Tēna koutou katoa
Ko Pataua te maunga, Ko Pataua te awa,
E tipu ake ahau ki Whangārei.
Ko Trevor Hayes ahau.
He kaiako ahau i te kura a Kiritana (Kristin) ki Albany, Tāmaki Makaurau.

"Nau te rourou, naku te rourou, ka ora ai te iwi"


Integration
Through
Sports Science

Objectives for today …

1. Take you through an exploratory “Sports Science” process
2. Carry out an experiment - work through the stages
3. Consider how you could use this in your context

Sports Science - it’s really cool stuff!

What were some issues?

- Trials
- Different footwear
- Warm-up
- …..
- But in terms of sparking student interest and acting as a hook - this works

Key Terms:

Validity

Reliability

Quantitative & Qualitative Data

Randomization

Trials

Subjects

Mean

Standard Deviation

Key Terms ..

Key Definitions	
Validity	Whether an experimental method will assess what it is intended to assess.
Reliability	How consistent your results are when you measure using your method.
Quantitative data	Data that you are measuring eg jump height, running speed
Qualitative data	Data that you observe on the day eg weather, distractions
randomization	When you allocate subjects randomly to each independent variable condition of an experiment. The order that each subject does the conditions varies so that the results are not influenced by everyone doing the tasks a particular way.
Trials	How many times you repeat a task that is being measured.
Subjects	People who complete your trials
Mean	Average result for a specific condition. The total amount divided by the number of trials completed.
Standard deviation	How the data you have collected is distributed/ spread around the mean score.

The process ….

1. Chose a sport to focus on
2. Identify the key measurable aspects of the sport
3. Consider realistic changes you can make to performance
4. Develop a research question
5. Identify the control variables you will try and manage

Step 1: Choose a sport …

Let’s look at an example together ….

Step 1: Chose a sport to focus on ..

Cycling

Step 2: Identify the measurable variables …

What are some measurable aspects that occur in cycling?

- Balance is important
- Going fast is important ie Speed
- Endurance … going for a long time
- Agility … being able to change direction quickly on trails

Step 2: My measurable variable for cycling ….

Let’s look at Speed:

- This will become my **dependent variable** - the variable we will measure.

Step 3: What changes can we make to influence speed?

This is what I came up with:

- Seat height - High or low
- Type of shoe - Firm or flexible sole
- Type of pedal - Plastic or steel with screws
- Body position - Upright or tucked

Step 3 & 4: How does body position affect speed?

Tucked V Upright

Step 5: Identifying the control variables ….

- The same force applied to the bike
- The clothing people wear
- The same type of bike is important to control

Method ….

Designing an Experiment

Now it’s your turn …….

Make a group of 3 or 4

Use the sheet provided to guide you through the process …..

- Select a sport to focus on
- Think about the measurable variables in that sport
- Select one you can work with and measure
- Consider how performance can be altered to impact on the measured variable
- Think about your research question

Designing an Experiment

Now it's your turn …….

Make a group of 3 or 4

Use the sheets provided to guide you through the process …..

Timer

Experiment Time ….

1. Does the ball colour affect a person's ability to catch a ball?
2. Does performing with shoes (compared to performing barefoot) give an added advantage to the distance achieved in the horizontal jump?
3. Does the inflation level of a ball influence the distance it can be thrown?
4. Are people stronger with their preferred or non-preferred grip?

Doing the experiment ….

1. For each condition have 2 people assisting each other - one directing the task + one recording data
2. Have a couple of people watching for any specific qualitative data - one for each condition
3. Have someone who will input the data into the digital form

https://docs.google.com/spreadsheets/d/1-nwTqpGJaSYvY7X1-hsK0dV1PJ_7dkoh8bTOpiLRh5A/edit?usp=sharing

Conclusion / Evaluation time ..

1. Using your means, describe the trend shown with the data you collected.
2. Outline any relevant qualitative data and their impact on results.
3. Outline whether your data supports your hypothesis.
4. Considering your results, discuss the recommendations you would have for coach's or player's in order to maximise performance.

Conclusion / Evaluation continued ..

Reflect on the following interpersonal skills you may have used to ensure the experiment ran well ….	
staying focused throughout the investigation	
sharing the roles	
encouraging everyone to perform at their best	
contributed my ideas calmly and remaining actively involved	
listened respectfully when my team members were speaking	
trying other's ideas and being prepared to discuss and compromise so that we have a win / win result for our team	
seeking and using feedback received from my peers and teacher	

Conclusion / Evaluation continued ..

As a sports scientist running an experiment gathering data and working with human subjects and fellow researchers ….

What went well?	What did not go as well as planned?	What would you do differently if you did this again?

Can you use this approach in your programme? Would it be useful?

1. In an option subject where you have the time?
2. Could the concept be used in a “Core” PE class to explore topics?
3. What about with your NCEA courses? Eg as the framework for AS 2.3
4. Could it be done as a presentation on an A1 sized board?
5. This can be done with either a teacher OR student directed focus and method.

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Gran Fondo Guide. (2016, August 26). *Skillful cyclist rides in Superman position at crazy speeds* [Video]. YouTube.

https://youtu.be/tEKGER6IAA4?si=nL6QR7LKGR0lWbkP

How does the ball colour affect a person's ability to catch a ball?

Procedure:

- Subjects who are catching have a feeder who is 3m away
- The feeder tosses the ball in an underhand lob toward the catcher to land marked with a line on the ground 1m from them – directly in front. They are not to put any additional spin on the ball, they need to let the shape of the ball determine the bounce.
- The catcher can step forward towards the ball once it has bounced in order to catch the ball.
- They receive 10 tosses for each condition.

Does performing with shoes (compared to performing barefoot) give an added advantage to the distance achieved in the horizontal jump?

Procedure:

- First subject places toes behind an identifiable line on the ground.
- Subject then jumps from a stationary, two footed position and jumps forward as far as position.
- Marker measures from the jumper’s body that is closest to the start of the measuring tape (normally the back of the feet unless the jumper falls back)
- The jumper repeats another two times.
- Next jumper performs their three jumps.

Does a pre-shot routine improve basketball shooting accuracy?

Procedure:

1. Warm-up: spend 5 minutes completing the following warm-up
   - With a basketball jogging and bouncing a basketball several lengths of the space you are working in.
   - Practice your free throw shot to get your eye in – practice from different angles and places – remember this is to warm you up.
2. Allocate each person to be a subject 1-11 which then shows the order of conditions for each person. For example subject 1 will do 10 shots using condition i (routine). They then have a break with another subject performing before they then do condition ii (no routine).

Are people stronger with their preferred or non-preferred grip?

Procedure:

1. Warm-up: spend 5 minutes completing the following warm-up
   - Jog several lengths of the space you are working in.
   - Perform some basic exercises and stretches such as press-ups; arm swings; wall hangs; forearm stretches.
2. Allocate each person to be a subject 1-11 which then shows the order of conditions for each person. For example subject 1 will do 3 repeats of condition i (preferred grip). They then have a break with another subject performing before they then do condition ii (non-preferred grip).

Understanding your experiment

- A digital copy is in “collaborations” for you
- Read through your experiment - any questions about what you are reading?
- Did you notice that your conditions are in a different order for each subject? This is called “randomization”
- Write your individual hypothesis - what do you think will happen and say why you think this (I believe that this condition ‘X’ will be best because …..)
- Have a trial run with your group - pretend you are going to run the experiment - make sure everyone knows how to do each part.

Final Trial Run

One person from each group will join another group - they will be your subject and will go through the process as a trial run.

Use this lesson to learn what you need to be aware of -

- what problems may arise that you will need to adjust
- Consider solutions to these problems