

Post-Assessment Analysis

Part 1:

**Individual Student Response Chart**

<p><b>Student:</b> James</p> <p><b>GLCE/Learning Goal:</b></p> <p>1) The learner will define “energy efficiency” and apply its meaning to a real world situation by explaining ways to change a home to become more energy efficient. S.RS.06.14 Evaluate scientific explanations based on current evidence and scientific principles.</p> <p>2) The learner will analyze the transformation of energy from potential to kinetic. EN.06.12 Demonstrate the transformation between potential and kinetic energy in simple mechanical systems.</p> <p><b>Assessment task description and rationale:</b> The students will answer questions and apply their knowledge of energy efficiency, kinetic, and potential energy. The questions are based on activities they participated in throughout the unit.</p> <p><b>Assessment features:</b></p> <ul style="list-style-type: none"><li>• Energy Efficient definition</li><li>• Example of home improvement</li><li>• Kinetic energy definition</li><li>• Potential energy definition</li><li>• Position of the rod for greatest kinetic</li><li>• Position of the rod for greatest potential</li><li>• Location of block using kinetic energy</li><li>• Location of block using potential energy</li></ul>	<ol style="list-style-type: none"><li>1. Energy efficient means to use appliances that consume less energy. Home B uses natural gas for heating which is better than oil because oil isn't as good for the environment and it does not occur naturally.</li><li>2. Potential energy is stored and kinetic energy is moving. The rod has the most gravitational potential energy when it's at the top of the tube, before it is dropped. The rod has the most kinetic energy when it reaches the bottom of the tube just before it hits the nail.</li><li>3. When the block is at the top the potential energy is 100J and the kinetic energy is 0J. When it's half way down the potential energy and kinetic energy are 50J, When it's at the bottom the potential energy is 0J and the kinetic is 100J.</li></ol>
--	--

<p><b>Evidence from work sample of weaknesses in student understanding:</b></p> <p>Feature:</p> <ul style="list-style-type: none"> <li>• Energy Efficient definition</li> </ul> <p>Student Response: “Energy efficient means to use appliances that consume less energy”</p> <p>In his response, he explained “energy efficient” as consuming less energy in <i>appliances</i> only.</p> <p>Energy efficiency can be applied to more situations than just appliances. During the lesson, we talked about home features, such as, air conditioning units, light bulbs, etc. This could have led to his narrow response, but we also talking about reflective film, shrubbery, and installation, items that do not require electrical energy and should be considered when defining energy efficiency.</p>	<p><b>Evidence from work sample of strengths in student understanding:</b></p> <p>Features:</p> <ul style="list-style-type: none"> <li>• Example of home improvement</li> </ul> <p>Student Response: “Home B uses natural gas for heating which is better than oil because oil isn’t as good for the environment and it does not occur naturally.”</p> <p>He directly answers the question asked. He finds a solution to making Home B more energy efficient and explains why it would be better for that home and the environment.</p> <p>Feature:</p> <ul style="list-style-type: none"> <li>• Kinetic energy definition</li> <li>• Potential energy definition</li> <li>• Position of the rod for greatest kinetic</li> <li>• Position of the rod for greatest potential</li> </ul> <p>Student Response: “Potential energy is stored and kinetic energy is moving. The rod has the most gravitational potential energy when it’s at the top of the tube, before it is dropped. The rod has the most kinetic energy when it reaches the bottom of the tube just before it hits the nail.”</p> <p>He defines the important terms and applies them correctly to the situation of the rod and the nail. This was a hands-on experiment the students participated in, which may be why his response was stronger here than other areas.</p>
--	---

<p><b>Student:</b> Katy</p> <p><b>GLCE/Learning Goal:</b> The learner will define “energy efficiency” and apply its meaning to a real world situation by explaining ways to change a home to become more energy efficient. The learner will analyze the transformation of energy from potential to kinetic. EN.06.12 Demonstrate the transformation</p>	<ol style="list-style-type: none"> <li>1. Energy efficient is when you save energy. New York uses less energy like energy efficient windows.</li> <li>2. When it isn’t falling. Before it hits the nail.</li> <li>3. Potential is when it’s on the table. The middle block has bot potential and kinetic energy. The bottom has the most kinetic energy because it is going faster and has used all its stored</li> </ol>
---	---

<p>between potential and kinetic energy in simple mechanical systems.</p> <p><b>Assessment task description and rationale:</b> The students will answer questions and apply their knowledge of energy efficiency, kinetic, and potential energy. The questions are based on activities they participated in throughout the unit.</p> <p><b>Assessment features:</b></p> <ul style="list-style-type: none"> <li>• Energy Efficient definition</li> <li>• Example of home improvement</li> <li>• Kinetic energy definition</li> <li>• Potential energy definition</li> <li>• Position of the rod for greatest kinetic</li> <li>• Position of the rod for greatest potential</li> <li>• Location of block using kinetic energy</li> <li>• Location of block using potential energy</li> </ul>	<p>energy.</p>
<p><b>Evidence from work sample of weaknesses in student understanding:</b></p> <p>Feature:</p> <ul style="list-style-type: none"> <li>• Example of home improvement</li> </ul> <p>Student Response: “New York uses less energy like energy efficient windows.”</p> <p>This response lacks an explanation. She just stated a feature “energy efficient windows” but did not adequately apply the term “energy efficient” to the feature.</p> <p>Feature:</p> <ul style="list-style-type: none"> <li>• Potential energy definition</li> <li>• Kinetic energy definition</li> <li>• Position of the rod for greatest kinetic</li> <li>• Position of the rod for greatest potential</li> </ul> <p>Student response: “When it isn’t falling. Before it hits the nail.”</p> <p>This answer is vague and unclear. I believe she is talking about the rod as “it”, but does not clarify this. If she is referring to the rod, then</p>	<p><b>Evidence from work sample of strengths in student understanding:</b></p> <p>Feature:</p> <ul style="list-style-type: none"> <li>• Location of block using kinetic energy</li> <li>• Location of block using potential energy</li> </ul> <p>Student Response: “Potential is when it’s on the table. The middle block has bot potential and kinetic energy. The bottom has the most kinetic energy because it is going faster and has used all its stored energy.”</p> <p>Although this student did not seem to develop an accurate understanding of kinetic and potential energy in the previous questions, she did show she knows the difference between moving and stored energy in this question. She knows when the block in on the table and not moving that it has stored or potential energy. Then, when the block is half way down, she realizes it still has some stored energy while falling. Finally, she makes the connection that the greater the speed and</p>

<p>her first part of her answer would be wrong. The greatest potential energy occurs when the rod is held at the top of the tube just before it is released. Also, she does not define kinetic or potential energy in her answer before she applies it to the nail and rod.</p>	<p>velocity of the object, the more kinetic energy it has just before it hits the ground.</p>
---	---

<p><b>Student:</b> Jordan</p> <p><b>GLCE/Learning Goal:</b> The learner will define “energy efficiency” and apply its meaning to a real world situation by explaining ways to change a home to become more energy efficient. The learner will analyze the transformation of energy from potential to kinetic. EN.06.12 Demonstrate the transformation between potential and kinetic energy in simple mechanical systems.</p> <p><b>Assessment task description and rationale:</b> The students will answer questions and apply their knowledge of energy efficiency, kinetic, and potential energy. The questions are based on activities they participated in throughout the unit.</p> <p><b>Assessment features:</b></p> <ul style="list-style-type: none"> <li>• Energy Efficient definition</li> <li>• Example of home improvement</li> <li>• Kinetic energy definition</li> <li>• Potential energy definition</li> <li>• Position of the rod for greatest kinetic</li> <li>• Position of the rod for greatest potential</li> <li>• Location of block using kinetic energy</li> <li>• Location of block using potential energy</li> </ul>	<ol style="list-style-type: none"> <li>1. It’s like you make your own energy like throwing a baseball.</li> <li>2. Kinetic energy is when something is moving. Potential energy is where something doesn’t move.</li> <li>3. At the top it’s potential but when it falls it kinetic then its potential when it hits the ground.</li> </ol>
<p><b>Evidence from work sample of weaknesses in student understanding:</b></p> <p>Feature:</p>	<p><b>Evidence from work sample of strengths in student understanding:</b></p> <p>Feature:</p>

<ul style="list-style-type: none"> <li>• Energy Efficient definition</li> <li>• Example of home improvement</li> </ul> <p>Student Response: "It's like you make your own energy like throwing a baseball."</p> <p>This response is unrelated to the question being asked. The student did not define "energy efficient" and did not give a home improvement example. The example he gave may have been what he was thinking about in relation to kinetic or moving energy, but did not fit for this question or assessment.</p> <p>Feature:</p> <ul style="list-style-type: none"> <li>• Position of the rod for greatest kinetic</li> <li>• Position of the rod for greatest potential</li> </ul> <p>Student Response: N/A</p> <p>The student did not respond to the portion of the question, "Define kinetic and potential energy in terms of the nail and rod..." Either he did read the directions thoroughly, did not understand the directions, did not know the answer, or chose not to answer. He defined what kinetic and potential energy is in part of his answer, but did not apply it to the nail and rod activity.</p>	<ul style="list-style-type: none"> <li>• Kinetic energy definition</li> <li>• Potential energy definition</li> </ul> <p>Student Response: "Kinetic energy is when something is moving. Potential energy is where something doesn't move."</p> <p>This is a correct response for the question asking to define these two terms. Although he could have included "stored" energy, he still covered the main idea.</p> <p>Feature:</p> <ul style="list-style-type: none"> <li>• Location of block using kinetic energy</li> <li>• Location of block using potential energy</li> </ul> <p>Student Response: "At the top it's potential but when it falls it kinetic then its potential when it hits the ground."</p> <p>Here he applies the meaning of kinetic and potential energy correctly as he describes the different energies at the different locations.</p>
--	--

### Whole Class Student Response Chart

#### GLCE/Learning Goal:

The learner will define "energy efficiency" and apply its meaning to a real world situation by explaining ways to change a home to become more energy efficient.

The learner will analyze the transformation of energy from potential to kinetic.

EN.06.12 Demonstrate the transformation between potential and kinetic energy in simple mechanical systems.

#### Description of the assessment task including specific wording:

The students will use complete sentences to answer three questions on energy:

1. Explain what “**energy efficient**” means and **provide one feature** as an example from one of the homes in Activity 53 and how it is more efficient than the other home.
2. Define **Kinetic** and **potential** energy in term of the nail and the rod in Activity 54. (*When does the rod have the most gravitational potential energy? When does it have the most kinetic energy?*)
3. Use the picture below to analyze the energy transformation as the block falls to the ground. Use kinetic and potential energy in your answer.

Student First Name or Initial	Energy Efficient definition	Example of home improvement	Kinetic energy definition	Potential energy definition	Position of the rod for greatest kinetic	Position of the rod for greatest potential	Location of block using kinetic energy	Location of block using potential energy	# of goal features
Lily	X	X	X	X	X	X	X	X	8
Tristan	X	X	X	X				X	5
Connor	X	X	X	X	X	X	X	X	8
Kaha	X	X	X	X			X	X	6
Max	X	X			X		X	X	5
Jordan			X	X			X	X	4
Ta’Dajah	X	X	X	X	X	X	X	X	8
Conor	X		X	X	X	X	X	X	7
Seth	X		X	X	X	X	X	X	7
Jenna	X	X	X	X	X	X	X	X	8
Alex	X		X	X	X		X	X	6
Caleb	X	X	X	X	X	X	X	X	8
Mohammed	X	X	X	X			X	X	6
James	X	X	X	X	X	X	X	X	8
Katy	X				X	X	X	X	5
<b>#/15</b>	14	10	13	13	11	9	14	15	99/120
<b>%</b>	93%	66%	87%	87%	73%	60%	93%	100%	83%

## Part 2:

Different students understood different parts of the assessment, but there was a common misconception with three of the features. These three features resulted in low completion percentages. The first feature at 73% completion was determining the position of the rod when it had the greatest kinetic energy. The students understood that kinetic energy refers to objects in motion (as their definitions showed), but they did not understand that after the rod has been falling it has gained speed therefore, right before it hits the nail and transfers that energy it has the greatest kinetic energy. To improve my teaching, I would have emphasized this more during the analysis questions after Activity 54. I would have also shown them another model of the situation and pause at the specific moment when the rod is about to hit the nail (I would hold the nail, but explain that once the rod is at that point it has gained all of the energy along the way).

The second feature at 66% completion was giving an example of a home improvement feature that would make one of the homes more energy efficient. Most students were close with this answer, but those that did not get credit for their answer either did not explain why the feature would be better "Home B has more insulation" or they misread the directions and did not answer that part of the question. During class, I would have stressed this more during the analysis questions from Activity 53. I would have had students offer more examples of home improvement to discuss in class. I would have also pushed students to explain why they would make that change.

The third feature at 60% completion was determining the position of the rod when it had the greatest potential energy. The students understood that potential energy refers to the stored energy in an object (as seen in their definitions), but they did not comprehend that right before the rod is released the rod has the greatest potential energy. In Activity 54, I would have emphasized this more during the analysis questions. I would have also shown them another model of the situation and pause when holding rod before dropping it down the tube explain that at this point it has gained all of its potential energy and is about to be released and transformed into kinetic energy.

## Part 3:

My assessment involved short essay answers. They had to be able to clearly write out their answers with explanations. Some students that are more verbal or hands-on might have had more trouble with this assessment. If time permitted, I would include a verbal or hands-on test where they could show me "At what point in the procedure would this occur...". Also, the picture in the last question was somewhat confusing because the position of the third block was difficult to determine if it was on the ground or about to hit the ground. This makes a difference between kinetic and potential energy. For this issue, I would make a clearer picture and write a note on the picture that I mean right before the block hits the floor. Question two asks students to define kinetic and potential energy in terms of the nail, but it was not clear that I wanted students to define the two terms, and then apply them to the situation of the nail and rod. I would reword this statement to ask the student to first define each term, then, tell me at what point did the rod have the greatest kinetic and potential energy.

The short essays can be helpful because they allow students to explain their thinking. I also bolded the important parts of the questions to make sure students were completing each feature. Lastly, many students are visual; therefore, the diagram for question three may have been beneficial to many students and may have triggered their memory to the picture in the book from one of the analysis questions.

## Part 4:

Overall, the students did well on the assessment with an 83% completion. I would however spend more time on and emphasize more of the concepts during the analysis questions block. This block of time is often rushed because it is at the end of class. The problem is that this step is important in pulling all the information together from the day's activity, applying meaning, and explaining the patterns. I would also reword some of the questions on the assessment. It is crucial to be as clear and explicit as possible when giving directions on an assessment. The more specific I am the lesser there is of a chance of confusion and the more chance I have of receiving the feedback that I am looking for.