Optimal decision-making in daily life

Method 1: Travel Expenditure

1. Ask if any students have experience using Excel spreadsheets. Pair up experienced students with those who are not. Any pairs with no experience will need assistance.
2. Show students the worksheet in Travel Cost Method 1 Tab. Explain coloured columns contain data collected by surveys or looking up data provided by organisations. The blank white columns are where students must calculate using the given data.
3. Ask students to use Columns B and C to calculate the number of people that visit Castle Hill at least once a year. As only a percentage of the total population in Aitkenvale visit the hill, we need to work out how many people that is.
4. Show students how to enter a formula. Click in destination cell – where you want the calculation to go. Then type in = then click on Column B cell 4. This is the first cell with data in the population size column. Then type * then click on Column C cell 4. Explain how C4 is the shorthand way to write the address for this cell. Ask students what the asterisk must represent (multiply)
5. Press return and the number is shown in cell D4.
6. Show students how to check the formula for this calculation by looking at the formula bar at the top of the spreadsheet just above the columns.
7. Go to column F to work out the total number of visits by people in a year using the data in Columns D and E. Click in cell 4 column F (this is the destination cell), type =, then click in D4, then type * then click in E4 then return. Now we know how many total visits are made by these people in a year.
8. Check that students are getting the right answers at this point before proceeding. They should be able to continue independently once they get the hang of the formulas. Assist any pairs that need help.
9. For Student Step 5, they may be tricked by not accounting for the return trip and including x2 in the formula.

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4. The value to residents is slightly more than the annual cost for maintaining the hill. So, this implies that the council could invest money in Castle Hill rather than leave it turn to rubble. Or bulldoze it and build a shopping centre. Is this a good idea? Possibly encourage students to take a side on the issue and have a quick debate considering different perspectives. Hopefully students should be outraged and this leads to the next question.

   We have assumed that the only value is a travel cost. But many residents like the picturesque way it sits in the middle of the city; tourists like to use it and tourists bring money into the town; using the hill for exercise means that people are getting health benefits that haven't been factored in; if people can't use the hill then they will use other areas like the strand which will become overused and require more maintenance.

This leads to Method 2, which is another way to consider whether it is worth spending money on Castle Hill maintenance.

Method 2: Economic Return

1. Ask students to look at Table 1 again. As a class discuss what are the differences between the two firms? Point out where Company B will spend on non-local goods/workers.
2. Ask students which company will spend the most in Townsville? Write down the total amount spent locally for each firm.
3. Introduce the idea of a multiplier effect. For every dollar that a Townsville based worker receives from the Maintenance company, the worker will spend some of it back on local products. Not all of it, but some of it will buy local goods from local businesses. So, some of that original dollar can be spent again by the business person who receives it from the worker. And the business person will spend some of that part of the dollar they received locally which means that the dollar can be spent over and over in the Townsville community until there are no parts left. Method 2 is the Economic Return method for working out how much of the council's maintenance money will be returned to the Townsville economy.
4. Go through the different ways a worker can use a dollar

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Step 8 Point out that the table is reproduced in grey just so they can refer to it. The pale green row is the initial expenditure by the council when they pay the company. The Excel formula should be =F4*0.504

Step 10 There were 29 rounds.

Step11 The totals are =Sum(F4:F34) or H

1. The amount of money returned to the local economy with either company is more than the travel cost method values Castle Hill.
2. The council should go ahead, because even though the initial expenditure is like the travel cost value of Castle Hill, paying a company to do the work will return money to the local economy.
3. The local company should be engaged because much more money is returned because more goods and services are sourced locally compared to the Brisbane company.

Procrastination

1. Introduce idea of presence bias using an example.
2. Introduce idea that the council must decide if they should do the work in 2017 or wait. What is the benefit in waiting? We will work out what the impact on the 2016 budget will be in two scenarios – doing the work in 2017 or 2018.
3. Introduce idea of risk. If the work is not done there is a 1% chance of a landslide. This can be written as a fraction 0.01. Y is the extra costs if it happens. So, for every year there is a delay in doing the work this cost is possible and should be added to the budget. But if the work is done the risk is reduced to 0.
4. Introduce the bias parameter called beta b. If the cost is incurred in the present then the value of b is 1. If it is incurred in the future the value of b is 0.5. So, when the maintenance work is done then the full amount of the maintenance cost is incurred in the budget for that year.
5. Show scenario table. The council must decide in 2016 whether to go ahead in 2017 or 2018. Already in 2016, the risk cost is 0.01 x b x Y in either case.
6. Show that if the work is done in 2017, the actual maintenance costs are incurred (1 x $249700), but if it is delayed another year, in 2017 the costs are just the risk costs.

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7. Show that in 2018 there are no more costs if the work has been done, but if there has been procrastination then another risk cost must be added in.
8. Calculate the total costs in the 2016 budget for work done in 2017 = 0.01xbxY + 05x249,700 + 0; and for work done in 2018 = (0.01xbxY)x2 + 0.5x249,700.
9. Calculate the total costs in the 2017 budget which change because the work is done and you can leave out the risks (=249,700); or there are still the risk costs if it is delayed another year (= 0.01xbxY + 0.5x249,700)