



### Graph Match Answer Key

**About this activity:** The “stories” require students to make some inferences and provide experiences observing and comparing what patterns are formed on the graphs when certain types of electrical devices are used. This activity is difficult for students if they do not have a sense of what types of appliances are relatively large electricity users and if they have not had experiences with cause and effect. When facilitating this activity, the focus should be on discussing the reasoning for the choices students have made. This activity can also be used as an opportunity to generate additional questions for further investigation and research about what causes different patterns of electricity use.

    **F**     1. All four members of this family take turns showering. During this time a pot of coffee is brewed and a quick check of the TV news takes place before the family members dash out the door to work and school.

    **C**     2. It's another typical morning – all four family members shower, coffee is brewed, the TV news is checked, but today in addition, eggs are fried on the stove and toast is made in the toaster. Yum!

#### **Notes:**

**Why?** Electricity use in this description is occurring primarily during morning hours. Graphs C, D and F are the only graphs that cover a typical morning time period. Graph D can be eliminated because the description says that the family leaves for work and school, and this graph shows that electricity is being used for a variety of things throughout the day. Even though Graph F does not show electricity use for the entire time period, the multiple spikes right around the 6 am time period would fit the coffee pot and 4 showers.

**Why?** Much of the same reasoning listed in the first example can be used to narrow the possible graph choices. What makes Graph C the most likely match for this scenario is the fact that the large spike in the morning reaches almost 3 kW whereas the morning spike in Graph F reaches just past 1.5 kW. Appliances used to heat things up – in this example a toaster and stove – use a relatively large amount of electricity.

**A**   3. After school kids watch a little TV and play video games. They start the dishwasher and hear the bread machine beginning to prepare pizza crust for tonight's dinner. After work, pizza is prepared and cooked in the oven. Even though the oven temperature is significantly lowered, it remains on to slowly cook "planets" made from salt dough for tomorrow's science class.

  **E**   4. It's a typical weekday – kids are off to school, parents are at work. Dinner together at home tonight!

  **B**   5. Midday house cleaning commences! The floors in the living room, dining room/kitchen, den, bathrooms, and bedrooms are all vacuumed and dusted, bathrooms cleaned, and floors washed. By early afternoon, kids are home from school and catch up on their favorite shows. No cooking tonight as there is a birthday being celebrated – the family enjoys takeout food together at home. Two loads of laundry are washed – one is dried in the dryer.

  **D**   6. There's no time to waste! The family is having guests for dinner. There are lots of preparations that need to occur. There are pies to make, homemade stuffing to prepare, vegetables and potatoes to wash and peel, casseroles to assemble, and a turkey to get ready for the roasting oven. Even though the guests aren't arriving until 5 pm, the turkey must start roasting around 2 pm. By mid morning there are enough dirty dishes to run the dishwasher, and some late risers take showers.

**Why?** Since the description includes activities that happened in the afternoon/evening hours, Graph F can be eliminated. One can infer that the parents and kids have been gone during the day ("After school..", "After work..") which eliminates Graphs B and D since these show electricity use throughout the day and leaves Graphs A, C and E. Graph C can be eliminated since the description says that the oven was left on throughout the evening. Although tough to distinguish differences between A and E, Graph A is a slightly better answer since a large spike, reaching over 4 kW appeared just after "after school" time, and another spike around 6 pm over 2 kW could be the oven coming on to cook the pizza.

**Why?** Based on this brief description, many of the graphs are a possibility. Graphs B and D can likely be eliminated since they show use throughout the day, and Graph F doesn't show use in the evening. Graph A is missing electricity use details for the early part of the day so, though a possible choice, is probably not the best match. One could infer that "dinner together at home" means that dinner is cooked at home, making Graph E a better choice than Graph C, which shows very little electricity being used around the typical dinner hour.

**Why?** Graphs B and D are reasonable matches since they both show electricity use throughout the day. While there are many electricity using activities described in both B and D, appliances such as vacuums and TVs use much less electricity than things like ovens and stovetops. The scale of Graph B ranges from 0-3 kW with the largest spike being just over 2 kW. The scale of Graph D ranges from 0-12 kW and shows spikes at times over 4, 6, 8, 10+ kW.

**Why?** Again, both Graph B and D are reasonable since they show electricity use throughout the day. Several clues in this description help make Graph D a better fit for the activities described here. First, a turkey roasting in the oven around 2 pm. This matches with a spike around 2 pm that reaches almost 6 kW. Dinner is scheduled to be served at just after 5 pm. Heavy electricity use indicated by large spikes (ranging from 6 kW to almost 12 kW) occur around and just before the scheduled dinner time. Spikes reaching almost 4 kW that occur around 8:30 – 9:00 am would also explain the "late risers taking showers."