**Powering Smallsburg Worksheet**

**Instructions**

The village of Smallsburg needs power. Smallsburg has a mall, a school, a sports stadium, and a hospital. Table 1 shows how much power each one needs.

|  |  |
| --- | --- |
| **Community Facility** | **Power Required  (in MW, mega watts)** |
| Mall | 20 |
| School | 1 |
| Stadium | 10 |
| Hospital | 15 |
| Offices/businesses | 4 |

**Table 1**

Now that you know about the community of Smallsburg, complete the following questions.

**Questions**

1. Based on Table 1, how much total power (MW) does the Smallsburg power plant have to supply? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

You can pick combinations of the power plants in Table 2 to add up to the total power needed in Question 1. Each power plant costs money, and some power plants give off emissions (pollution) and some do not.

You have **a total of $250** million dollars to spend.

| **Power Plant Type** | **Power Provided (MW)** | **Cost  (million $)** | **Emissions Per/Year** |
| --- | --- | --- | --- |
| Hydroelectric | 10 | 40 | None |
| 25 | 100 | None |
|  |  |  |  |
| Photovoltaic | 5 | 50 | None |
| 25 | 250 | None |
|  |  |  |  |
| Wind turbines | 10 | 60 | None |
| 25 | 150 | None |
|  |  |  |  |
| **Power Plant Type** | **Power Provided (MW)** | **Cost  (million $)** | **Emissions Per/Year** |
| Nuclear | 10 | 40 | 1 ton radioactive waste |
| 25 | 100 | 2.5 ton radioactive waste |
|  |  |  |  |
| Coal | 10 | 20 | 80,000 ton CO2, 200 ton SO2, 6 pounds mercury |
| 25 | 50 | 200,000 ton CO2, 500 ton SO2, 15 pounds mercury |
|  |  |  |  |
| Advanced Coal | 10 | 50 | 80,000 ton CO2, 20 ton SO2, 0.6 pounds mercury |
| 25 | 125 | 200,000 ton CO2, 50 ton SO2, 1.5 pounds mercury |

**Table 2**

1. Fill in the table below with your power plant choices to power the necessary services listed in Table 1. (Note: You do not have to use all of the rows below.)

|  |  |  |  |
| --- | --- | --- | --- |
| **Power Plant Type** | **Power Provided (MW)** | **Cost  (million $)** | **Emissions Per/Year** |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

1. What is the total energy (power) production of your power plants? \_\_\_\_\_\_\_\_\_\_\_MW (Note: add up column 2)
2. What is the total cost of your power plants? $\_\_\_\_\_\_\_\_\_\_\_\_million dollars   
   (Note: add up column 3)
3. Do your power plants give off emissions (pollution)? \_\_\_\_\_\_\_\_\_\_\_\_

What might that pollution do to the community?

1. How much money do you have left, after buying the power plants? $\_\_\_\_\_\_\_\_\_\_\_million dollars
2. If you did not spend all the $250 million on power plants, what will you buy with the money left over (see Table 3)?

|  |  |
| --- | --- |
| **Improvement** | **Cost (million $)** |
| Repair streets and sidewalks | 20 |
| Fund universities to research cleaner energy technologies | 30 |
| Double the number of teachers in all the schools | 20 |
| Make food free for the community | 100 |
| Nobody works on Fridays | 40 |
| Build large central park | 20 |
| Help fund a free medical clinic | 10 |
| Give money back to taxpayers | Remainder |

**Table 3**