

SOLAR Electricity

Night Light Activity Gr.4-6

- Activity Based
- Hands-on
- Low Cost
- Tech integration
- Challenges
- Equipment Sources
- Curriculum Connections
- Detailed How-To
- Resource Links
- Fact Sheet Available On-Line

TEACHER RESOURCES

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*For your own information, there is a more comprehensive fact sheet available at the 3NE website that also covers:

- Solar PV Systems (on & off grid, industrial)
- Benefits of Solar Energy
- Case Study: Fort Chipewyan Solar Farm

<https://www.3ne.ca/wp-content/uploads/2020/09/Solar-Electricity-Fact-Sheet-General-e.pdf>

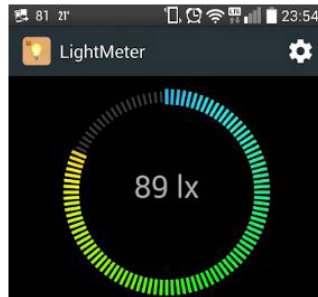


STUDENT HANDOUT

Activity: How to Make a Solar Night Light5
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ADDITIONAL RESOURCES

- .Available at www.3NE/Learning:
- Fact Sheet: Solar Electricity Facts and Questions
 - Activity: Solar Electricity - Solar Night Light
 - Activity: Solar Electricity - Angle of the Sun - Build a Clinometer
 - Activity: Solar Electricity - Angle of the Sun
 - Activity: Solar Electricity - Angle of the Sun - Enrichment Computer Activity





What's Included

The resources are in 2 sections:

1. Teacher Resource p2-4

- Curriculum Connections
- Equipment Resources
- General Instructions

2. Student Handout p5

- Optional Student Instruction Sheet
- (Optional [Activity Fact Sheet and Question Sheet](#) available on [3NE website](#))

Overview

This relatively low cost, hands-on activity is a great opportunity to demonstrate how solar electricity is produced.

This exercise compliments the program if your students are exploring society's impact on the environment in regards to greenhouse gases, with a solution based, hands on project.

This can also be used to connect the demonstration of solar electrical energy to other real-world applications such as using solar energy for home electrical production, vehicles and tools as well as more commercial/industrial applications

Curriculum Connections

There are multiple connections to the Alberta curriculum. Here are some of the relevant concepts:

Grade 4 - Key Concepts

General Learner Expectations

- Investigate the nature of things, demonstrating purposeful action that leads to inferences supported by observations.
- Students will show growth in acquiring and applying respect for living things and environments, and commitment for their care.

Light and Shadows

- Demonstrate that light travels outward from a source and continues unless blocked by an opaque material.
- Recognize that light can be reflected and bent (reflected light contributes to charging a solar panel).

Grade 5 – Key Concepts

General Learner Expectations

- Students will show growth in acquiring and applying respect for living things and environments, and commitment for their care.

Mechanisms Using Electricity

- Identify example applications of electrical devices i
- Recognize the importance of switches and other control mechanisms.

- Given a design task and appropriate materials, invent and construct an electrical device.

Weather Watch

- Describe the effects of the Sun's energy on daily and seasonal changes in temperature 24-hour and yearly cycles of change.
- Identify human actions that have been linked to the greenhouse effect.

Grade 6 - Key Concepts

General Learner Expectations

- Students will show growth in acquiring and applying respect for living things and environments, and commitment for their care.

Sky Science

- Describe seasonal changes in the length of the day and night and in the angle of the Sun above the horizon. (Useful for solar technology.)

All curriculum connections were derived from

<https://education.alberta.ca/media/159711/elemsci.pdf>

Useful Links

Video

Solar Energy - Bill Nye's How Stuff Works

<https://www.youtube.com/watch?v=av24fEMhDoU>

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Teacher Instructions - Solar Powered Night Light

This is a simple activity to give hands-on experience with a mini solar panel.

As usual, try the activity out before using it in class so you can modify the instructions to match your equipment.

Equipment:

- A solar pathway light
- A mason jar with fitting lid
- Sticky Tack (you can try foam weather stripping, layers of masking tape or glue gun if you prefer.)
- Optional: paint/glitter glue, colored pebbles, etc.

Instructions:

1. Measure the top of the jar to make sure the light will fit, as pathway lights come in a variety of sizes.
2. Gently twist off the solar light from the rest of the stake.
3. The solar panel is on top so you can point this out to your students when you do the activity.
4. Underneath, remove the plastic cover over the light to see the small LED.
5. Remove the lid of your mason jar, and put the flat part aside. You only need the ring.
6. Compare the size of your solar light to the ring.
7. The light should fit snugly into the center of that ring. If there is a gap between the ring and the solar light, try wrapping the light with some foam weather stripping or sticky tack (poster tack). Fix the light into the center of the lid so it is secure.
8. Replace the lid and light assembly back onto the jar.
9. Put the jar outside or in a window in full sun for a day to charge it up. Bring it in and turn off the lights (or cover the top) to see the LED light turn on.

Optional Activities

- **Demonstration:** Using a small screwdriver, take apart one of the solar lights so you can see the small circuit board and battery inside. Discuss how batteries are important in providing power when there is not sunlight. You can also discuss the use of the light sensor to save energy.
- **Experiments:** How long does the solar charged battery last? Completely cover the solar panel and see how long the light stays on. (It can be a few days.) How long does it take in the light for the battery to have enough energy to turn on the light again? (This can be a few seconds!)
- **For Fun:** The jars can be decorated with paint, glitter glue, colorful stones or other objects can be placed inside. (See samples on right.)



SOLAR Electricity

HOW TO MAKE A SOLAR NIGHT LIGHT!

Equipment:

- 1 small outdoor solar light with round top (pathway light)
- 1 regular mouth glass mason jar with lid (2-3/8" / 60mm inner diameter)
- Sticky Tack OR glue gun OR plastic wrap
- Optional: paint/glitter glue, colored pebbles, etc.



Instructions:

1. Check the top of the jar to make sure the light will fit.
2. Gently twist off the solar light from the rest of the stake.
3. Twist off the plastic cover over the light.
4. Find the solar panel on top and the small LED light bulb underneath.
5. Remove the lid of your mason jar, and put the flat part aside. You only need the ring.
6. Compare the size of your solar light to the ring.
7. The solar light should fit snugly into the centre of that ring, light bulb facing down.
8. If the light is loose, roll out the sticky tack into a long "snake" and wrap it around the light to fill the gap. You can also use a glue gun or wind plastic wrap around the light to make it fit snug.
9. Fix the light into the centre of the lid so it can't move around.
10. Replace the lid back onto the jar. The solar panel will be on top with the LED bulb facing down inside the jar.
11. Put the jar in a window in full sun for a day to charge it up. Bring it in and turn off the lights (or cover the top) to see the LED light turn on.



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CHALLENGE

How long does the solar charged battery last? Completely cover the solar panel and see how long the light stays on. (It can be a few days.) How long does it take in the light for the battery to have enough energy to turn on the light again? (This can be a few seconds!)

For Fun:

The jars can be decorated with paint, colored tissue paper or glitter glue. Marbles, colorful stones or other objects can be placed inside.



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