Solar Clock

He tātai whetū ki te rangi, mau tonu, mau tonu,
he tātai tāngata ki te whenua, ngaro noa, ngaro noa.
As humans our time on earth is but fleeting
yet the stars that hang in the sky
they will last forever.

Did you know that te rā (the sun) will cast a shadow in the same direction at the same time of day, every sunny day of the year? In Aotearoa, during the middle of the day the sun is always to raki (the North), although its height changes through the year. This means it can help us tell direction, date and time! All ships that sailed open oceans before GPS used the sun (and stars) to find out where in the world they were!

Task:

Let's use this knowledge to create a clock in our backyard that can tell us the time whenever the sun is out! We just need some simple household items, and a clock to set up the initial positions.

1. Gather the equipment we need:
   - A clock/phone/something that tells time
   - A thin, straight object that can stand upright (I will use a bamboo rākau (stick) hammered into the ground)
   - 10 objects we can write times on and will stay in place. This could be rocks, ice cream sticks, tent pegs or anything else you can think of!
   - A spot in the backyard that gets the sun most of the day and won't be in the way! Check with your parents that the spot is OK to use. Any surface is fine as long as you can see the shadow.

2. Set up the clock

   Stand the pole upright. Try and get this as upright as possible. If your parents have a level you can use this, but doing it by sight is OK too.

3. Take note of the time.

   You are going to come out each hour of the day when the sun is out and place a marker for that hour where the shadow is. Don't worry if you can't get it all done in one day, the hourly position will always be pretty much the same! Try to get every hour from between 8am and 5pm over the next week.

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4. Position your markers,

Put them about halfway between the pole and the end of their shadow. This means that when the sun is higher during raumati (summer), the clock will still work.

Ka rawe!

You now have a working solar clock!
You can now use this to tell the time whenever the sun is out.

See if you can extend your thinking by answering these questions

- What direction does the sun move in the sky?
- The days are longer in te raumati (the summer). Will the shadows be longer or shorter than the same time of day in takurua (winter)?
- Where does the sun rise and set at your house? How will this change as we go into summer?

If you loved this project ask us for some further extension activities!

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