

# Triangle Triage

Math

**Background:** This lesson is based on the concepts of sustainability. Sustainability is commonly defined as “Meeting the needs of current generations without compromising the needs of future generations.” In order to determine if something is sustainable, three elements must be considered: economics, environment and social equity. These are known as the “three Es.”

- Economic factors or criteria might be, but are not limited to, jobs, cost, human hours, etc.
- Environment factors or criteria might be, but are not limited to, air quality, water quality, open space, etc.
- Social equity factors or criteria might be, but are not limited to, diverse populations, number of people positively impacted, increased lifestyle efficiency, etc.

**Goal:** Students apply the concepts of economics, social equity and environment to relevant decisions and will increase their knowledge of sustainability.

**Objectives:** Students will ...

- Understand the importance of sustainability for the future
- Brainstorm and prioritize long term goals
- Draw conclusions
- Identify the concepts of sustainability
- Write concise definitions
- Use components to make a balanced decision
- Rationalize their own decisions
- Understand the perspectives of others
- Develop criteria to quantify their decisions

**Materials (for a class of 30):**

- Information for an issue on which students will make a decision, such as: Cost and specs for an SUV and of a Hybrid car (choose 2 on opposite ends of the spectrum)
- Sidewalk chalk
- Information on their countries
- 30 copies of Triangle Triage – Student Sheet
- Overhead projector
- Overhead of Triangle Triage – Student Sheet
- 3 pieces of easel paper or dry erase boards
- Overhead markers

**Time Required:** 45-60 minutes

**Standards Met:** E1, M1, M11, M14, LA3, LA6, LA12

Procedure:

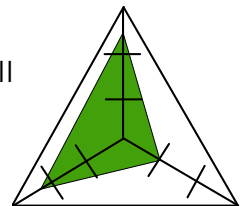
PREP

- Using sidewalk chalk, draw 2 large decision grid triangles on an outdoor concrete surface. See the Triangle Triage – Student Sheet for an example.
- If you don't have access to an outdoor space for this activity, use an overhead projector with transparencies of the decision grid or use masking tape on the floor in your classroom.

IN CLASS

- Split class into two groups of 15. Within these two groups there should be 3 groups of 5 students.
- Hand out Triangle Triage – Student Sheet.
- For each half of the class, assign each group of 5 students an "E". (5 for environment, 5 for social equity and 5 for economics (the three 'Es')).
- Have the students brainstorm 3 criteria, only for their assigned "E", that they feel are important when buying a car and write the criteria on the Triangle Triage – Student Sheet.
- Assign half of the class to research their "E" for a SUV and the other half to research their "E" for a hybrid.
- Explain that students will be using a tool, the Decision Grid, to help the class determine which type of vehicle is the most sustainable by analyzing the vehicle and the "E" that was assigned to them.
- Allow the students time to rate each of their criteria based on the vehicle information given and then find the average of all three of their criteria. They will place their average on their chart located on the Triangle Triage – Student Sheet.
- Go outside to the location of your Decision Grids. Ask each group of 5 to find their 'E' and stand near it.
- Explain the rating scale: 3 – Meets all or nearly all of the criterion, 2 – Meets most of the criterion, 1 – Meets some of the criterion, 0 – Meets little, if any of the criterion.
- One representative from the group should then go and stand on the corresponding average rating point in the triangle. A rating of 3 would put the student at the point of the triangle, 2 would be one dash in, etc.
- Have each group explain the number on which they are standing and what their considerations were when making the decision. Explain to students that they have just described the criteria they used to determine a rating.
- Ask students who are not standing on a point of the grid to fill in the space contained within the points, thus making a new triangle. Or, ask students to draw a triangle connecting the points they have chosen. Then have them shade in the newly formed triangle. See Figure 1.
- Discuss the sustainability of their vehicle. How do they compare?
- If time allows, switch groups and evaluate vehicles again. Group A will evaluate the SUV, while Group B evaluates the Hybrid. Debrief and discuss differences. Are the results the same when different groups evaluated the same vehicle? Why or why not?
- When finished, students should be shown that they have just paraphrased the three aspects of sustainability – the triangles of environment, social equity and economics.

Figure 1



- Return to the classroom.
- Using the overhead transparency of the Triangle Triage – Student Sheet, go through one example the students demonstrated outside. Ask students to complete the student sheet while the class reviews the topic together.
- As a math extension, you could ask the students to find the area of each of the two triangles.
- Have the students return to their country groups.
- Have each country brainstorm three criteria for each of the 3 Es of sustainability that they feel are important in arriving at a solution to their country's climate changes.
- Record these criteria in the table provided. Country groups will revisit and rate these criteria after they have analyzed potential solutions.
- If necessary, ask students to complete the student sheet for homework.

**Assessment:**

- Participation in class demonstration
- Completed Triangle Triage – Student Sheet



# Triangle Triage – Student Sheet

Name: \_\_\_\_\_ Date: \_\_\_\_\_

**Directions:** Complete the decision grid for the topic discussed in class today.

**Rating Scale:**

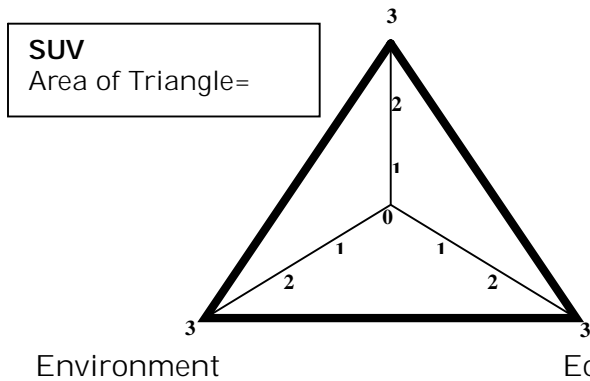
- 3 - Meets all, or nearly all of the criterion
- 2 - Meets most of the criterion
- 1 - Meets some of the criterion
- 0 - Meets little, if any of the criterion

**Topic:**

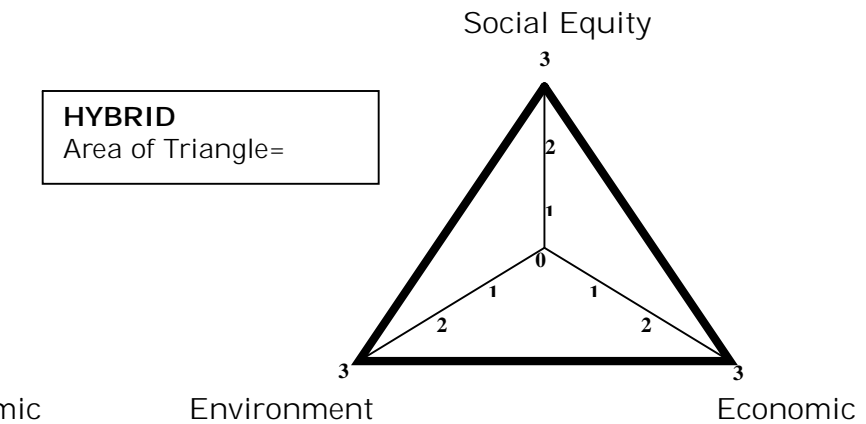
Determine most sustainable vehicle to purchase

	SUV	HYBRID
<b>Environment</b>		
Criteria	Ratings	Ratings
AVERAGE RATING:		
<b>Social Equity</b>		
AVERAGE RATING:		
<b>Economics</b>		
AVERAGE RATING:		

Social Equity



**HYBRID**  
Area of Triangle=





# Triangle Triage – Student Sheet

Name: \_\_\_\_\_ Date: \_\_\_\_\_

**Directions:** Complete the decision grid for the topic discussed in class today.

**Rating Scale:**

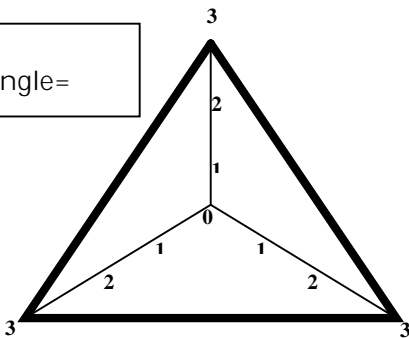
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**Topic:** Determine most sustainable vehicle to purchase

	SUV	HYBRID
<b>Environment</b>		
Criteria	Ratings	Ratings
AVERAGE RATING:		
<b>Social Equity</b>		
AVERAGE RATING:		
<b>Economics</b>		
AVERAGE RATING:		

Social Equity

**SUV**  
Area of Triangle=

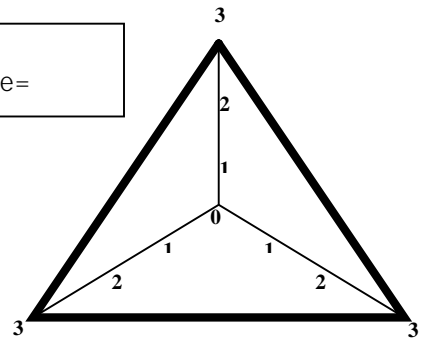


Environment

Economic

Social Equity

**HYBRID**  
Area of Triangle=



Environment

Economic



## Math Extension

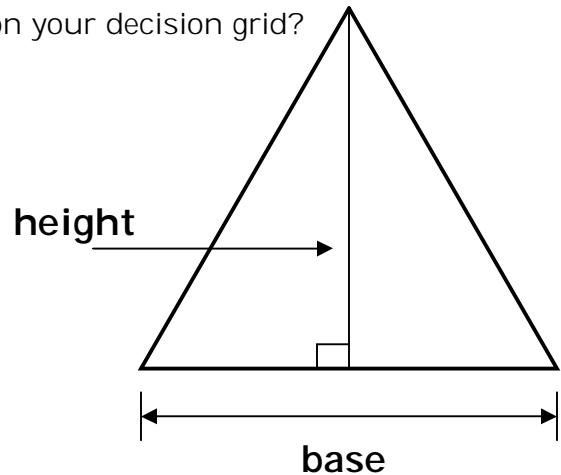
How to find the **perimeter** of a triangle: sum of all three of the sides. **All measurements should be in mm.**

1. What is the perimeter of the original, blank triangle on the decision grid?
2. What is the perimeter of your colored triangle on the decision grid?

The area of a figure measures the size of the region enclosed by the figure.

**How to find the area of a triangle:** multiply one-half the base times the height.

3. What is the area of the original, blank triangle on your decision grid?



4. What is the area of your colored triangle on the decision grid?
5. What is the difference between the perimeter of the original triangle and your colored triangle on the decision grid?
6. What is the difference between the area of the original triangle and your colored triangle on the decision grid?

Name: \_\_\_\_\_ Date: \_\_\_\_\_

**Directions:** Complete the decision grid with criteria important to your country.

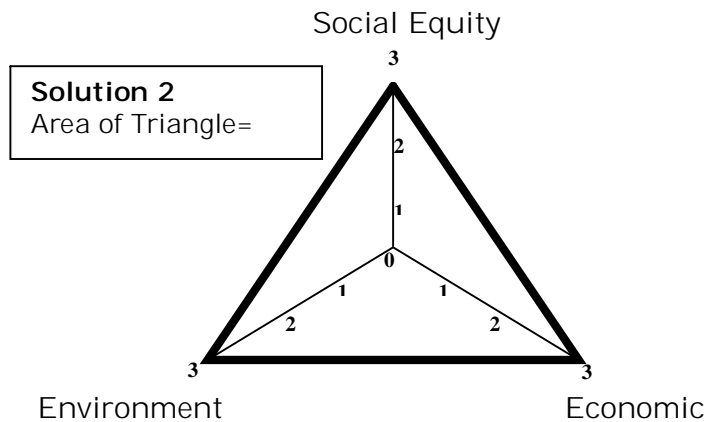
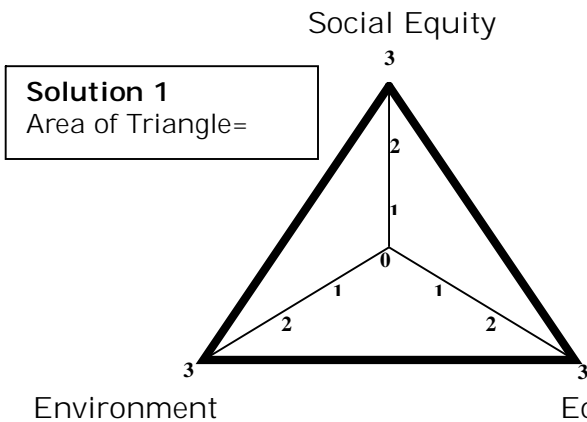
**Rating Scale:**

- 3 - Meets all, or nearly all of the criterion
- 2 - Meets most of the criterion
- 1 - Meets some of the criterion
- 0 - Meets little, if any of the criterion

**Topic:**

Determine the most sustainable solution

	Solution 1	Solution 2
<b>Environment</b>		
Criteria	Ratings	Ratings
AVERAGE RATING:		
<b>Social Equity</b>		
AVERAGE RATING:		
<b>Economics</b>		
AVERAGE RATING:		



Name: \_\_\_\_\_ Date: \_\_\_\_\_

**Directions:** Complete the decision grid with criteria important to your country.

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**Topic:**

Determine the most sustainable solution

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Criteria	Ratings	Ratings
AVERAGE RATING:		
<b>Social Equity</b>		
AVERAGE RATING:		
<b>Economics</b>		
AVERAGE RATING:		

