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| **Lesson Plan:** |

**Prior learning and thinking:** Students have covered Kinetic Molecular Theory, chemical families, and the Bohr Model.

**Learning objectives**

1. Understand and identify the differences between physical and chemical changes
2. Categorize natural and artificial processes as physical and chemical changes (ex. state changes)
3. Provide examples of chemical and physical changes

**Big Ideas**

1. Classify natural changes in our environment as physical or chemical changes

**PLOs**

**C4** describe changes in the properties of matter

**Skills developed to meet development goals**

1. Self-directed learning
2. Critical thinking
3. Collaborative skills
4. Asking questions
5. Creativity

**Material and equipment needed**

- InstaSnow-http://www.stevespanglerscience.com/lab/experiments/insta-snow-polymer

- Instasnow

- Measured water in beaker

- Inquiry handouts

- Poster paper

- Goal setting sheet

**Assessment Plan:**

**Formative -** Inquiry questions discussed in class and worksheet handed in this class or next class

**Hook and Introduction**

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| **Time** | **Activity** | **Teaching notes** | **Assessment** |
| 25 min | * Introduction to class and the structure of the classes * Social expectations | * Introduce teacher candidate, learning outcomes, lesson structures, and assessment * Put class into groups to brainstorm what kind of expectations do they expect of others and have a volunteer write them down on a poster board * Hand out goal setting sheet on skill development * Introduce their self-directed learning rubric that students will be assessed for feedback once in the middle and at the end of the 10 weeks | * Goal setting handout - assessing own strengths, weaknesses, and steps to improve - self directed learning begins |

**Development**

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| **Time** | **Activity** | **Teaching notes** | **Assessment** |
| 10 min | * **Inquiry - Undemo with InstaSnow** - **Pre-show** | * Show students the materials and ask them to do question 1 of handout * Tell students that you will add the water to the powder and ask them to write their predictions for question 2 * Ask if anyone wants to share their predictions and ask a student volunteer to write these on the board | * Predictions - are they backing up their predictions with the science they know? |
| 5 min | * Demonstrate: add water to Instasnow | * Make sure to stand where students can see * Give all groups a chance to see what happened * Have students write down their observations for question 3 and any questions they might have at this point for question 4 | * Asking meaningful questions - are students putting thought behind their questions or just filling the sheet so it looks full. Are they copying the questions their friends write down? |
| 15 min | * Group directed exploration and learning | * Students will form groups of 4 to 5 and use their textbooks to search up physical and chemical change. They will use their best judgment to choose which one it is for this reaction. They will write this on their worksheet for question 5. * The same will be done for exothermic and endothermic reactions for question 6. * After a good 15 mins, groups will be asked to share to the class what they think | * Collaboration - are students working together and assigning roles? * Asking questions - how well are students asking questions to help them fill in the knowledge gap? |
| 15 min | * Group directed exploration | * Groups brainstorm how the change could've happened and are asked to come up with an explanation and a way they can test their explanation for questions 7 and 8 | * Critical thinking/self-directed learning - using what they know and find to construct a logical explanation of the phenomenon. Exercising their understanding of the scientific method to test the unknowns. * Creativity - using the chemical phenomenon in different ways to solve other problems. |

**Closure**

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| **Time** | **Activity** | **Teaching notes** | **Assessment** |
| 10 min | * **Article on InstaSnow (TEDideas)** \*\*this can be omitted if there is no time at the end of the lesson | If the students do not end on time, check in with the class to see how they are finding the learning process - is it too hard? Too easy? Or challenging enough? What could be done next time - for students as well as for the teacher | **HWK**  1) Students read the TEDideas article and write their thoughts on the side of the article. They need to be prepared to share their thoughts next class.  2) Students think of one chemical or physical change for the class to "eduguess". Make sure they can justify it.  3) If the inquiry undemonstration worksheet wasn't finished, it can be completed for homework. |