Strand: **8.2**	Standard: **8.2.3**	Episode 1	**Anchor Phenomena**: The kinetic energy of an object changes as energy is transferred to or from the object.

Title: Phenomena: Skater	**Time**: 45 min	CCCs Energy and matter	Practices **Engage in Argument**

Narrative of episode:
Students will share experiences with and talk about the phenomenon of using the metal brake on a scooter going down a hill. They will identify questions about why this happens. Students will then do an online simulation that will allow them to explore the energy transfer of a person on a skateboard on a halfpipe. They will be able to explain about the change in the types of energy by the end of the activity.

Gather:
Show students a picture of a scooter. Ask the students if any of them have ever gone down a large hill on a scooter and had to push on the break as they went down the hill. Ask them to share their experiences with this. Students will most likely share that they either burned their foot or melted their shoe. You can also show pictures of a melted shoe caused by the break of the scooter.

Have them fill out the phenomenon document about this and come up with questions to help them explain the phenomenon.

Have students go to the skate park Phet let them explore the intro area (make sure they turn on the bar graph showing energy). You can review the idea that the higher up on the ramp he is released the more energy he will have as well as if you increase his mass the overall amount of energy increases because objects with more mass have more kinetic energy.

Reason:
After letting them explore for a few minutes ask them what is unrealistic about this situation. There is no friction, he just keeps going forever.
Discuss with students what friction is (just get their ideas on what it is). Do this for a minute or two then, have the students go to the friction section and again turn on the graphs showing the energy. Have them release him again and have a discussion on what happens to the energy when friction is present. Have them rub their hands together as quickly as possible and identify what they are feeling. Then have the students answer the question on the student sheet as they work through. The last two explanations are the main focus for what they are supposed to be getting from the activity, what energy transfers are taking place and what friction is.

Communicate:
Have students share their answers on the last two explanations with a classmate and discuss if there need to be any changes made to either of their explanations. Discuss as a class what they wrote as their responses and how it helps explain the phenomenon with the scooter.

Assessment: Student sheet, especially the last two questions are how the teacher will know the student understands how the energy is transferred from potential to kinetic to heat through the process of moving back and forth.	**Materials, resources, handouts, etc:** Phenomenon Student Sheet skate park student reflection sheet