many items as possible without actually touching them.

Aim: To construct a robotic hand that is capable of picking up various items.

Material used:

Evaluation: *Describe in words how your robotic arm function, thinking about how your design performed against the criteria and whether it was fit for purpose*

Modifications: *Describe and/or draw any modifications you would make to make your robotic hand work better next time*

Design your next prototype::

Conclusions: *What have you learned from this project, what opportunities can you see from this tech idea* .

Bibliograhy: This is where you would list any books and websites that you used in researching your project

Log book: Don't forget to keep a log book showing all thought process, every modification and result/observation recorded

_____

_____

_____

Scitec Student Science Fair Te Hāpai Mauri

Project Title: _____

_____

Name: _____

CAWTHRON

Background: We use lots of chemicals around the house for cleaning and washing the dishes. All of these end up going down the drain and eventually into our waterways. But often we don't think about what's in these household cleaning products and the effects they can have on the environment. This could include:

-

-

-

-

Today we are going to test how common household chemicals change the pH of water. Both low and high pH can damage the gills of fish and lower their birth rates.

Hypothesis: *Your Prediction*

Methods: One teaspoon of common household cleaning chemicals were mixed with 200 mL of tap water until they dissolved.

My control was _____ and I tested _____ replicates of each solution.

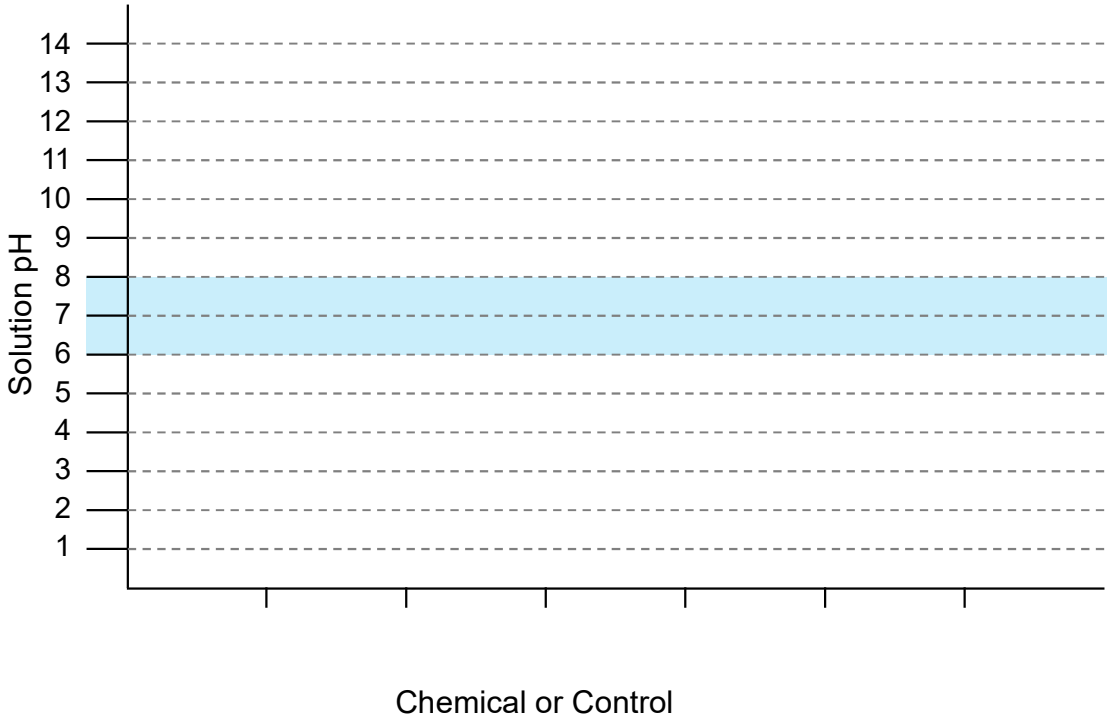
The solution pH was measured using pH tests strips that change colour depending on how acidic or basic the solution is. The resulting test strip colour was matched with the colour chart to determine the pH and this was recorded in Table 1 and plotted in Figure 1.

Results: *Record your data in Table 1 and plot it in Figure 1.*

Table 1: _____

Chemical or Control				

Figure 1: _____



Results Interpretation: *Describe your results in words, thinking about what the data is telling you.*

Conclusions: *What did you learn from the experiment?*

Discuss your results: *Have your results and conclusion made you think of more questions? If so, what experiment would you like to do to learn even more?*

Evaluate: *How could we improve our experiment? Is there a way to make the test 'fairer'? Are there other things that we should have looked at instead?*