

# Microzine<sup>®</sup>

The Learning Library on Disk

38

**Outer Space Adventures in Government** • Reading/Social Studies

**Exploring Simple Machines** • Science

**Math Mall** • Fractions/Decimals

**Eskimo Escapade** • Problem Solving/Visual Discrimination

# Microzine®

Student Handbook and Teacher's Guide

38

**Outer Space Adventures in Government** • Reading/Social Studies

**Exploring Simple Machines** • Science

**Math Mall** • Fractions/Decimals

**Eskimo Escapade** • Problem Solving/Visual Discrimination

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**Microzine**  
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# STUDENT HANDBOOK

## Getting Started

### Equipment You Need

#### APPLE COMPUTERS

1. Monitor or TV
2. 128K Apple® IIe, IIc, IIc Plus, or IIGS
3. Disk drive

#### MS-DOS COMPUTERS

1. Monitor or TV
2. 256K IBM® with a Color Graphics Adapter (CGA), Tandy® 1000, or any true compatible
3. Disk drive
4. Disk Operating System (DOS), version 2.0 or higher

### Making Legal Copies of *Microzine*

The disks in this package are fully protected by copyright law. It is against the law to copy or in any way duplicate these disks or any portion of the program except under the terms expressly stated in these instructions and in Scholastic's Software License and Warranty Agreement.

The disks included in the *Microzine* package are Archival disks. Follow the instructions for using the Archival disks to make Legal Copies. For a complete description of your rights and responsibilities in copying disks and using the program, see the Scholastic Software License and Warranty Agreement included in your *Microzine* package.

You must make a Legal Copy of each Archival disk. You may not use the Archival disks for running the program. Use the Legal Copies instead.

To make Legal Copies of the Archival disks, follow these instructions:

1. Use any standard copy program or function to copy the entire contents of each Archival disk onto one blank formatted disk. If you are copying the Apple version of the program, use the Duplicated Disk function of your ProDOS® System Disk or a commercial disk copying program. If you are copying the MS-DOS® version of the program, use the DOS DISKCOPY command or a commercial disk copying program.

***NOTE: Be sure to copy the complete contents of each disk. If the label on the Archival disk indicates that it is double-sided, be sure to copy both sides. Do not change any directory or file names.***

2. Your package includes Legal Copy disk labels. Use a soft-tipped marker to write the serial number from the enclosed Software License and Warranty Agreement in the space provided on each disk label.
3. Affix the appropriate Legal Copy disk label to each of the copies that you created in Step 1.
4. Store the Archival disks in a safe place with a copy of the Software License and Warranty Agreement.

If a Legal Copy becomes damaged or defective, first try recopying the program from the Archival disk to the Legal Copy disk. If the program still does not work, the Legal Copy disk medium itself may be defective. In this case, copy the program from the Archival disk to another disk as a temporary Legal Copy. Then send the defective Legal Copy disk to Scholastic at the following address for a free replacement. When you receive the replacement, erase the temporary Legal Copy that you made.

If an Archival disk is damaged or defective, send it to Scholastic at the following address for a free replacement:

Scholastic  
Software  
Scholastic Inc.  
P.O. Box 7502  
2391 E. McCarty St.  
Jefferson City, MO  
65102

**In Canada:**  
Software from  
Scholastic  
123 Newkirk Rd.  
Richmond Hill,  
Ontario, Canada  
L4C 3G5

**In Australia:**  
Ashton Scholastic  
Software  
P.O. Box 579  
Gosford, N.S.W.  
2250 Australia

## **Loading the Apple Version of *Microzine***

1. Open the disk drive door.
2. Hold the disk with the label end facing you.
3. If you have a 3.5-inch disk, insert the disk slowly with the label facing up. If you have a 5.25-inch disk and the program you want is on Side 1 of the disk, insert the disk slowly with the label facing up. If the program you want is on Side 2 of the disk, insert the disk slowly with the label facing down.
4. Close the drive door.
5. Turn on the computer and monitor (or TV).

***NOTE: Never remove or insert a disk while the disk drive's red light is on.***

## **Loading the MS-DOS Version of *Microzine***

You must load DOS into your computer before you can load *Microzine*.

1. If you have a hard disk, turn on the computer.  
If you have DOS on a 5.25-disk or 3.5-inch disk, open the drive door and insert the disk. Turn on the computer.
2. You will see a DOS prompt. The prompt will be a letter followed by a greater-than sign (A>). The letter of the prompt corresponds with the disk drive.

3. If you want to load *Microzine* in the drive that corresponds with the letter of the prompt (if the DOS prompt is A> and you want to load *Microzine* into the A drive), put the *Microzine* disk in that drive.

If you want to load *Microzine* in a drive that is different from the drive indicated by the DOS prompt (the prompt is A> and you want to load *Microzine* in the B drive), type the letter of the drive and a colon, then press Enter (B:, then Enter). You will see a new DOS prompt (B>). Put the *Microzine* disk in the drive.

## **Loading the Programs**

Choose a program you want to load. Find the disk with that program's name on the label. Type these commands to load the *Microzine* programs:

**MICROZINE GUIDE:** Type **MZ** and then press Enter.

**NOTE:** *You may also load the other Microzine programs from within the Microzine Guide. Choose Programs and then choose the Microzine program you want to load. Choose the option Start the Program and then press Enter.*

**OUTER SPACE ADVENTURES IN GOVERNMENT:** Type **OSAIG** and then press Enter.

**EXPLORING SIMPLE MACHINES:** Type **ESM** and then press Enter.

**MATH MALL:** Type **MM** and then press Enter.

**ESKIMO ESCAPE:** Type **EE** and then press Enter.

**NOTE:** *In each issue of Microzine, you may load any program by typing the initials of the program name at the DOS prompt.*

If the *Microzine* program does not appear on the screen, read the instructions once more, and try again.

## **The *Microzine* Guide**

There are six features in the *Microzine* Guide. They are Programs, Computer Stuff, Credits, Letters, Hand, and Exit. The features are listed in a collection of boxes on the screen. Each box is labeled.

Use the Hand icon to point to the box that describes what you want to do. For example, to read the Credits, use the Hand to point to the box labeled Credits, and then press Return or Enter.

### **PROGRAMS**

Use the Hand to point to Programs on the *Microzine* Guide, and then press Return or Enter to read a description of the programs in this issue of *Microzine* or to load a program from this issue of *Microzine*.

### **COMPUTER STUFF**

Use the Hand to point to Computer Stuff on the *Microzine* Guide, and then press Return or Enter to see a list of the functions in Computer Stuff. (See Computer Stuff, page 21.)

### **CREDITS**

Use the Hand to point to Credits on the *Microzine* Guide, and then press Return or Enter to see the credits for this issue of *Microzine*.

### **LETTERS**

Use the Hand to point to Letters on the *Microzine* Guide, and then press Return or Enter to read letters from the *Microzine* Editor and *Microzine* readers.

### **HAND TUTORIAL**

Use the Hand to point to Hand Tutorial on the *Microzine* Guide and then press Return or Enter, or press ?, to learn how to use the *Microzine* Hand.

### **EXIT**

Use the Hand to point to Exit on the *Microzine* Guide, and then press Return or Enter to quit using *Microzine*.

## **Troubleshooter**

We have included this section in the *Microzine* handbook to help you if you run into problems using *Microzine*. Each *Microzine* program is documented in the handbook, and specific hints for using the program are included there; however, we occasionally receive calls about more general problems.

### **LOADING MICROZINE**

If *Microzine* does not appear on the screen, turn off the computer. Then turn it back on and try again. Make sure the disk drive door is closed, and check to see that the disk drive is hooked up correctly.

### **APPLE IIc PLUS**

*Microzine* programs run most effectively when the Apple IIc Plus is running in slow mode, rather than fast mode. Put the *Microzine* disk in the drive. Hold down the Open Apple key, the Control key, the Reset key, and the Escape (Esc) key simultaneously, then release all four keys. The computer will reboot the *Microzine* program in slow mode.

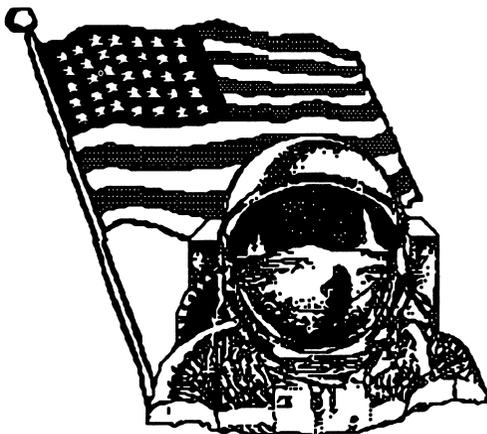
### **Control (Ctrl) Keys**

Sometimes you will have to press the Control (Ctrl) key and another key at the same time. This will be written as Ctrl-(the key). For example, if you see Ctrl-N, it means press the Control key and the N key at the same time.

# OUTER SPACE ADVENTURES IN GOVERNMENT

A Social Studies  
Twistaplot®  
Adventure

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Yikes! It's the twenty-first century and you're lost in space! Your school's spaceship has crashed and needs repairs. You've lost all contact with Earth—which is where your teachers are—and everything is in chaos. Repair Robots can fix the ship, but it's up to you to form a government that will bring law and order to the spaceship. Then, and only then, will you be able to make it safely back to Earth.

## **What You Will Find**

With the help of Dolley, your personal computer, you'll gather information about the U.S. Constitution and the U.S. government. Once you know enough about the U.S. government, you'll get the chance to run for political offices. Then you can help solve problems that arise on the spaceship.

## **Choosing Your Options**

Dolley will ask you what you want to do and where you want to go. Use the arrow keys to move the button to the option you'd like to choose. Then press Return or Enter.

## **Writing Your Campaign Speech**

Before your fellow students will vote you into office, you'll need to write a campaign speech. Dolley will tell you when it's time to write your speech. Type your speech on the speech writing screen. Press Delete or Backspace to erase errors. When you are finished typing your speech, press Ctrl-E.

## **Printing Your Speech**

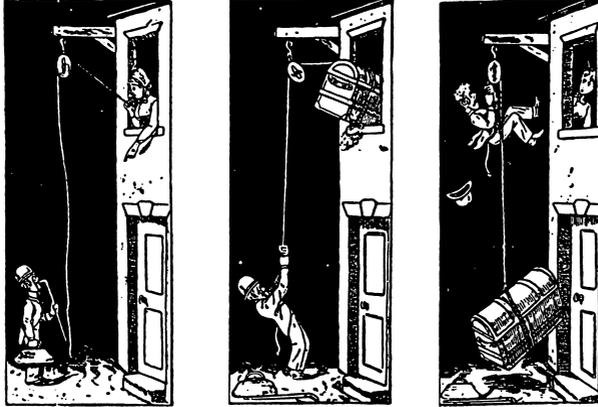
After you deliver your speech, Dolley will ask if you want to print a copy of it. Use the arrow keys to choose Yes or No, then press Return or Enter. Next, make sure that your printer is turned on and is connected to your computer. Dolley will then ask if you want extra linefeeds. Choose Yes or No, then press Return or Enter. The program will then print your speech.

## **Helpful Hints**

- Ask Dolley for information whenever you can. You'd be surprised at how much she can tell you.
- Pay attention to details and write down important facts. You never know when you might need the information.
- Read each option and question you see on Dolley's screen; they will change often. Use all of your options!

# EXPLORING SIMPLE MACHINES

A Science  
Simulation



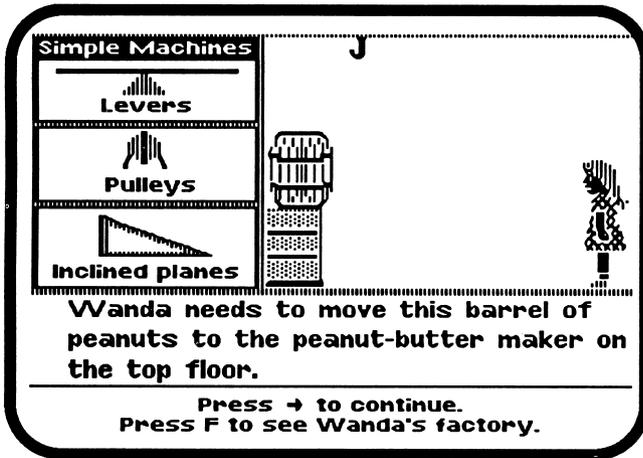
You are a very important guest at Wanda's Peanut Butter Factory. Wanda is having trouble figuring out how to move a barrel of peanuts from the basement to the peanut butter machine at the top of her factory. She needs you to help her figure out which simple machines to use to get the job done. You'll have to strengthen your brain muscles for this task!

## What You Will Find

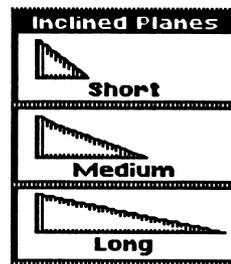
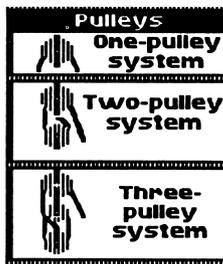
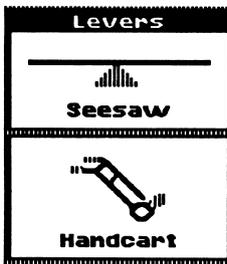
You will choose from different types of simple machines to move the peanut barrel to the top of the factory. You will have to help Wanda lift the barrel off of a shelf, up some stairs, and into an elevator. You will need to choose the best simple machine to overcome each obstacle.

## Exploring Simple Machines MAIN MENU

There are three types of simple machines from which you may choose. You may choose to use levers, pulleys, or inclined planes.



Press Space Bar to highlight the simple machine you want to use, then press Return or Enter. You will then see different types of the simple machines you may choose.



## **LEVERS**

You may choose from two different types of levers. They are the seesaw and the handcart.

## **PULLEYS**

You may choose from three different types of pulleys. They are the one-, two-, and three-pulley systems.

## **INCLINED PLANES**

You may choose from three different inclined planes. They are the short, medium, and long inclined planes.

Press Space Bar to highlight your choice, then press Return or Enter.

Press Esc to return to the *Exploring Simple Machines* MAIN MENU.

## **Using a Simple Machine**

Once you have chosen a simple machine, you can watch as Wanda uses it to move the barrel. If the machine you chose doesn't help Wanda, you may choose another simple machine and try again.

## **Options**

There are two options you may type to help you help Wanda. They are F to see the factory and ? for help.

**F:** Each time you are presented with a new obstacle, you may type F to see the factory. This will help you choose the best machine to overcome the obstacle.

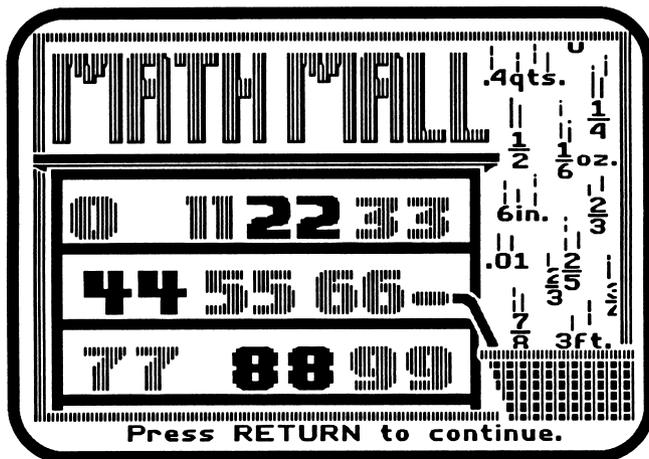
**?:** Type ? at any time to find out more about the simple machines and how to use them.

## **Helpful Hint**

- Sometimes more than one simple machine may help do the same job. Experiment!

# MATH MALL

A Math Feature



## What You Will Find

You are the only salesperson at a mall where customers shop for bread, pepper, and paint. At Sneezy's Pepper Shop and The Paintagon, customers use fractions when they ask for ounces of pepper and gallons of paint. At Strange Breadfellows, customers use decimals when they ask for loaves of bread. You will have to use addition, multiplication, and division in order to come up with the right fractions and decimal amounts to fill the customers' orders.

## How the Game Works

You are in charge of all the shops in the *Math Mall*. Since you're the only salesperson, you will have to serve as many customers as you can in each shop.

There are three shops in the *Math Mall*. You may enter Strange Breadfellows, Sneezy's Pepper Shop, or The Paintagon.



### **CUSTOMERS SERVED**

At the top left corner of the screen, you will see how many customers you have served in the mall.

### **CUSTOMERS LOST**

At the top right corner of the screen, you will see how many customers have left the mall since the game began.

### **MOVING IN THE *MATH MALL***

Use the arrow keys (← and →) to walk between the shops.

### **ENTERING A SHOP**

To enter a shop in the mall, walk to the shop door, and press Space Bar.

When you enter a shop for the first time, you have two options. You may press **I** to read the instructions or **S** to start working.

**Press I to Read Instructions** Press I the first time you enter each shop. Read the on-screen instructions to learn how to fill customers' orders in that shop. Remember, each shop works differently.

**Press S to Start Working** Fill each customer's order as quickly as you can. Use the arrow keys (←, →, ↑, ↓) to move the blinking arrow to choose between the fractions and decimals in each shop.

### **EXITING A SHOP**

Press Esc to leave the shop in which you are working. The Mall screen will appear and you may visit another shop.

### **WARNING MESSAGES**

As you are working, customers will enter and leave the mall. When this happens, warning messages will appear on the screen and interrupt your sale. For example, when there are eight customers waiting at The Paintagon, you will see the message, "CROWD ALERT: There are eight customers waiting at The Paintagon." The message will disappear as soon as you use the arrow, Return, or Enter keys.

You may either go to the shop the warning message tells you about, or continue working where you are.

### **ENDING THE GAME**

Customers will leave the mall when the shop in which they are waiting becomes overcrowded. When the 10th customer enters a shop, all the customers in the shop will leave.

No matter how fast you work, some shops will eventually become overcrowded and you will lose customers. But don't worry. New customers will enter the mall. With so many customers to serve, there is always someone else who needs your help.

The game is over when 50 customers leave the mall. The program will tell you how many customers you served in each shop.

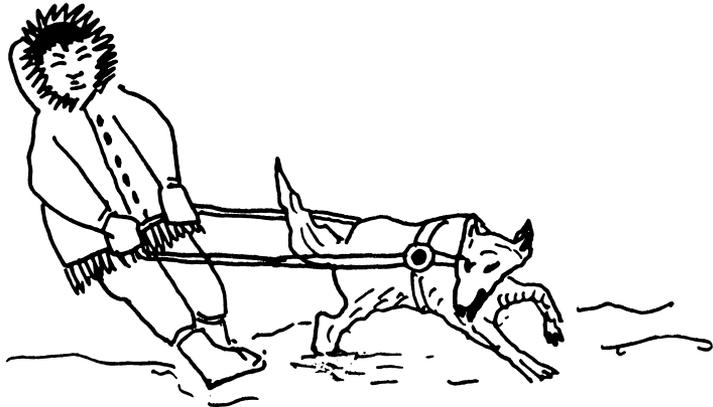
## **Tips on Playing *Math Mall***

- Enter the most crowded shops first.
- If more than one shop has eight or more customers in line, enter the shop nearest you first. This way, you will save time walking around the mall. Every second counts!
- Serve at least a few of the customers in each shop. Remember, the first customers in each shop are the easiest ones to serve. Even if you only serve three customers, you will delay overcrowding. This will give you more time to work in the other shops.
- A shop can never become overcrowded while you're working there. Even if you let a line in a shop build up to nine customers, as long as you enter the shop before the 10th customer does, you can take your time serving all the customers.
- Use a pencil and paper to help you figure out how to serve the customers in each shop. This may slow you down at first, but it will be worth it. Once you learn how to work with different fractions and decimals, the game will seem easier.

# ESKIMO ESCAPADE

A Picture This

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It's the spring of 1930 and the American Eskimos in *Eskimo Escapade* are at home in Alaska. But wait! Something is wrong with our picture! Many of the items in the picture were never used by Eskimos at that time. Some things are too modern and others are not a part of the traditional Eskimo way of life. Can you uncover the 10 mistakes in *Eskimo Escapade*?

## What You Will Find

You will look at a picture and use a magnifying glass to uncover the errors in *Eskimo Escapade*.

## Moving Around *Eskimo Escapade*

Use the magnifying glass to point to what you want to do, and to the errors in the picture.

Use these keys to move the magnifying glass:

**PRESS TO**

- (↑) Move up.
- (←) Move left.
- (→) Move right.
- (↓) Move down.

Press Return or Enter when you think you've placed the magnifying glass on an object that doesn't belong in the picture. If you are correct, the incorrect object will change into an object that belongs in the picture.

**CHECK UP**

Choose this option to find out how many errors you've uncovered. Press C to move the magnifying glass directly to the Check Up option at the bottom of the screen.

**HELP**

Choose this option to read the instructions at any time. Press ? to move the magnifying glass directly to the Help option at the bottom of the screen.

**QUIT**

Choose this option when you're finished playing. Press Esc to move directly to the Quit option.

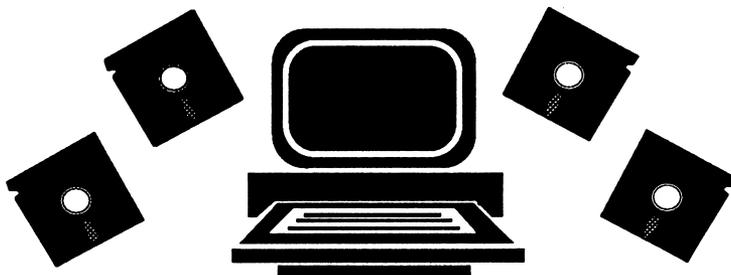
**Extra Reading**

Once you have uncovered all of the mistakes in *Eskimo Escapade*, you may read more about the Eskimo objects. Use the magnifying glass to point to an object's label, then press Return or Enter. You'll discover some interesting facts about the object.

# COMPUTER STUFF

A Utility

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## What You Will Find

Choose Computer Stuff on the *Microzine* Guide to initialize a data disk.

A data disk is a blank disk (or one that you don't mind erasing) that has been initialized, or formatted. Initializing a disk gets it ready to save your data for *Microzine*.

## APPLE

To initialize a data disk, use the Hand to choose Initialize a Disk, and then press Return. Follow the on-screen instructions.

The program will initialize the disk. Then the Computer Stuff list of functions will appear. You now have a data disk. You may use it for any *Microzine* feature that requires a data disk.

### **MS-DOS**

Use any MS-DOS format utility to format or initialize a disk.

***NOTE: Issues 1–26 of Microzine require a DOS 3.3 data disk. Beginning with 27, each issue of Microzine that requires a data disk will require a ProDOS data disk for Apple computers or an MS-DOS data disk for MS-DOS computers.***

# TEACHER'S GUIDE

## MICROZINE SCOPE & SEQUENCE CHART

### CRITICAL THINKING SKILLS

	OUTER SPACE ADVENTURES IN GOVERNMENT	EXPLORING SIMPLE MACHINES	MATH MALL	ESKIMO ESCAPEDE
Comparing/Classifying		•	•	•
Sequencing	•			
Analyzing	•	•	•	•
Inferring	•			•

### CURRICULUM AREAS

Reading/Language Arts	•			•
Math/Problem Solving			•	
Science		•		
Social Studies	•			•

### INFORMATION PROCESSING SKILLS

Word Processing/Publishing	•			
Database/Research				
Maps/Charts/Graphs				
Visual Discrimination		•		•

# OUTER SPACE ADVENTURES IN GOVERNMENT

**Lesson Plans**

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## **Speech-Writing for Critical Thinking**

**Vocabulary Preview:** constitutional, democracy, dictatorship, judiciary, legislature, monarchy

**Learning Objective:** Students will be able to apply critical-thinking strategies as they work in a collaborative learning environment.

Your students are on the Madison Voyager, a spaceship-school that travels the solar system. Problems erupt when a meteor crashes into the school, causing the ship to lose contact with Earth—which is where you and the other teachers are! Repair Robots can fix the ship, but it's up to the students to keep everything—and everybody in order. They will have the opportunity to become a member of the Senate or House of Representatives, Chief Justice of the Supreme Court, and President—if they can convince their fellow students to elect them.

## **Lesson: A Follow-up Activity**

### **TEACHER INSTRUCTIONS**

After playing *Outer Space Adventures in Government*, students should have an understanding of a democratic government. The objective of this lesson is to allow students to continue the speech-writing activity introduced in the Twistaplot.

It also will draw on their understanding of the principles of democracy. Writing and delivering a speech can seem a difficult task to your students. By breaking down the process into different roles for each student, this task will come within their reach. Begin by discussing each role and its function, so students feel confident as they begin.

In the role-playing activity that follows, each student in the team will be assigned a role that serves a specific function. The class should be broken up into teams of five students. Each team should assign one student to the following responsibilities:

**Speech Writer** This student will act as secretary for the group and actually write down the speech.

**Speech Deliverer** This student will deliver the speech to the class.

**Sympathetic Network Commentator** This student will explain in the post-speech "news coverage" why the position taken in the speech was right.

**Critical Network Commentator** This student will explain in the post-speech "news coverage" why the position taken in the speech was wrong.

**Floor Manager** This student will poll public opinion (the rest of the class), report to the group on their chances for winning the vote, and suggest changes in the speech or the work of the others on the team to ensure that the team's position wins the vote.

Before breaking up into groups, discuss with your class one (or more) of the "campaign issues" below.

Each issue is based on the First Amendment to the Constitution and discussed in *Outer Space Adventures in Government*.

Explain to the class that there will be an election, and that people will vote for them if they agree with the students' stance on these issues.

- Should people be banned from participating in fun and whimsical activities when very serious problems exist in their society? In *Outer Space Adventures in Government*, this issue is raised. Because being stranded on Miranda is a serious problem for all students, some believe that everyone should maintain a serious attitude until the problem is settled. Therefore, activities such as cheerleading should be banned.
- Should anyone be able to censor the news? In *Outer Space Adventures in Government*, the soccer coach announces that in order to keep morale high, the student newspaper should not report it if the team loses any games. The newspaper staff feels they should be able to print the whole truth.
- Can the government make it illegal to believe in something? In *Outer Space Adventures in Government*, the members of Congress are concerned that many students are wasting valuable time and energy (that should be spent trying to get the ship back to Earth) searching for signs of life on Mars. Therefore, Congress wants to pass a bill making it illegal to believe that there is life on Mars.

Have each team meet to discuss its position on the issues. Then have members draft their team's speech. Explain to students that they should clearly state their position on the issues, and why they feel their position is correct. Remind them that the purpose of the speech is to convince others that this position is correct.

When all the groups are ready, have the Speech Deliverer from the first group give his or her speech. Then have the Sympathetic and Critical Commentators discuss the speech, and finally, have the Floor Manager poll students on how they'd vote. Depending upon the results of the poll, encourage students to revise their speeches in hopes of winning more votes.

Now continue the activity with the next group, and so on, until all the groups have presented their speeches.

## TEACHER TIPS

- If the teams are having difficulty formulating their opinions and drafting their speeches, lead students in a brainstorming session. Write on the blackboard or overhead projector the key points on which the teams should focus.
- For more advanced students, print the speech (if it was drafted on a word-processor) and make a copy for each student. Then have students discuss and compare the effect of the written speech to its effect when delivered orally. Ask the students, "What is the difference between a speech and an essay?" Encourage them to notice the difference between the speeches which might be more powerful when read than listened to, and vice versa, and discuss why.

Hints on Playing *Outer Space Adventures in Government*.

The Madison voyager is stranded on Miranda.

James Madison is the father of the Constitution.

Choose to form a democracy.

Choose to form a Congress.

Choose to run for the Senate or House of Representatives.

End your speech with Choice A.

Vote against the bill to ban cheering.

Choose Yes to be the Chief Justice of the Supreme Court.

Choose No on the case of the Daily Data vs. the Coach.

Choose to have a President.

Choose to run for President.

Choose Madison McKinley to be your Vice President.

If you're a Homeroomite, end your speech with Choice 1.

If you're a Schoolite, end your speech with Choice 2.

Veto the bill that would make it illegal to believe there's life on Mars.

# EXPLORING SIMPLE MACHINES

Lesson Plans

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## Making Work Easy

**Vocabulary Preview:** force, work, lever, pulley, inclined plane, fulcrum

**Learning Objective:** Students will be able to use their prior knowledge to select simple machines to overcome physical obstacles.

In *Exploring Simple Machines*, students study the force needed to use levers, pulleys, and inclined planes. In Wanda's Peanut Butter Factory, students help Wanda move barrels from the factory's basement. To reach the peanut butter machine on the top floor, they have to make decisions about using three kinds of pulleys, two kinds of levers, and three kinds of inclined planes.

A few facts should be kept in mind to be successful:

- The amount of work stays the same no matter which machine is used.
- Some machines require less force to get the job done.
- Machines that require smaller amounts of force also require the barrel to be moved over greater distances.

## **Lesson 1: A Warm-up Activity**

### **TEACHER INSTRUCTIONS**

This program is a great tool to use when teaching a unit about simple machines and physical energy in your science curriculum. Be sure to reinforce two key concepts: force (strength exerted against something) and work (the amount of force used over a period of time to accomplish a task).

Help students understand the concepts of force and work by asking, “What are some of the ways we can move a stack of 10 books to the second shelf of a book case?” Have students suggest a variety of ways. To make the learning more practical, have the class try two methods of moving a stack of books:

Method 1: Lift the entire stack (carefully) onto the shelf.

Method 2: Slide the stack up a long board, piece of shelving, or some other “makeshift” inclined plane.

After trying both methods, ask several questions: Which took longer — lifting the whole stack or pushing the stack up an inclined plane? (pushing the stack) Which took more energy or force? (lifting the stack) Which one was easier? (pushing the stack) When you use less energy, is there a trade-off? (Yes. It takes longer to finish the task.)

Now have students think of a variety of simple machines that make physical tasks easier. List their suggestions on the board or overhead projector, and ask students to categorize each — is it a pulley, lever, or inclined plane?

Answers may include:

pulley	lever	inclined plane	other
<ul style="list-style-type: none"><li>• clothesline</li><li>• venetian blind</li><li>• elevator</li><li>• flag pole hoist</li></ul>	<ul style="list-style-type: none"><li>• hand truck</li><li>• nail clippers</li><li>• crowbar</li><li>• can opener</li><li>• nutcracker</li><li>• steam shovel</li></ul>	<ul style="list-style-type: none"><li>• wheelchair-access ramps</li><li>• road winding around a hill</li><li>• sloping driveway</li></ul>	<ul style="list-style-type: none"><li>• drill (screw-type machines)</li><li>• shopping cart (wheel)</li><li>• all types of gears</li><li>• saws and knives (cutting)</li><li>• electronic type machines</li></ul>

### TEACHER TIP

- If your students are not familiar with the way pulleys, levers, and inclined planes work, find practical examples in the classroom to illustrate each. Word meanings are provided in the program.

## Lesson 2: A Follow-up Activity

### TEACHER INSTRUCTIONS

Use this lesson with students after they've had the opportunity to work with *Exploring Simple Machines*. To reinforce their understanding of the differences in physical energy needed to use different machines, have students complete the Matching Machines black line master (page 33).

Before handing out the black line master, ask the students, "If you're riding downhill on a bicycle, how difficult is it to pedal?" It's not difficult at all! Point out that pedalling could be a waste of energy since the bicycle may be going faster than a person can pedal. Wasting energy is a problem students encounter as they help Wanda move the peanut barrel from the basement to the peanut butter machine. Some tasks require machines that take less energy . . . some require more. Students should remember to match the machine to the job (or obstacle) so that energy isn't wasted.

To complete the black line master, have students read each task at the bottom of the page (lettered A through I). Then have students write a letter next to a machine that is best suited to the task. (Answers, from left to right, beginning in the upper left-hand corner: G, E, D, H, I, A, B, F, and C.)

***NOTE: Some tasks can be accomplished by more than one machine. Use these situations as points for class discussion. For example, a trunk can be pushed to the top of a house via a long ramp or lifted with several pulleys. However, a ramp that reaches the top of a house may be difficult to find. Even worse, the trunk could fall from the ramp. Pulleys are a better solution to the problem—and little energy will be wasted in completing the task. For each case, have students explain why they selected a specific machine.***

### **TEACHER TIPS**

- Some students may have difficulty understanding the effect of moving a fulcrum to different places under a lever. Try to make the situation as practical as possible. For example, have students lift classroom objects using a ruler as a lever and an eraser as a fulcrum. Have students move the fulcrum (eraser) and lift a variety of objects.

- If your students need more practice understanding the differences among the simple machines, point out the basic features of each machine, and variations of that feature, that make it operate: Use the table below as a guide.

<b>MACHINE</b>	<b>FEATURE</b>	<b>VARIATION</b>
Pulley	Pulley (a grooved wheel)	Number of pulleys. (The more pulleys you have, the easier it is to lift heavy items.)
Lever	Fulcrum (a pivot)	Position of the fulcrum. (The closer the fulcrum is to the object being lifted, the easier it is to lift heavy objects.)
Inclined Plane	Slope	Length of ramp. (The longer [and less steep] the ramp, the easier it is to push heavy items.)

### **Home Activity**

While using *Exploring Simple Machines*, students study the concepts of work and force by using pulleys, inclined planes, and levers. To extend their appreciation of machines, have students find other types of machines found around their homes that are not studied in this unit (simple machines such as wheels, screws, gears, and wedges, or complex machines using electricity).

Establish a rule: Only machines that allow people to use less energy to accomplish a task are acceptable. For example, an electric drill is a machine because it allows a person to make a hole in wood more easily than if it were done by hand.

## **MATCHING MACHINES**

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Which machine is best? It depends on the task! Read each task and decide which machine you would use. Write the letter of the task in the box.

Be careful. Some machines will work for more than one task, but some will be better than others. Try to use each machine once. The first one is done for you.

<b>PULLEY</b>	<b>LEVER</b>	<b>INCLINED PLANE</b>
One pulley G	Fulcrum close to object	Short ramp
Two pulleys	Fulcrum half-way between you and object	Medium ramp
Three pulleys	Fulcrum far away	Long ramp

- A. Move 10 boxes of shoes to a middle shelf.
- B. Lift a huge dog to the roof of a house.
- C. Get six huge watermelons on top of a refrigerator.
- D. Roll five bowling balls to a low shelf.
- E. Lift a person off the ground.
- F. Get a book off the wet ground.
- G. Raise a flag to the top of a pole.
- H. Lift a desk 10 feet off the ground.
- I. Keep you and a friend in the air (like a seesaw).

### Fraction and Decimal Manipulations

**Vocabulary Preview:** divisible, equivalent, expand, fraction, reduce

**Learning Objective:** Students will be able to identify and manipulate equivalent fractions, decimal numbers, and mixed numbers.

In *Math Mall*, students will complete problems using fractions and decimals. Their success depends largely on their ability to quickly identify the problem, and then estimate the answer. The purpose of these lessons is to help students recognize the fractions and decimals they'll encounter in *Math Mall* so they can quickly solve the problems.

#### Lesson 1: A Warm-up Activity

##### TEACHER INSTRUCTIONS

Use a balance scale or contrive a simple balance with a ruler, paper clips, and two small paper cups, to demonstrate that two objects (pieces of chalk, for example) have the same mass and therefore balance on the scale. This is the basis for the equal sign in an equation and for the statement of equivalence.

Break (fracture) the chalk on one side of the scale into fragments and replace it, in all its parts, on the scale. Point out to students that of course the scale still balances because the mass is the same, even if the size of the pieces has changed. They are still equivalent. Remind students that objects (or groups of objects) that look different—and fractions that look different—may be equal.

Once students understand that both sides are equal, move on to other manipulatives. Have each student (or pair of students) cut up construction or other heavy paper to make 24 two-inch squares. Ask students to show you with their squares the result of subtracting eight from 24. Talk about how many times you can remove eight from 24 (three times). Ask students what the “number of times” is called (the quotient). Write the results on the board: Three sets of eight are in 24. Repeat this step until your students understand the concept of divisibility and factors of a number.

Now explain the concept of reduction and expansion of fractions using a pencil and the paper squares. Instruct students to place a pencil in the center of their desks to represent the division line in the fraction. Place six squares above the pencil, and eight below. Read the fraction,  $\frac{6}{8}$ . Ask students, “What is a divisor or factor, common to both numbers?” The simplest (lowest) common factor is two. Remove sets of two from the numerator and the denominator. Ask students, “how many times can we remove sets of two?” (three times from the numerator, and four from the denominator) Explain to students that by counting the number of times that sets of two can be removed from the numerator and denominator, you get the fraction  $\frac{3}{4}$ , which is an equivalent fraction of  $\frac{6}{8}$ .

Illustrate the equivalence by taking two whole pieces of paper. Divide one piece into eighths, the other into fourths. Remove  $\frac{6}{8}$  of one and  $\frac{3}{4}$  of the other. Put the paper you removed on opposite sides of the balance scale to show students that the mass is the same for both pieces of paper. Repeat this step using other fractions, such as  $\frac{8}{12}$  and  $\frac{6}{12}$ , which have more than one common factor.

## TEACHER TIPS

- If your students are more advanced, extend this activity to include odd numbered fractions. Students will have to understand the difference between prime and composite numbers, and fractions in their lowest terms.

- This activity works well to explain proper fractions and expanding and reducing proper fractions. It does not work well to explain mixed numbers or improper fractions.

## Lesson 2: A Warm-up Activity

### TEACHER INSTRUCTIONS

In *The Paintagon in Math Mall*, students must find the quantity for the unlabeled container (the missing addend) when the sum is a mixed number. Begin by creating a number line (either on the blackboard or with tape marks on the floor, if you have the space) with whole numbers 1 through 20. Using 10 as a “benchmark,” students can now visualize the difference between numbers in terms of distance from 10. Talk students through the sample problem  $15 - 7 = ?$ . Say, “7 is only 3 before 10 and 15 is 5 past 10.  $3 + 5 = 8$ , therefore,  $15 - 7$  is a difference (or distance) of 8.”

Once your students are comfortable using the number line, introduce a number line using mixed numbers, with 1 as the “benchmark.” Create a number line using quarters ( $1/4$ ,  $2/4$ ,  $3/4$ , 1,  $1\ 1/4$ ,  $1\ 2/4$ ,  $1\ 3/4$ ). Now students can visualize the difference between numbers in terms of distance from 1.

Talk students through the sample problem  $3/4 + ? = 1\ 1/4$ . Say, “ $3/4$  is  $1/4$  before 1, and  $1\ 1/4$  is  $1/4$  past one.  $1/4 + 1/4 = 2/4$  (or  $1/2$ ). Therefore,  $3/4 + 2/4 = 1\ 1/4$ .” Repeat this activity until students are comfortable adding and subtracting mixed numbers.

### TEACHER TIP

- If your students are having difficulty using the number line, try making a “human-sized” line. Have students stand on the points on the number line and move themselves through the problem.

## Lesson 3: A Warm-up Activity

### TEACHER INSTRUCTIONS

To help students understand the process of adding decimals, give students piles of three or four different types of dried beans and an equal number of small paper plates. Ask students to line up the plates from left to right across their desks. Have them place a small pile of beans above each plate. Ask students to place an eraser or pencil between the first two plates. This will represent the decimal point. Now, have students label each plate with a place value. The first plate on the left should be labeled “Units Place,” the next one should be labeled “Tenths Place,” the next one “Hundredths Place,” and so on.

Now, write different addition problems on the board, each involving two decimal numbers. For example, write  $.7 + .8 = X$  or  $.27 + .84 = X$ .

For each numeral in the equation, ask students to put the corresponding number of beans on the corresponding paper plate. For example, for the equation  $.27 + .84 = X$ , students should place a total of 10 beans in the “Tenths” dish and 11 beans in the “Hundredths” dish. Next, tell students that it is “illegal” to have 10 or more beans on any one plate. Explain that 10 beans on any plate is equal to one bean on the plate to the left. Thus, every time a plate has 10 or more beans on it, students must remove 10 of the beans and add one bean to the plate on the left.

In this example, students should remove 10 beans from the “Hundredths” dish and add one bean to the “Tenths” dish, increasing the number of beans in the “Tenths” dish to 11. Students should then remove 10 beans from the “Tenths” dish and place one bean in the “Units” dish. They should end up with one bean in the “Units” dish, one bean in the “Tenths” dish and one bean in the “Hundredths” dish. Ask them to write down the sum, including the decimal point. The answer is  $.84 + .27 = 1.11$ .

Repeat this activity with other equations until your students feel comfortable adding decimal numbers.

### **TEACHER TIP**

- To illustrate that decimal numbers are merely a regrouping of whole numbers, ask students to remove the decimals from the numbers they've added and add them as whole numbers. Point out that even though the values of the numbers are different, the numerals remain the same.

# ESKIMO ESCAPADE

## Lesson Plans

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### Cultural Differences

**Vocabulary Preview:** escapade, native, traditional

**Learning Objective:** Students will be able to apply their research and reading skills to increase their knowledge of another culture.

In *Eskimo Escapade*, students discover graphics (and facts) which depict traditional Eskimo life. To successfully complete the program, they must determine which elements in the graphic don't belong in the picture because they wouldn't be found in a traditional Alaskan Eskimo habitat.

### Lesson: A Follow-up Activity

#### TEACHER INSTRUCTIONS

To extend students' discovery of another culture and their own culture, divide the class into small groups. Assign each group to research one (or more, depending on the number of students in your class) of the 10 elements in the graphic that changes from a traditional "western" graphic to a traditional Eskimo graphic.

Direct students to use the encyclopedia or other reference books to research their topic. Encourage them to read as much as they can, and to take careful notes on what they read.

Now have students compare what they've learned with what they'd find in their own culture. For example, the group assigned the topic of food will discover that Eskimos eat a lot of fish—raw, dried, or smoked, depending on the season—because there are many species of fish in the waters around Alaska. What kinds of food do people from the students' culture traditionally eat? Once their research is complete, have students write a few paragraphs about what they learned.

## **TEACHER TIPS**

- If your students have difficulty finding information on the specific elements found in the graphic, assign them to research more general topics. Possible topics to include are: schools, food, housing, and climate.
- This activity can be especially interesting if there are students from many cultural backgrounds in your class. Encourage students to draw on their own cultural traditions, and to research their backgrounds if they're not familiar with them.
- If your students are more advanced, have them orally present their research findings to the class. Encourage them to make their presentations visually interesting by including pictures, models, or other examples of their topic.

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