

Name _____ Date _____ Period _____

Video Worksheet: "How do solar panels work?"

CONCEPTUAL PHYSICS: UNIT 6

Directions: Answer the following questions while watching YouTube video "The Science of Static Electricity". <https://www.youtube.com/watch?v=xKxrkht7CpY&t=38s>

1. How much solar power does the Earth absorb every day?
2. Solar panels are made up of smaller units called _____.
3. What are the most common solar cells made of?
4. What is the most abundant element on Earth?
5. Why can't electrical current flow in silicon?
6. How many different layers are there in a silicon solar cell?
7. What is special about an "n-type" silicon?
8. What is special about the "p-type" silicon layer?
9. Where the two types of silicon meet, electrons can wander across the p/n junction, leaving a _____ charge on one side and creating _____ charge on the other.
10. You can think of light as the flow of tiny particles called _____.
11. When one of these photons strikes the silicon cell with enough energy, it can knock an _____ from its bond leaving a hole.

12. The _____ charged electron and location of the _____ charged hole are now free to move around. But because of the electric field at the p/n junction, they'll only go _____ way. The electron is drawn to the ____-side, while the hole is drawn to the ____ - side.

13. The mobile _____ are collected by thin metal fingers at the top of the cell. From there they flow through an external _____, doing electrical work like powering a light bulb before returning through the conductive aluminum sheet on the back.

14. Each silicon cell puts out _____ a _____ but you can string them together to in modules to get more _____.

15. How many photovoltaic cells do you need to power a cell phone?

16. What are the only moving parts in a solar cell?

17. How long can solar cells last?

18. So what is stopping us from being completely reliant on solar power? (*name at least two*)

19. The most efficient solar cell yet still only converts _____% of the available sunlight to electricity, and most commercial systems are currently _____% efficient.

20. How much space would we need to power the world with solar power?

21. How many people on our planet do not have access to a reliable electrical grid?