## Starburst Energy Pyramid

Summary
Students will model energy transfer through an ecosystem using Starburst candy as the energy.
Time Frame
1 class periods of 60 minutes each
Group Size
Large Groups
Materials
Two bags of starburst per class. (You can reuse them or let kids eat them after the activity. Students can be asked to bring them in.)

- student page (attached)
- Energy Pyramid illustration for overhead (attached)


## Instructional Procedures

Count the number of individual Starbursts candies in the two bags. Read the introduction and procedures with the class so they what data they are collecting.
Set up the energy pyramid by placing students in the positions shown in the drawing below).
All the students need to be facing the same direction and about 10 to 15 feet apart from the row before them and at least arms with apart from the students next to them.
The student in the "sun" role throws the starbursts a handful ( $5-10$ ) at a time over their shoulder to the "Producers". The "Producers" cannot take steps to get the starbursts but can only reach with their hands.
Record the number of starburst transferred to the "Producers" and then have the "Producers" throw to the next energy level, the "Primary Consumers". When they throw, the "Producers" all need to throw at the same time, again behind their backs. The "Primary Consumers" however, can take only one step in whichever direction needed.
Record the number of starbursts transferred and continue to the next energy level. This time the "Secondary Consumers" can take two steps. Again the "Primary Consumers" need to throw at the same time over their back.
Record and continue to the tertiary consumer. Record the final number and be sure students observe the energy lost by looking at all the starbursts on the ground before they pick them up. Have the students reflect on the activity. These are the types of questions I ask the before we go inside:

How is this energy pyramid similar to the energy pyramids in real life?
Why did we use starbursts?
Why couldn't the producers move to get food?
Why could the consumers move to get food?
Why could the secondary and tertiary consumers take more than one step (they generally have a greater range)?
How is this activity a poor model of a real energy pyramid?
In real life how does energy get "lost" or used up?
Why did or didn't the Tertiary Consumer get any starbursts?

Sometimes the consumers are more effective at capturing food than the plants are and then the numbers are off. Adjust the size of the energy pyramid for next class or do another trial to see if they get better numbers. You may wish to have the producer students take off a sweater or use their shirt to capture more starbursts. Then you can discuss how some organisms are more efficient and can out compete others.
Once inside work as a class through the energy transfer data to calculate the percent of energy lost or transferred by each energy level. (You might expect the numbers to be between 15-20\% energy transferred to the 3 consumer).

Example: Starting Starburst 200
Producers received 26 -- 87\% energy loss, $13 \%$ transferred
1 Consumers received 5 -- 80\% loss, 20\% transferred
2 Consumers received $1-80 \%$ loss, $20 \%$ transferred
3 Consumers received 1 -- 0\% loss, $100 \%$ transfer
Bibliography
Lesson Design by Jordan School District Teachers and Staff.
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Utah LessonPlans

