

WOOD MAGIC SCIENCE FAIR

WOOD MAGIC SCIENCE FAIR PROJECTS COMBINE THE NATURAL ALLURE OF WOOD WITH SCIENTIFIC PRINCIPLES TO CREATE ENGAGING AND EDUCATIONAL EXPERIMENTS. THESE PROJECTS EXPLORE THE FASCINATING PROPERTIES OF WOOD, SUCH AS ITS STRENGTH, FLEXIBILITY, AND REACTION TO ENVIRONMENTAL FACTORS, MAKING THEM IDEAL FOR STUDENTS EAGER TO DEMONSTRATE REAL-WORLD APPLICATIONS OF SCIENCE. FROM UNDERSTANDING THE CELLULAR STRUCTURE OF WOOD TO INVESTIGATING HOW WOOD CAN BE TRANSFORMED OR PRESERVED, THESE PROJECTS BLEND CREATIVITY WITH SCIENTIFIC INQUIRY. PARTICIPANTS CAN DELVE INTO TOPICS LIKE WOOD DENSITY, CHEMICAL TREATMENTS, AND EVEN THE MAGIC BEHIND WOOD-BURNING TECHNIQUES. THIS ARTICLE PROVIDES A COMPREHENSIVE GUIDE TO WOOD MAGIC SCIENCE FAIR PROJECTS, OFFERING IDEAS, EXPERIMENTAL SETUPS, AND SCIENTIFIC EXPLANATIONS. WHETHER FOR A SCHOOL COMPETITION OR PERSONAL CURIOSITY, THESE PROJECTS PROMISE TO CAPTIVATE AND EDUCATE. BELOW IS AN ORGANIZED OVERVIEW OF THE TOPICS COVERED IN THIS ARTICLE.

- UNDERSTANDING THE SCIENCE BEHIND WOOD
- POPULAR WOOD MAGIC SCIENCE FAIR PROJECT IDEAS
- STEP-BY-STEP GUIDE TO CONDUCTING WOOD SCIENCE EXPERIMENTS
- MATERIALS AND TOOLS NEEDED FOR WOOD EXPERIMENTS
- SAFETY TIPS AND BEST PRACTICES
- ENHANCING YOUR PROJECT PRESENTATION

UNDERSTANDING THE SCIENCE BEHIND WOOD

WOOD IS A COMPLEX NATURAL MATERIAL PRIMARILY COMPOSED OF CELLULOSE, HEMICELLULOSE, AND LIGNIN. ITS UNIQUE PROPERTIES MAKE IT A SUBJECT OF INTEREST IN VARIOUS SCIENTIFIC STUDIES. UNDERSTANDING THE SCIENCE BEHIND WOOD IS ESSENTIAL FOR DEVELOPING INSIGHTFUL WOOD MAGIC SCIENCE FAIR PROJECTS THAT SHOWCASE THE MATERIAL'S VERSATILITY AND BEHAVIOR UNDER DIFFERENT CONDITIONS.

COMPOSITION AND STRUCTURE OF WOOD

THE BASIC COMPOSITION OF WOOD INCLUDES CELLULOSE FIBERS BOUND TOGETHER BY LIGNIN, WHICH GIVES WOOD ITS RIGIDITY. THE CELLULAR STRUCTURE CONSISTS OF XYLEM VESSELS RESPONSIBLE FOR WATER TRANSPORT IN TREES. THIS MICROSCOPIC NETWORK CONTRIBUTES TO WOOD'S STRENGTH AND FLEXIBILITY, WHICH CAN BE OBSERVED IN EXPERIMENTS INVOLVING BENDING OR COMPRESSION.

PHYSICAL PROPERTIES OF WOOD

WOOD EXHIBITS SEVERAL PHYSICAL PROPERTIES SUCH AS DENSITY, POROSITY, MOISTURE CONTENT, AND GRAIN PATTERN. THESE PROPERTIES AFFECT HOW WOOD REACTS TO FORCES, TEMPERATURE CHANGES, AND WATER ABSORPTION. MEASURING THESE CHARACTERISTICS ALLOWS STUDENTS TO ANALYZE WOOD'S BEHAVIOR SCIENTIFICALLY AND UNDERSTAND WHY DIFFERENT TYPES OF WOOD HAVE VARIED USES.

CHEMICAL PROPERTIES AND REACTIONS

WOOD UNDERGOES CHEMICAL CHANGES WHEN EXPOSED TO HEAT, CHEMICALS, OR ENVIRONMENTAL ELEMENTS. FOR EXAMPLE, WOOD BURNS DUE TO COMBUSTION OF ITS ORGANIC COMPOUNDS, WHILE TREATMENTS LIKE VARNISHING ALTER ITS SURFACE CHEMISTRY. UNDERSTANDING THESE REACTIONS IS CRUCIAL FOR EXPERIMENTS INVOLVING WOOD PRESERVATION, BURNING, OR COLOR CHANGES.

POPULAR WOOD MAGIC SCIENCE FAIR PROJECT IDEAS

NUMEROUS CREATIVE AND EDUCATIONAL PROJECTS CAN BE DEVELOPED AROUND THE THEME OF WOOD MAGIC SCIENCE FAIR. THESE PROJECTS EMPHASIZE SCIENTIFIC EXPLORATION AND DEMONSTRATE FASCINATING WOOD-RELATED PHENOMENA.

INVESTIGATING WOOD STRENGTH AND FLEXIBILITY

THIS PROJECT INVOLVES TESTING VARIOUS WOOD SAMPLES TO MEASURE THEIR STRENGTH AND FLEXIBILITY UNDER STRESS. STUDENTS CAN USE WEIGHTS OR MECHANICAL DEVICES TO OBSERVE HOW MUCH FORCE DIFFERENT TYPES OF WOOD CAN WITHSTAND BEFORE BREAKING OR BENDING.

EXPLORING WOOD DENSITY AND BUOYANCY

BY MEASURING THE MASS AND VOLUME OF WOOD SAMPLES, PARTICIPANTS CAN CALCULATE DENSITY AND PREDICT BUOYANCY. THIS EXPERIMENT DEMONSTRATES WHY SOME TYPES OF WOOD FLOAT WHILE OTHERS SINK AND INTRODUCES CONCEPTS OF MATERIAL SCIENCE AND PHYSICS.

EFFECTS OF MOISTURE ON WOOD PROPERTIES

WOOD ABSORBS AND RELEASES MOISTURE DEPENDING ON ENVIRONMENTAL HUMIDITY. THIS PROJECT EXAMINES HOW MOISTURE CONTENT AFFECTS WOOD'S WEIGHT, SIZE, AND STRUCTURAL INTEGRITY. IT CAN INVOLVE EXPOSING WOOD TO DIFFERENT HUMIDITY LEVELS AND MEASURING CHANGES OVER TIME.

WOOD BURNING AND CHEMICAL CHANGES

BURNING WOOD IS A DRAMATIC EXAMPLE OF CHEMICAL TRANSFORMATION. THIS PROJECT CAN EXPLORE HOW DIFFERENT CONDITIONS AFFECT COMBUSTION, WHAT BYPRODUCTS ARE RELEASED, AND HOW WOOD COLOR AND TEXTURE CHANGE AFTER BURNING. SAFETY PRECAUTIONS ARE ESSENTIAL FOR THIS EXPERIMENT.

WOOD PRESERVATION TECHNIQUES

TESTING VARIOUS NATURAL AND SYNTHETIC PRESERVATIVES ON WOOD HELPS STUDENTS UNDERSTAND HOW TO PROTECT WOOD FROM DECAY. THIS PROJECT CAN INCLUDE APPLYING OILS, VARNISHES, OR CHEMICAL TREATMENTS AND OBSERVING THEIR EFFECTIVENESS OVER TIME.

STEP-BY-STEP GUIDE TO CONDUCTING WOOD SCIENCE EXPERIMENTS

SUCCESSFULLY EXECUTING A WOOD MAGIC SCIENCE FAIR PROJECT REQUIRES CAREFUL PLANNING AND SYSTEMATIC EXPERIMENTATION. THE FOLLOWING STEPS HELP ENSURE SCIENTIFIC RIGOR AND CLARITY.

SELECTING A RESEARCH QUESTION

CHOOSE A SPECIFIC ASPECT OF WOOD SCIENCE TO INVESTIGATE, SUCH AS STRENGTH, MOISTURE ABSORPTION, OR CHEMICAL CHANGES. A CLEAR RESEARCH QUESTION GUIDES THE EXPERIMENTAL DESIGN AND DATA COLLECTION.

GATHERING MATERIALS AND SETTING UP

COLLECT ALL NECESSARY MATERIALS INCLUDING WOOD SAMPLES, MEASURING INSTRUMENTS, AND ANY CHEMICALS NEEDED. PREPARE A CONTROLLED ENVIRONMENT TO MINIMIZE EXTERNAL VARIABLES AFFECTING THE RESULTS.

CONDUCTING THE EXPERIMENT

FOLLOW THE EXPERIMENTAL PROCEDURE PRECISELY WHILE RECORDING OBSERVATIONS AND MEASUREMENTS. REPEAT TRIALS TO ENSURE RELIABILITY AND ACCURACY.

ANALYZING DATA AND DRAWING CONCLUSIONS

ORGANIZE COLLECTED DATA INTO TABLES OR CHARTS, THEN ANALYZE TRENDS AND PATTERNS. USE SCIENTIFIC REASONING TO INTERPRET RESULTS AND ANSWER THE RESEARCH QUESTION.

MATERIALS AND TOOLS NEEDED FOR WOOD EXPERIMENTS

PERFORMING WOOD MAGIC SCIENCE FAIR PROJECTS REQUIRES A VARIETY OF MATERIALS AND TOOLS TAILORED TO THE SPECIFIC EXPERIMENT.

- DIFFERENT TYPES OF WOOD SAMPLES (E.G., PINE, OAK, BALSA)
- MEASURING INSTRUMENTS (RULER, SCALE, CALIPER)
- WEIGHTS OR FORCE MEASUREMENT DEVICES
- CONTAINERS FOR WATER OR CHEMICALS
- PROTECTIVE EQUIPMENT (GLOVES, GOGGLES)
- HEAT SOURCE FOR BURNING EXPERIMENTS (WITH SUPERVISION)
- PRESERVATIVE SUBSTANCES (VARNISH, OILS, CHEMICALS)
- RECORDING MATERIALS (NOTEBOOK, CAMERA)

SAFETY TIPS AND BEST PRACTICES

SAFETY IS PARAMOUNT WHEN CONDUCTING WOOD MAGIC SCIENCE FAIR PROJECTS, ESPECIALLY THOSE INVOLVING CHEMICALS OR HEAT SOURCES. ADHERING TO BEST PRACTICES ENSURES A SAFE AND SUCCESSFUL EXPERIMENT.

HANDLING TOOLS AND CHEMICALS SAFELY

ALWAYS WEAR PROTECTIVE GLOVES AND GOGGLES WHEN WORKING WITH SHARP TOOLS OR CHEMICALS. FOLLOW MANUFACTURER INSTRUCTIONS FOR ANY SUBSTANCES USED AND DISPOSE OF WASTE RESPONSIBLY.

SUPERVISION FOR EXPERIMENTS INVOLVING HEAT

WOOD BURNING OR HEATING EXPERIMENTS MUST BE CONDUCTED UNDER ADULT SUPERVISION IN A WELL-VENTILATED AREA. KEEP FIRE EXTINGUISHING EQUIPMENT NEARBY AND AVOID FLAMMABLE SURROUNDINGS.

MAINTAINING A CLEAN WORKSPACE

KEEP THE WORK AREA ORGANIZED AND FREE FROM CLUTTER TO PREVENT ACCIDENTS. CLEAN TOOLS AND SURFACES AFTER THE EXPERIMENT TO MAINTAIN A SAFE ENVIRONMENT.

ENHANCING YOUR PROJECT PRESENTATION

A WELL-PRESENTED WOOD MAGIC SCIENCE FAIR PROJECT CAPTURES ATTENTION AND EFFECTIVELY COMMUNICATES SCIENTIFIC FINDINGS. CONSIDER SEVERAL ELEMENTS TO ENHANCE THE OVERALL PRESENTATION.

ORGANIZING VISUAL AIDS

USE CHARTS, DIAGRAMS, AND LABELED WOOD SAMPLES TO VISUALLY SUPPORT YOUR EXPLANATIONS. CLEAR VISUALS HELP JUDGES AND VIEWERS UNDERSTAND COMPLEX CONCEPTS EASILY.

PREPARING A DETAILED REPORT

DOCUMENT THE HYPOTHESIS, METHODOLOGY, RESULTS, AND CONCLUSIONS IN A STRUCTURED REPORT. INCLUDE PHOTOGRAPHS AND DATA TABLES TO ADD CREDIBILITY AND CLARITY.

PRACTICING THE ORAL PRESENTATION

REHEARSE EXPLAINING THE PROJECT IN A CONCISE AND CONFIDENT MANNER. BE PREPARED TO ANSWER QUESTIONS ABOUT THE SCIENTIFIC PRINCIPLES AND EXPERIMENTAL PROCESS.

FREQUENTLY ASKED QUESTIONS

WHAT IS WOOD MAGIC IN THE CONTEXT OF A SCIENCE FAIR?

WOOD MAGIC REFERS TO THE EXPLORATION AND DEMONSTRATION OF THE UNIQUE PROPERTIES OF WOOD, SUCH AS ITS STRENGTH, FLEXIBILITY, AND ABILITY TO INTERACT WITH MOISTURE OR CHEMICALS, OFTEN SHOWCASED THROUGH CREATIVE EXPERIMENTS AT SCIENCE FAIRS.

HOW CAN I CREATE A WOOD MAGIC PROJECT FOR A SCIENCE FAIR?

YOU CAN CREATE A WOOD MAGIC PROJECT BY INVESTIGATING HOW WOOD CHANGES UNDER DIFFERENT CONDITIONS, SUCH AS

SOAKING IN WATER, EXPOSURE TO HEAT, OR CHEMICAL TREATMENTS, AND THEN DEMONSTRATING THESE EFFECTS THROUGH EXPERIMENTS AND PRESENTATIONS.

WHAT ARE SOME SIMPLE WOOD EXPERIMENTS SUITABLE FOR A SCIENCE FAIR?

SIMPLE EXPERIMENTS INCLUDE TESTING WOOD ABSORPTION RATES, DEMONSTRATING WOOD EXPANSION AND CONTRACTION WITH MOISTURE, CREATING WOOD BENDING DEMONSTRATIONS USING STEAM, OR SHOWING THE INSULATING PROPERTIES OF WOOD.

CAN WOOD MAGIC INVOLVE CHEMICAL REACTIONS?

YES, WOOD MAGIC CAN INVOLVE CHEMICAL REACTIONS, SUCH AS USING VINEGAR OR OTHER ACIDS TO CHANGE THE COLOR OF WOOD, OR DEMONSTRATING HOW WOOD REACTS WITH CERTAIN SUBSTANCES LIKE IODINE TO REVEAL STARCH CONTENT.

WHAT SCIENTIFIC CONCEPTS CAN BE DEMONSTRATED WITH WOOD MAGIC PROJECTS?

WOOD MAGIC PROJECTS CAN DEMONSTRATE CONCEPTS LIKE MATERIAL SCIENCE (STRENGTH AND FLEXIBILITY), CHEMISTRY (REACTIONS WITH ACIDS AND BASES), PHYSICS (THERMAL EXPANSION), AND BIOLOGY (WOOD STRUCTURE AND COMPOSITION).

HOW DOES MOISTURE AFFECT WOOD IN WOOD MAGIC EXPERIMENTS?

MOISTURE CAUSES WOOD TO ABSORB WATER, LEADING TO EXPANSION, SWELLING, AND SOMETIMES SOFTENING, WHICH CAN BE DEMONSTRATED TO EXPLAIN WOOD'S HYGROSCOPIC PROPERTIES AND ITS EFFECTS ON CONSTRUCTION MATERIALS.

IS IT SAFE TO USE CHEMICALS IN WOOD MAGIC SCIENCE FAIR PROJECTS?

YES, BUT SAFETY PRECAUTIONS SHOULD BE FOLLOWED. USE NON-TOXIC CHEMICALS, WEAR PROTECTIVE GEAR LIKE GLOVES AND GOGGLES, AND CONDUCT EXPERIMENTS IN A WELL-VENTILATED AREA OR UNDER ADULT SUPERVISION.

WHAT MATERIALS DO I NEED FOR A BASIC WOOD MAGIC SCIENCE FAIR PROJECT?

BASIC MATERIALS INCLUDE DIFFERENT TYPES OF WOOD SAMPLES, WATER, HEAT SOURCE (LIKE STEAM OR WARM WATER), SIMPLE CHEMICALS LIKE VINEGAR OR IODINE, MEASURING TOOLS, AND SAFETY EQUIPMENT.

HOW CAN I MAKE MY WOOD MAGIC SCIENCE FAIR PROJECT MORE ENGAGING?

INCORPORATE VISUAL DEMONSTRATIONS, INTERACTIVE ELEMENTS LIKE HANDS-ON EXPERIMENTS FOR VIEWERS, CLEAR EXPLANATIONS OF SCIENTIFIC PRINCIPLES, AND USE COLORFUL CHARTS OR VIDEOS TO HIGHLIGHT YOUR FINDINGS.

ARE THERE ANY FAMOUS APPLICATIONS OF WOOD MAGIC IN TECHNOLOGY OR INDUSTRY?

YES, WOOD MAGIC PRINCIPLES ARE APPLIED IN INDUSTRIES LIKE CONSTRUCTION, FURNITURE MAKING, AND PAPER PRODUCTION, WHERE UNDERSTANDING WOOD'S PROPERTIES LEADS TO INNOVATIONS IN DURABILITY, FLEXIBILITY, AND SUSTAINABILITY.

ADDITIONAL RESOURCES

1. *ENCHANTED TIMBER: THE SCIENCE OF WOOD MAGIC*

THIS BOOK EXPLORES THE FASCINATING INTERSECTION OF NATURAL WOOD PROPERTIES AND MAGICAL ENCHANTMENTS. IT DELVES INTO HOW DIFFERENT TYPES OF WOOD CAN BE USED TO HARNESS AND AMPLIFY MAGICAL ENERGIES. READERS WILL FIND PRACTICAL EXPERIMENTS AND SCIENTIFIC EXPLANATIONS PERFECT FOR SCIENCE FAIR PROJECTS WITH A MAGICAL TWIST.

2. *THE ALCHEMY OF WOOD: TRANSFORMING TIMBER THROUGH MAGIC*

DISCOVER THE ANCIENT SECRETS OF WOOD ALCHEMY, WHERE SCIENCE AND MAGIC BLEND TO TRANSFORM ORDINARY TIMBER INTO

EXTRAORDINARY MATERIALS. THE BOOK PROVIDES STEP-BY-STEP GUIDES TO INFUSING WOOD WITH MAGICAL PROPERTIES USING BOTH SCIENTIFIC METHODS AND FOLKLORE TECHNIQUES. IDEAL FOR STUDENTS INTERESTED IN COMBINING CHEMISTRY AND ENCHANTMENT.

3. *WOODLAND WONDERS: MAGICAL BOTANY AND WOOD SCIENCE*

FOCUSING ON THE MAGICAL QUALITIES OF TREES AND THEIR WOOD, THIS BOOK CONNECTS BOTANY WITH MYSTICAL TRADITIONS. IT OFFERS INSIGHTS INTO HOW DIFFERENT TREES ARE BELIEVED TO POSSESS UNIQUE MAGICAL POWERS, SUPPORTED BY SCIENTIFIC STUDIES ON THEIR PHYSICAL AND CHEMICAL CHARACTERISTICS. A GREAT RESOURCE FOR SCIENCE FAIR PROJECTS ON PLANT MAGIC AND MATERIAL SCIENCE.

4. *SPELLBOUND SAPLINGS: GROWING MAGIC INTO WOOD*

THIS TITLE INVESTIGATES HOW YOUNG TREES CAN BE NURTURED TO DEVELOP SPECIAL MAGICAL TRAITS THROUGH ENVIRONMENTAL AND SCIENTIFIC INFLUENCES. IT INCLUDES EXPERIMENTS ON GROWTH PATTERNS, MAGICAL ENERGY ABSORPTION, AND WOOD DENSITY CHANGES. PERFECT FOR HANDS-ON PROJECTS THAT MERGE BIOLOGY, ECOLOGY, AND MAGIC.

5. *THE PHYSICS OF WOOD ENCHANTMENT*

EXPLORE HOW PHYSICAL PRINCIPLES APPLY TO THE ENCHANTING OF WOOD, FROM RESONANCE AND VIBRATION TO ENERGY CONDUCTION. THE BOOK PROVIDES A SCIENTIFIC FRAMEWORK FOR UNDERSTANDING HOW MAGIC CAN BE MEASURED AND MANIPULATED IN WOODEN OBJECTS. IT'S AN EXCELLENT GUIDE FOR STUDENTS INTERESTED IN PHYSICS-BASED MAGIC PROJECTS.

6. *CRAFTING MAGICAL ARTIFACTS: WOODWORKING MEETS WIZARDRY*

LEARN THE ART AND SCIENCE BEHIND CREATING MAGICAL WOODEN ARTIFACTS, INCLUDING WANDS, STAFFS, AND TALISMANS. THIS BOOK COMBINES WOODWORKING TECHNIQUES WITH MAGICAL THEORY, SHOWING HOW DIFFERENT WOODS INFLUENCE THE POWER OF CRAFTED ITEMS. IT'S IDEAL FOR CREATIVE SCIENCE FAIR PROJECTS THAT INVOLVE CRAFTSMANSHIP AND SPELLCASTING.

7. *WOOD MAGIC IN MODERN SCIENCE: BRIDGING MYTH AND REALITY*

THIS BOOK EXAMINES CONTEMPORARY SCIENTIFIC RESEARCH THAT SUPPORTS TRADITIONAL BELIEFS IN WOOD MAGIC. IT PRESENTS CASE STUDIES AND EXPERIMENTS WHERE WOOD'S MAGICAL PROPERTIES HAVE BEEN TESTED AND VALIDATED. A COMPELLING READ FOR STUDENTS WHO WANT TO CHALLENGE THE BOUNDARIES BETWEEN FOLKLORE AND EMPIRICAL SCIENCE.

8. *RESIN AND RITUAL: THE CHEMISTRY OF MAGICAL WOOD*

DELVE INTO THE CHEMICAL COMPONENTS OF WOOD, SUCH AS RESINS AND ESSENTIAL OILS, THAT CONTRIBUTE TO ITS MAGICAL PROPERTIES. THE BOOK EXPLAINS HOW THESE SUBSTANCES CAN BE EXTRACTED AND USED IN RITUALS OR SCIENTIFIC EXPERIMENTS. IT'S A PRACTICAL GUIDE FOR CHEMISTRY-FOCUSED PROJECTS INVOLVING NATURAL MATERIALS AND MAGIC.

9. *LIVING WOOD: THE BIOLOGY OF MAGICAL TREES*

THIS TITLE PROVIDES AN IN-DEPTH LOOK AT THE BIOLOGY BEHIND TREES THAT ARE TRADITIONALLY ASSOCIATED WITH MAGIC. IT COVERS CELL STRUCTURE, GROWTH MECHANISMS, AND ENVIRONMENTAL FACTORS THAT MAY INFLUENCE A TREE'S MYSTICAL ATTRIBUTES. A VALUABLE RESOURCE FOR BIOLOGY STUDENTS INTERESTED IN THE NATURAL FOUNDATION OF WOOD MAGIC.

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Robert Gardner, 2009-08-01 Get kids interested in science while making toys and doing magic tricks with the unique experiments in this book. Make a genie in a bottle, a flame that jumps, a toy electric motor, and more. Readers will learn chemistry and physics while having fun. Many experiments include high-interest ideas to get young people involved in science fairs. Students can ace their next science project or test using magic and toys.

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wood magic science fair: Rigor in the RTI and MTSS Classroom Barbara R. Blackburn, Bradley Steven Witzel, 2018-04-09 In this new book, bestselling author Barbara R. Blackburn and intervention expert Bradley S. Witzel show you how to develop rigorous RTI and MTSS programs that will support students and lead them to lasting success. Written in a clear, engaging style, *Rigor in the RTI and MTSS Classroom* combines an in-depth discussion of the issues facing at-risk and learning-disabled students with practical strategies for all teachers. You'll discover how to: Improve academic and social-emotional performance with scaffolding and demonstration of learning techniques; Establish and teach class rules, expectations, and consequences; Use evidence-based activities to spark student discussion; Implement rigorous, research-based strategies for math, literacy, reading, and writing development; Assess student growth and encourage self-reflection. Form an MTSS leadership team to ensure that student needs are met across building and district levels. Each chapter contains anecdotes from schools across the country as well as a variety of ready-to-use tools and activities. Many of the tools are offered as free eResources at www.routledge.com/9781138193383, so you can easily print and distribute them for classroom use.

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who have already tried a trick or two.

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