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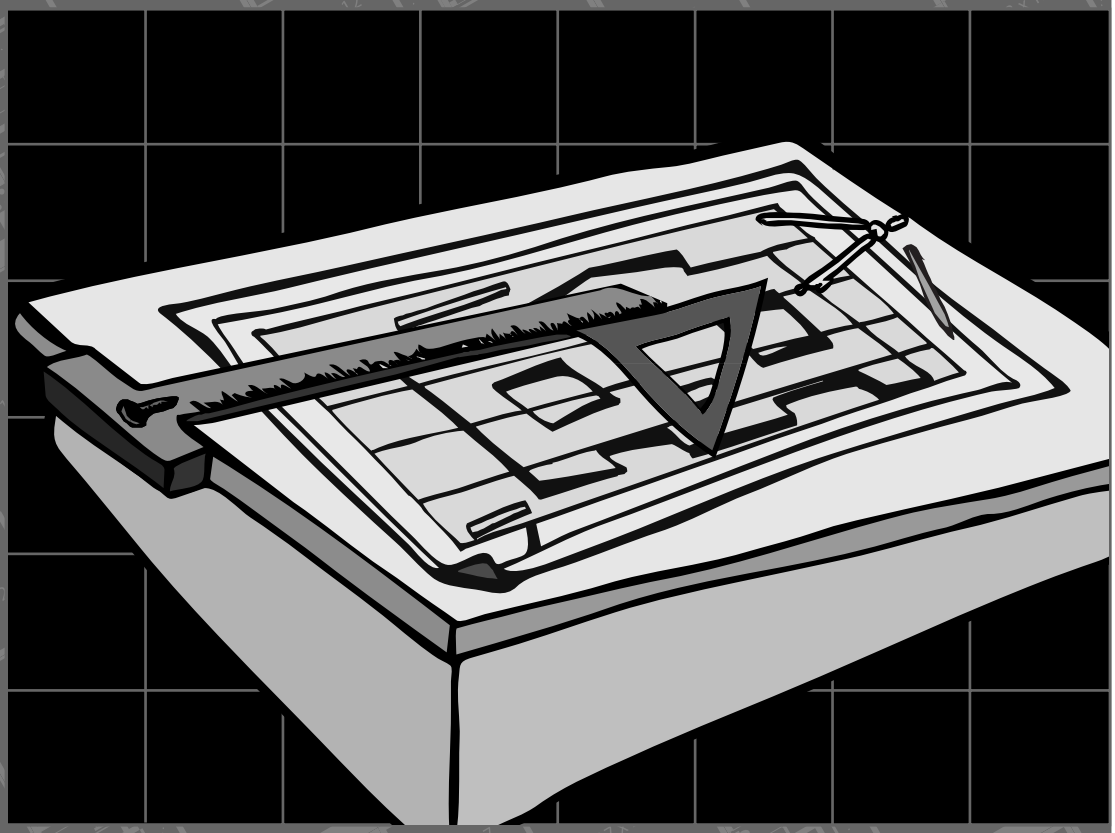
HOUSE DESIGN



A Simulation of Student Teams Designing Houses for Clients

WELCOME

Hours of Instruction: 14+

Grades: 4–8

Overview: Students apply their math skills, cooperation skills, and creativity to a true-to-life situation—designing and furnishing a house within a budget.

Your students will:

- Evaluate the pros and cons of building single-family houses, condominiums, and mobile homes
- Calculate the number of square feet in a given area
- Design and draw specific floor plans that meet their clients' needs and budgets
- Choose furnishings, appliances, and other items to complete the interior of their designs
- Maintain budget records

35 large design sheets (22" x 34") included!

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ICONS KEY When you see these icons...

Answer Key
For student activities with specific objective responses, this icon directs you to the answer key.

Learning Tip
Found in the Student Guide. This directs your students to important procedures or directions.

Teaching Tip
In the margins of your Teacher Guide, these tips clarify materials or procedures.

Read or Tell
This is important information your students need for the activity. Be sure to read the passage or clearly instruct your students as stated in your Teacher Guide.

Grouping
This shows if your students work independently, in partners or in cooperative groups for each activity.

Reproducible
Find this icon in the upper outside corner of every master page needing duplication.

Timing
Many activities vary in length. Use this icon to help plan your teaching time.

HOUSE DESIGN

A Simulation of Student Teams Designing Houses for Clients

FRAN LYONS SAMMONS completed her undergraduate and graduate work at the University of Rhode Island. After thirty years as a classroom teacher in the Jamestown, RI schools in Narragansett Bay, Fran is now a freelance writer and consultant with school districts to help them implement standards-based curricula.

HOUSE DESIGN is a derivative work based on DESIGN written by John Wesley in 1974.

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The nationwide movement for high standards has not only determined what students should learn, but also has mandated that students demonstrate what they know. DESIGNING A HOUSE is a standards-based program addressing National Math and Economics Standards. The simulation provides many opportunities for performance assessments when students, working as members of architectural firms, apply their math skills, cooperation skills, and creativity to a true-to-life situation—designing and furnishing a new house within a budget. The cooperation and group decision-making required throughout HOUSE DESIGN address Applied Learning standards.

National Standards for School Mathematics

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.

STANDARDS

STANDARDS

National Council on Economic Education Standards

Standard 1: Productive resources are limited. Therefore, people cannot have all the goods and services they want; as a result, they must choose some things and give up others.

Standard 2: Effective decision making requires comparing the additional costs of alternatives with the additional benefits. Most choices involve doing a little more or a little less of something: few choices are "all or nothing" decisions.

Standard 4: People respond predictably to positive and negative incentives.

Standard 11: Money makes it easier to trade, borrow, save, invest, and compare the value of goods and services.

California Applied Learning Standards

Standard 3: Students will understand how to solve problems through teaching and learning. Students will develop and implement a teaching-learning program.

Standard 4: Students will understand how to solve problems through meeting client needs. Students will conduct a commissioned project.

Standard 6: Students will understand how to apply communication skills and techniques. Students will demonstrate ability to communicate orally and in writing.

Standard 8: Students will understand the importance of teamwork. Students will work on teams to achieve project objectives.

TABLE OF CONTENTS

CONTENTS

TABLE OF CONTENTS

CONTENTS

Owning your own home is part of the American Dream. However, due to rapidly rising costs for land, materials, and labor, some families have been priced out of the market for traditional single-family dwellings. Families can consider lower cost options including condominium/townhouses, and mobile homes. Regardless of what house style they choose a family must make many decisions and solve many problems to make their dream a reality.

HOUSE DESIGN will give each student insights into the problems and pleasures of designing a house, and will introduce the practical skills they will need to design a home of their own.

Through their work in HOUSE DESIGN students will understand and experience the following:

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

PURPOSE

OVERVIEW

HOUSE DESIGN is organized into three phases. Students first review math skills, then design one room, and finally design a whole house.

Phase One

A pretest determines the students' prior knowledge and skills. (Recognizing students' prior knowledge helps teachers know which areas to emphasize during the simulation. Re-administering the pretest as a posttest at the conclusion of the simulation provides an assessment of each student's overall progress.) During this phase students review necessary math skills, including computing area and drawing to scale. Students also use measuring skills to create a collection of dimensions for common furnishings, appliances, windows, doors, etc. that they will need in the simulation.

The student architectural firms earn points for successful completion of Phase One activities, as well as for demonstrating good cooperative group skills. At the end of Phase One the firms choose a client from a list on page 4 in the Student Guide. All the client families are different. They have different incomes and have families of different sizes. *The number of points the firms earn in Phase One determines the order in which they choose clients.* The firm with the highest point score chooses first.

Phase Two

First Design Task

The student firms design and create a blueprint for one bedroom that minimally meets the following guidelines:

- A minimum of 100 square feet
- At least one exterior window
- At least one door to the inside of the house
- One closet

The students draw the footprints of furnishings on the blueprint graph paper and make a construction paper Collage Portfolio describing flooring, wall covering, furniture, electronics (if any), and any other pertinent information. They make a brief presentation of their design to the class. In Phases Two and Three students earn cash for *Expected* or *Exemplary* rubric scores. They spend the extra cash on the total house design in Phase Three.

If a students are pleased with the firm's bedroom, they may use it "as-is" in the total house design in Phase Three. However, a firm may also choose to modify it or not to use it at all.

Phase Three

Second Design Task

Student firms design a whole house. The Student Guide lists information about each potential client family such as number of family members, age of children, and family yearly income. Although all students may want to design a mansion, they must work cooperatively to determine what style and grade of house best meets their clients' needs, but does not exceed their clients' budget. Together student firms draw an original house design, purchase major appliances and furniture, and stay within a budget.

At the culminating activity, a *Design Expo*, the architectural design firms share their designs, Collage Portfolios, and costs records with an audience of peers and invited guests.

Differentiated Instruction

Like all Interact units, HOUSE DESIGN provides differentiated instruction through its various learning opportunities. Students learn and experience the knowledge, skills, and attitudes through all domains of language (reading, writing, speaking, and listening). Adjust the level of difficulty as best fits your students. Assist special needs students in selecting activities that utilize their strengths and allow them to succeed. Work together with the Resource Specialist teacher, Gifted and Talented teacher, or other specialist to coordinate instruction.

OVERVIEW

SETUP DIRECTIONS

15 Days

1. **Before you Begin**
   Read this entire Teacher Guide and the Student Guide. Decide how you will use HOUSE DESIGN in your classroom and curriculum. (See Setup Directions #6, **Using HOUSE DESIGN within your Curriculum** for ideas and suggestions.)

2. **Using the Teacher Guide**
   Throughout the Teacher Guide Interact employs certain editorial conventions to identify materials.
   a. In preparing materials, *class set* means *one per student*.
   b. One *Day* on the **Unit Time Chart** is the length of a normal *class period*—45 minutes to one hour.
   c. All transparency masters and student handouts are listed by name using ALL CAPITAL LETTERS.
   d. Teacher reference pages are named in **Bold** (e.g., **Cooperative Group Work Rubric**).
   e. Student-created materials are named with plain text, beginning with capital letters (e.g., Collage Portfolio).
   f. Special events are named using *Italics* (e.g., *Design Expo*).

3. **Using the Student Guide**
   The Student Guide introduces students to the simulation. It also includes the roles and responsibilities, the information needed to make decisions, and the evaluation rubrics.

4. **Planning your Schedule**
   a. The daily lesson plans describe 15 days of lessons. This is only a recommendation. Adjust the timeline to accommodate your own teaching objectives and the needs and capabilities of your students.
   b. To shorten the time, you may choose to study only house design and eliminate the interior design requirements. In that case, form teams of two students who will work closely to complete the responsibilities of the Architect and Contractor. They will still need to collect "footprints" of built-in bookcases, kitchen cabinets, bathroom fixtures like toilets and bathtubs, and major appliances in order to plan the layout of the rooms.
   c. You can extend the time by inviting guest speakers representing jobs associated with house design and building, such as architects, bankers, contractors, interior designers, and the construction trades.