

Solar-Powered Water Desalination

Duration	Age	Difficulty
45 min	15-16	Medium
Technology #Solar Energy #Sustainable energy		

DESCRIPTION

In this session, students will explore how solar energy can be harnessed to desalinate saltwater—an essential process in regions with limited access to clean drinking water. They will work in teams to design, test, and iteratively improve a mini solar-powered desalination system using simple materials. Students will collect and analyze data, build visual infographics, and reflect on the impact of their designs. To connect technical work with social justice and gender equity, students will learn about Maria Telkes and other gender-diverse innovators in renewable energy. They'll also explore ethical questions and cultural dimensions of water access.

ACTIVITY OBJECTIVES

- Explain the principles of solar desalination and energy transformation.
- Build and iteratively improve a prototype using design-thinking methodology.
- Compare results between prototype versions and justify design changes.
- Collect and visualize temperature and volume data with charts.
- Reflect on the ethical dimensions of water access and sustainable technology.
- Explore the intersection of gender, equity, and STEAM leadership.

KEY COMPETENCES (EU)

- Cultural Awareness and Expression
- Social and Civic Competence
- Digital Competence
- Learning to Learn



MATERIALS



Scissors



Pen/pencil



Notebook or printable worksheet

- Provided by students
- Provided by the teacher/institution
- Downloadable Elements



Clear plastic containers with lids



Black construction paper or shallow trays



Plastic wrap



Aluminum foil



Salt



Heat lamps or access to sunlight



Measuring cups/spoons



Droppers



Food coloring (optional)



Stopwatch or phone timer



Printed role cards (engineer, recorder, presenter, leader)



Printed story cards



Printed slides on global water inequality and traditional water filtration methods



Student worksheet (data table, reflection prompts)



Gender-reflection sheet



Printable infographic template





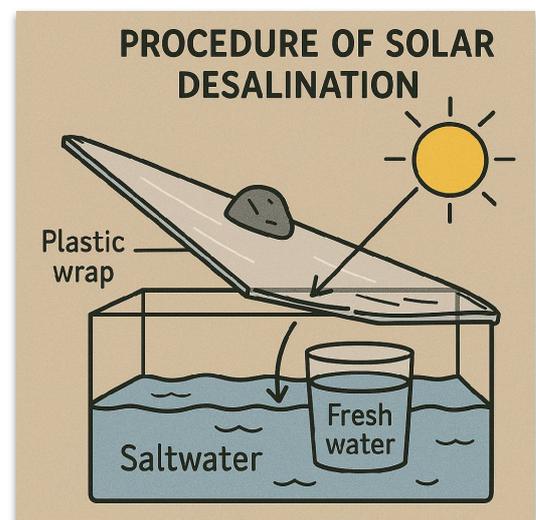
PREVIOUS PREPARATION

- Form diverse teams of 3–4 students.
- Print role cards to encourage equitable distribution (e.g., engineer, recorder, presenter, leader).
- Prepare kits with all materials.
- Review access to heat lamp or sunlight.
- Prepare printed stories of at least 3 gender-diverse STEAM role models.
- Show short video: “Solutions to Fresh Water Shortage Problem (Solar Desalination)”



CONTEXTUALIZATION AND ADAPTATION

Over 2 billion people lack access to safe drinking water. In many regions, women and girls bear the burden of water collection, often missing school or risking safety. Solar desalination offers a low-cost, clean-energy solution. This activity connects STEAM problem-solving with global justice. Through storytelling, students will learn from gender-diverse innovators and be challenged to reflect on the ethical implications of water inequality.



Watch video 🎥 - “Solutions to Fresh Water Shortage Problem (Solar desalination)”

★ Link: <https://www.youtube.com/watch?v=gHFHenZpHQU>



Note for the teacher 📝

Monitor Group Dynamics: Encourage role rotation to ensure all students, especially girls, have the chance to take the lead on technical tasks like building and presenting.

Time Management Tip: Allocate:

- 5 minutes for intro + Maria Telkes story
- 25 minutes for construction and testing
- 10 minutes for infographic/presentation
- 5 minutes for class wrap-up discussion



ACTIVITY

Step 1: BUILD Prototype (20 min)

1. Each team gets a clear container with black paper.
2. Pour saltwater to 2 cm height.
3. Place an empty cup in the center.
4. Seal the container with plastic wrap.
5. Add a stone on top, above the center cup.
6. Place under sunlight or a heat lamp.



Step 2: Test, Record & Improve (15 min)

1. Measure and record water temperature.
2. Run the experiment for 30 minutes.
3. Record volume of collected water.
4. Document temperature change.
5. Use food coloring to observe purification (optional).
6. Teams revise design and predict how changes will improve results.

Step 3: Infographic & Reflection (10 min)

Each team creates a poster/infographic including:

- Diagram of the system
- Experimental results
- A quote or story about Maria Telkes
- A water-related equity issue
- Visual or symbolic comparison with a traditional water method





CONCLUSION AND SHARING

CLASSROOM REFLECTION & DISCUSSION

Wrap up with discussion prompts:

- What design choices improved water collection?
- How does this prototype help communities in need?
- What did you learn about STEAM leadership from female/gender-diverse inventors?
- Did every member get to lead in some way?
- What did you learn about STEAM leadership from female/gender-diverse inventors?



EXTENSION OPTIONS

- Debate: Should access to desalinated water be a human right?
- Art Extension: Draw a "water hero" from your team or history.
- Ethics Essay: Who benefits from solar tech and who might be left out?
- Research: Find a real-world community using solar desalination."

Cultural Reflection Extension (Optional):

- Choose a traditional water purification method from any culture (e.g., clay pots, sand filters)
- Create a drawing or small model to represent it.
- In your infographic, include a side-by-side visual comparison between your solar prototype and the traditional method.
- Use symbols, materials, or colors that reflect the values behind both approaches (e.g., sustainability, community).
- Reflect: How can we combine ancient knowledge with new technology?

#SolarSTEAM #STEAMbrace #GirlsInTech

Don't forget to take a photo of your experience and share it with us!



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[Instagram](#)



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BIBLIOGRAPHY AND REFERENCES

- Maria Telkes - U.S. Department of Energy
- How Solar Desalination Could Help Solve the Water Crisis (YouTube)
- Maria Telkes bio – U.S. Department of Energy
- UN SDG 6: Clean Water and Sanitation
- Design Justice Principles
- Inclusive Design Toolkit

