

**M1.** (a) Award **ONE** mark for:

- the Sun;
- sunlight.

**Allow:**

- daylight.

***Do not** give credit for a response that includes incorrect science describing the use of artificial light sources [they would not produce a dark shadow on a sunny day]:*

- spotlights.

***Do not** give credit for an insufficient response:*

- the sky [this is the location of the source, not the source itself].

**1(L3)**

(b) Award **ONE** mark for:

- opaque.

**1(L4)**

(c) Award **ONE** mark for an indication that the shadow became shorter:

- the shadow kept getting shorter;
- it got shorter.

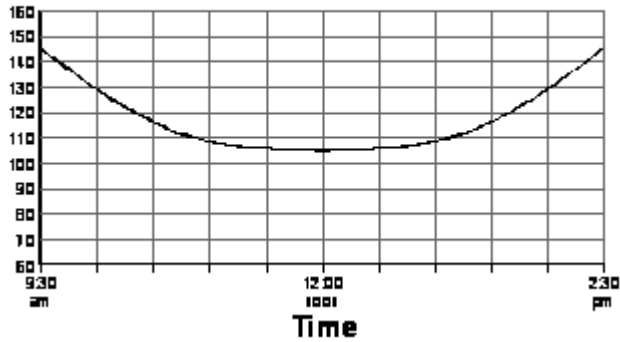
**Allow:**

- it was less long at lunchtime;
- it was longer at first.

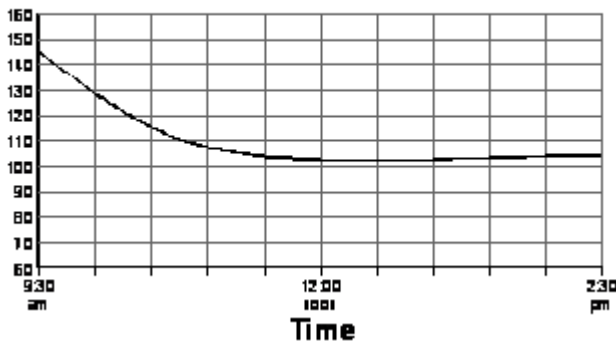
**1(L3)**

(d) Award **ONE** mark for a graph with a minimum point of no lower than 95cm, occurring between noon and 1pm. Following the minimum point, the graph should go upwards to a maximum point of no more than 160cm and no less than 105cm.

### Minimum at noon



### Minimum at 1pm



*Do not give credit for an insufficient response where the line remains level or gets lower at any time after 1pm.*

1(L5)

[4]

- M2.** (a) Award **ONE** mark for an understanding that light cannot pass through opaque objects.

The response **must** make reference to **light** or **opacity**:

- the chair blocks (some of) the light (from the lamp);
- light cannot pass through the chair;
- the chair is opaque.

**Allow:**

- the light is blocked.

**Do not** give credit for a response that includes incorrect science:

- light goes around the chair.

**Do not** give credit for an insufficient response that does not explain shadow formation:

- light cannot get past the chair [it passes on either side];
- light travels in straight lines [does not explain];
- the light cannot bend around the chair.

1

(b) Award **ONE** mark for:

• shiny	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>

1

(c) Award **ONE** mark for arrowheads drawn in the following directions:



**Do not** give credit if only one arrowhead is drawn correctly.

1

[3]

- E1.**
- (a) children were asked to identify the Sun as a source of light in their playground. Almost all children (95%) gained the mark, including four-fifths at level 3, and almost all at levels 4 and 5 (94% and 98% respectively).
  - (b) two-thirds correctly selected 'opaque' from six options presented in the question. Only a quarter of those at level 3 and a half at level 4 gained the mark. In contrast four-fifths of those achieving level 5 chose opaque. About a fifth, a quarter of those at levels 3 and 4 and a tenth at level 5 wrongly selected 'solid'. A quarter of children at level 3 selected tall and a quarter, transparent
  - (c) required children to describe the changes in the length of the shadow during the day using data presented in a table. Four-fifths, half of those at level 3, three-quarters at level 4 and four-fifths at level 5, showed a credit worthy understanding. A small proportion –fewer than 5% - described the shadow as getting lower.
  - (d) children had to continue the graph to show the change in the length of the shadow. About a half drew a creditworthy line. About a tenth at level 3, a third at level 4 and three-quarters at level 5 gained the mark. The most common error was to draw a line which continued downwards rather than the required 'U'-shape.

**E2. Lamp**

- (a) In this question two thirds of children gained credit, however less than a quarter of those at level 3 were successful compared with just over half those at level 4 and almost all of those at level 5. The most common creditworthy response was that the chair blocked the light. Fewer than one tenth of the children overall and only a fifth of those achieving level 5 used the term 'opaque'
- (b) This question asked children to identify what made it possible to see the reflection of the lamp in the window. Almost all children at all levels of achievement selected 'shiny' from the four options in the question. 'Solid' was chosen by a tenth of children overall, including almost one-fifth of those at level 3, and a tenth at level 4.

- (c) In this question children had to place an arrow on each of two lines to show the direction of light 'which allows Ben to see the reflection in the window'. Over three-quarters placed the two arrows in the correct direction to gain the mark. Almost a fifth of those achieving level 3 and a tenth of those achieving level 4 showed the direction of only one of the arrows correctly.

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