Makey Makey Interactive Poster

Year level band: Year 3-4

Description: Add a makey makey to a poster/model or diorama. The makey makey combined with Scratch.mit.edu will enable students to record a voiceover for the poster to add extra information and create an interactive project. This can be applied to any subject area. The target group is Years 3-4, but as not all students have been exposed to coding and physical computing it could be used with secondary students. Students create a poster and then add a makey makey to the back. Each point of the makey makey will create an interactive element for the poster/model or diorama. This style of project using Makey Makey's may need to be run multiple times to ensure all students in the class have an opportunity to complete all components of the project eg: coding, connecting the makey and research.

Resources:

- Makey Makey
- Cardboard poster, Model or Diorama
- Research
- Written scripts with information to be recorded for interactive project
- Split pins
- Computer with browser with Flash functionality (not an ipad)
- Scratch logins -
  Educator Account https://scratch.mit.edu/educators/#teacher-accounts will be needed for students under 13 or
  csfirst.com or students can create their own account.
  For ease particularly with younger students it may be easier for teachers to create a class set of logins to distribute to students.
- Sharp 2B Pencil
- Pen, textas, pencils
- Camera to take pictures of finished structure (and during building process)

Prior Student Learning:

Science: Research topic area and create a poster or model for concept. Identify key areas of the poster to add interactive points. eg: Research the lifecycle of a tomato and create a poster to illustrate their understanding.

Grow a tomato plant in the classroom.

English: Write a script with additional information to enhance the poster/model, the script will be used for the recording the information.

Digital Technologies: Be familiar with the parts of a makey makey. Students should be given time to explore how the circuit works and conductivity of the points, prior to the adding it to a poster. http://makeymakey.com/how-to/classic/ has a visual procedure for setting up a makey makey.

Art: A still life drawing lesson using tomatoes prior to creating the poster on the life cycle of a tomato could enhance the quality of drawings on the poster.

Australian Curriculum

Year	Content Descriptors
Year 4	• Identify and explore a range of digital systems with peripheral devices for different purposes, and transmit different types of data (ACTDIK007)
	• Implement simple digital solutions as visual programs with algorithms involving branching (decisions) and user input (ACTDIP011)
	• Living things have life cycles (ACSSU072)
Achievement Standards (Australian Curriculum)	By the end of Year 4, students describe how a range of digital systems (hardware and software) and their peripheral devices can be used for different purposes. They describe relationships that assist the survival of living things and sequence key stages in the life cycle of a plant or animal.
Learning Map (Sequence)	• Students conduct research to identify how different elements both natural and man made forces impact on the life cycle of a tomato • Students write a plan and compose a script based on their research. • Students connect the makey makey to create a working circuit with conductive points on the poster. • Students work together to record their scripts in scratch.mit.edu to provide additional support information to their research. • Students work in teams to design their visual program using a scratch. • Students work in teams to ensure their system works when the user touches the split pins on the poster. • Students can debug their hardware and software to create a working system.

Element	Summary of tasks
Learning hook	Students have created a poster (or model). It is to be an interactive poster on the topic of the tomato life cycle. Students are asked to research the life cycle of a tomato and different factors that may influence the successful growth of plant and bearing fruit. eg: water, soil, sun, too much or too little of each, being planted in the wrong position, changes in the environment both natural and man made.
Learning input	The teacher models how to create a series of blocks (algorithm) in scratch.mit.edu on the board. Teacher models how to connect one point on the makey makey to the split pin on the poster. The teacher demonstrates how to make the program operate. If students have not used the makey makey before you will need to allow time to demonstrate/explore how the makey makey works and the significance of the neutral or earth connection. The recorded scripts should include information about how the lifecycle could be interrupted by both natural and man made interventions eg: lack of water, sun,

	poor soil, human land use, predators
	The teacher introduces and uses new language: "algorithm" and "debugging/debug", "circuit", "interactive point"
	Teacher discretion/Differentiation Depending on the experience of your class the teacher may offer an opportunity for students to solve the problems themselves prior to demonstration. The teacher may choose to only demonstrate one point and ask students to create the rest without assistance. This could be differentiated so lower students have visual support of the graphic below but more capable students do not.
Learning construction	Learners now work in teams, to construct their own series of blocks (algorithm) and a recording using their script. Once the recording is working in

	scratch.mit.edu they can then work together to connect the makey makey.
	Teams are given the opportunity to create additional interactive points using the split pins and scratch, by recording their voices and connecting the makey makey.
Learning demo	Once all teams have had a chance to test and debug their algorithm, teams are given a chance to demonstrate their learning to the class, or another team. Peers are to be critical friends and to help provide feedback.
Learning reflection	Students are given a chance to think about and describe what happened in their scratch programming and to talk about what they learned and how they might change or extend their algorithm for next time.

Assessment:

Formative Assessment:

- Teachers observe students using the makey makeys, creating their algorithms and debugging.
- Use questioning to elicit student understanding of the functions of the makey makey, scratch programming and poster and their algorithmic thinking. Determine if all students had an opportunity to work with all components of the project.
- You might take photos of the students' final posters to document their progress, or record the interactive poster in their final demonstration.
- Determine if recording and poster have enough detail on how the life cycle can be interrupted by natural and man made problems eg: shade from buildings, lack of water, poor soil or predators.

Criteria	Quantity of knowledge			Quality of understanding	
	Pre-structural Below Average	Uni-structural Average	Multi-structural Above Average	Relational Average	Extended abstract Above Average
Algorithms	No working curcuit	Circuit only working in a few points	Circuit and programming working for all points.	Circuit has instructions linked in the correct sequence to achieve the task	Circuit brings in prior learning and/or independent learning beyond the task and possibly includes repetition
Knowledge	Basic or no information about the life cycle of a tomato	Includes information about the lifecycle but limited information about natural and man made effects that can impact on life cycles	Includes information about natural and man made practises that can impact on life cycles.	Poster includes a graphic of the tomato lifecycle and limited additional interactive information.	The poster includes a graphic of the life cycle and additional interactive information detailing how life cycles are interrupted by both natural and man made activities.
Vocabulary	When describing algorithms, coding terms or makey makey circuit, no specific	The terms instruction, algorithms, coding terms or makey makey may	The terms instruction, algorithms, coding terms and makey makey may be used as a	The terms algorithm, coding terms and makey makey is used confidently with specific reference to	Specific vocabulary like decisions and repetition is used, going beyond the set language

	vocabulary is used	be used as a general description	description with reasoning about why the project was set up the way it is.	learner's work	NSW vocabulary should include scientific words regarding the life cycle process and advanced nature of the writing and script recorded for all levels.

Teacher/Student Instructions:

Student Activity

Background information

Makey Makey's act as a replacement keyboard. They can be connected to conductive materials to create a circuit.

How To Use Guide

How to make a sound recording in Scratch

Instructions:
- Create a poster of a plant life cycle. Put split pins on each part of the life cycle.
- Join a makey makey to Scratch and then to the poster with split pins.
- Create a project in Scratch that will run recorded information each time you touch the split pins

Lesson Objective:
- Must identify objects that can be used with a makey makey to form a working circuit
- Create a poster of the life cycle of a plant
- Connect a Makey Makey to Scratch.mit.edu
- Must use a Makey Makey to create an interactive description of the life cycle of a plant
- To share results via a shared online venue with classrooms worldwide

Task: Design an interactive poster using a Makey Makey that talks about parts of a life cycle.

The investigation must show the following aspects:
- Must link a makey makey to scratch.mit.edu and than to split pins on the poster.
- Must use a Makey Makey.
- Must program scratch sound blocks to play a recorded message about parts of a life cycle.
- Take photographs and document your procedure and findings.

Resources:
- Makey Makey
- Split Pins
- Sharp 2B Pencil
  Pen, textas, pencils
- Paper
  Cardboard
- Computer with browser
- Camera to take pictures of finished structure (and during building process)
- Presentation from teacher for documenting findings

Rules:
- Work with a friend/s
- Document your work with photos

Time Limit:
- Ask your teacher during class time. 2 - 3 hours
  - 1 hour to make poster
  - 1 hour for scratch.mit.edu program
- If no timekeeper, keep the timer where you can see it. Use this one http://e.ggtimer.com

Extension

If you have enjoyed this project add some more split pins and describe the parts of a flower.

Conclusion:
- Take a photos.

- Post pictures of your project in the presentation your teacher shared with you.
- Complete the investigation
- Write about your project beside your picture in the presentation your teacher shared with you.

Explaining results

What happened? Describe the successes when making your poster.

What helped you when creating the poster?

Did the result match your prediction? If not, how was it different?

Evaluating the investigation

What challenges did you experience during the investigation?

How did you, or could you, overcome them?

How could you improve this investigation? (fairness, accuracy)

CSER Professional Learning:

This lesson plan corresponds to professional learning in the following CSER Digital Technologies MOOCs:

F-6 Digital Technologies: Foundations

- Unit 7: Algorithms and Programming
- Unit 8: Visual Programming

Further Resources

Digital Technologies Hub: www.digitaltechnologieshub.edu.au

CSER: https://csermoocs.adelaide.edu.au/