Light Reflection

Read from Lesson 1 of the Reflection chapter at The Physics Classroom:

MOP Connection: Reflection and Mirrors: sublevel 1

1. Place a letter in the blank in order to classify the following objects as being either luminous (L) or illuminated (I) objects.
   
<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>Sun</td>
<td>I</td>
</tr>
<tr>
<td>I</td>
<td>Moon</td>
<td>I</td>
</tr>
<tr>
<td>I</td>
<td>Whiteboard</td>
<td>L</td>
</tr>
<tr>
<td>L</td>
<td>Light bulb</td>
<td>L</td>
</tr>
<tr>
<td>L</td>
<td>Candle</td>
<td></td>
</tr>
</tbody>
</table>

3. State the law of reflection in the space below.

The angle of incidence and angle of reflection are the same

Consider the diagram at the right in answering the next three questions.

4. The angle of incidence is denoted by angle \( \theta \).

5. The angle of reflection is denoted by angle \( \theta \).

6. If an incident ray of light makes an angle of 35° with the mirror surface then the angle of reflection is \( 55^\circ \).

7. Why do windows of distant houses appear to reflect the sun only when rising or setting? Explain in words. Use the diagram to help, drawing appropriate light rays on the diagram.

At 1PM, it reflects onto the ground. At 7 PM, it reflects into our eyes.
8. Use the law of reflection and the *embedded* protractor in order to draw the reflected ray associated with the given incident ray for the following plane mirror situations. (Markings are provided at 15° increments.)
Curved Mirrors and The Law of Reflection

Read from Lesson 3 of the Reflection chapter at The Physics Classroom:
http://www.physicsclassroom.com/Class/refl/u13l3a.html

MOP Connection: Reflection and Mirrors: sublevel 5

The diagram below depicts a concave mirror with its principal axis and its center of curvature (C). Five incident rays are shown traveling parallel to the principal axis.

1. Construct normal lines for each of the five incident rays. (Geometry Review: A line which passes through the center of a circle will be perpendicular to the circle at its point of intersection. Thus, the normal line for each of these incident rays passes through C.)

2. Measure the angle of incidence and use the law of reflection to construct five reflected rays at the appropriate angle of reflection.

3. Construct two more incident rays parallel to the principal axis that strike points 6 and 7. Draw the normal line and use the law of reflection to draw the corresponding reflected rays.

4. Label the focal point (F) on the diagram above.

5. Propose your personal definition of the focal point: The focal point is ...
   halfway between the centre of the circle
   and the centre of the curve

6. Make some generalized statements about rays 1-5 and about rays 6-7. How are they similar and how are they different?

   they all pass through the focal point
Spherical Mirrors

Read from Lesson 3 of the Reflection chapter at The Physics Classroom:

http://www.physicsclassroom.com/Class/refl/u13l3a.html
http://www.physicsclassroom.com/Class/refl/u13l3b.html
http://www.physicsclassroom.com/Class/refl/u13l3c.html

MOP Connection: Reflection and Mirrors: sublevel 5

1. A spherical mirror has a shape that is a section of a sphere. Consider the concave spherical mirror shown at the right. Label the following on the diagram:
   - the principal axis (a line) as PA
   - the focal point (a point) as F
   - the center of curvature (a point) as C
   - the focal length (a length) as f
   - the radius of curvature (a length) as R

2. Explain why concave mirrors are sometimes called converging mirrors.

the light waves converge

3. Explain why convex mirrors are sometimes called diverging mirrors.

the light waves diverge