 FSHu1CEC Blood

MG1H-1 uses mathematics and statistics to evaluate and construct arguments in a range of familiar contexts

MG1H-2 analyses representations of data in order to make predictions

MG1H-3 makes predictions about everyday situations based on simple mathematical models

MG1H-4 analyses simple two-dimensional and three-dimensional models to solve practical problems

MG1H-5 interprets the results of measurements and calculations and makes judgements about reasonableness, including the conversion to appropriate units

MG1H-8 solves problems involving uncertainty using basic counting techniques

MG1H-10 uses mathematical argument and reasoning to evaluate conclusions drawn from other sources, communicating a position clearly to others.

| Content | Teaching Strategies | Resources |
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|  | Blood Stain Analysis  Introduce the topic of blood via ‘interesting’ avenues.  E.g. forensics: blood stain analysis | <https://www.youtube.com/watch?v=3jFKZaSeNjg> |
|  | Go into how blood spatter is measured through the distortion of blood drops from perfect spheres into ellipses. <http://www.forensicsciencesimplified.org/blood/how.html>  Distortion has many factors including impact, speed of blood spurting from the body, arterial vs venous bleeding etc.  Introduce more blood facts e.g. approximately 8% of weight is blood, blood is pumped around the body in about a minute etc. | <http://science.howstuffworks.com/bloodstain-pattern-analysis2.htm>  <http://www.forensicsciencesimplified.org/blood/how.html> |
| Describe heart rate as a rate expressed in beats per minute | Move from pumping around the body to heart rate and beats per minute.  Discuss technology such as fitbit trackers etc. How to measure heart rate. <http://www.topendsports.com/testing/heart-rate-measure.htm> | <http://www.topendsports.com/testing/heart-rate-measure.htm> |
| Measure and graph a person’s heart rate over time under different conditions, eg at rest, during exercise, and after exercise | Measure and record heart rate under different conditions, e.g. heart rate during different exercises, recovery rate after exercise, relationship between a person’s resting heart rate and heart rate after exercise, or recovery time after exercise. Good to use low energy activities first, then progress to high intensity activities. Utilise competitive activities to obtain further data. Use heart rate calculators to compare theoretical rates. | Target Heart Rate(THR) <http://www.bupa.com.au/health-and-wellness/tools-and-apps/tools-and-calculators/target-heart-rate-%28thr%29> |
| Identify mathematical trends in heart rate over time under different conditions  Calculate the total number of heart beats over a given time under different conditions | Graph the data: Individual progression, class data for specific conditions etc. Compare to heart rate tables.https://www.illustrativemathematics.org/content-standards/tasks/1365  Discuss:   * whether the relationships are linear or non-linear * expected differences between resting heart rate in non-stressful conditions versus in stressful conditions * other measures (factors) of health that may affect heart rate. | <https://www.illustrativemathematics.org/content-standards/tasks/1365> |
| Calculate Targeted Heart Rate ranges during training | What is a ‘healthy’ heart rate for particular ages and during what kind of activity? (Approximately 65 bpm at rest) How does this compare to the data? Discuss what factors can influence heart rate. | <http://www.mydr.com.au/tools/heart-rate-calculator> |
| Express blood pressure using measures of systolic pressure and diastolic pressure | Lead into blood pressure. Understand how it works: | <http://www.heart.org/HEARTORG/Conditions/HighBloodPressure/AboutHighBloodPressure/Understanding-Blood-Pressure-Readings_UCM_301764_Article.jsp> |
| Measure blood pressure over time and under different conditions  Read a blood pressure chart and interpret the‘healthiness’ of a reading | If possible obtain instruments to measure blood pressure. Prepared graphs could be used if measuring equipment is unavailable. The appropriateness of different types of graphs to display this information should be discussed. Identify systolic and diastolic readings. Discuss and interpret graphs of healthy ranges of blood pressure: | <http://www.bloodpressureuk.org/BloodPressureandyou/Thebasics/Bloodpressurechart>  <http://www.bloodpressureuk.org/BloodPressureandyou/Thebasics/Bloodpressurechart>  <http://www.myvmc.com/tools/blood-pressure-calculator/>  <http://www.myvmc.com/tools/blood-pressure-calculator/>  <http://www.heart.org/beatyourrisk/en_US/hbpRiskCalc.html> |
|  | Utilise activities again to see if blood pressure is affected by activity. | <http://www.bloodpressureuk.org/BloodPressureandyou/Yourlifestyle/Beingactive> |
| Interpret data in a blood compatibility chart as an alternative presentation of data in a two-way table | Discuss facts that link to blood transfusion. There are strict conditions for blood compatibility. Discuss the importance of donating blood.  Discuss different types of blood. Go through statistical work with data (two way tables etc).[http://www.redcrossblood.org/learn-about-blood/blood-types](http://www.redcrossblood.org/learn-about-blood/blood-types%20) | <http://www.donateblood.com.au/about-blood/types>  <http://www.donateblood.com.au/about-blood/types>  <http://www.redcrossblood.org/learn-about-blood/blood-types> |
| Predict, by calculation, the number of people of each blood type in a population given the percentage breakdowns  Predict, by calculation, the expected number of people of a particular blood type in a population. | Use probability and other calculations to determine blood type population.  Blood typing game (advanced) <http://www.nobelprize.org/educational/medicine/bloodtypinggame/gamev2/index.html> | <http://www.nobelprize.org/educational/medicine/bloodtypinggame/gamev2/index.html> |

Additional Links: [MathsLinks FSHu1CEC: Blood](https://mathslinks.net/browse/fshu1cec-blood)