School of Engineering – H.V. Jenkins High School
Day-to-Day Interdisciplinary Instruction

Unit Title: Beanium Isotope	
Grade Level: 9-12th	Time Frame: 90 minutes
Georgia Content Standards and Objectives:	
Science Standards: SC1d. Construct an explanation that relates the relative abundance of isotopes of a particular element to the atomic mass of the element.	Engineering Standards: SCSh4. Students use tools and instruments for observing, measuring, and manipulating scientific equipment and materials. SCSh5. Students will demonstrate the computation and estimation skills necessary for analyzing data and developing reasonable scientific explanations.
Math Standards: MGSE9-12.N.Q.1 Use units of measure (linear, area, capacity, rates, and time) as a way to understand problems: MGSE9-12.N.Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities MGSE9-12.N.Q.2 Define appropriate quantities for the purpose of descriptive modeling. Given a situation, context, or problem, students will determine, identify, and use appropriate quantities for representing the situation PC.PAR.7.4. Demonstrate that a series is the sum of the sequence and represent series graphically, numerically, and symbolically	Technology integration: Data collection tools such as scales and calculators
Other:	
Project Summary In this activity, students will determine the average atomic mass of a sample of an imaginary element called Beanium.	
Driving Question: What is the average atomic mass of beanium	Essential Questions: How do you calculate the average atomic mass?
Challenge to be solved – Engineering Design Process: Collect and Analyze Data Students are working through a guided inquiry investigation where they are collecting data and analyzing	

<table>
<tr><td colspan="2">the results through mathmatical calculations to determine the average atomic mass of a newly discovered element called beanium.</td></tr>
<tr><td>Entry Event/Hook:
The only research chemist at Anywhere High School has discovered a new element! This element was discovered in the mixture that makes up the baked beans in the cafeteria. The researchers have named this element Beanium. No tests have been done on this element because the researchers could not determine the atomic mass of this new ground breaking element.
There is a large sample of this new element in the lab at the research facility at the high school. A reporter has learned that this top secret facility is funded from the same people that fund AREA 51. As you may know, this secret funding comes from the international alien cover-up conspiracy started in Roswell, New Mexico in 1947.
This lowly research chemist has brought this new element to your classroom so that the lab technicians can determine the atomic mass of Beanium.</td><td>Product:
Final calculations and average atomic mass of beanium.</td></tr>
<tr><td>Activities in the Unit (labs, lectures, discussions, readings, problems, etc.):
Beanium Isotope Activity</td><td>Reflection Methods:
Students will complete analysis questions in their STEM journals</td></tr>
<tr><td colspan="2">Materials/Resources Needed:

For each group:

· 3 different types of beans for “Beanium” (suggested: kidney beans, pinto beans, black beans)

· 100-mL beaker or plastic cup (for holding beans)

· Balance

· Student activity sheet (per student or per group)</td></tr>
<tr><td>Key Vocabulary:
Average atomic mass
Isotope
Atomic Mass</td><td>Daily lesson objectives:
Day 1:

By the end of this lesson, students should be able to:

· Determine the atomic mass from a mixture of isotopes.</td></tr>
</table>

Assessment	
Formative STEM Journal	Summative Unit 1 Test

Links to other documents: