



# Living *with a* Star

*From Sunscreen to Space Weather*

**GEMS Teacher's Guide® for Grades 6-8**



# WHAT YOU NEED FOR THE WHOLE UNIT

The quantities below are based on a class size of 32 students. You may, of course, require different amounts for smaller or larger classes. This list gives you a concise “shopping list” for the entire unit. Please refer to the “What You Need” and “Getting Ready” sections for each individual activity, which contain more specific information about the materials needed for the class and for each team of students.

## Nonconsumables

- 8 sets of **Mystery News Flashes** (pages 24–25), cut into strips and paper-clipped together
- 8 copies each of the **Information Sheets** (pages 28–37; 10 pages total; see “Getting Ready” on page 17 for how to sort them):
  - Satellites
  - Weather
  - Unusual Lights in the Sky
  - Nuclear Weapons
  - Space Debris
  - Solar Wind
  - Solar Surface Activity
  - Earth’s Magnetosphere
  - Solar Flares in January
  - Solar Flares on January 25th
- 1 round balloon, softball, or other ball approximately 4 in. in diameter
- 1 piece of diffraction grating material, 4 in. square (see “Resources” on page 163)
- 1 copy each of the 6 “icons” (AM/FM radio, microwave oven, TV remote control, sunglasses, X-ray of hand, nuclear explosion) on pages 54–56
- 1 copy of the **Particles from the Sun** sign (page 58)
- 1 copy of the **Completed Balloon/Rocket Solar Energy Mission Sheet A**, complete with graphed data (page 76)
- 1 copy of the **Completed Balloon/Rocket Solar Energy Mission Sheet B**, complete with graphed data (page 77)
- 1 copy of the **Extension Graph of Solar Particles beyond 200 Km** (page 78)
- 1 of the following UV light sources (see “Getting Ready” on page 89):
  - natural sunlight *or*
  - 3 fluorescent UV lamps (blacklights) *or*
  - a combination of sunlight and fluorescent UV lamps

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*If you’re using blacklights as your UV source, you need to be able to make the classroom dark or very dim.*

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- 1 or more of the following UV-blocking materials (students can bring them in)
  - sunscreens
  - sunglasses
  - fabric
  - hats
  - UV fingernail polish
  - protective lip balm
  - makeup
  - lotions
  - waxed paper
  - leaves
  - paper money
  - opaque plastic bags
  - paper
  - newspaper
  - aluminum foil

**If sunlight will be your UV source:**

- 64–96 UV beads, plus a few extra
- 16 dark, opaque film canisters or other suitable small containers to keep the beads in the dark

**If fluorescent UV lamps will be your UV source:**

- 96–160 fluorescent paint swatches plus a few extra (see “Getting Ready” on page 90 for how to make the swatches, and General Supplies on page 6 for materials needed)
- 1 small bucket or other cylindrical container no less than 24 in. around, with one flat end (see note under “Getting Ready” on page 114)
- 1 spinner of any kind (such as one from a board game)
- 1 copy of the three sunspot strips: 1 each low activity, medium activity, and high activity (page 126)
- (optional) an audio- or videotape “broadcast” of the news flashes (see “Getting Ready” #5 on page 18)
- (optional) a TV or stereo remote control
- (optional) a pair of UV-blocking sunglasses
- (optional) an X-ray film
- (optional) a radio
- (optional) a pager
- (optional) a cell phone

An overhead transparency of each of the following:

- Information Sheet 1, Satellites** (page 28)
- Quiet Sun Data Table** (page 73)
- Completed Balloon/Rocket Solar Energy Mission Sheet A**, complete with graphed data (page 76)
- Completed Balloon/Rocket Solar Energy Mission Sheet B**, complete with graphed data (page 77)
- Earth's Magnetosphere** (page 79)
- Maximum Energy Levels** (page 80)
- EXAMPLES—What Is the Risk?** sheet (page 109)
- (*optional*) **Space Weather Game Graph** (page 130)
- (*optional*) **Solar Cycle 1750–2000** graph (page 131)

## Consumables

- 8 copies of the **Balloon/Rocket Solar Energy Mission Sheet A** (page 74)
- 8 copies of the **Balloon/Rocket Solar Energy Mission Sheet B** (page 75)
- 32 clear plastic sandwich bags with fold-over tops

Thirty-two copies each of the following student sheets:

- Calendar** sheet (page 23)
- Research Notes** sheet (pages 26–27)
- Solar Output Data Sheet** (page 57)
- History of Solar Science** handout for homework (pages 81–83)
- Ultraviolet Experiments** data sheet (page 99)
- Risk Scales** sheet (page 108)
- What Is the Risk?** sheet (pages 110–111)
- Characters in the Space Weather Game** sheet (page 127)
- (*optional*) **Energy Levels Graphing Sheet** (page 84; see “Getting Ready” #7 on page 63)

## General Supplies

- an overhead projector
- an overhead transparency pen
- 32 binders or folders to store student sheets
- 1 wide-tipped black marker
- 1 roll of masking tape
- 1 pair of scissors

- 1 sheet of white butcher paper 6 ft. long x 3 ft. wide for class **Electromagnetic Spectrum** chart
- 1 sheet of butcher paper about 3 ft. x 4 ft.
- approximately 6 oz. fluorescent paint, any color
- several manila file folders or other large pieces of stiff paper
- 1 paintbrush or sponge
- 3 colored markers: 1 each yellow, orange, and red
- 1 piece each of red and orange colored paper to make the **Space Weather Game Cards** (pages 128–129)
- transparent tape
- (optional)* colored pencils or markers
- (optional)* 32 pens or pencils of two different colors, for students to use on **Energy Levels Graphing Sheet**
- (optional)* construction paper to back the sunspot strips  
(See “Getting Ready” #2b on page 115)