

STEM/STEAM Project for Year 4 at Clayfield College

Mr Bret Hudson and Mrs Angela Clark
Year 4 Core Teachers
Clayfield College



Through an adapted version of an “Authentic Task”, created by the Victorian Government in 2008 for middle school students, Clayfield College developed a term-long project for two Year 4 classes. The students were asked to construct 12 miniature golf holes from 12 pieces of thin plywood 91cm². They were charged with making the holes challenging, visually attractive and fun. In addition to this, they also had to recoup funds spent on the development of the holes by holding a ‘Yr 4 Miniature Golf Day’ at the end of term.


To complete this task there were many steps in order for students to achieve the desired outcomes and meet each weekly target. Students received ongoing constructive feedback and ample time to test the effectiveness of their designs. The steps included designing and planning, constructing, reviewing and testing, specialist feedback and group reflection and modification.

It is important to note this was a student-directed project. Teachers guided students through the process showing them different ways to design and build their holes and provided the necessary resources when required; however, students ultimately decided which information they chose to accept or ignore. Teachers were mainly called upon to assist in an advisory capacity only.

Designing and planning

Students were shown a variety of putt-putt golfing courses, including some that were homemade. They discussed key features of holes and reflected on those that were the most interesting in terms of shape, ‘risk and reward’ and attractiveness.

Students chose their own groups and collaboratively decided upon a theme. They designed their golf holes and drew them using a labelled aerial and side view drawing. Once complete they measured and drew lines on their 91cm² plywood so it could be cut and later reshaped into the design of their golf hole.

 [Click here to download the design and planning form](#)

The groups then made a list of recycled materials they would require to construct their golf holes. Additional non-valuable toys or objects were also added to the list to increase the attractiveness of the hole.



Our school’s maintenance crew cut the boards along the lines the students had marked.

Construction

During the construction phase, the groups reattached their plywood (if needed) to form the shape of their hole. As a year group, we then discussed the most effective ways to raise their design to ensure the ball could fall into the hole. We also spoke about and demonstrated ways to attach walls, bridges, tunnels, obstacles and other decorative pieces.

Varying techniques were discussed on how to effectively reinforce and strengthen their walls. A part of the project was to create a golf hole that was visually attractive and students applied paint to achieve this. They also added an element of texture to slow the ball down or change its direction using sand, dirt or bark.

Students had identified that a key element of creating a successful golf hole was the ‘challenge’. Each group placed their various methods of providing that challenge (obstacles, bridges, volcanoes) on their boards, but did not yet secure them so they could be moved or altered if needed during the next testing phase.

Throughout the term, discussions on team work were crucial to maintaining a harmonious work environment within each group. As students were required to share ideas and work-load, encourage each other and demonstrate patience, it was essential to touch base with each group regularly.

Reviewing and testing

Once the basic structure of the hole was complete, students discussed in greater detail the effectiveness of having obstacles and the importance of their position. This phase involved a lot of testing and reflection. For the first time, students were able to gain a sense of whether or not their hole was going to be effective and enjoyable or require modification.

Students then added toys to make the holes come to life. They also designed a sign on their computers showing the name of their holes and added a par number.

Specialist feedback

Once students reached this point, they had tried and tested their holes and felt that they were satisfied. We then invited an expert in the field to come and play their holes in the classroom. Our expert Scott McKay tours the world building golf courses and had real insight into what makes a challenging-yet-rewarding golf hole.

Students really took to the ‘risk and reward’ concept whereby if you design a hole that has a high risk and it pays off, your ball should end up next to the hole and reduce your overall number of shots. However, if you miss that may add additional shots to your total. He also asked them what par their holes were and gave advice on whether their par score was realistic or not. At this point many groups made minor changes to improve their holes.

Group reflection and modification

Having completed their golf course, Year 4 played each others’ holes and provided written feedback about what they liked or would encourage each group to change in order to improve the enjoyment and success of their holes. On completion of this activity, last-minute modifications were made.

Year 4 golf day

Students invited the entire primary school and School Leadership Team to visit and play their 12-hole golf course at the cost of a gold-coin donation. Pairs of students spoke to each class when they arrived outlining the course and expectations, supervised each hole and helped Pre-Prep to Year 6 students complete the hole successfully. Other students repaired holes when necessary, some were even photographers, DJs and coin collectors.

Students raised enough money to recoup their original costs and send additional funds to our chosen charity.

STEM/STEAM

During this endeavour the Year 4 students had to:

- Use their understanding of materials and motion to design their holes – Science.
- Follow the design technology process. Use digital technology to record and reflect upon the process and also make signs for their holes – Technology.
- Work with materials to create bridges, tunnels, ramps, walls, structures, volcanoes, supports, holes and a tee-off position, and to make running repairs – Engineering.
- Apply their knowledge of colour, pattern, shape, line and texture – Art.
- Work out the area and perimeter of their golf hole, use measurement, make monetary calculations and apply their understanding of angles, data and statistics – Mathematics.

Throughout the project the students’ language skills were used extensively to brainstorm, list, plan, create a procedure and an invitation, identify problems, come up with solutions, collaborate and cooperate, adjust, improve and present their golf holes.

 [Click here to see the class website](#)