## Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period \_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



**Lesson 1: Self-Healers**

Many objects in the world can be broken, worn down, or deteriorate over time. They do not possess the ability to heal themselves. Wouldn’t it be a great idea to incorporate the ability to self-heal into objects that are commonly damaged to prevent deterioration? Look at biology for example. If a bone breaks, it heals. If you get a cut, a scab forms over it and it heals. Can you help concoct a good self-healing material for your surfboard?

**Doing the Science**

1. Start the Heal Thyself Simulation by clicking on the “Sim” tab.
2. Click on the “Mix” button to go to the mixing station.
3. Click on “2.5%” under the Microcapsules section and “2.5%” under the Catalyst section.
4. Click on the “Mix” button to mix the epoxy and create your surfboard.
5. Click on the “Test” button to go to the testing center.
6. Click on the green “Start” button to begin punching holes into your surfboard.
7. After the machine is finished, click on the “Analyze” button to look at the results.
8. On a scale of 1 − 10 (1 being the best and 10 being the worst), rate how well the crack healed. Record your results in Table 1.
9. Repeat steps 2-8, changing the microcapsule and/or catalyst percentage concentration. Remember, that a good experimental strategy is to hold one variable constant for a given test and change the other variable. Make sure to test all possible combinations and to record your data in Table 1.

**Table 1.**

|  |  |  |
| --- | --- | --- |
| **Microcapsule Concentration (%)** | **Catalyst Concentration (%)** | **Rating** |
| **2.5** | **2.5** |  |
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**Do You Understand?**

1. Which combination of microcapsules and catalyst provided the best self-healing material?