

Course Title:
House Design

Length:
Three-Six months
Grades 7 & 8

Schools:
Pierrepont
Union

Dated:
March 10, 2014

Amended:
June 15, 2015

GIFTED AND TALENTED DEPARTMENT
HOUSE DESIGN MINI-COURSE GRADES 7 & 8

1. Introduction/Overview/Philosophy

The program enables students to become familiar with the fundamentals of Architecture, Interior and Landscape Design and Contracting. "House Design" is an integrated math-science project where students learn the key stages of the design process. They work in small teams to design a home for a four-person family given design constraints such as location, maximum square footage and plots of land. The major components of the project are a scale site plan, scale floor plan(s), a scale architectural model of the home, a design portfolio, written proposal with cost estimate, and a brochure/pamphlet explaining the design of the home.

The classroom quickly becomes a studio where formal and informal student critiques are held and where improvements are made through research and continuing examination of the design goals. Each member has their own role and is responsible for their own tasks, such as architect, contractor and designer. All drawings begin as sketches that evolve into small-scale pencil drawings on graph paper. Upon completing these sketches, students begin drawing blueprints, then proceed to model building.

2. Content Standards & Objectives:

Objectives:

Knowledge

- *Different types of house design and construction*
- *Necessary elements of house design*
- *Correlation between income and mortgage eligibility*
- *Costs of house construction*
- *Costs of home furnishings*

Skills

- *Calculating linear measurement*
- *Computing area in square feet*
- *Drawing to scale and reading scale drawings*
- *Applying math problem-solving strategies to real life situations*
- *Using money in various mathematical computations*
- *Participating in group discussions to solve problems and to make firm decisions*

Attitudes

- *Appreciation of the need to save before buying a house*
- *Appreciation of the high cost of housing*
- *Awareness of choices that need to be made to balance needs, wants, and budgets*
- *Realization of how family size and income influence the type of house that a family owns*
- *Awareness of the choices and sacrifices their parents made when choosing a house*

Standards:

Writing Common Core- W7.1, 7.2, 7.3, 7.4, 7.5, 7.6, 7.8, 7.9; W 8.1, 8.2, 8.3, 8.4, 8.5, 8.6, 8.8, 8.9

Reading Common Core- R7.1, 7.3, 7.4, 7.8, 7.9; R8.1, 8.3, 8.4, 8.8, 8.9

Language Common Core- L7.1, 7.2, 7.3; 8.1, 8.2, 8.3

RH Common Core- 6-8.1, 2, 3, 8

Math Common Core- 7.G.A.1, 2; 7.G.B.4; 7.G.B.6; 7.EE; 7.RP.A.1, 2

Number and Operations Standard

- Compute fluently and make reasonable estimates.

Geometry Standard

- Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships.
- Use visualization, spatial reasoning, and geometric modeling to solve problems.

Measurement Standard

- Understand measurable attributes of objects and the units, systems, and processes of measurement.
- Apply appropriate techniques, tools, and formulas to determine measurements.

Problem Solving Standard

- Solve problems that arise in mathematics and in other contexts.
- Apply and adapt a variety of appropriate strategies to solve problems.

Communication Standard

- Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.

Representation Standard

- Use representations to model and interpret physical, social, and mathematical phenomena.

21st Century Skills:**9.1A, B, C, D, E, F****Thinking and Reasoning Skills**

- Students will understand how to solve problems through teaching and learning. Students will develop and implement a teaching-learning program.

Personal and Workplace Skills

- Students will understand how to solve problems through meeting client needs. Students will conduct a commissioned project.

Information and Communication

- Students will understand how to apply communication skills and techniques. Students will demonstrate ability to communicate orally and in writing.
- Students will understand the importance of teamwork. Students will work on teams to achieve project objectives.

3. Proficiency levels

This mini-course is offered to students in grades 7 & 8 who have qualified for the Gifted and Talented Program.

4. Methods of Assessment

a. Student Assessment

The teacher will provide a variety of assessments, which may include, but are not limited to the following: teacher observation of individual and group exercises, class discussions, and evaluation of student products.

- Pre-assessment: Informal open-ended questions
- Performance Task: Participation in class activities; collaboration within teams; critical thinking and problem solving; Checklists/Observations
- Post Assessment: Final Student Project assessments for: scale model, site plan, floor plan, interior design portfolio, cost estimate/written proposal, marketing materials, and final presentation. Written personal reflection at the end of the unit will not be formally assessed but must be completed.

b. Curriculum Assessment/ Teacher Assessment

The teacher/Gifted and Talented coordinator will review this course and continue to modify and update its content.

5. Grouping

Students self-select this mini-course in grades 7 & 8.

6. Articulation/ Scope & Sequence

Major Group Products:

a. Scale Model: The scale model represents your house.

CONSTRUCTION OPTIONS:

- cardboard, tag board, foam core, colored paper, glue guns, and other supplies are provided or you may bring your own

REQUIRED ELEMENTS:

- cut out openings for windows & doors
- include interior walls and staircases
- include a "paper doll" person inside to help viewers understand the scale

b. A site plan: Demonstrates how the site will be developed; it shows what you'd see if you flew over the site (e.g., a "footprint" of all buildings, and any garages, backyard, sheds, roads, etc.).

CONSTRUCTION OPTIONS:

- use design software, or cut out shapes and paste them on graphed drawing of the site, or carefully draw the buildings by hand

REQUIRED ELEMENTS:

- everything must be to correct scale
- clearly label each building and developed area—a key may be helpful
- at least some of the land must be used as yard
- the plan must be visible from the back of the room

c. Floor Plan(s): The floor plans show the outline of the house. They also show the location of interior walls, stairs, windows and doors.

It is not necessary to show furniture in floor plans, however, you can show the location of large appliances and heating/cooling elements.

CONSTRUCTION OPTIONS:

- use design software such as Visio or Adobe Illustrator, or carefully draw the floor plans by hand on oversize graph paper (or carefully and neatly attach pieces together).

REQUIRED ELEMENTS:

-indicate the scale being used

-all spaces/rooms must be clearly labeled

-use a standard symbol for windows and doors

d. Interior Design: The interior design is a sample of what the house will look like. It's your chance to capture the viewer's imagination and convey the spirit of the place (e.g. calm, nature, high-tech, kid-friendly).

REQUIRED ELEMENTS:

-you must choose one room that will exemplify the feel for the whole house. Kitchens are not allowed.

-you are required to show detail such as textures, color pallet, patterns, etc.

-you must stay within a budget of \$5,000.

-you must clearly note on a separate spreadsheet or table the cost of each item in the room including totals for paint, wood, curtains, etc.

CONSTRUCTION OPTIONS:

-can be done on paper with colored pens/pencils.

-can use sample color swatches and label accordingly.

-can print pictures from the Internet or cut from magazines (preferred).

e. Cost Estimate: The cost estimate is the total projected cost for developing the house/site, including construction of buildings (house/garage/shed), creation of yard, leveling, fencing, etc. The Interior Design is not included in the cost.

PRESENTATION OPTIONS:

-use a spreadsheet

-create a table

-create your own display

REQUIRED ELEMENTS:

-all totals must be easily verifiable (e.g., show dimensions, units and formulas used, and label all subtotals)

-the cost for constructing buildings is \$350/sq. ft.

-the cost for outdoor construction (grass/pavement/driveway) is \$100 sq. ft.

-all dimensions must match those shown on floor plan.

-calculation errors could cost you the contract!

f. Written Proposal: The written proposal is your chance to (1) explain all of the advantages of your plan in detail and (2) sell your idea as the best one and persuade client to hire you. Your aim is to convince the client that you've considered every possible need of theirs and even exceed them.

REQUIRED ELEMENTS:

- explain your vision for the home
- defend your building design decisions – explain how form follows function
- include a cover page with company logo and names of members, include section headings and a table of contents
- document must be word processed
- append the cost estimate

g. Marketing Materials: You need to “sell” your house, much like a real estate agent would for a prospective buyer. It is a visual snapshot of your written proposal- the first impression for a client.

REQUIRED ELEMENTS:

- choose one part of your house to feature- it may be a perspective drawing of the house in its entirety, or a picture of your completed designed room.
- highlight elements of your house that a client would most likely be interested in
- list the details (e.g., number of rooms, baths, bedrooms, other standout features)
- it should be visually attractive and attention getting

h. Design File: The design file is a record of your problem-solving and creative process, and a place to keep rejected ideas for potential revisiting. It contains hard evidence that you employed a systematic method to finding the best possible solution to the building design, site use, cost, and marketing problems.

REQUIRED ELEMENTS:

- building and other sketches with brief notes on rejected ideas
- notes from team meetings
- rough drafts of written proposals and oral presentation

i. Oral Presentation to Clients:

The objective of the oral presentation is to highlight the strengths of your proposal and convince your client that you can handle the job.

Your potential client gets a sense for what it would be like to work with you by the competence and sincerity you express, and by how you answer their questions and respond to their needs. The oral presentation is the client’s first impression of you, and often a lasting one. A strong presentation can overcome weaknesses in the proposed design, and a weak presentation can create a deficit that is difficult to overcome even with a strong proposal.

PRESENTATION OPTIONS:

- you decide how many team members will make the presentation, but whomever stands up must have a speaking role.
- feel free to use PowerPoint or other visual aids

REQUIRED ELEMENTS:

- each team member, whether presenting or not, must be introduced to the clients
- you are limited to 10 minutes to explain your proposal which will be followed by 5 minutes of questions
- you must prominently display the site plans, floor plans, designs, marketing materials and scale models (a tri-fold will be given to you)
- whomever presents must be able to answer any questions asked by the clients- team members who remain seated are not allowed to chime in from their seats.

Map the Process/Project: Each part may take 1-3 classes. Students may begin to work on different aspects of projects concurrently.

Students will be able to choose their own strengths (Engineer/Architect will be primarily responsible for blueprints, site design and floor plans; Contractor will be primarily responsible for scale model and costs; Designer will be primarily responsible for interior design and marketing materials as well as overseeing the project organization as a whole). Once students determine their preference they will be grouped by teacher or chosen by designer.

Teacher will review all knowledge students should know prior to the project and review skills needed.

Part 1	Part 2	Part 3	Part 4
<p>ACT: Teacher introduces the project and hands out the Project Guidelines. This document provides students with an overview of the design problem they are to address, what products and performances will be required of them, what the timeline is, how students should work together, and how the projects will be assessed. Architectural firms select names Discuss Roles and Responsibilities- students then choose roles. Contractor, Architect, Designer (Engineer if 4th needed)</p> <p><i>Class Discussion:</i> Typical American House <i>Review Concept:</i> Finding Area of different shapes</p> <p>Student completion of Area handout</p>	<p><i>Discussion to Review Concept of Drawing to scale</i> (using props) Distribute Drawing to scale handouts. Review with students. Optional: Site Description handout- This document describes the physical attributes of the site for which the student teams will design the house. This can be given or students can be allowed to draw up own site layout. Teamwork Handout- This one-page document asks each student team to address the question, "If we are working together exceptionally well, what will it look like?" Each team specifies how decisions will be made, conflicts resolved, and misunderstandings clarified as they work together as a team. Where do I start? Handout is given out to students that outline good places for them to begin this challenge.</p>	<p>Site Plan/Cost Estimate- This document models the types of calculations teams are required to do in preparing cost estimates for construction of their school designs. (Handout cost-estimate.)</p> <p>Students will finalize site plan and work on floor plan(s)- Formative Assessment for site plan.</p>	<p>Budget -Students will use site plan/floor plan to begin formulating costs. They are all working with \$500,000 budget. Review Decisions Determining Const. Costs</p> <p>Students can begin scale model as soon as their site plan is complete.</p>
Part 5	Part 6	Part 7	Part 8
<p>Revise plans to meet budget Floor plan of house (final draft) Begin collecting pictures for</p>	<p>Hand in Final Floor Plan Cont. work on Collage Portfolio from collected pictures</p>	<p>Proposal Final Practice presentations of</p>	<p>Presentation- Awards</p>

Interior Design Finalize costs for house/adjust to stay within budget Submit Design to peer inspection Work on finishing Scale Model	Finalize Cost Estimates Create Marketing Materials Begin Written Proposal	blueprints, collage portfolios and expense records Formative Rubrics	Reflection
---	---	--	-------------------

Daily Assessment:

Cooperative Group Work Rubric to assess groups on teamwork.
 Teacher observation of cooperation, participation, preparation
 Completion of any handouts distributed

Closure:

Each class will close by teacher determining and noting the cooperative rubric. We will discuss any HW and steps for next class.

7. Resources

a. Speakers

Speakers may be recruited depending on the topics selected.

b. References

- <http://www.edutopia.org/mountlake-terrace-geometry-design-how-to>

- Design a High School for Your Grandchildren

A project developed by Eeva L. Reeder for her geometry students at Mountlake Terrace High School, WA (Learning by Doing) reedere@earthlink.net

- CLASSROOM CHALLENGES A Formative Assessment Lesson

Drawing to Scale: Designing a Garden

Mathematics Assessment Resource Service

University of Nottingham & UC Berkeley

- Home Landscape: Understanding the basics of landscape design, PM 2004.

www.extension.iastate.edu/store

c. Resources

- Microsoft Word
- Microsoft Excel
- PowerPoint
- Google Docs/Drive

d. Texts

There is no text for this course. Students will use self-chosen books/websites to help guide their decisions about house styles and design. They will also visit home stores to collect paint samples, and may use magazines and store brochures for portfolio.

8. Methodologies

Methods include but are not limited to:

- Cooperative learning
- Individual and group research
- Individual and group problem solving
- Inquiry
- Class discussion
- Brainstorming
- Critical Thinking
- Experimenting
- Short lecture

9. Suggested Activities

- Team-building activities
- Skill-building activities
- Exploring multiple intelligences
- Researching
- Public Speaking

10. Interdisciplinary Connections

The scope of materials for this House Design unit is broad and interdisciplinary. While rooted in Math, designs can be (and normally are) constructed from real-world, local, and personal perspectives (such as cultural and social). The individual tasks and projects presents requirements and problems to the students that are interdisciplinary in nature (Writing, Computer research, Environmental Study). Students are also encouraged in creativity as they prepare their designs. As a team activity, House Design encourages individual responsibility and cooperation among team members.

11. Differentiating Instruction

Differentiating instruction is a flexible process that includes the planning and design of instruction, how that instruction is delivered, and how student progress is measured. Teachers recognize that students can learn in multiple ways as they celebrate students' prior knowledge. By providing appropriately challenging learning, teachers can maximize success for all students. Examples of Strategies and Practices that Support

Students with Disabilities

- Use of visual and multi-sensory formats
- Use of assisted technology
- Use of prompts
- Modification of content and student products
- Testing accommodations
- Authentic assessments

Gifted & Talented Students

- Adjusting the pace of lessons
- Curriculum compacting

- Inquiry-based instruction
- Independent study
- Higher-order thinking skills
- Interest-based content
- Student-driven
- Real-world problems and scenarios

English Language Learners

- Pre-teaching of vocabulary and concepts
- Visual learning, including graphic organizers
- Use of cognates to increase comprehension
- Teacher modeling
- Pairing students with beginning English language skills with students who have more advanced English language skills
- Scaffolding
- word walls
- sentence frames
- think-pair-share
- cooperative learning groups
- teacher think-alouds

12. Professional Development

As per the PDP/100 Hours statement: the teacher will continue to improve expertise through participation in a variety of professional development opportunities. Specialized professional development for teachers in the Gifted and Talented Department is offered through the Bergen County Consortium of Teachers of the Gifted (BCCTG), the New Jersey Association for Gifted Children (NJAGC), and Montclair State University G/T Youth Program