

# Science and Technology Start-Up Stars

## TEACHER'S GUIDE

In today's innovation-driven society, students are training for careers that may not even exist yet, or will look vastly different by the time they join the workforce. Problem solving, critical thinking, and perseverance are all important skills for students to succeed in this society. Understanding how to approach problems and challenges in a way that allows them to create their own solutions is crucial to developing 21st century skills. Each book in the *Science and Technology Start-Up Stars* series explores a different field with endless possibilities. The books detail various advancements in each scientific area, while also highlighting entrepreneurs who have advanced their field.

The Science and Technology Start-Up Stars Teacher's Guide includes a series of lessons that allow students to develop their abilities to think critically and approach problems in unique ways. The interactive and engaging lesson plans in this guide are created with grade 5 and 6 in mind. Students will learn about what it means to be an entrepreneur, and how entrepreneurs create products as solutions to a problem they have encountered. Students will think like an entrepreneur by diving into problems that are relevant to them. The goal is that they will realize that they have the potential to create new products and make discoveries.

The lessons in this guide follow a sequential order that works to scaffold understanding and should be taught as such. Reproducible worksheets and assessment tools accompany each lesson plan. The titles in *Science and Technology Start-up Stars* include:

***Energy Entrepreneurs***  
***Engineering Entrepreneurs***  
***Industry Entrepreneurs***  
***Medical Entrepreneurs***  
***Military Entrepreneurs***  
***Space Entrepreneurs***

# PACING CHART AND VOCABULARY

Lesson Plan Title	Pacing	Vocabulary
What is an Entrepreneur?	1-2 class periods*	amateur business entrepreneur goods industry innovative services start-up
Problem & Solution Finding	2 class periods	issues pitch product problem solution
Finding Your Own Problem	2-3 class periods	global local

\* 1 class period = 40-60 minutes

# ACCOMMODATION STRATEGIES

Accommodations provide equal access to learning and equal opportunity to demonstrate what is learned. Accommodations allow a student access to the subject or course without any changes to the knowledge and skills the student is expected to demonstrate.

Educators are encouraged to adapt the instructional approach, activities, and assessments included in this guide to best meet the diverse interests, needs, and abilities of their students. Possible accommodations may include:

## Instructional Strategies

- Break tasks into parts with accompanying timelines
- Provide extra time for processing of oral information
- Pair oral instructions with visual ones (writing or symbols)
- Pre-teach new vocabulary and regularly review previously taught vocabulary
- Provide model of completed work
- Frequently check with the student to get him/her started
- Provide oral and visual instructions and examples
- Provide a checklist of tasks for the student

## Environmental Strategies

- Proximity to teacher
- Strategic seating
- Flexible or mixed-ability grouping
- Provide an alternative setting for learning that is free from visual and auditory distractions.

## Assessment Strategies

- Build in extra time to allow student to process questions asked and answers given
- Provide written instructions and rubrics for assignments
- Offer a choice of assessment activities so that the student can choose one suited to their strengths
- Space out or extend assignments to prevent student feeling overwhelmed
- Reduce the number of tasks used to assess skill or concept
- Allow students to use assistive devices or technology

# LESSON 1

## What is an Entrepreneur?

### Curriculum Correlations

#### C3 Framework

D2.Eco.7.6-8

#### Common Core

CCSS.ELA-LITERACY.R1.5.4

CCSS.ELA-LITERACY.R1.6.4

#### Ontario Language Arts

Grade 5 Reading

Overall Expectation 1

1.5

Grade 6 Reading

Overall Expectation 1

1.5

### Materials

- Chart Paper
- Markers
- Post-it notes
- TED talk: Why you should make useless things-  
<https://bit.ly/20KyBEJ>
- “You Can Be an Entrepreneur” section of each *Science and Technology Start-Up Stars* book
- *What is an Entrepreneur? Checklist*
- *What is an Entrepreneur? Exit Card*

### Setting the Stage

Begin by asking students:

- What is the greatest invention? Why?

Encourage students to think outside of things only they use to what a larger population would think is important.

Have students brainstorm this on their own for a few moments, then have them share with a partner or small group. In their pairs or groups, students must decide on an invention to share and explain why they feel it is the greatest invention.

After groups have decided on one invention, have each group share with the class their final decision. Write these choices on the board, so they are displayed to the class.

Ask the class to consider:

- How would your life be different without these inventions?

### Objectives

Students will:

- Consider the impact of innovative thinking on their own lives.
- Understand what an entrepreneur is and create their own understanding.
- Use evidence from the text to support their ideas.

## Activity

On the board write the word “entrepreneur”.

Discuss with the class what this word means, and have a few students share their ideas about its meaning. Make sure to clarify if a student shares false information.

Place students in 6 groups and give each group a few Post-it notes. On the Post-its, have students write words or short phrases describing an entrepreneur (these can include examples).

As the groups finish filling out the Post-it notes, have them post them around the word entrepreneur on the board.

Leave the notes up as the activity progresses.

In their groups, provide each group with one of the *Science and Technology Start-Up Stars* books. Have each group open to the “You Can Be an Entrepreneur” section on pg. 4 & 5.

Each group will work together to read all the sections on these two pages. Inform students that after reading this section of the book, they will work together to create a definition of entrepreneur using details from the text.

Encourage students to look beyond just the examples given in their book. Remind them that while each book focuses on a different area, they all focus on what an entrepreneur is.

Discourage students from using the glossary to look up the definition.

After students have created their definitions, have them write the final versions on a piece of chart paper. Leave the chart paper with definitions up for students to utilize throughout the lessons in this unit.

## Extensions

- If students have access to technology, have them research examples of different entrepreneurs, and ask them to determine how that person is an entrepreneur.
- Collect a number of definitions of the word entrepreneur (i.e., from the glossary, Internet, and dictionary) compare them to the student-created definitions. Decide if there is anything that you should change in your class definition.

## Wrap-Up

Show the students the TED talk by Simone Giertz : *Why you should make useless things*. <https://bit.ly/20KyBEJ>

Have students complete the *What is an Entrepreneur Exit Card*.

This exit card can be used for the video provided or for another video of an entrepreneur speaking about their craft or industry. It should encourage students to test and think about their definition.

## Assessment

Assess students understanding during lessons using observational and anecdotal notes. Assess students' understanding of an entrepreneur using the *What is an Entrepreneur Exit Card*. Use the *What is an Entrepreneur? Checklist* to assess their responses from the exit card as well as group definitions.



Student name: \_\_\_\_\_ Date: \_\_\_\_\_

### What is an Entrepreneur? Checklist

Objective	Achieved	Somewhat Achieved	Not Yet Achieved
The student gained an understanding of what an entrepreneur is.			
The student used information from the text to support their ideas (definition and Exit card).			

Notes: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Student name: \_\_\_\_\_ Date: \_\_\_\_\_

### What is an Entrepreneur? Checklist

Objective	Achieved	Somewhat Achieved	Not Yet Achieved
The student gained an understanding of what an entrepreneur is.			
The student used information from the text to support their ideas (definition and Exit card).			

Notes: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

# LESSON 2

## Problem & Solution Finding

### Curriculum Correlations

#### C3 Framework

D2.Eco.7.6-8

D2.Eco.2.3-5

#### Common Core

CCSS.ELA-LITERACY.R.1.5.1

CCSS.ELA-LITERACY.R.1.6.1

#### Ontario Language Arts

Grade 5 Reading

Overall expectation 1

1.8

Grade 6 Reading

Overall expectation 1

1.8

### Materials

- *Science and Technology Start-Up Stars* books—any “Start-up Stars” profile
- *Problem and Solution Finding Organizer*
- *Problem and Solution Finding Checklist*
- YouTube Video: Carly & Charley’s Single Sox pitch: <https://bit.ly/2Jk7Roi>
- YouTube Video: Caleb & Lars’ Easyrups pitch: <https://bit.ly/2ELTZ7W>

### Setting the Stage

To begin, ask students to think of a time that they have encountered a problem.

- Ask students to think about a time when they had a problem that couldn’t be solved using the materials and items, they had available to them.
- Ask students if they ever considered how a new or slightly different item could easily have helped them in that situation.

If students have an example, allow them to share either as a class or in small groups.

If students don’t have an example, provide a simple example as a teacher

- (i.e., I could not find a worksheet for division that had no remainders. Since we hadn’t learned how to divide with remainders yet, I created my own worksheet that was tailored to what I wanted for my students).

### Activity

Inform students that today, we will be looking for problems and their solutions.

To begin, you will be watching a clip from the television show *Dragons Den*, which features kid entrepreneurs who created a product as a solution to a problem.

Tell the students we will be watching the video and identifying:

1. What is the problem that inspired the invention of their product?
2. How does their product solve the original problem?

Show students either:

- Carly & Charley’s Single Sox pitch: <https://bit.ly/2Jk7Roi>
- Caleb & Lars’ Easyrups pitch: <https://bit.ly/2ELTZ7W>

### Objectives

Students will:

- Understand how to identify a problem in an area of interests.
- Classify ideas and information using graphic organizers.
- Make judgements and draw conclusions about ideas and information in texts.



After watching the video, invite students to complete a “Think-Pair-Share” surrounding the two discussion questions.

If necessary, show the clip a second time. Allow students to share some of their responses with the class.

Bring up the *Problem and Solution Finding Organizer* on a projector, or provide each student with a copy.

As a class, break down the problem from the video into smaller issues.

- For example: for Carly & Charley’s Single Sox, they had the issues of: losing one sock, wearing mismatched socks, providing socks to those in need)

After breaking down the problem into the smaller issues, discuss which features of their product addressed that specific issue.

Complete this as a class to discuss and model to students how a problem can be broken down into smaller more manageable issues.

Inform students that not every entrepreneur and product is going to have 4 problems and solutions, so they do not need to complete the whole organizer. Also discuss how the final product or solution works to solve all of the smaller issues.

Once the class has collectively completed the organizer, leave it on display for students to refer back to throughout their group work.

Arrange students into small groups and provide each group with a *Science and Technology Start-Up Stars* book.

Each group will select one of the “Star-Up Stars” profiles in their specific book. As a group, the students will read through the two pages and complete the *Problem and Solution Finding Organizer* based on their entrepreneur(s). Each student completes their own organizer.

Remind students again that they do not need to use the whole organizer if their problem or product does not break down into four smaller issues. If time allows, have students share their summary of their “Start-Up Star” with the class.

## Extensions

- If technology is available, allow students to research their own entrepreneur to complete the *Problem and Solution Finding Organizer*.
- Challenge students to see if anyone else has come up with an alternative solution/product for a similar or same problem. Allow students to compare the two solutions and determine which they feel is a superior solution or product.

## Wrap-Up

After groups share their findings from the *Problem and Solution Finding Organizer*, discuss how easy it was to find this information in the reading.

- Was all of the information you needed clearly laid out in detail in the reading?
- If not, what strategies did your group use to gather the information for the *Problem and Solution Finding Organizer*?

Encourage students to begin thinking of their own problems that challenge them in their daily life or something that weighs on them.

Tell students in the next class, they will be given an opportunity to break down their own problem and begin to find solutions that will possibly start their own entrepreneur journey.

## Assessment

Assess students’ understanding during lessons using observational and anecdotal notes. Assess students’ ability to make judgments and draw conclusions about information from the text using the *Problem and Solution Finding Checklist*. Visit groups when they are working and listen to how they are gathering the information to complete the *Problem and Solution Finding Organizer*. Collect the organizers when the task is finished to further inform your assessment of students’ ability to make judgements and draw conclusions from the text.

Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Problem and Solution Finding Organizer

Entrepreneur(s): \_\_\_\_\_

**Product:**

**Problem(s)**

**Solution(s)**



**Student name:** \_\_\_\_\_ **Date:** \_\_\_\_\_

### **Problem and Solution Finding Checklist**

**Objective:** Students will be able to make judgments and draw conclusions about ideas and information in texts

<b>Student Name</b>	<b>Objective Achieved (Y/N)</b>	<b>Notes</b>

# LESSON 3

## Finding Your Own Problem

### Curriculum Correlations

#### C3 Framework

D1.1.3-5

D1.1.6-8

#### Common Core

CCSS.ELA-LITERACY.W.5.1.A

CCSS.ELA-LITERACY.W.6.1.A

#### Ontario Language Arts

Grade 5 Writing

Overall expectation 1

1.2

Grade 6 Writing

Overall expectation 1

1.2

### Materials

- Post-it notes
- White board or chalk board with markers or chalk
- Paper
- Markers
- *Finding Your Own Problem Organizer*
- *Finding Your Own Problem Assessment*

### Objectives

Students will be able to:

- Break down problems in their lives into smaller issues.
- Develop ideas for their writing.
- Sort and select ideas from their brainstorming to use for writing.

### Setting the Stage

Remind students of the activity from the day before. In that lesson, students broke down problems into smaller, more manageable issues.

Have students review thinking about breaking down ideas by detailing the steps to make toast (or another simple task).

- Have each student write these steps on a piece of paper individually. Do not give a minimum or maximum number of steps that they should have.
- Once everyone has written the steps out, have students join in groups to share their steps.
- Each group needs to create one set of steps to making toast. Encourage the groups to make decisions together to determine which steps need to be included.
- Compare the groups final list to each other.
- Discuss with the class how they found the process of breaking down such a simple task.

Explain to students that by breaking down a problem, we can better understand how the problem started and can have a clearer view of what a solution might look like.

## Activity

On the board, write a number of topics that may prompt students to think of a problem related to that topic. To keep the activity realistic and manageable, to keep ideas on a smaller, local scale (the classroom, their community etc.) and avoid large national or global issues.

Some ideas for brainstorming topics could include:

- School safety
- Technology at school or home
- Environmental health in community
- Healthy living
- A current topic students are studying (to integrate their thinking).

When a few topics are written on the board, have students use Post-it notes to write about a related problem they experienced or know about.

Encourage students to think simply, and to contribute to as many of the topics as they can. They should add a Post-it note to at least two of the topics on the board.

- For example, in the technology topic, a student might write that they never have headphones to plug into the computer at school.

At this point, students are only in the stage of brainstorming.

Read through some of the ideas listed under each category.

Then, have students pick a topic that they feel most interested in further exploring. Provide students with the option of selecting their own topic as well.

Have students who chose the same topic gather in groups. Invite any students who selected a new topic to meet as one group.

Once in their topic groups, allow students time to discuss their topic and the problems that are already listed. Encourage the groups to add more possible problems to the list. Reiterate to students that discussion is vital to this activity and to developing their problem finding process.

Now that students have had time to brainstorm and discuss the topics and problems, students should begin to fill out the *Finding Your Own Problem Organizer*. These should be completed individually.

Students should pick three possible problems to begin exploring and breaking into smaller issues. Inform students that some problems may have fewer than three smaller issues—they do not need to fully complete the sections of the worksheet if this is the case.

## Extensions

- Students could follow the same process and begin brainstorming products or processes that could act as a solution to their problem. Students could conduct research surrounding their problem; research other issues related to this problem, interview others about how the problem affects them.
- Students could develop a quick pitch to present their problem to the class, persuading the class to support their problem and search for a solution.

## Wrap-Up

Have students write a short paragraph detailing one problem from their *Finding Your Own Problem Organizer*, and how it was broken down into smaller issues.

Students should explain why they feel this problem is important. They should use an idea from their organizer and show that they can develop it into a clear paragraph.

To conclude, allow students to look at items around the room, or think about items they regularly use (i.e., sharpener, highlighter, stapler, tape etc.).

Remind students that at one point in time, these items did not exist. They were created out of the need to solve a problem. Inspire students by telling them that one day, their ideas could one day do the same!

## Assessment

Assess students' understanding during lessons using observational and anecdotal notes. Students' *Finding Your Own Problem Organizer* and final paragraph will be assessed using the *Finding Your Own Problem Assessment*, to determine how students were able to develop their ideas from the brainstorming and organizer into their paragraph.

Name: \_\_\_\_\_ Date: \_\_\_\_\_

### Finding Your Own Problem Organizer

Problem	Smaller Issues

Student name: \_\_\_\_\_ Date: \_\_\_\_\_

## Finding Your Own Problem Assessment

Strengths	Objective	Areas for Improvement
	Developed ideas for their writing	
	Sorted and classified ideas to use for their writing	

Additional notes: \_\_\_\_\_

---

---

---

---

---