

MATHEMATICS IN CAREERS

Investigation - Body Mass Index (BMI)

Key career focus for this investigation: Sport scientist, dietician, personal trainer

Related career areas: Health sciences



THINKING ABOUT CAREERS

- Brainstorm health sciences professions (such as sport scientist, personal trainer, dietician) you can think of where maths is frequently used. Use <https://joboutlook.gov.au> to explore health sciences related career pathways that include use of mathematics. *How is maths used in these scenarios? What maths is used in these scenarios?*
- This task focuses on how maths is used in health and fitness through investigating BMI.
- The tasks specifically looks at BMI as a determining factor of whether an individual is within a healthy weight range and asks you to identify some limitations to this.
- Explore careers such as sports scientist, dietician, personal trainer to discover how maths is used in these. For a more extensive list of careers related to this task, with a maths / science focus, refer to the table at the end of the task and explore the maths used in these jobs.

MATHEMATICS IN EVERYDAY LIFE AND CAREERS

Mathematical focus for this investigation

- Using formulas to solve problems
- Re-arranging expressions to make a specified variable the subject
- Using authentic data to construct scatter plots, make comparisons and draw conclusions

Scientists including health professionals use various measurement formulas. They apply their knowledge and understanding of surface area and volume to see the relationship between volume and surface area, in various situations. In this case specifically looking at the reliability of BMI as an indicator of healthy weight range.

- Many people use various measurement formulae every day. For example, they do the area calculations in their head to calculate carpeting or tiling floor surface.
- Brainstorm and share scenarios where this mathematics may be used in health and biological sciences to solve problems.

MATHEMATICAL INVESTIGATION

BODY MASS INDEX (BMI)

INVESTIGATION BACKGROUND

The BMI or Body Mass Index is one way of trying to work out whether you are within a healthy weight range. However, it experiences some limitations that are problematic. For example, many elite athletes may be considered either obese or underweight. Examples may include AFL footballers who may be considered 'obese' according to the BMI; on the other end of the scale, healthy individuals who are shorter than average can be considered 'dangerously underweight'. It also changes for men and women, so it can be quite variable.

YOUR INVESTIGATION

Using the BMI as a jumping off point, can you create a formula that is inclusive of both the upper and lower outliers of the BMI? The general formula for BMI is given below:

$$\text{BMI} = \frac{W}{H^2}$$

W – weight in kg H – height in m

You may wish to start with a sample population, such as

- Your AFL team. If you have the AFL app for your team, click on players and for each individual player record their height and weight.
- Likewise, if you have the Australian Open app, click on players and whether you choose male or female you will find heights and weights of all players
- Investigate any other group of elite sportspeople
- Your class, if permissions are granted
- Investigate any other group that has data available that you think may refute the BMI healthy weight range guide.

REFERENCE MATERIAL

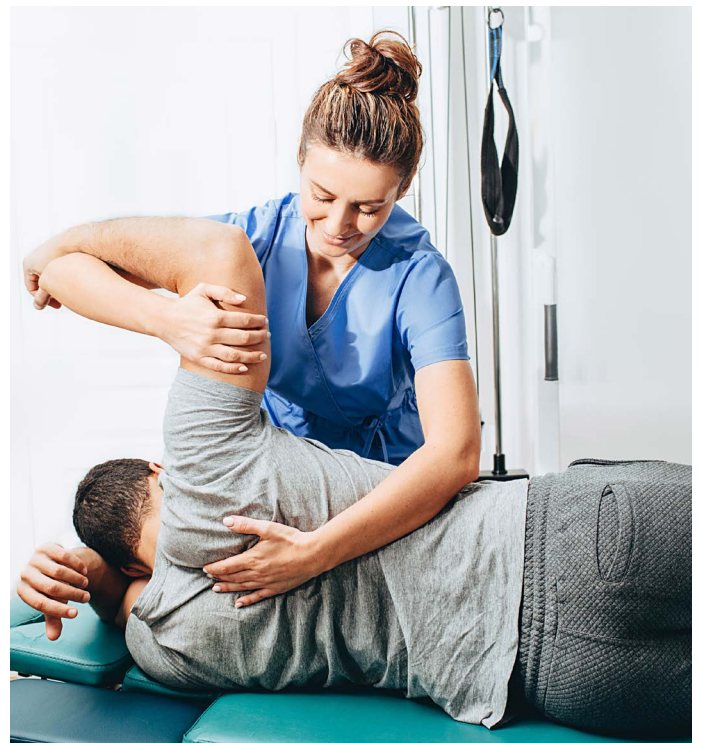
The following weblinks may be useful.

<http://healthyweight.health.gov.au/wps/portal/Home/helping-hand/bmi>

<http://healthyweight.health.gov.au/wps/portal/Home/get-started/are-you-a-healthy-weight/bmi/>

<https://caloriesburnedhq.com/bmi-calculator/>

<https://www.heraldsun.com.au/sport/afl/the-top-10-footballers-in-country-victoria/news-story/a2fb89d931c-7be211a70a027daf8f8bd>



MATHEMATICAL INVESTIGATION

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CAREERS RELATED TO THIS INVESTIGATION

HEALTH SCIENCE

Career description	Key skills required	More information
<p>Health science is a wide area of practice, this activity focuses more on careers that work with body systems and treatment of disorders and diseases related to skeletal system including:</p> <ul style="list-style-type: none"> • Physiotherapist • Osteopath • Chiropractor • Radiologist • Orthopaedic surgeon 	<ul style="list-style-type: none"> • Human biology knowledge • Knowledge of health-related medical issues and injuries and their treatment • Reasoning and problem solving • Teamwork and communication • Patient focused care • Scientific method and quantitative skills • Flexibility and adaptability 	<p>www.aeseducation.com/blog/health-science-career-pathways</p> <p>https://careerswithstem.com.au/the-a-z-of-health-jobs/</p> <p>https://careerswithstem.com.au/5-awesome-jobs-you-could-get-with-a-health-science-degree/</p>

NUTRITION

Career description	Key skills required	More information
<p>Nutrition careers look to use evidence-based advice relating to food and its impact on human health. Careers include:</p> <ul style="list-style-type: none"> • Nutritionist • Dietician • Food technologist • Health and diet advisor • Health promotion 	<ul style="list-style-type: none"> • Biology knowledge • Knowledge of food and health • Patient focused care • Good communication 	<p>https://mallory.com.au/nutritionist-dietitian-career-opportunities/</p>

FITNESS

Career description	Key skills required	More information
<p>There are lots of careers in the fitness industry for individuals who enjoy health and wellbeing. Some careers include:</p> <ul style="list-style-type: none"> • Personal trainer • Exercise therapist • Studio trainer • Fitness business manager 	<ul style="list-style-type: none"> • Good collaboration • Problem solving skills • Knowledge of health and fitness • Intrapersonal skills • Creativity • Flexibility and adaptability 	<p>https://www.aipt.edu.au/articles/2019/04/fitness-industry-careers-what%E2%80%99s-right-for-you</p> <p>https://fitness.edu.au/your-career/</p>

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CAREERS RELATED TO THIS INVESTIGATION

SPORT

Career description	Key skills required	More information
<p>Careers in sport incorporate using health and fitness to assist individuals reach their sporting goals. Careers in sport:</p> <ul style="list-style-type: none"> • Exercise physiologist • Sport management • Sports psychologist 	<ul style="list-style-type: none"> • Good collaboration • Problem solving skills • Knowledge of health and fitness • Intrapersonal skills • Creativity • Flexibility and adaptability 	<p>https://www.murdoch.edu.au/news/series/series-articles/creating-healthy-futures/5-great-careers-in-sport-you-ll-want-to-have</p>

OTHER RELATED CAREERS TO EXPLORE

- Remedial massage therapist
- Sports coach
- Physical education teacher
- Sport science
- Epidemiologist

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CAREERS ACTIVITIES

THE 10 BEST RATED JOBS OF 2021			
Rank	Career	Median salary	Projected growth
1	Data Scientist	\$98 230	33%
2	Genetic Counsellor	\$85 700	21%
3	Statistician	\$92 270	35%
4	Medical Services Manager	\$104 280	32%
5	Mathematician	\$110 860	33%
6	University Professor	\$80 790	9%
7	Operations Research Analyst	\$86 200	25%
8	Information Security Analyst	\$99 730	31%
9	Actuary	\$111 030	18%
10	Software Engineer	\$110 140	22%

Data from [Careercast.com](https://careercast.com).

Select one of the careers, from either of the tables above, that interests you and find out:

- What are the tasks involved in this career? What may a typical day look like?
- What level of education or qualifications do you need to do this career?
- What are some other similar or related careers?
- What mathematics skills would be used in this career?
- Where does the career you have selected, to investigate, rank according to careercast.com?
- How many people in Australia are currently employed in this career (or field)?

INDUSTRY PARTNER

This project was produced collaboratively between The Mathematical Association of Victoria (MAV) and the Victorian Space Science Centre (VSSEC).

The Victorian Space Science Education Centre (VSSEC) is a specialist STEM learning facility, one of six established by the Victorian State Government. Since its official opening in 2006, VSSEC has used the context of space to enhance the learning experiences in Mathematics, Science, Technology and Engineering for both teachers and students. VSSEC is located in the grounds of Strathmore Secondary College. The spiral galaxy shaped building provides a stimulating environment which encourages students to be fully engaged in problem-solving and scenario-based learning. www.vssec.vic.edu.au

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FURTHER CAREER REFERENCES

Australian Jobs Report 2021

www.nationalskillscommission.gov.au/australian-jobs-report

An overview of trends in the Australian labour market to support job seekers and employment service providers, career advisers, those considering future training and people interested in labour market issues.

Business Victoria Future Industries

<https://business.vic.gov.au/grants-and-programs/future-industries>

Future Industries is about supporting investment in high-growth industries through industry excellence and development projects, including establishing collaborative networks and building supply chain readiness capabilities.

Career Education

www.education.vic.gov.au/school/teachers/teachingresources/careers/Pages/default.aspx

Career Education teaching resources to help teach students to make informed career decisions and equip themselves for the world of work.

CEAV Online Learning Resources

<https://ceav.vic.edu.au/media/250615/careers-in-the-construction-technology-industries-student-resource.pdf>

Designed to enable students to attend a virtual Industry Immersion Experience, these online resources will help students discover more about Victoria's priority growth industries and give them the opportunity to reflect on their skills, interests and undertake career planning and exploration.

Jobs Victoria

www.jobs.vic.gov.au

JobOutlook

www.joboutlook.gov.au

Relevant and current labour market trends and career information.

MyFuture

www.myfuture.edu.au

A database of over 600 careers.

National Careers Institute

www.dese.gov.au/nci

The National Careers Institute (NCI) ensures Australians have access to reliable and accurate careers information, resources, and support.