Dear Parents,

Please find, at the end of this letter, a "tear off slip", that needs to be signed and returned to your child’s teacher, so that your child’s teacher knows that you have read and understood the letter. PLEASE KEEP THE PACKET FOR FUTURE REFERENCE.

Once again the 4-8th grade students of PACE Academy are participating in the Science Fair. Each child is required to do a project for a final grade as well as being graded for steps along the way. Each individual project will be worked on at home. All projects are due on February 6th, 2012, but the actual Science Fair is February 27th, 2012. The fair is a little earlier this year so that the 6-8th graders can compete in the Science and Engineering Fair of Metropolitan Detroit, a tri-county Science Fair.

Attached you will find a timeline of dates, showing when each part of the project is due. Teachers will provide your child with the forms that are due per the timeline. Students will be turning in a Science fair Proposal sheet, which must meet approval of the parent and teacher. Also to be turned in are the hypothesis/procedure sheet, bibliography/research sheets, and a work in progress sheet. Again, teachers will provide these sheets for their students.

Each project must include every step of the Scientific Method: Question; Research; Hypothesis; Procedure (which includes materials as well as explicit steps to be taken); Journal (a separate document to be turned in with the display that contains the observation and raw data collected during the experiment); Analysis (graph, chart, table); Conclusion; Display and Oral Presentation.

If you have any questions, please call or email Ms. Conley.
Ext. 218
mconley@pacek-8.org

Thank you.

I’ve read and understood the requirements of my child for this Science Fair project.

Student name: _______________________ Teacher: _______________________

Parent signature: ____________________________________________
SCIENCE FAIR TIMELINE
(PACKET AND SHEETS WILL ALSO BE ON THE SCHOOL WEBSITE)

11/26 PACKETS GO HOME & STUDENTS NEED TO GET AND BEGIN THEIR LOG BOOK

12/4 SCIENCE FAIR TOPIC PROPOSAL SHEET
Bring your final topic statement to class; teachers will hand out proposal sheet.

12/11 RESEARCH/BIBLIOGRAPHY
Document a minimum of THREE different/quality sources of background research. Research sheets are found in this packet. Be prepared to discuss your findings and to have your teacher mark off that you did the work.

12/19 HYPOTHESIS WRITING SHEET AND PROCEDURE
Complete the hypothesis writing sheet with the hypothesis stated as an “If...then” statement. Teacher will hand out this sheet. Also, detailed PROCEDURE AND MATERIAL LIST must be handed in for feedback. Make sure that you have written your procedure in the proper step-by-step numbered format. Be sure your parents read over the procedure; it is very important that they know what you are doing since the work will take place outside of school. THESE SHEETS WILL BE GIVEN TO THE STUDENTS BY THEIR TEACHERS.

1/8 “WORK IN PROGRESS”
Bring in your “work in progress” sheet for feedback and to your teacher where you are at with your project. SHEET WILL BE GIVEN TO YOU BY YOUR TEACHER.

1/25 DATA DUE
Bring your data and log book to class. We will discuss a variety of ways it can be presented (graphs, charts, etc.)

1/30 DATA ANALYSIS AND CONCLUSION/ABSTRACT
Bring your log book and completed data tables and graphs to class. We will discuss your data and how to write a conclusion. We will also discuss how to write your abstract.

2/6 PROJECTS ARE DUE!
POINT WILL BE TAKEN OFF FOR LATE PROJECTS.
Science Fair Proposal

I Propose

The following investigation for my Science Fair Project

PROJECT TITLE: ____________________________________________________________

QUESTION (What I want to find out.)
________________________________________________________
________________________________________________________

HYPOTHESIS (What I think will be the answer to my question.)
________________________________________________________
________________________________________________________
________________________________________________________

PARENT SIGNATURE: ___________________________________________
STUDENT SIGNATURE: __________________________________________
TEACHER SIGNATURE: __________________________________________
WORK IN PROGRESS

DUE 1/8

Please check off what you have completed so far for your science fair project.

______ QUESTION   ______ RESEARCH
______ HYPOTHESIS   ______ PROCEDURE
______ ANALYSIS   ______ CONCLUSION
______ BOARD   ______ LOG BOOK
______ PRESENTATION

Also, write a paragraph what you need to complete.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

_____________________

Parents Signature: ______________________________
Teacher Signature: ______________________________

DUE ON JANUARY 8TH!
MIDDLE SCHOOL IDEAS

The effect of sleep amount on learning and academic performance
Does aerobic exercise improve cognitive function?
Does an electric toothbrush remove more plaque than a manual toothbrush?
How accurately the egg producers measure their eggs?
Statistically analyze the best picks for a playoff hockey pool.
Which Bridge Will Support More Weight: Beam, Arch Bridge or Suspension Bridge?
Find the amount of ground-level ozone near your home.
Effect of an Oil Water Separator’s Shape on Its Effectiveness
How do oil spills affect plant growth?
The Effect of Water Acid Levels on the Growth of Radishes
Determine the effect of different water pollutants on corn.
Effect of Different Waters on the Growth of Soybeans
Which Liquid Germinates a Bean Seed the Best?
Effect of carbon dioxide on temperature change in the atmosphere
Effect of Turbidity on Dissolved Oxygen Levels of Water
Effect of vegetation decay on water acidity.
Effect of flow rate on water quality parameters.
How a community living along a creek affects the quality of the creek water
Effect of Damming on Water Quality Conditions for Aquatic Life
The effect of pH levels on the growth of minnows
Effect of Human Activity on Water Quality and Stream Pollution
Effect of Development on Water Quality
The Effect of Antifreeze on the Survival Rate and Growth of Algae
What material, when burned, gives off the most black carbon particulates
Which location in town has the most pollution?
Effectiveness of Furnace Air Filters
How does different pH water level affect algae cell structure?
The Effect of Various Wind Speeds and Blade Factors on Energy / Voltage Output
Temperature effects on the energy developed by a solar panel
Effects of Angle of Solar Cells Towards the Sun on Electrical Power Generated
Will the use of lenses improve the efficiency of a solar panel?
Comparing the effect of electrical load on a fuel cell and rechargeable batteries
Which treated wood can withstand better a fire?
Which building design will best withstand an earthquake?
The effect of the shape of towers on their strength
Determine the conductivity of different liquids
Does an incandescent bulb produce more heat than a fluorescent bulb?
Which battery works better? Alkaline, lithium, nickel cadmium, or nickel metal hydride?
Create an efficient cold pack using water and different types of fertilizer.
Are the inks of different markers and highlighters mixtures of the same colors?
Determine the relationship between temperature and the corrosion rate of aluminum
Investigate the effect of antibiotics on plant growth
Temperature effect on mold growth
What effect does the salicyclic acid in the "pain relief" medicine aspirin have on the growth of plants

ELEMENTARY IDEAS
Does a person’s heart rate change when listening to different types of music?

Does music change the behavior of fish? Dogs? Cats?

Can girls or boys hear sound from the farthest away?

Does sound travel better through solids, liquids, or gases?

How much does the pitch of a vibrating rubber band change as it is stretched longer?

How much sugar and salt can dissolve in water before it becomes supersaturated?

How soluble are flour and baking soda compared to sugar and salt?

Do materials mix more easily in tap water or bottled water?

Do differently weighted items float better on tap water or salt water?

Are there any oils that allow color to be permanently mixed into them?

Which type of paper is best to use when conducting a chromatography test?

How does the amount of sugar in ice cream affect the formation of ice crystals?

Which type of cat litter absorbs the most liquid?

Does hot water freeze faster then cold water?

Will salt, tap, or bottled water freeze faster?

Does water change size when it freezes?

Do different colors of crayons melt at different temperatures?

Do different liquids evaporate at the same rate?

Does the thickness of a liquid affect its evaporation rate?

Does the size and shape of a container affect evaporation rate?

Do different liquids take different amounts of time to boil?

How long does it take for a bathroom mirror to fog up using different temperatures of water?

Does a balloon stay inflated longer in warm or cold air?

Do soap bubbles last longer on warm or cold days?

How much salt does it take to make an egg float?

Do equal volumes of different liquids weigh different amounts?

Do stains come out better in hot or cold water?

Does the surface type of a ramp affect how fast toy cars will travel down it?

Does the angle of a ramp affect how fast toy cars will travel down it?

Which grit of sandpaper will cause toy cars to go slowest down a ramp?

Does vegetable oil, soap, or petroleum jelly work best as a lubricant on a ramp?

Will a tennis ball or a smooth ball spin faster in water? Why?

Does gravity affect the direction in which a plant grows?

Do larger objects always have more mass than smaller objects?

Do heavier objects fall to the ground faster than lighter objects?

What is the best type of fabric to generate static electricity when rubbed against a balloon?

Does the shape of a balloon affect how much static electricity it can generate?

Can cold magnets pick up objects?

What time of day does a house use the most electricity?

Does the strength of an electromagnet change if different sizes of batteries are used to make it?

Does the temperature of the copper wire in an electromagnet affect its conductivity?

Will plants continue to grow if their stomata are covered?

Does exercise make a person eat more or less food?
HYPOTHESIS & PROCEDURES & MATERIALS

Directions
Create a hypothesis statement for each of the situations below using the *If and then format.*
(If = the CAUSE -> then = the EFFECT)

A hypothesis is an estimate or "educated guess" for solving a problem based on facts, observations, and available data.

- Example Scenario: A student wants to see if the amount of sunlight affects the growth cycle of a pansy. The student places one pansy on a window sill (natural light) and another in the living room (only artificial light).

  *Hypothesis: If a pansy is placed in natural light then it will grow two inches higher than a pansy grown in the artificial light.*

HYPOTHESIS FOR YOUR SCIENCE FAIR PROJECT:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

MATERIALS:

1) ____________  2) ____________  3) ____________  4) ____________
5) ____________  6) ____________  7) ____________  8) ____________

PROCEDURES:

1) __________________________________________
2) __________________________________________
3) __________________________________________
4) __________________________________________
5) __________________________________________

(USE BACKSIDE IF NEEDED)

PARENT SIGNATURE: _____________________________
TEACHER SIGNATURE: ___________________________
2) The logbook is a crucial part of any research project.

It is a detailed account of every phase of your project, from the initial brainstorming to the final research report. The logbook is evidence that certain activities occurred at specific times.

3) Following the pointers below will help keep you organized. It's a great opportunity to show off all of your hard work and impress the science fair judges!

The Log Book

- The first page of the log book must be the Title Page. It should contain the title of the project, the name of the student, the name of the teacher, and the name of the school.
- The second page will become the Table of Contents. Once the log book is finished the table of contents will list page numbers and what is found on each.
- Make logbook entries in pen, not in pencil; this is a permanent record of all of your activities associated with your project. When a mistake is made the error is marked out neatly (no white-out).
- Organize your logbook. Make a table of contents, an index, and create tabs for different sections within your logbook. This helps keep you organized for different activities. For example, have a data collection section, a section with contacts, sources, etc. and a section of schedule deadlines.
- Always date every entry, just like a journal. Entries should be brief and concise. Full sentences are not required.
- Don't worry too much about neatness. Your logbook should be organized, but keep in mind that this is a personal record of your work. Think of the logbook as your "Diary" for the science fair. It's not just for recording data during the experimental phase of your project and it's not just for your teacher.
- The logbook should be used during all phases of your project for jotting down ideas or thoughts for a project, phone numbers, contacts or sources and prices of supplies, book references, diagrams, graphs, figures, charts, sketches, or calculations. Log entries should include your brainstorming, calculations, library/internet searches, phone calls, interviews, meetings with mentors or advisors, notes from tours of laboratories, research facilities and other related activities. Remember that it's documentation of your work.
- Use the logbook regularly and write down everything, even if it seems insignificant; it could later be extremely useful. For example, you may find yourself frantically searching for the title of a crucial reference the night before the fair. Make sure that you describe things completely, so that when you read your notes weeks or months later you will be able to accurately reconstruct your thoughts and your work.
- Glue, staple or tape any loose papers into your logbook, such as photocopies of important items. Loose papers look messy and tend to fall out and go missing. If you have several pages to include you may want to download and print off your own version of the logbook and organize all of these pages into a binder along with your own table of contents.
• Include a reflections section in your logbook. For example, what, if anything would I do differently next time? What part of the experiment could be changed to improve the experimental procedure?
• Always include any changes made to procedures, as well as mishaps, failures, or mistakes. As human beings, all of us make mistakes! (i.e. “1/4/05 my cat, Sheba scratched the pots of soil, and ate 4 of my 12 plants. I will have to replant everything! I need to protect my plants from the silly cat. Maybe I should try putting a screen around the pots or keep the cat outside!”)
• Include any and all observations made during your experiment. In other words, record ALL data directly in your logbook. If this is not possible, then staple photocopies of data in the logbook.

Create your own website for free: [http://www.webnode.com](http://www.webnode.com)

<table>
<thead>
<tr>
<th>Project Elements</th>
<th>Description of Criteria</th>
<th>Possible Points</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td>Has an interesting and exciting title.</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Abstract</td>
<td>Title</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Purpose</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Procedure</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Result</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Conclusion</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>TESTABLE QUESTION &amp; HYPOTHESES</td>
<td>Testable question: Asks a specific, measurable, cause &amp; effect question</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hypothesis: Expresses a reasonable prediction about how specific changes affect the expected outcome</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>BACKGROUND</td>
<td>HISTORY, SIGNIFICANCE, FACTS, METHODS BIBLIOGRAPHY-</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>INCLUDES AT LEAST 5 SOURCES</td>
<td>5(1 per source)</td>
<td></td>
</tr>
<tr>
<td>MATERIALS, PROCEDURES</td>
<td>Materials used are listed</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>There is a list, clearly describing the experiment</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The list is numbered with clearly defined steps</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The steps are arranged in a sequential order that describes exactly how the experiment was conducted</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Observations, Data</td>
<td>There is evidence to support your conclusion</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Includes pictures, drawn or camera</td>
<td>5(1 pt per picture)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Includes a chart or graph</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CONCLUSION:</td>
<td>Restates the Hypothesis</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Reflects what the student learned.</td>
<td>States that your hypothesis was proven or disproven</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>There is a statement of how your data reinforces your results</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>
An abstract is an abbreviated version of your science fair project final report. For most science fairs it is limited to a maximum of 250 words (check the rules for your competition). The science fair project abstract appears at the beginning of the report as well as on your display board.

Almost all scientists and engineers agree that an abstract should have the following five pieces:

- **Introduction.** This is where you describe the purpose for doing your science fair project or invention. Why should anyone care about the work you did? You have to tell them why. Did you explain something that should cause people to change the way they go about their daily business? If you made an invention or developed a new procedure how is it better, faster, or cheaper than what is already out there? Motivate the reader to finish the abstract and read the entire paper or display board.

- **Problem Statement.** Identify the problem you solved or the hypothesis you investigated.

- **Procedures.** What was your approach for investigating the problem? Don't go into detail about materials unless they were critical to your success. Do describe the most important variables if you have room.

- **Results.** What answer did you obtain? Be specific and use numbers to describe your results. Do not use vague terms like "most" or "some."
• **Conclusions.** State what your science fair project or invention contributes to the area you worked in. Did you meet your objectives? For an engineering project state whether you met your design criteria.

**Things to Avoid**

• Avoid jargon or any technical terms that most readers won't understand.
• Avoid abbreviations or acronyms that are not commonly understood unless you describe what they mean.
• Abstracts do not have a bibliography or citations.
• Abstracts do not contain tables or graphs.
• For most science fairs, the abstract must focus on the previous 12 months’ research (or less), and give only minimal reference to any earlier work.
• If you are working with a scientist or mentor, your abstract should only include procedures done by you, and you should not put acknowledgements to anyone in your abstract.

**Why Is an Abstract Important?**

Your science fair project abstract lets people quickly determine if they want to read the entire report. Consequently, at least ten times as many people will read your abstract as any other part of your work. It's like an advertisement for what you've done. If you want judges and the public to be excited about your science fair project, then write an exciting, engaging abstract!

Since an abstract is so short, each section is usually only one or two sentences long. Consequently, every word is important to conveying your message. If a word is boring or vague, refer to a thesaurus and find a better one! If a word is not adding something important, cut it! But, even with the abstract's brief length, don't be afraid to reinforce a key point by stating it in more than one way or referring to it in more than one section.

**How to Meet the Word Limit**

Most authors agree that it is harder to write a short description of something than a long one. Here's a tip: for your first draft, don't be overly concerned about the length. Just make sure you include all the key information. Then take your draft and start crossing our words, phrases, and sentences that are less important than others. Look for places where you can combine sentences in ways that shorten the total length. Put it aside for a while, then come back and re-read your draft. With a fresh eye, you'll probably find new places to cut. Before you know it you will have a tightly written abstract.
Science Fair Ideas

What is the effect of temperature on the growth of caterpillar?
What size of windmill blades gives maximum wind energy and at what angle?
Can dogs and cats identify all visible colors? Or are they colorblind to specific colors?
Studying the stages of a star, including formation, in between phases and death of the star?
What are the advantages of using fruit flies in genetic studies and researches?
Does exposure to caffeine affect the survival rate of fruit flies?
What is the concentration of carbon dioxide in a soda bottle?
Which objects rust the most and why?
What are the plus points of cryopreservation in scientific applications?
Explain the effects of gravity on the growth direction of plants?
Studying the effects of water pH on the shape and size of algal cells?
Is it true that cruciferous vegetables aid in combating cancer disease? If yes, in what way?
In what way, food preservatives help in fighting against microbes?
What concentration of bleach is required to kill molds and alike fungus species?
Can you detect electric charge in fruits and vegetables? If yes, which vegetable or fruit has the highest charge?
What is glass recycling? What are the benefits of recycling glass?
Why does a night insect get attracted to lamp? Is it the heat or the light?
What is the big fuss behind genetically modified foods? What are the pros and cons of GM foods?
Does light affect the food spoiling time? Under which light intensity, foods spoil the most?
Are there any materials that glow in the dark? What is the phenomenon behind it?
What ratio of baking soda to vinegar in volcano project produces the best eruption effects?
Is repeated use of the same water bottles safe for us? Or is there negative effects of reusing water bottles?
What are the factors (e.g. water amount, light intensity, temperature, soil, etc.) that contribute to quick germination of seeds?
Do different cations (calcium ion, sodium ion, potassium ion) affect the growth rate of plants?
Does soapy water promote the growth and development of plants? What about the concentration of soap water that is destructive for plants?
What is the reason behind killing of plant pests and insects with mild detergent solution?
Is there any effect of magnetism on plant growth?
What are the factors that determine the fertility of soil other than nutrients levels?
How do beneficial soil microbes help in providing nutrients to plants?
Can plants grow without soil? If yes, under what conditions?
Is grafting tomato plants over potato plants possible?
Why planting the same crop repeatedly for many years in the same area affects the crop yield?
How do certain plants affect the growth of other plants growing in the same area?
What can you do to control the ripening of fruits?

Science Fair Display Checklist

After you have completed your backboard take time to complete this checklist yourself to be sure you have everything included on your display board. Then add or revise any areas that you did not check off as being complete. After you have made any changes to your board, have your parent complete the checklist as a final review of your work before turning it in at school.

Assessment

Self Parent
1. Overall appearance is neat and attractive. ________ ________
2. All necessary parts are included and labeled (Question, ________ ________ Prediction, Materials, Procedure, Results, and Conclusion.)
3. I used no more than three colors when doing my backboard. ________ ________
4. My backboard has a short and catchy title.

5. All of the words on my backboard are spelled correctly.

6. I have used proper grammar and punctuation.

7. My procedures are written in clear sequential order.

8. My procedure shows that I conducted repeated trials (at least 3) and used an adequate sample size, if necessary.

9. I have identified my independent, dependent and control variables.

10. All necessary parts are included on my chart (title, labels, and units) and it is neatly drawn and filled in with appropriate data.

11. I have the correct type of graph that displays my data from my chart and the graph includes all the necessary parts (title, axes, increments, labels, and scale). A key is present if necessary.

12. I included a written explanation of my chart, graph and any other observations I made.

13. My conclusion includes the answer to the original question, accuracy of my prediction, what I learned supported with data, any problems and real-world applications.

14. My research paper follows the guidelines listed in the journal.

TIPS FOR CREATING OUTSTANDING DISPLAYS

- **BE NEAT**- Avoid frayed or ripped edges of paper, glue globs, lots of cross outs or white outs etc.

- **USE COLORS TO ATTRACT ATTENTION BUT DON’T OVER DO IT**- No more than (3) three colors should be used on a project except for special situations. Too much color can be distracting. Instead develop a color pattern that is pleasing to the eye.

- **FRAME OR MATTE YOUR WORK**- Use construction paper or other colored materials to provide a background for your written work and labels (construction paper, newspaper, wrapping paper, old wall paper, contact paper etc…)

- **TITLES SHOULD BE SHORT, CATCHY AND RELATED TO THE PROJECT IDEA**

  For example:
  
  Color of Cool Cubes is better than The Melting Rate of the Different Colors of Ice Cubes
  
  Sizing Up Seeds is better than The Relationship between the Size of the Seed and the Size of the Plant

- **WRITING SHOULD BE NEAT AND LEGIBLE**- If you choose to use a computer or typewriter, stick to one or two fonts to type your work. Too many fonts can be distracting and difficult to read. If you hand write your work, either print or use cursive, don’t mix the two. Also, if you are handwriting the information, be extra careful to write so it can easily be read by others. Pen is easier to read than pencil. Messy or illegible writing can really lower your score.

- **SPELLING DOES COUNT**- Take time to check over your work before you put it on your display board. Don’t overuse white out. Scratching out mistakes is not acceptable. If you do recognize an error after finishing, place a single line through it and write the correct word above. However, too many of these types of marks will effect the overall appeal of your project.

- **PRACTICE YOUR LAYOUT**- Before you begin gluing things down, practice moving the parts of the display around until they are evenly spaced and centered. Crowding together or large gaps can take away from your project’s appeal. Trying to rip off or move things once they are glued down can be messy and often ruins the paper or display board.

- **DON’T GLUE ON MATERIALS FROM YOUR PROJECT**- Don’t glue on food items such as M & M’s, popcorn or moldy bread to the board. Food products attract bugs, so do their wrappers. Don’t place samples of chemicals or their containers on the board. This includes household items such as vinegar, dish soap, oil etc.
TAKE PHOTOS OR DRAW PICTURES/DIAGRAMS OF THE ITEMS FOR DISPLAY: This will help you to avoid attaching materials from your experiment to your display. Inappropriate materials will be removed from the board before allowing it to be displayed in the fair.

RESEARCH REPORTS ARE PLACED IN FRONT OF THE DISPLAY: Don’t attach the report to the display board. It is placed in front of the display.

SCIENCE FAIR PROJECT DISPLAY INFORMATION

Title: short, catchy, related to the topic and results of the experiment

Question: the question to be tested

Prediction: the predicted answer to the question/problem asked with a reason

Materials: a list of the supplies, equipment to be used

Procedure: a list of the steps followed to perform the experiment
data displayed in table and graph form to include data analysis (mean, medium, mode, range) and accompanied by a written explanation

Conclusion: briefly answers the question asked in the beginning; states the prediction to be supported or not supported, and makes suggestions for further research