

Subject(s): Chemistry Grade: 10-12 Time: 50 min

**Instructions:** Please fill out ONE Individual Common Core Lesson for EACH lesson in your lesson plan. Each lesson plan should have a **minimum** of **three** Individual Common Core Lessons. Complete LESSON ELEMENTS (#1-8) *and* STUDENT-FRIENDLY TRANSLATION (#2-4 only).

LESSON ELEMENTS	STUDENT-FRIENDLY TRANSLATION ( # 2,3,4only)
<p><b>1. Common Core Learning Standard(s) Addressed:</b> HS-PS1-3. Cite evidence to relate physical properties of substances at the bulk scale to spatial arrangements, movement, and strength of electrostatic forces among ions, small molecules, or regions of large molecules in the substances. Make arguments to account for how intermolecular interactions are determined by atomic composition and molecular geometry, and for how ions or small molecules arrange into two major types of three-dimensional crystal structures: atom/ionic networks or molecular crystals.</p> <p>WHST.9-10.2, RST.9-10.9, HSA-CED.A.4</p>	
<p><b>2. Learning Objective(s):</b> <i>What will students know (content) and be able to do (skills) as a result of this lesson?</i></p> <p>Students will be able to connect the macroscopic properties of condensed phase matter to the intermolecular forces of attraction between particles to make predictions about the properties of adhesives.</p>	<p>Students will be able to reason about the particulate and macroscopic properties of liquids to support claims about the strengths of adhesives.</p>

<p><b>3. Relevance/Rationale:</b>  <i>Why are the outcomes of this lesson important in the real world? Why are these outcomes essential for future learning?</i></p> <p>Many of the bulk characteristics of condensed phase matter can be explained using particulate level reasoning. The ability to connect particulate properties to macroscopic properties allows the student to explain data that supports a claim.</p> <p>The ability to relate structure to function is fundamental for supporting arguments with reasoning.</p>	<p>Matter is not continuous at the particulate level. If students can connect the behavior of matter at the macroscopic level to the structure of the matter at the particulate level that they can make predictions about and evaluate the properties of unknown samples of matter.</p>
<p><b>4. Formative and Summative Assessment Criteria for Success:</b>  <i>How will you and your students know if they have successfully met the selected Common Core Learning Standards and outcomes? What specific criteria will be met in a successful product/process? What does success on this lesson's outcomes look like?</i></p> <p>See the Boston Globe Lesson Plan Rubric for specific writing criteria assessed.</p> <p>Students should be able to analyze several different adhesives and determine the best product for a given task.</p> <p>Students will be able to respond to a question prompt and use evidence gathered during the class to support a claim with appropriate reasoning.</p> <p>Students will complete a guided inquiry activity consisting of text dependent questions and questions requiring claims, evidence and reasoning.</p>	<p>Students should be able to write a clear and testable claim supporting their reasoning with evidence from the text.</p> <p>Given several different adhesive products, students should be able determine which one is best based on their physical and chemical properties.</p>
<p><b>5. Activities/Tasks:</b>  <i>What learning experiences will students engage in? How will you use these learning experiences or their student products as formative assessment opportunities?</i></p> <p><b>Surface Tension Demonstration</b>  Students are engaged and encouraged to ask questions about forces when they view a surface tension demonstration.</p> <p><b>Jig Saw Activity</b>  Students will work in groups and visit stations to acquire content knowledge about the different properties of adhesives and intermolecular forces.</p>	

Each group will be responsible for gathering information from a station, constructing a summary of the information and sharing the content with other groups. Individual groups will report out their summaries and the class will engage in discussion about refining their reports.

### **Close Read Activity**

Students will work in groups to complete a close read of the Boston Globe article “For heart surgery a glue replaces needle and thread”. Each student will have a unique role in their group and roles consist of Manager, Speaker, Analyst and Quality Control. Groups will be asked to periodically “report out” their findings at specific points during the activity. The report outs will be varied and may include the following; answers written on sticky notes and posted to the front board, white board summaries and presentations, oral presentations and students comparing answers between groups. The report outs serve as brief formative assessments.

### **Ticket To Leave**

Students will be asked evaluate three different adhesives and to choose the best one for a baseball bat. Students are asked to support their claim with evidence and reasoning from the information gathered during the class.

#### **6. Resources/Materials:**

*What texts, digital resources and materials will be used in this lesson?*

Flinn Surface Tension Demonstration

MIT Surface Tension Video

Boston Globe article “For heart surgery a glue replaces needle and thread”

Text dependent questions for Boston Globe article

#### **7. Access for All:**

*How will you ensure that all students have access to and are able to engage appropriately in this lesson? Consider all aspects of student diversity.*

Students are offered a variety of entry points to become engaged in constructing chemical concepts. Digital media, scientific texts, direct instruction and collaborative inquiry provide students with the flexibility to learn in their own unique ways.

**8. Modifications/Accommodations:**

*What curriculum modifications and/or classroom accommodations will you make for Students with Disabilities in your class? Be as specific as possible.*

Students who have trouble writing will have the option of using a keyboard for notes and responses.

Content information can be recorded and disseminated on a needs basis or posted to a website for ease of access.

Concept maps and structured notes can be given to English Language Learners to assist content acquisition.

Reading comprehension strategies like summarizing, 2-column notes and Frayer models will be deployed as tools to assist learners of all levels.

**9.**

**Common Core Aligned Lesson: Reflection**

➤ In addition, please choose ONE question below to respond to *after you have taught the lesson* OR create your own question and respond to it after you have taught the lesson.

1. How did this lesson support 21<sup>st</sup> Century Skills?
2. How did this lesson reflect academic rigor?
3. How did this lesson cognitively engage students?
4. How did this lesson engage students in collaborative learning and enhance their collaborative learning skills?

You are also encouraged to use a facilitated “Learning from Student Work” protocol to review and reflect on student work related to this lesson.