

This assessment is based on a now-expired version of the achievement standard and may not accurately reflect the content and practice of external assessments developed for 2024 onwards.

91923Q



Mana Tohu Mātauranga o Aotearoa
New Zealand Qualifications Authority

Level 1 Science RAS 2023

91923 Demonstrate understanding of science-related claims in communicated information

Credits: Five

PILOT ASSESSMENT

ASSESSMENT TASK

Check that this booklet has pages 3–10 in the correct order and that none of these pages is blank.

CANDIDATE GUIDANCE

For this standard you will need to:

- select only ONE science-related claim to use from this report guide

Tick the claim you will write about in the report:

organic meat benefits

astrology

climate change

- write a digital report on the selected claim using your science knowledge and language, and science critical thinking skills.

In your report consider including discussions on:

- what science-related claim is made in the resource
- who or what the source of the claim is, and the intended purpose of the communicated information
- how science language and conventions are used to support the claim
- how science language and conventions represent or mis-represent the science ideas in the claim.

Report format and submission requirements

The digital report must:

- be one document file that is no longer than 5 A4 single-sided pages including pictures, diagrams, and visuals
- use size 12pt Times New Roman font
- have no file links that take the assessor out of the document
- the file size should not be greater than 200MB.

Your work must be authentic to you. You will need to confirm a notification of authenticity as part of the digital submission upload process.

SCIENCE-RELATED CLAIM: ORGANIC MEAT BENEFITS

Content for the scientific claim:

Dr Amber Sciligo and Dr Jessica Shade published a report called “The Benefits of Organic Meat.” They suggest that organic meat is better for the environment. The report can be found here: https://www.organic-center.org/sites/default/files/MeatReport/meatstudy-final_05_14_1.pdf

Some ideas from the report:

The diagram “Organic meat means” shows how the researchers define what organic meat is. Other claims from the report include:

- Organic farming doesn’t use artificial growth hormones so it’s better for the environment. In non-organic farming, animals might be fed artificial growth hormones (e.g. ractopamine) and steroids (e.g. beta-antagonists) to quickly grow more muscle. However, these chemicals don’t always stay in the organisms. Artificial growth hormones can end up in the environment and in wastewater.
- Bees, birds, and other wildlife benefit when there are no pesticides being used. Some harmful pesticides in non-organic meat are organophosphates, neonicotinoids, and pyrethroids which can build up in the human body. Organic meat doesn’t contain pesticides like a lot of non-organic meat.

The researchers were paid to write this report by The Organic Center and Applegate, two American companies:

The Organic Center is a non-profit research and education organisation. Their aim is to conduct credible, evidence-based science on the environmental and health effects of organic food and farming and communicate the findings to the public.

Applegate have been producing a range of organic meat products for over 30 years. They say their meat products are made without genetically modified organism ingredients. Their foods have no added nitrites, nitrates, phosphates, or artificial ingredients or preservatives.

Source: https://www.organic-center.org/sites/default/files/MeatReport/meatstudy-final_05_14_1.pdf

Supporting content to help examine the claim:

In 2017 researchers named Michael Clark and David Tilman (2017) examined everything that happens to food right up until it leaves a farm. They compared different food types grown organically and non-organically. Some of their results are shown in the graph “Environmental impacts of organic vs. conventional agriculture”.

Environmental impacts of organic vs. conventional agriculture

Each food in the graph has a vertical bar. The smaller the bar, the more confident the researchers are that their findings are correct.



Source: <https://ourworldindata.org/is-organic-agriculture-better-for-the-environment>

In a different study, four researchers from English universities studied 71 other research articles on organic farms.

They found that organic farms usually have more good microbes in the soil and don't lose as many important nutrients like nitrogen, nitrous oxide, and ammonia, compared to other farms.

But when you look at each thing they make, like a kilogram of beef, the organic farms actually have more nitrogen, nitrous oxide, and ammonia leaking into the environment.

Organic farms need less energy, but they use more land and could cause more pollution, depending on the food being grown.

Source: Tuomisto, H. L., Hodge, I. D., Riordan, P., & Macdonald, D. W. (2012). Does organic farming reduce environmental impacts? – A meta-analysis of European research. *Journal of Environmental Management*, 112, 309–320. <https://doi.org/10.1016/j.jenvman.2012.08.018>

Sources

https://www.organic-center.org/sites/default/files/MeatReport/meatstudy-final_05_14_1.pdf

Tuomisto, H. L., Hodge, I. D., Riordan, P., & Macdonald, D. W. (2012). Does organic farming reduce environmental impacts? – A meta-analysis of European research. *Journal of Environmental Management*, 112, 309–320. <https://doi.org/10.1016/j.jenvman.2012.08.018>

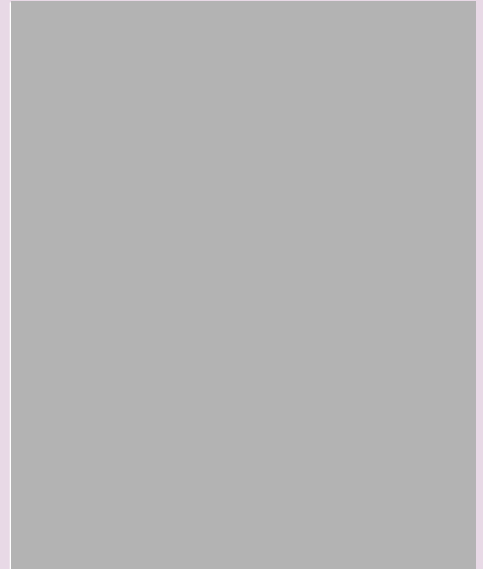
SCIENCE-RELATED CLAIM: ASTROLOGY**Aliza Kelly**

The popular astrologer Aliza Kelly makes the following statement:

Your birth chart reveals the location of the planets in the sky at the time of your birth. An analysis of this chart, also called a natal chart, can provide deep insight into your personality.

According to her website, “Aliza Kelly is a celebrity astrologer, columnist, bestselling author, and host. Referred to as a ‘rising star’ in modern spirituality, Aliza has been featured in *The New York Times*, *The New Yorker*, *Vogue*, *InStyle*, *The Cut*, and numerous other publications. She’s the author of three popular books about astrology.”

Source: <http://alizakelly.com/>)

**Astrology and the zodiac**

The zodiac is a belt shaped region of the sky that extends approximately 8° north and south of the ecliptic (the plane of the Earth’s orbit). In Western astrology the zodiac is divided into twelve signs, each occupying about 30° of celestial longitude, starting with Aries in March and ending in Pisces twelve months later. Astrologers use the position of the Sun, Moon and planets relative to these twelve signs at your birth to predict your personality.



The signs of the zodiac are determined by the constellation
that the Sun is aligned with when you are born

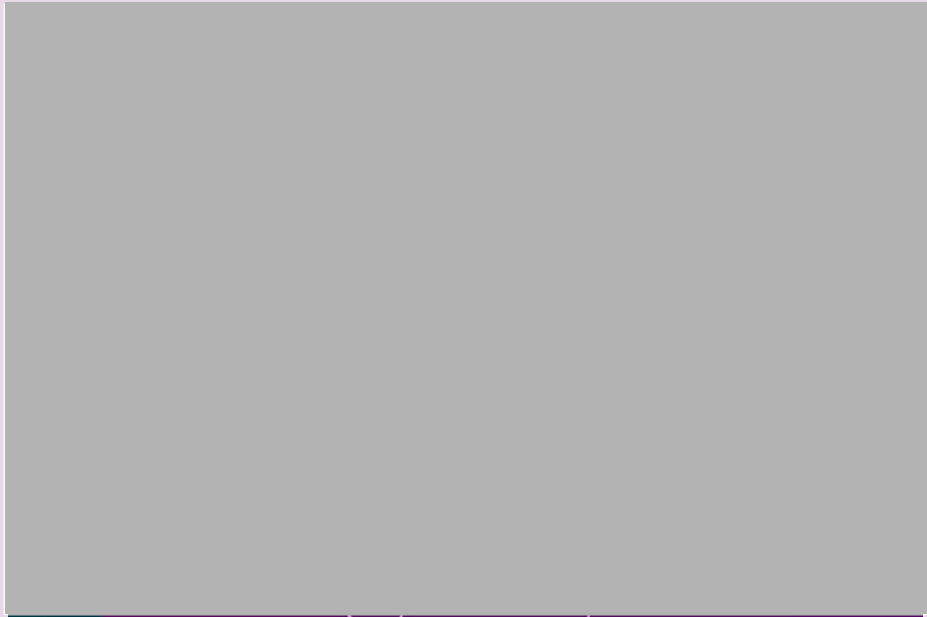
Source: <https://asztronauta.com/en/24-constellations-that-will-show-you-your-true/>

Personality

According to the American Psychological Association (APA), personality is made up of special characteristics, “including major traits, interests, drives, values, self-concept, abilities, and emotional patterns”.

According to psychology, personality is determined by interactions between your genes and your environment, but not astrology. One way psychologists study personality is using the California Personality Inventory (CPI). A CPI uses reliable and scientifically measured values about a person to create a list that describes that person’s personality.

Sources: <https://www.apa.org/topics/personality>
<https://www.verywellmind.com/what-is-nature-versus-nurture-2795392>

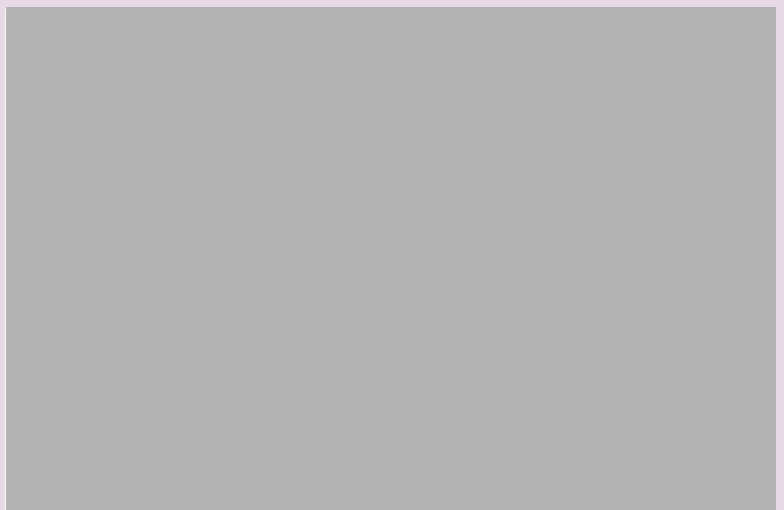


Double blind trial

American physicist Shawn Carlson concluded in a unique double-blind test of astrology, the results of which were published in *Nature* (December 5, 1985). The controlled study was designed to test whether astrologers could predict someone’s personality from their birth chart.

A single blind trial is a trial carried out where the test group don’t know whether something is real or a “fake” substitute. Carlson ensured that his trial was double blinded. This means that not only the astrologers didn’t know which birth chart was real, but neither did the people carrying out the research.

Source: <https://sciencenotes.org/double-blind-study-blinded-experiments/>



Carlson's Study

Carlson's study produced a real personality profile and a birth chart for 116 different people.

The experiment: an astrologer was given a random person's birth chart and three personality profiles, but only one of the personality profiles actually matched the birth chart. The other two personality profiles were for different people.

The astrologer had to judge which of the three personality profiles best matched the birth chart.

Thirty different astrologers completed this test, and each astrologer completed around 30 different trials. Overall, the test was completed about 900 times in total.



Sources

<https://www.astrology.com/us/home.aspx>

<http://alizakelly.com/>

<https://earthsky.org/astronomy-essentials/what-is-the-zodiac/>

<https://www.apa.org/topics/personality>

Hartmann, P., Reuter, P., Nyborga, H. (2006) "The relationship between date of birth and individual differences in personality and general intelligence: A large-scale study" (PDF), *Personality and Individual Differences* 40 (7): 1349–1362

Carlson, S. A double-blind test of astrology. *Nature* 318, 419–425 (1985).

<https://home.ifa.hawaii.edu/users/wynnwill/pdf/Astrology%20test.pdf>

SCIENCE-RELATED CLAIM: CLIMATE CHANGE**Dr Sam Dean**

Dr Sam Dean is a Principal Scientist at the National Institute of Water and Atmospheric Research (NIWA). NIWA's mission is to conduct leading environmental science to enable sustainable management of natural resources for New Zealand.

After Cyclone Gabrielle, he said that it “was a gigantic, gargantuan event and I have no doubt ... that climate change has influenced that event.” (RNZ, March 2023)

According to NIWA, changes to our rainfall and temperature will increase the likelihood of extreme events like Cyclone Gabrielle.

This is because a warmer atmosphere can hold more energy and moisture, leading to heavier and more intense rain.

For the same reason, ex-tropical cyclones (cyclones that originate in the Pacific) may be stronger and more intense when they reach New Zealand, say NIWA.

The greenhouse effect

The greenhouse effect is an atmospheric process where greenhouse gases like carbon dioxide, methane, and water vapour trap outgoing infrared radiation in the Earth's atmosphere.

This process helps to keep the Earth warm and habitable.

Carbon dioxide levels

The graph below shows the change in CO₂ levels over the past 800 000 years which has been measured in ice core samples. Current CO₂ levels are approximately 415 parts per million (ppm).



Source: <https://www.zmescience.com/ecology/climate/carbon-dioxide-global-warming-05042019/>

Most scientists agree that there have been 11 interglacial periods in the last 800 000 years. An interglacial period is when the global temperature is warmer than average. An interglacial period can last for approximately 10 000 years. The peaks on the graph above show these interglacial periods.

Sources

<https://www.rnz.co.nz/news/national/485990/niwa-scientist-in-no-doubt-climate-change-behind-cyclone-gabrielle-s-intensity>

<https://niwa.co.nz/>

https://energyeducation.ca/encyclopedia/Greenhouse_effect

Parrenin, Frédéric; Masson-Delmotte, Valerie; Köhler, Peter; Raynaud, Dominique; Paillard, Didier; Schwander, Jakob; Barbante, Carlo; Landais, Amaelle; Wegner, Anna; Jouzel, Jean (2013): Atmospheric carbon dioxide, methane, deuterium, and calculated Antarctic temperature of EPICA Dome C ice core. PANGAEA, <https://doi.org/10.1594/PANGAEA.810199>, Supplement to: Parrenin, F et al. (2013): Synchronous change of atmospheric CO₂ and Antarctic temperature during the last deglacial warming. *Science*, 339(6123), 1060-1063, <https://doi.org/10.1126/science.1226368>

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