|  |  |
| --- | --- |
| **NATURE OF CHALLENGE:** | **GRADE LEVELS** |
| Students are challenged to understand general properties of melting point and emulsions. | 9-12 |
| **TARGETED SUBJECT AREA/S** | **MANUFACTURING LEVEL** |
| Science, Chemistry, Math, Technology Education | Design, Fabrication, Testing |
| **LEARNING OBJECTIVES – The Students Will….** | **TIME FRAME** |
| 1. Learn how to measure temperature 2. Understand melting point and emulsions 3. Develop an understanding of the role of R&D and experimentation in problem solving 4. Develop abilities to assess the impact of products 5. Apply the design process | 4 Class Sessions |
| **Standards Addressed** | |
| ITEEA: <http://www.iteea.org/TAA/PDFs/xstnd.pdf>  NGSSS: <http://www.fldoe.org/bii/curriculum/SSS/> | |
| **MATERIALS** | |
| Temperature: Science lesson on melting points, white chocolate bar, dark chocolate bar and milk chocolate bar, paper plates, napkins, thermometer, timer  Emulsion: cocoa butter, coconut oil, raw cocoa powder, agave nectar, sea salt, vanilla, aluminum foil, heat safe bowl, spoon, boiling water | |
| **KEY TERMS** | |
| Change of state, melting point, temperature, melting, emulsions | |
| **DESCRIPTION OF ACTIVITY** | |
| |  |  | | --- | --- | | **Approx. Time** | **Description of Teacher Action** | | 2 class sessions | Watch the movie provided by FLATE. Review theory with students. See teachers reference material provided. Hand out students the student worksheet. Review the lesson requirements with the students. Have students complete part A, once they are done, review the answers. | | 2 class sessions | Explain part B-Chocolate bar experiment to the students. Once the students are done with part B, have them complete part C. It is important to prepare all activity materials ahead of time. | | |
| **EVALUATION AND DISCUSSION:** | |
| See example of grading rubric provided. | |
| **EXTENSIONS & ADDITIONAL RESOURCES** | |
| We recommend the following websites to explore melting point, temperature, emulsions and how chocolate is made. . These sites are useful and can be applied at any point(s) during this lesson.   1. Video of how chocolate is made: <http://www.youtube.com/watch?v=fiMjr3Rwdjs> 2. Hersheys Web Site: www.[hersheys.com/ads-and-videos/how-we-make-chocolate.aspx](http://www.blackdiamond.com) 3. Cooking activities <http://www.kids-cooking-activities.com/how-is-chocolate-made.html> 4. Made in Florida: <http://www.madeinflorida.org> 5. Virtual Tours: <http://www.madeinflorida.org/virtual_tours.htm> 6. Lesson Plans: http://flate.pbwiki.com 7. Educational Pathways: <http://www.madeinflorida.org/Pathways.htm> | |