Name: _____ Class: _____ Date: _____

5.4 Grading the Explanations Tool: How does a skin cell in the leg of a cow use food to grow and divide?

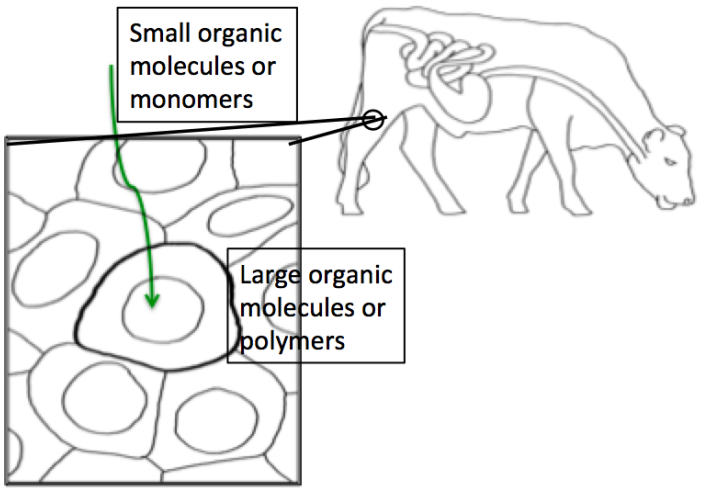
*This worksheet has "grading" in the title because at this point, students can be held accountable for correct answers. Level 4 (correct) responses to the questions are in **blue bold italics** below.*

Red italics suggest ways to grade student responses by giving them points for correct or partially correct answers. There are 14 points total on this worksheet.

Carbon TIME Discourse Routine around the Explanations Tool:

1. *Introduction: Students review their Evidence-Based Arguments Tools. Establish the purpose for completing the tool as developing a complete explanation for the unit phenomenon.*
2. *Private thinking and writing: Students complete the Explanations Tool individually.*
3. *Partner or small group work: Students share and compare ideas in pairs/small groups, with the goal of improving their explanations.*
4. *Sharing ideas in whole-class discussion: Class discussions serve to elicit, clarify, and compare explanations from individual students and/or student groups*
5. *Consensus-seeking discussion accompanied by public writing: Class discussions focus on coming to consensus around a correct, coherent explanation that answers the Three Questions while addressing the 4 steps. We recommend that students revise their explanations in a different colored pen/pencil.*

The Matter Movement Question



Draw and label arrows that show molecules moving into and being used into the skin cell.

- Show and label molecules with carbon atoms moving into the skin cell in its leg.
- Label the molecules that stay in the skin cell.

Level 4:

- ***An arrow showing small organic molecules or monomers going into the cow's skin cell***
- ***A label showing large organic molecules (or polymers) staying in the cow's skin cell.***

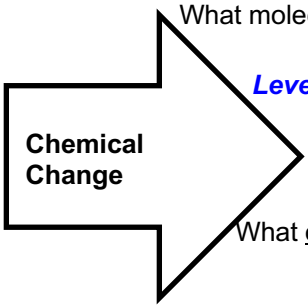
1 point for each correct arrow/molecule. 2 points total.

Name the chemical change that cow cells use to build large organic molecules: ***Biosynthesis***
1 point for correct answer

What molecules are carbon atoms in before the chemical change?

Level 4: Small organic molecules (or monomers such as amino acids, sugars, and fatty acids)
1 point for correct answer.

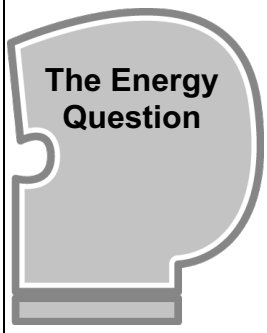
What other molecules are needed?
None
1 point for correct answer.



What molecules are carbon atoms in after the chemical change?

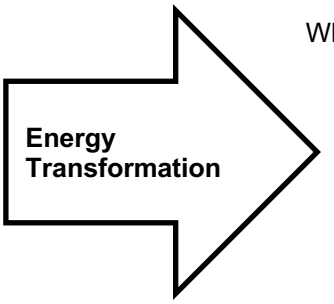
Level 4: Large organic molecules (or fats/lipids, and proteins).
1 point for correct answer.

What other molecules are produced?
Level 4: Water
1 point for correct answer.



What forms of energy are needed for this chemical change?

Level 4: Chemical energy.
1 point for correct answer.



What forms of energy are produced by this chemical change?

Level 4: Chemical energy.
1 point for correct response.

Explain in words: How does a skin cell in the leg of a cow use food to grow and divide? (*Answer on the back*).

Use this Explanations Tool to help guide your written explanation, being sure to answer the Three Questions.

Remember: **Atoms last forever** (so you can arrange atoms into new molecules, but can't add or subtract atoms).
Energy lasts forever (so you can change forms of energy, but energy units can't appear or go away).

Level 4 responses should include answers to each of the four numbered steps on the Three Questions poster and handout:

1. ***Matter movement: Small organic molecules (or monomers, such as amino acids, sugars, fatty acids, and glycerol) enter the cow's skin cell.***
2. ***Matter change: The small organic molecules are combined to make large organic molecules (or polymers, such as carbohydrates, fats/lipids, and proteins).***
3. ***Energy change: The chemical energy stored in the C-C and C-H bonds in the small organic molecules (monomers) stays in these bonds when they are combined into large organic molecules (polymers).***
4. ***Matter movement: The cell grows bigger and may eventually divide as more large organic molecules (polymers) are made.***

Level 2 and 3 responses may describe cells using food molecules to grow but focus on the food being used for energy in order for the cell to grow and divide..

1 point for each correct part of the answer
4 points total