Arch 464
ECS
Spring 2007

Name_____

Quiz #1

"Fab Pre-Fab"

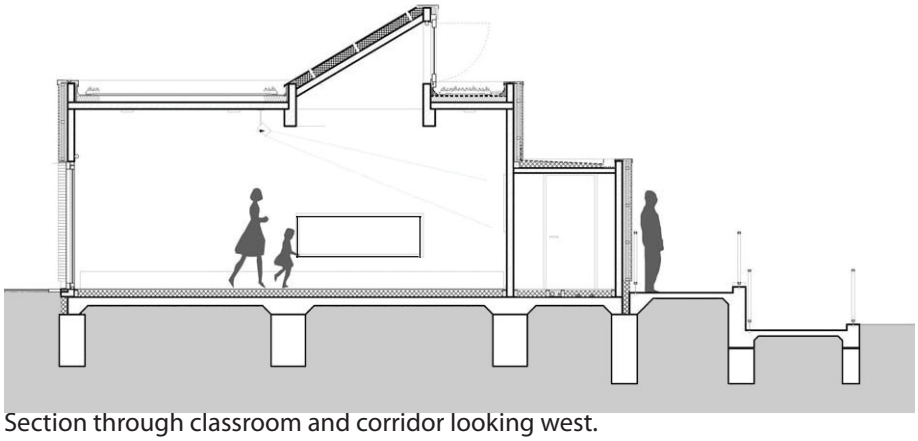
For this problem you are performing a daylighting analysis for team 51.5° architects who have designed a prefabricated single classroom extention for Brandlehow Primary School, a listed building (historic), in Putney, SW of London, UK. Your focus for this problem is to improve the daylighting in the small classroom.

The architects have asked you to critique the existing conditions and to recommend a scheme for improving the daylighting in the space. According to architect Franziska Wagner, the team's consideration of sun, light, natural ventilation, and contemporary materials are consistent with principles outlined in "Classroom of the Future" by the UK Department for Education and Skills (DfES). This initiative aims to challenge current school design practices and test new ideas for application in future buildings. Swenn Geiss of team 51.5° architects explains: "We have developed various openings in the building that allow for different light qualities in the room. A large opening to the south, which is protected from excessive solar gain by a new tree, juxtaposed with a rooflight, bringing in constant north light." The other windows open with electric motors to enable natural ventilation. The south-facing roof of the skylight housing can be fitted with solar collectors or photovoltaic panels if funding becomes available in the future. The solid wood structure reduces carbon dioxide emissions —compared to conventional construction—by replacing steel and other materials high in embodied energy. Geiss adds: "The emissions are also reduced through the use of a building material with a low embodied energy. This is achieved by increased storage of carbon within the timber by an average of 75 years (design life) and reduced fossil fuel use through the use of the timber structure as a heating medium at the end of the building's useful life."

Putney is at 51.5 degrees north lattitude and has an humid climate with mild winters and warm summers.

Photos and drawings: Architecture Week, Sept 6, 2006.

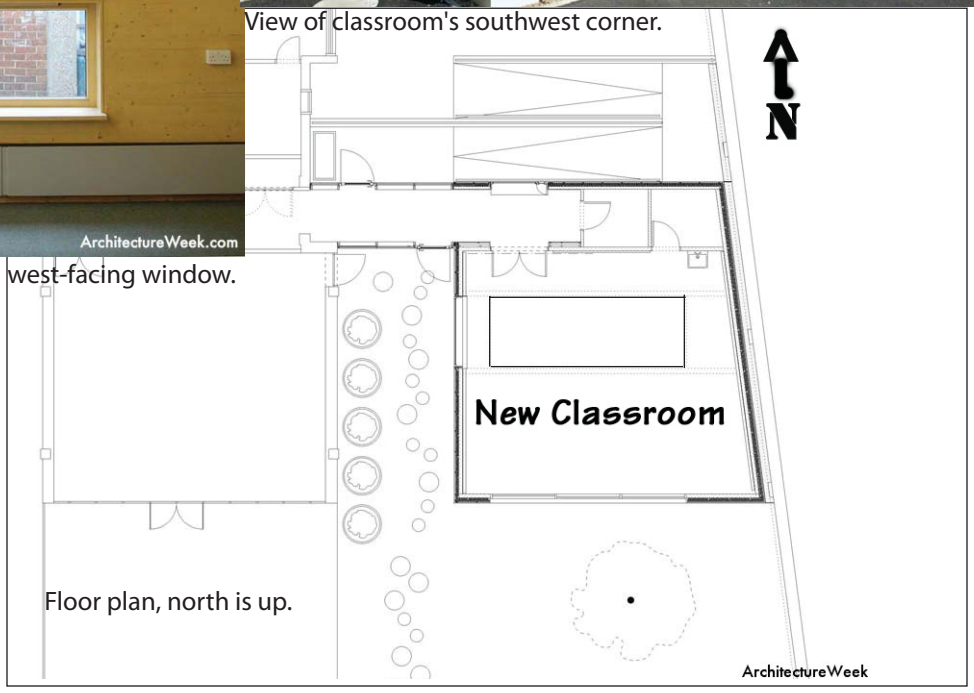
Both the south-facing aperture and the roof of the north-facing clerestory can be seen from the street.



Section through classroom and corridor looking west.

Interior view of clerestory and west-facing window.

View of classroom's southwest corner.



Floor plan, north is up.

1. **Describe two** strengths and one weakness in the lighting design of the classroom.

3 pts

2. **Suggest two** methods for accurately predicting the daylighting performance of the classroom for an entire year and explain why each is appropriate.

2 pts

Midmorning winter view of south facade with designated shade tree..

Interior view of the classroom in use, looking toward the southeast.

3. **Sketch two** proposals for improving the daylighting in the classroom and explain why each would be effective. 4 pts

4. **Describe two** glare problems imposed by the current design (see interior view). 1 pt