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| Key Area of Astrobiology |
| Detection of Life elsewhere – how can we detect life on other planets? |
| Sciences Experiences and Outcomes |
| SCN 2-15a - By contributing to investigations into familiar changes in substances to produce other substances, I can describe how their characteristics have changed.  SCN 2-20b - I can report and comment on current scientific news items to develop my knowledge and understanding of topical science.  **Inquiry and Investigative Skills**  *Plans and designs scientific investigations and enquiries*   * Formulates questions and predictions (hypotheses), with assistance, based on observations and information. * Identifies the independent, dependent and controlled variables, with assistance. * Anticipates some risks and hazards.   *Carries out practical activities in a variety of learning environments*   * Applies appropriate safety measures. * Contributes to carrying out all the procedures. * Makes observations and collects information and measurements using appropriate devices and units. *(Possible link to MNU 2-11b)* * Manages identified controlled variables to ensure validity of results.   *Analyses, interprets and evaluates scientific findings*   * Draws basic conclusions consistent with findings. * Identifies and discusses additional knowledge and understanding gained.   **Scientific analytical thinking skills**   * Applies scientific analytical thinking skills, with assistance, working with less familiar (or familiar but more complex) contexts. |
| Prior Learning |
| See Teacher notes word document in module folder  Suggested Prior Learning – living things. Suggest using the Primary Science Framework from Highland Council, SCN 2-01a planet earth - biodiversity (requires GLOW log-in)  <https://glowscotland.sharepoint.com/sites/national/sciences/Lists/Web%20Links/AllItems.aspx> (click on Planet Earth, then SCN 2-01a) |
| Learning Intentions and Success Criteria |
| LI   * We are learning how to detect life on other planets   SC   * I can describe events in space exploration history * I can write about conditions on other planets which could sustain life * I can investigate the difference between chemical and biological reactions |
| Suggested Learning Activities |
| Introduce section by looking at the History of Space exploration – top 10 events  <https://www.youtube.com/watch?v=4s4AlG44EKc>  Station Activities  (a) Space exploration timeline    [https://www.twinkl.co.uk/resource/t2-s-604-space-travel-timeline-ordering-](https://www.twinkl.co.uk/resource/t2-s-604-space-travel-timeline-ordering-        activity)  [activity](https://www.twinkl.co.uk/resource/t2-s-604-space-travel-timeline-ordering-        activity)  or  <https://www.tes.com/teaching-resource/space-exploration-timeline-7510627>  (b) Space exploration powerpoint - lots of discussion, active tasks and opportunity  to research forms of space exploration. Opinion can be expressed about  whether they’d like to travel into space.  (c) Difference between a chemical reaction and a biological reaction? Astrobiology  experiment (refer to experiment guide) |
| Resources |
| * Planet top trumps cards for assessment activity * Timeline activities – to be copied (choose which one to do) * Circle template for experiment * Pupil Experiment guide sheet |
| Safety |
| * Yeast – biohazard – yeast is a microorganism that should not be ingested or allowed to enter cuts or abrasions on the skin surface. Plasters to be worn if cuts exist. Wash hands thoroughly before and after use. * Iodine solution – irritant – used in low concentration. Clear up spillages with water. Wash hands thoroughly if it comes into contact with the skin. |
| Approaches to Assessment |
| Using the planet top trumps cards, write a letter home from space, describing the conditions on the planet you now inhabit. Alternatively, write a newspaper article or TV script which reports discovery of life on another planet. Consider what success criteria for letter writing/drama or newspaper articles would look like.  Experimental write up could also be used to determine progress in scientific writing and in development of understanding. |