The Crown Joules: A Chemical Bonding Game made with *Unity*

Steve Sogo
Laguna Beach High School
[ssogo@lbUSD.org](mailto:ssogo@lbUSD.org)
tinyurl.com/IC2020Games
Using Unity to Model Chemical Behaviors/Reactions
A look under the hood

```csharp
using UnityEngine;

public class HydroxideScript : MonoBehaviour
{
    public GameObject rnxproduct;
    private GameObject mainObject;
    private Slider temperatureSlider;
    public AudioSource Soundsource;

    // Start is called before the first frame update
    void Start()
    {
        mainObject = GameObject.Find("GameObject").GetComponent<forces>();
        temperatureSlider = GameObject.Find("temperatureSlider").GetComponent<Slider>;
        Soundsource = GameObject.Find("Sounds").GetComponent<AudioSource>();
    }

    private void OnCollisionEnter(Collision collision)
    {
        print (collision.gameObject.name);

        if(collision.gameObject.tag == "Hi")
        {
            print (gameObject.name);

            //spawn the new objects with the old coordinates but flipped
            Instantiate(rnxproduct, transform.position, transform.rotation);

            //Destroy the old objects
            //gameObject.name = "destroyed";
        }
    }
}
```
NGSS Chemical Bonding Standard(s)

HS-PS1-4.

Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy. [Clarification Statement: Emphasis is on the idea that a chemical reaction is a system that affects the energy change. Examples of models could include molecular-level drawings and diagrams of reactions, graphs showing the relative energies of reactants and products, and representations showing energy is conserved.] [Assessment Boundary: Assessment does not include calculating the total bond energy changes during a chemical reaction from the bond energies of reactants and products.]

Disciplinary Core Ideas

- A stable molecule has less energy than the same set of atoms separated; one must provide at least this energy in order to take the molecule apart.

PS1.B: Chemical Reactions
- Chemical processes, their rates, and whether or not energy is stored or released can be understood in terms of the collisions of molecules and the rearrangements of atoms into new molecules, with consequent changes in the sum of all bond energies in the set of molecules that are matched by changes in kinetic energy.
Originally an in-class game with Tiles and Jewels
Let’s Play The Crown Joules!

tinyurl.com/IC2020Games

tinyurl.com/CrownJoules

http://lbhs.github.io/Games
Contact Information for Steve Sogo

Laguna Beach High School
625 Park Ave
Laguna Beach, CA  92651

ssogo@lbusd.org