**The Internet-based smart home is available at** <https://smarthome.cemastprojects.org/> **or** <https://cemastprojects.org/IBSH/>.



*Take a moment to explore the functions on this page. You can tap many elements on this screen to control your home, but some elements provide status information only. When you are finished exploring, answer the questions below.*

The dashboard shows an interface you might see on a tablet if you lived in a smart home. Based on what you see, what does it mean for a home to be 'smart?'

Which of the functions on this page do you think could offer the greatest convenience? Defend your reasoning.

Which of the functions on this page do you think could help best conserve energy? Defend your reasoning.

 Go to the Challenges page.



*Complete the activities on screen. Before marking the challenge complete, answer the questions below.*

All of the light bulbs produce the same amount of light. Why then does the energy cost of the different light bulbs vary so dramatically?

In percent of energy use, what is the energy cost of an LED when compared to an incandescent?

If you use 4 bulbs in a room, how much energy do you save in a year by converting incandescent bulbs into LEDs?



*Complete the activities on screen. Before marking the challenge complete, answer the questions below.*

Why is the recommended indoor temperature lower when it is cold outside and higher when it is hot outside?

Trend 1:

Explanation:

Trend 2:

Explanation:

The 20° and 100° lines are often mirror images of one another. Why is the shape of the 60°F line so different?

In what geographic region(s) of the U.S. would you expect to see the lowest energy usage? What region(s) might you expect to have the highest energy usage?



*Complete the activities on screen. Before marking the challenge complete, answer the questions below.*

Which of the reasons for choosing an appliance seems most reasonable to you? Why do you think that is most important?

Why does the U.S. Government mandate that EnergyGuide tags be made available for most appliances?

Energy use is recorded in kilowatt hours (kWh). A clothes dryer typically uses about 4000 watts, so using the dryer for 15 minutes (one quarter of an hour) would be 1 kWh.

If the refrigerator uses an average of 160 watts each hour, how many kilowatts of energy does it use each day?



*Complete the activities on screen. Before you click the check mark, answer the questions below.*

Why do you think the energy profiles of the office building are almost inverted between January and July?

In which month is the energy use greatest at each business? Why do you think the energy is highest during those months?

How do you think a home's average daily energy usage would compare to that of the office (2,000 kWh), grocery store (400 kWh), and factory (10,000 kWh)?

 Proceed to the Experiments page.



*Complete the activities on screen. Before you click the check mark, answer the questions below.*

What was the plan you developed for your car's arrival?Why was your plan a good one? How would your plan reduce energy use? How would your plan improve convenience?

What are some additional ways automation might be used in your home? Describe why these additions would be energy-efficient and/or convenient.



*Complete the activities on screen. Before you click the check mark, answer the questions below.*

Why are heat pumps the most efficient electric water heater?

If you watch closely, you can figure out how much water showers, baths, and sinks commonly use. Which flow rates were you able to identify?

If kWh of electricity cost $0.12 and therms of natural gas cost $0.45, why are natural gas water heaters cheaper to power than electric?

Why is heat uptime a valuable number?



What happens when there is not enough wind? Too much wind?

Where do you get your electricity if there is no power coming from the turbine?

What happens when the turbine generates more power than you need? Where does the extra power go?

In Part 2, you can see a comparison of how different devices (eg. mobile phone, refrigerator, electric vehicle) use the power generated by your wind turbine. Do these energy use comparisons make sense to you? Why or why not?

This simulation assumes that the home we are looking at has power storage capabilities. In the real world this is rarely true, but is only sometimes a problem. Why would a lack of power storage be a problem? Why is it only a problem sometimes?



*What kinds of household tasks use the greatest amount of energy?*

Based on what you've learned today, what could you do in the next week to reduce your energy usage?