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| **Title**  |  ***Ready, Set, Save on Solar Energy Technology!*** |
| **Introduction**  | This is a Project Based Lesson (PBL) designed as an extension to the Marketing Unit. The 5 main components are (1) Investigate (2) Research(3) creation of a product (PowerPoint, pamphlet or poster) (4) presentation to the class.(5) educational display to exhibit to the community. Participants will investigate and conduct independent research on solar energy and solar energy products then use this research to create a Marketing product. Participants will apply the 4 P’s of Marketing (product, price, place and promotion) to a new solar business they will manage. Participants will be expected to create a 3-5 minute presentation on a solar energy business they will own. Participants will use the Internet and YouTube videos to investigate and research, and industry guest speakers to obtain project information.  |
| **Real Science Application**  | If you ever wondered, "Why is solar energy important?" Well, you’re not alone. With all of the talk in the media about alternative energy, it is a common question. Since the beginning of time solar energy has been an important part of life. More and more, man is learning how to harness this important resource and use it to replace traditional energy sources. The sun supplies the Earth with ample energy to fulfill all the world's power needs. It doesn't give off carbon dioxide emissions, it won't run out and it's free. On Earth we have an excess of sunbeams which can be useful electricity thus creating solar energy. Solar power is used to create many solar productsIn the future, solar energy may well be the primary source of energy. This could lead to a clean environment, less money spent on utilities, and a healthier world. Why is solar energy important? It has the potential to allow technology and nature to co-exist peacefully. |
| **Learning Outcomes**  | * Participant will be able to demonstrate knowledge of Solar Energy Technologies (definition of solar energy, solar energy products)
* Participant will be able to demonstrate knowledge of Marketing and its valuable benefit to a business
* Participants will be able to explain and define various Marketing Mix terms and how they relate to the Business world.
* Participants will get actual hands-on practice in creating a marketing activity. This will help the students’ better understand marketing a business and deepen their interest in learning more about Marketing.
* Participants will prepare and deliver a presentation of a product to their classmates
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| **Time Required and Location**  | 45 minute class period in classroom on day 1. Additional 45 minute class periods on day 2, day 3 and day 4 |
| **Materials Needed**  | *Facilitator List** Computer – Internet
* Handouts for Participants –see below

*Participant List** Solar Energy websites and Solar Energy products websites
* Solar Company Notes/Research worksheet (1 per participant)
* Microsoft PowerPoint Template (1 per participant)
* PowerPoint presentation Rubric (1 per participant)
* Marketing Unit handouts and notes, from prior lessons
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| **Safety**  | Follow All Lab Safety Rules |
| **Participant Prior Knowledge**  | Participants should be familiar with the Marketing mix via a PowerPoint presentation that introduces participants to the terminology and concepts related to marketing. Students must know the terminology to understand the career opportunities in marketing. Participants should have knowledge about basic marketing fundamental concepts and an understanding of business management activities and entrepreneurship.Participants should have knowledge of Microsoft PowerPoint.  |
| **Facilitator Preparations**  | Discuss with participant’s solar energy and solar energy uses. Discuss with participants that they are an Entrepreneur of a new solar energy business. They use their solar energy research to creating their own solar energy product. They will be creating the Marketing Mix of price, place, promotion and product for the new solar business they will own. They will present a Marketing Mix for a new solar energy product they will create. Participants will present the information to their classmates in a Microsoft PowerPoint, pamphlet or brochure. Participants will work independently.  |
| **Activities**  | **Day 1: Introduction of Lesson**Introduce lesson by showing participants a solar - powered dancing flower. Link to solar - powered dancing flower: <https://www.youtube.com/watch?v=MCI2E_WxJmM> or teacher can purchase a solar powered object to model solar power movement. Ask participants to respond back orally; how they think the toy is moving. [5 minutes] Open a discussion by asking the participants to define the word “solar.” [5 minutes]Explain to participants what solar energy is and where solar energy comes from. Explain how it is used in personal and business world. [5 minutes] Independent Internet Research: Participants will view YouTube videos on solar energy for further understanding. See Solar Energy websites worksheet [15 minutes]Wrap-up: Participants will complete and then discuss; what is solar energy using the Frayer Model graphic organizer worksheet. Link to Frayer Model: <http://www.theteachertoolkit.com/index.php/tool/frayer-model> [15 minutes]**Day 2: Investigate Existing Solar Products**Class warm –up: Show participants a Solar Energy Car. Elf You tube video: <https://www.youtube.com/watch?v=LGDSkFQEOjo> [10 minutes]Participants will view solar product YouTube videos. See solar energy product websites worksheet [25 minutes]Participants will complete Padlet.com question, “What solar power product do you like and why?”[10 minutes]**Day 3: Participants complete research notes/ worksheet and marketing mix template** Discuss and allow participants time to look over handouts and ask questions. [10 minutes]Hand out project requirements worksheet, solar business research notes worksheet, and rubric to each participant. Direct participant to use the Marketing Mix bubble chart as a resource. Research: Participants will research solar energy products and complete solar business research notes worksheet[25 minutes]Participants will create a Market Mix project using price, place, product and promotion template. See template as a resource [10 minutes]Day 4 Presentation of Final ProjectParticipants will present Solar Power projects [45] |
| **Assessment**  | See rubrics below. The rubric will be used for assessing (1) the Marketing Mix of a solar energy product, and (2) the oral presentations to classmates.Participant Grade for the notes and references compiled during researchASSESSMENT ACTIVITYPowerPoint and Presentation RubricStudent Project:Spelling/Grammar Accuracy of Project – did the participant accurately depict the Marketing Mix?* Thoroughness of project—did the participant include all the required information about the solar company?

Public Speaking – Presentation* Extent to which presentation was sincere, interesting, clear, creative, convincing, and concise
* Confidence
* Appropriate gestures, eye contact

Voice quality, delivery –not to loud or too soft, clear vocalsParticipant GradeAssess students completed project worksheets, the solar energy project to include neatness, grammar, spelling, accuracy of content, etc. The presentation of their product to their classmates. Consider the student’s reasons for choosing their solar business, the likelihood that they would be successful, and  |
| **Critical Vocabulary**  | 1. **Solar energy** - radiant energy emitted by the sun. Another term for [solar energy is solar power](https://www.google.com/search?rlz=1C1CHXU_enUS644US644&espv=2&biw=1366&bih=639&q=define+solar+power&sa=X&ved=0CCEQgCswAGoVChMI9IrixdD8xgIVifMeCh1fYAT5).

 **Marketing mix** – product, price, place, promotion. Participants should know "**The 4 P's"of Marketing:Product**- The firm's goods or services they are selling.  This includes not only physical unit, also package, warranty, and brand and company image.**Price** - Price is determined by demand for the goods and the cost of the goods. Examples of various pricing strategies: introductory prices, sale prices, odd pricing ($9.99 vs. $10.00).**Place/Distribution**: How a product flows from producer to customer.  Wholesalers link the producer of the goods to the customer.**Promotion:** Different elements that help increase the sale of the product. Examples: advertising, sales, public relations.**Entrepreneur:** An entrepreneur is an individual who undertakes the risk associated with creating, organizing, and owning a business**Target Market:** The customers who are most likely to buy the firm's products. Also called target audience. The Right Principle:  companies try to get the right goods to the right people at the right place at the right time at the right price using the right promotional strategies.  |
| **Community Engagement**  | Display participant’s products in the display case in our main hallway for school and community viewing.Guest speaker –Engineers from Industry |
| **Author Info**  | In this section, tell us about yourself and your mentor! Include the following:Kenan Fellow:* Joanne Jeffries
* Gravelly Hill Middle School, Orange County School, Hillsborough
* Teach 6th,7th, 8th -Keyboarding, Computer Skills and Applications, Exploring Business, Marketing and Entrepreneurship and Introduction to Computer Science
* Teaching 20 years
* Joanne.Jeffries@orange.k12.nc.us

Mentor:* Dr. Pam Carpenter
* FREEDM System Center
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# Solar Energy Business PowerPoint Presentation rubric:

# Student’s Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Class Period

#  \_\_\_\_\_ *Max # of points Total Points Given*

|  |  |  |
| --- | --- | --- |
| **Student Project:****Spelling/Grammar** **Accuracy of Project – did the participant accurately depict the Marketing Mix?*** **Thoroughness of project—did the participant include all the required information about the Solar Company?**
 | **10****30****20** |  |
| **Public Speaking – Presentation*** **Extent to which presentation was sincere, interesting, clear, creative, convincing, and concise**
* **Confidence**
* **Appropriate gestures, eye contact**
* **Voice quality, delivery**
 | **10****10****10****10** |  |

Comments:

**Solar Energy Business Research/Notes**

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**Your Company’s Name:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Product:**

* What are your products?
* How are new products developed?
* How are existing products improved?
* Picture of Product(s) If: possible

Research:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Price:**

* Cost of Product(s)
* Quantity sold: Units, Sets, Individual

Research:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Place:**

* Where are products available for sale? Example: Store
* How do the products get distributed to stores and consumers?

Research:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 **Promotion**:

* How are customers made aware of products? Ex: Commercial on TV
* How does the seller entice the buyer to purchase the product? Ex: Coupon

Research:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The 4 P’s of Marketing Bubble Chart:



Sales, Grand Openings

Newspaper, TV, Radio Ads

e-Business Websites

Stores

Catalogs

Demand

Innovation

Supply

Goods & Services

Market Research

Competition

Price

Product

Place

Promotion

Internet Ads