

Solar Schools for British Columbia

A collection of
lessons to assist
teachers and students
with their exploration
of solar energy



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Our Solar Roof

Preparing for an installation

What will happen

Students predict what a solar hot water system for their school will be like and compare with one that is installed or planned for their school or a nearby school. Students record the event on video by analyzing the installation plans, identifying key content and developing a strategy to provide future students and others with a dynamic tool to learn about solar

Students will

- Predict what an installation will look like;
- Collaborate on knowledge and design processes;
- Review and analyze the rationale for the installation;
- Make inferences based on what they know and what they can interpret from drawings;
- Gather information about other installations and results;
- Assess and evaluate needs and content requirements;
- Set criteria for best methods of presenting content;
- Formulate a strategic plan to make an effective video and implement it;
- Teach others about solar and the system in their school.

Total Time 2 - 2½ hours + homework	Establish what students know	Activity - Part A	Activity - Part B	Debrief what students learned
	25 - 35 minutes	30 - 45 minutes	45 - 60 minutes	20 minutes

In Advance

Request copies of the technical, mathematical and background information related to the installation at your school.

What you need to know

By having students guess or predict what they think the solar installation and mechanical systems are like before they take a tour or review schematic drawings, creates the 'need to know' and engages students in thinking about what systems require to operate. This lesson works for schools expecting either thermal or PV systems.

What might surprise you

- Hot water demands the second largest amount of energy in our homes, after space heating, and it represents about 30 per cent of total energy use in our homes. A solar water heater can supplement up to 60 per cent of the water heating energy needs for a typical family of four. *Source: Solar BC*
- Solar energy is one of the cleanest and greenest forms of electricity, and it's growing more popular by the year, with a 25 per cent annual increase in demand over the last 15 years. *Source: Volvo car magazine 2008*



WildBC

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What you need

- Poster paper
- Markers
- A bell or something else to signal time to students during noisy activities
- Vocabulary list

Establish what students know

1. Individually, have students guess where the energy from solar panels on the roof will travel, how it will get there and what will happen when it arrives. Then, have students form pairs and exchange information with one another.
2. Invite a few students to share their ideas with the class to establish some of what is commonly known and identify gaps.
3. Review how water/electricity in the school is currently heated/provided.
4. Form teams of four or five students. Provide each team with poster paper and each student with a marker. Everyone is expected to write on the paper simultaneously and continuously for the duration of time allotted.
5. Provide the following directions:
 - a. You will be sketching a diagram and have 5 minutes. I'll signal when to start, and when to stop.
 - b. As a team, your task is to sketch and label what you think the solar installation will look like at our school and how it will work.
 - c. Go!
6. Debrief their sketches with questions like:
 - a. How do you feel about your sketch?
 - b. What happened?
 - c. What did you learn about solar installations? Working in a team?
 - d. How does your drawing relate to the existing energy system?
 - e. What if you had more time? What if only one person had a marker?
 - f. What if you could do the task again, what would you do differently?



Use the discussion to help students get at points, such as:

- Working in a team introduces more information and ideas.
- Working simultaneously increased involvement, but caused confusion duplication and omissions.
- Having a plan will improve the results.

Main Activity

What you do

Part A

1. As a class, have students suggest ways they could find out more about how solar installations work. They may suggest taking a tour, witnessing an installation, interviewing an installer, reading books and the Internet, reviewing technical drawings, etc. Discuss the pros and cons of each suggestion and, specifically, how witnessing a solar installation would improve their sketches.
2. Tell the students that the installation process is a one-time event and that once the installation is in place, the panels and equipment will most likely be inaccessible for viewing. Provide students with any specifics related to the installation planned for their school, e.g. who will be involved, timing and accessibility limitations.
3. Inform students that they will video record the event (as a class or in teams) and have the opportunity to create a legacy for the school's solar energy initiative by making it a dynamic learning tool. Discuss what makes a dynamic and interesting documentary video.

(Note: Even if you decide to produce only one or two 'film crews,' you may wish to have students work in smaller teams to develop their ideas on content and strategies for implementation before bringing the ideas together.)

4. Discuss various sources to assist them with content development for the video.
5. Students regroup in the same sketch teams to develop video content. Distribute copies of the information and/or mechanical drawings or photos of the solar installation that's planned. Have students compare their sketches and ideas with the plans to identify what content they believe helps people understand solar energy.
6. To assist teams with their ideas on content, have them consider questions like:
 - a. What do you expect to see and learn during a school solar installation and the heating or electrical system connected to it?
 - b. What questions would you want a video to answer?
 - c. What do you think are the key concepts and key messages?
 - d. What story might the video be able to tell about how it was decided that a solar system was being installed? Who was involved? What did it take?
 - e. What do future students need to learn from the video?
 - f. What do you think they will be most interested in seeing?

Part B

1. Have teams develop a strategy for recording the installation event by considering questions like:

How will you ensure the video is:

- a. Informative?
 - b. Easy to understand?
 - c. Engaging and interesting?
 - d. Easy to find and people know about it?
 - e. Lasting and memorable?
 - f. Supported by school administration?
 - g. Made safely?
2. Students video tape the installation event.

Debrief what students learned

- What did you enjoy most about making the video?
- What are you most proud of and why?
- What do you think will stick in viewers minds after they finish watching the video?
- What recommendations would you make to another group of students that are about to video a solar installation?

Assessment

- Explain the rationale for the installation at their school.
- Describe the steps for the installation.

Extensions

- **Max out the savings.** Students analyze the existing system and make improvements to the existing one or propose an alternate. Consider material and labour costs, anticipated difference in savings, pay-back period, sustainable practices, life cycles of materials, state of technology, convenience and even policies of school district and funding requirements from sponsors. For the students' ideal system and installation, have them outline what it would take to make it a reality.
- **Solar Days.** Design and host an event to educate others about solar.
- **Students Teaching Students.** Design and host a student-centred conference. Involve solar experts, showcase careers and display technology. Help people understand the differences between solar thermal and photovoltaic systems. Set up solar models as demonstrations.