**Workshop Template**

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| Workshop Name:    Our S.A.D Diet | Workshop Content/Objective:  Standard American Diet, Diet of Other Countries, and Energy Needed to Supply American Diet. |
| Learning Standard Addressed:    **AP Environmental Science Standard:**  The principle of conservation of energy can be modeled by the energy transformations along food chains and energy production systems. | Needed Supplies:  5-6 Copies of the S.A.D diet article and charts.  5-6 Copies of the global dietary illness article |
| Small Entry Event:    <http://www.motherjones.com/tom-philpott/2014/01/standard-american-diet-sad-charts>  <http://www.takepart.com/article/2015/09/14/global-dietary-illness> | Knows:  What does my diet normally look like?  Need to Knows:  What is the standard American Diet?  What is the diet of other countries in comparison?  How much energy is needed to supply the American diet and our local community, as well as the cost, to produce? |
| Student Take-Away Mechanism:  The Standard American Diet is not a healthy diet and it is also not good for the environment as well. There needs to be a change that satisfies nutritional needs and is environmentally conscious. Students fill out what they ate in the last 48 hours and discuss within their groups if it was similar to the Standard American Diet. | Additional Notes:  Make sure to tell the workshop leaders to bring scratch piece of paper and pencils. |

**Instruction**

1. Who needs to attend?

* Workshop Managers

2. Workshop Activities (like the 5e Explore/Explain/Elaborate):

* Explore: KLW chart for Standard American Diet.
* Explain: Have students read and discuss the article and charts.
* Elaborate: Discuss how the S.A.D. is detrimental to human health potentially and perhaps ideas of how this is detrimental for the environment

3. Evaluation/Assessment Measures (like the 5e Evaluation):

* Have students fill out on their sheet of paper what they ate in the last 48 hours and discuss if it was similar to the Standard American Diet.

**Workshop Template**

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| --- | --- |
| Workshop Name:    Modeling Energy Transfer | Workshop Content/Objective:  Students will learn about energy consumption, energy transformation, and energy production, by using manipulatives in order to make a model. The students will talk about biomass as well. |
| Learning Standard Addressed:    **AP Environmental Science Standard:**  The principle of conservation of energy can be modeled by the energy transformations along food chains and energy production systems. | Needed Supplies:  Energy transformation cards. (6 sets)  5-6 copies of empty boxes sheet that they can fill in on their own |
| Small Entry Event:    Putting cards in order of how energy is transferred (attached to the back). | Knows:  What is a food chain?  Predator-prey relationships.  Need to Knows:  What is energy consumption?  What is energy transformation?  How is energy transferred?  What is energy production?  How do we make a model displaying energy consumption? |
| Student Take-Away Mechanism:  Photo of their timeline of events to discuss within their groups. | Additional Notes:  Make sure to mention biomass and the population of different organisms in relation to energy transfer (Maybe bring up the movie Zootopia where it was briefly mentioned that prey outnumber predators 100 to 1). |

**Instruction**

1. Who needs to attend?

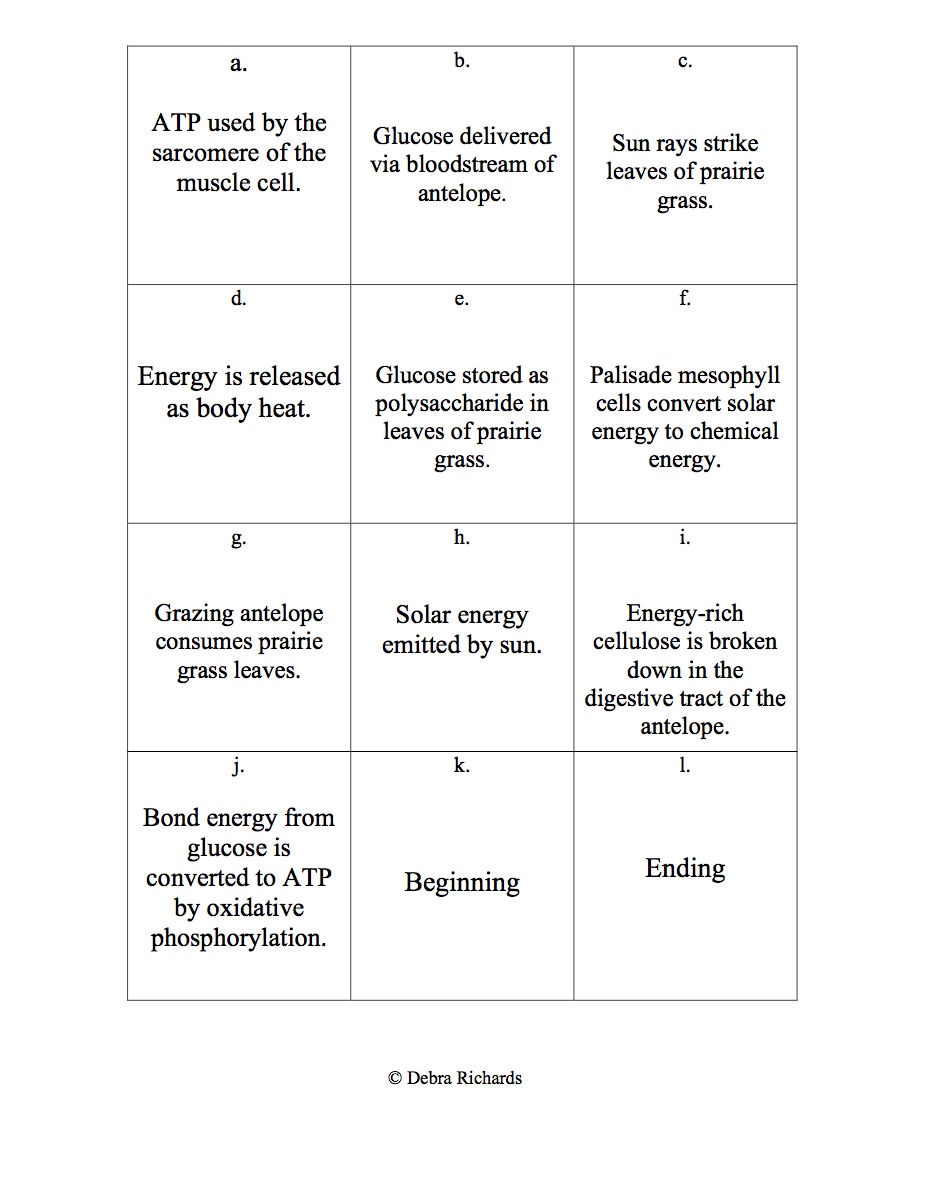
* Workshop Managers

2. Workshop Activities (like the 5e Explore/Explain/Elaborate):

* Explore: Have each student make a timeline of how energy is transferred with their cards.
* Explain: Have students explain their timeline.
* Elaborate: Ask students what would happen if you add an additional animal to add to the energy transfer manipulatives (lion that eats an antelope), and how would it work in relation to energy transfer. Also talk about numbers and how in general why there are always more prey than predators due to energy transfer and how a lot is lost through heat.

3. Evaluation/Assessment Measures (like the 5e Evaluation):

* Ask the students to make their own energy transfer model which has to have at least 3-4 different organisms involved which they can take back to their groups.



**Texas Association of Biology Teachers Manipulative by Debra Richards**

**Version for AP Students.**

**Energy from food is burned in a muscle cell in the leg of an antelope.**

**b.**

**The blood stream brings sugar from the digestive system to the body of the antelope. c.**

**Sunlight lands on the leaves of a grass plant**

**d.**

**The antelope gives off heat from its body.**

**e.**

**Plants use the sugar they made in photosynthesis to grow leaves and stems.**

**f.**

**Green Chlorophyll in the leaves turns solar energy from the sun into chemical energy for the plant to use to live and grow.**

**g.**

**An antelope eats grass leaves for lunch. h.**

**Solar energy is given off by the sun. i.**

**The antelope digests the plant leaves and breaks them down into sugars.**

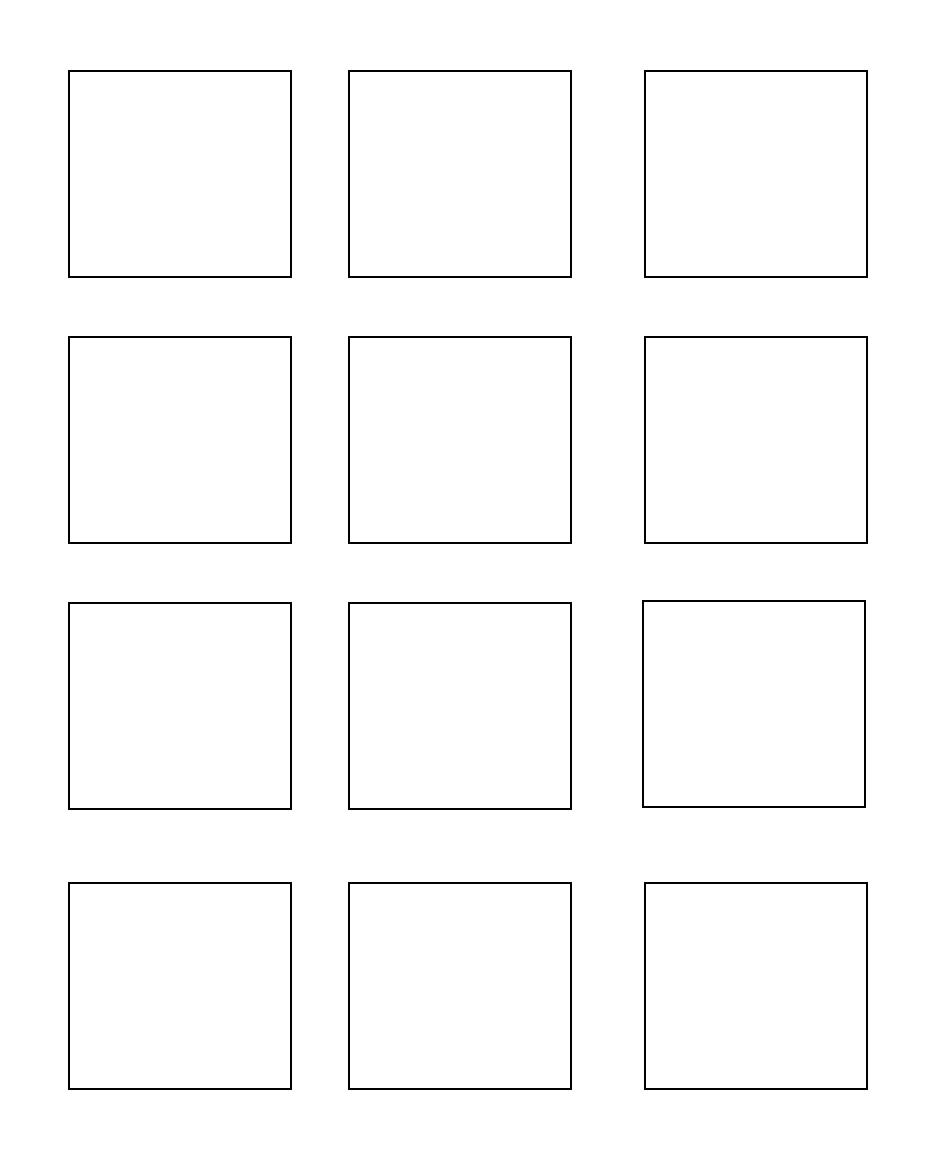
**j.**

**Sugar is turned into energy in the cells in the mitochondria of the antelope. k.**

**Beginning l.**

**Endingudents**

**Key: K, H, C, F, E, G, I, B, J, A, L**



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| a.  Energy from food is burned in a muscle cell in the leg of an antelope.  C:\Users\ked013100\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\SUDGXT0B\muscle_epimysium_02[1].jpg | b.  C:\Users\ked013100\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\NYREXPDJ\377px-Circle_of_Willis_la.svg[1].png  The blood stream brings sugar from the digestive system to the body of the antelope. | c.  C:\Users\ked013100\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\SUDGXT0B\0511-0705-2512-0450_Photosynthesis_clipart_image[1].jpg  Sunlight lands on the leaves of a grass plant |
| d.  The antelope gives off heat from its body.  C:\Users\ked013100\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\4TO9LHJ2\Antelope_2_%28PSF%29[1].png | e.  Plants use the sugar they made in photosynthesis to grow leaves and stems.C:\Users\ked013100\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\NYREXPDJ\600px-I_can_photosynthesis.svg[1].png | f.  Green Chlorophyll in the leaves turns solar energy from the sun into chemical energy for the plant to use to live and grow.C:\Users\ked013100\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\4TO9LHJ2\photosynthesis_21[1].jpg |
| g.  An antelope eats grass leaves for lunch.C:\Users\ked013100\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\8YSUOJI4\Screenshot_5[1].png | h.  C:\Users\ked013100\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\4TO9LHJ2\shining-sun[1].pngSolar energy is given off by the sun. | i.  C:\Users\ked013100\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\8YSUOJI4\Digestive_system_without_labels.svg[1].png  The antelope digests the plant leaves and breaks them down into sugars. |
| j.  Sugar is turned into energy in the cells in the mitochondria of the antelope.C:\Users\ked013100\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\8YSUOJI4\cell_diagram_3_ces[1].gif | k.  BeginningC:\Users\ked013100\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\4TO9LHJ2\once-upon-a-time-600x397[1].jpg | l.  C:\Users\ked013100\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\AZVBGIWY\end[1].jpgEnding |

Version for Regular Biology Students

**DIY Template**

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| Workshop Name:    Diets Around the World | Workshop Content/Objective:    Students will learn about diets around the world and seeing how other cultures eat to obtain energy, whether it be from maintaining a vegetarian diet to eating lower trophic level organisms (bugs for example) in order to obtain nutrients. The students will talk about how if this is environmentally conscious or not. |
| Learning Standard Addressed:    **AP Environmental Science Standard:**  The principle of conservation of energy can be modeled by the energy transformations along food chains and energy production systems. | Needed Supplies:  Pictures of diets from different countries. (6-8 examples) |
| Small Entry Event:    <http://menzelphoto.photoshelter.com/gallery/What-I-Eat-Around-the-World-in-80-Diets/G0000.us7tw6HCdw/C0000zsQX1niZ0zw> | Knows:  What does my diet consist of?  Need to Knows:  What are some similarities and differences that can be observed in these diets?  Are there diets better than SAD that other cultures have that are better for the environment. |
| Student Take-Away Mechanism:  Photo of their matches to discuss within their groups. | Additional Notes:  Students will have to bring a sheet of paper and pencil to do the evaluation portion of the DIY |

**Instruction**

1. Who needs to attend?

* Workshop Managers

2. Workshop Activities (like the 5e Explore/Explain/Elaborate):

* Explore: Have each students match pictures with their countries.
* Explain: Have students explain their matches.
* Elaborate: Talk about the diets in particular and see what surprised them. Talk with the students to see if any of these diets seem better for the environment than the S.A.D. and why?

3. Evaluation/Assessment Measures (like the 5e Evaluation):

* Ask the students to choose one of the diets from other cultures that were given and give a detailed written explanation about why they think this is the best diet for an environmentally conscious person while also making sure that nutritional needs are met.