LEARNING WITH: POWER GRID

ABOUT THE GAME

# of Players: Class **Grade**: 9-12 **Time**: Class Period
Subject: Economics, Supply and Demand

The objective of Power Grid is to supply the most cities with power when someone's network of houses gains a predetermined size. Players mark pre-existing routes between cities for connection, and then bid against each other to purchase the power plants that they use to power their cities. However, as plants are purchased, newer, more efficient plants become available, so by merely purchasing, you're potentially allowing others access to superior equipment. Additionally, players must acquire the raw materials (coal, oil, garbage, and uranium) needed to power said plants (except for the 'renewable' windfarm/ solar plants, which require no fuel), making it a constant struggle to upgrade your plants for maximum efficiency while still retaining enough wealth to quickly expand your network to get the cheapest routes.

WARNING: YOU NEED TO KNOW HOW TO PLAY POWER GRID BEFORE RUNNING THIS LESSON PLAN

WHAT THE GAME TEACHES

Power Grid will show the students what supply and demand looks like in fun and exciting way. It also touches on how societies (the groups) compete for allocated resources and how the scarcity of resources influence decision making. During the game, the students will have to make calculated decisions on what power plant to bid on, which and how many resources to buy, and where to place new houses that they wish to power. Each phase of a single turn brings its own challenges and if the group does not manage their money well, it could result in their power company falling behind the competition. Power Grid can be used to focus on any number learning objectives. Economics and the idea of supply and demand come to mind, and this is what we have focused this lesson on. There is a worksheet attached that will help the students track the supply of each resource and the amount of each type of power plant in play at the end of each round. There should be a correlation between the two at the end of the game that can show what supply and demand looks like and students can draw conclusions for how to play a better game next time around.

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Please contact us if you have any questions about this game, or if you would like to know about more games that can help make learning fun!

EXAMPLE LESSON PLAN

Prep Time: 15 Min

Material Usage: Power Grid Game and Worksheet

Standards and Learning Objectives: EPF.1.ER, EPF.3.ER. Students will be able to see how supply and demand are affected by the market in the game. Students will be able to see how societies react to the scarcity of resources and how that affects decision making.

Set Up: Set up the Power Grid Board so that the entire class can see it. Take out the Elektro (money) and hand each group 50 Elektro. Take the Power Plant Cards numbered 03-10 and place them where the class can see them in a 2x4 pattern in ascending order. When you add new power plants to the market, they will always be arranged in ascending order. On the game board set out the raw materials on the resource market. Place three coal on spaces 1-8; three oil on spaces 3-8; three garbage on spaces 7 and 8. Place 1 uranium on spaces 14-16. These spaces denote the cost of each of the materials occupying them. During the game, at the end of each round, you will replace materials on the market. You will replace three (and only three) of coal, oil, and garbage, and only one uranium each round. Even if a resource is not purchased by anyone, you will still place three on the market when the time comes, unless there is material on the one's space, after all, the only free material is wind!

Randomly Select what color each group will represent; this will tell you where they start on the game board as well.

Play the game of Power Grid and have students fill out their tracker sheet as the game is being played.

Tips while playing: Each turn is played in phases. Giving each group some time to think and talk with one another may be beneficial throughout the game. Allow students to work together as a group to come up with the best strategy for that round. Make sure they are aware that each round will be different depending on how many houses they can power. A good strategy to tell them is to have an incremental growth as the game goes. Aiming to add at least one house each round is good start, but make sure you have enough money for materials to power your plant because if you cannot power your plant, then they cannot power your houses, which is how you make more money! Everything in this game is connected and every phase matters. Students will catch on to this rather quickly when they see one group being the only group that has a power plant that runs on trash, because all the trash will be going to them, and that is how you get pretty cheap resources!

Assessment: At the end of the game, the players will have a full tracking sheet, you can have each of them create a graph or create one as a class. Overlaying the supply of the items and the demand throughout the game will show students exactly how it works, as well as showing them what power plant they should have purchased at a certain point, instead of just the cheapest option at the time. Being the only group to have a power plant that takes coal for a round or two can save a major amount of money due to the amount the group saves on resources.

Extended/Optional Learning: Have the students take their tracker sheets home and make a graph showing the supply and demand of the resources. You can even turn this into a whole group project by having the group evaluate themselves on their performance during the game. This game could also be used as a conversation starter for current events in different energy production.

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Money Earned and Money Spent

NAME: _____ DATE: _____

Instructions: Track the amount of Elektro (money) you have throughout the game in the space provided. There are 4 phases in each round where Elektro is tracked: The amount you start the turn with, the amount you have after buying a power plant, the amount you have after buying raw materials, and the amount you have after building new houses.

Turn	Starting with:	After buying power plant:	After buying raw materials:	After building new houses:
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Graph your table below. Half the group will graph rounds 1-5 and the other half will graph rounds 6-10

150					
140					
130					
120					
110					
100					
90					
80					
70					
60					
50					
40					
30					
20					
10					
0	Round __	Round __	Round __	Round __	Round __

RESOURCES TRACKING SHEET

Turn	COAL How many are available/ How many are needed by power stations		OIL How many are available/ How many are needed by power stations		GARBAGE How many are available/ How many are needed by power stations		URANIUM How many are available/ How many are needed by power stations	
	Available	**Needed**	**Available**	**Needed**	**Available**	**Needed**	**Available**	**Needed**
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								