
Generation IB
Generación IB
Génération IB
IB GLOBAL
CONFERENCE 2019
24–26 March • Hong Kong
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IB GLOBAL CONFERENCE 2019

24–26 March • Hong Kong

Turning Science Students into Scientists

Student Research and Publishing in IB Science

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Science Student vs Scientist

Science Student

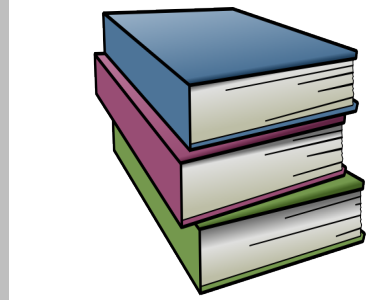
- Master Current Knowledge

Scientist

- Master Current Knowledge
- **Create New Knowledge**
- **Publish**

Model of the Process of Science

Process of Science



Master Current Knowledge

Conduct Investigation

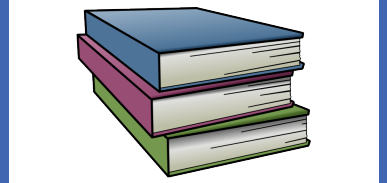
Create New Knowledge

Write Report

Publish

Master Current Knowledge

Process of Science



Master Current Knowledge

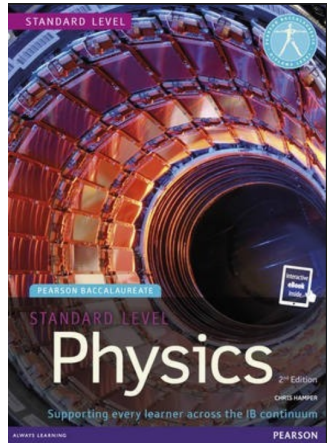
Conduct Investigation

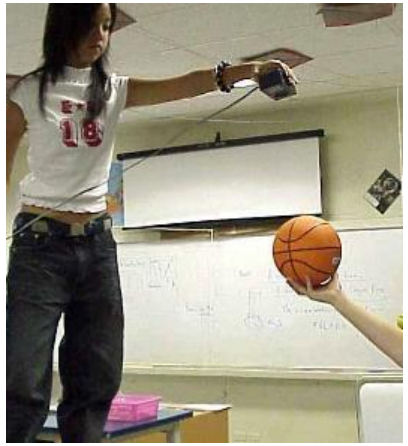
Create New Knowledge

Write Report

Publish

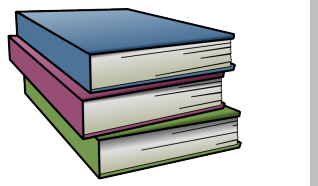
- Class discussion
- Text reading and homework
- Labs





Create New Knowledge

Process of Science



Master Current Knowledge

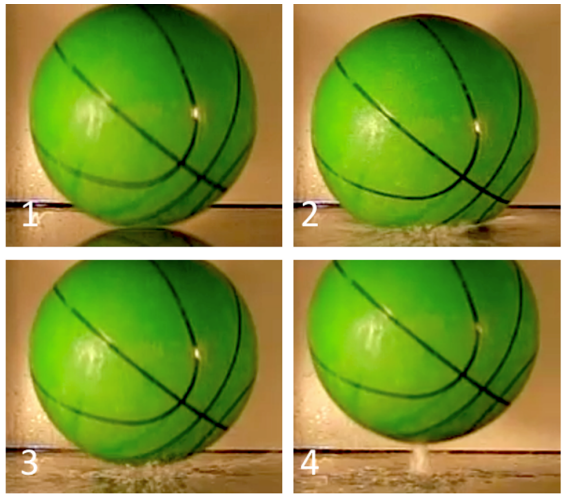
Conduct Investigation

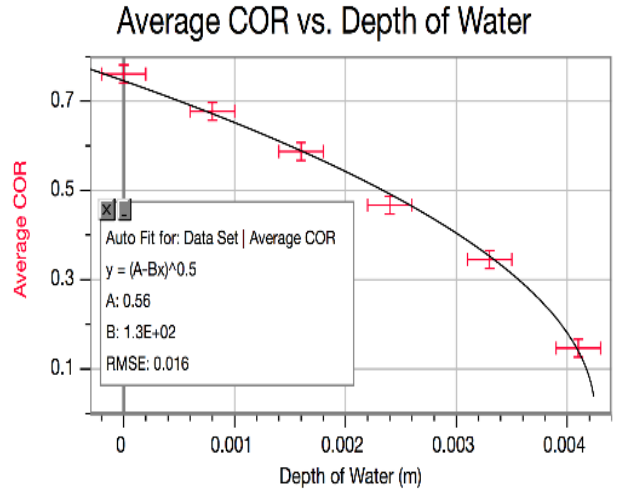
Create New Knowledge

Write Report

Publish

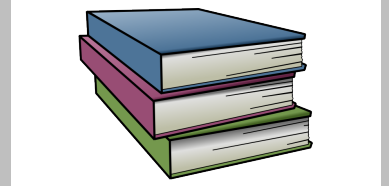
How does the depth of a puddle affect the bounce of a basketball?





Publish

Process of Science



Master Current Knowledge

Conduct Investigation

Create New Knowledge

Write Report

Publish

International Scholastic Journal of Science 9 (1) Jan-Dec, 2015 www.isjos.org

Bounce of a Basketball in a Puddle: Depth of Water and Coefficient of Restitution

Chankyu Han
International School Bangkok,

Abstract

A basketball was dropped into puddles with depths of water ranging from zero to 4 mm from a height of 1.1 m. to investigate the relationship between the depth of water in a puddle and the coefficient of restitution with measurements of the drop height and bounce height. It is shown that the coefficient of restitution has a square root relationship with the depth of the puddle. A "puddle constant" is defined and found for this drop height and this ball to be 830 kgm/s^2.

Keywords: basketball, water depth, coefficient of restitution

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International Scholastic Journal of Science (ISJOS)

ISJOS.org
International Scholastic Journal of Science

Founded: ISB Journal of Physics

2007

Papers Published

61

Papers Cited

24

Total Citations

65+

Journals Citing ISJOS Papers

J. of Material Science and Engineering A. (Elsevier, USA)

Photonic Network Communications. (Springer, USA)

The Physics Teacher. (AAPT, USA)

*J. of Micromechanics and Microengine*ering. (IOP, UK)

J. of the Institute of Electr. Engineers of Korea. (IEE, Korea)

Canadian J. of Physics. (NRC, Canada)

Student Research & Publishing (SRP) in IB Science

What is it?

How does it benefit students?

Can you do it?

SRP: What is it?

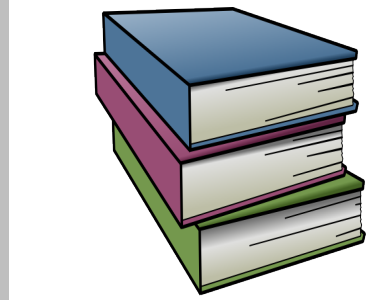
Embedded in an **Inquiry-Based Science Program**

Students conduct **Original, Entry-Level Scientific Research (IA)**

Opportunity to **Publish**

Model of the Process of Science

Process of Science



Master Current Knowledge

Conduct Investigation

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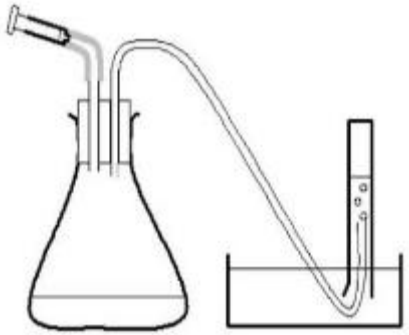
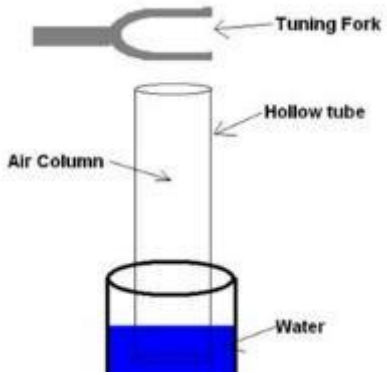
SRP: What is it?

Embedded in an **Inquiry-Based Science Program**

Use Standard Experiments

- Design
- Conduct
- Analyze
- Report

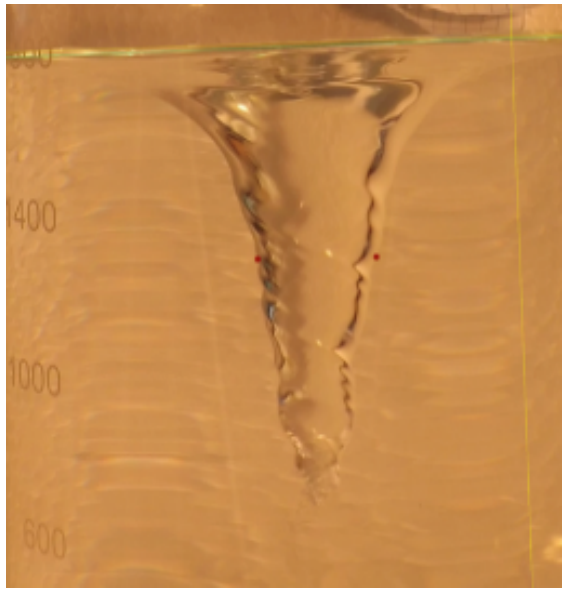




SRP: What is it?

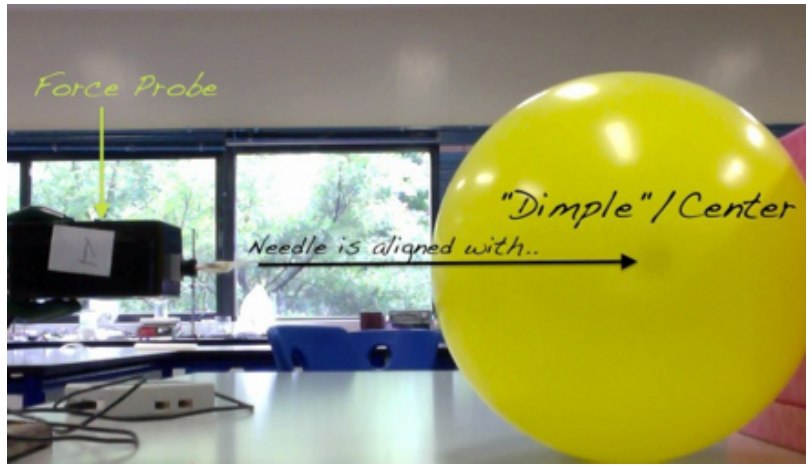
Students conduct

Original, Entry-Level Scientific Research (IA)



Ask Original Questions (Internal Assessment)

- How does the Volume of a balloon affect the force required to pop it?
- How does Spin Rate affect Vortex Formation?



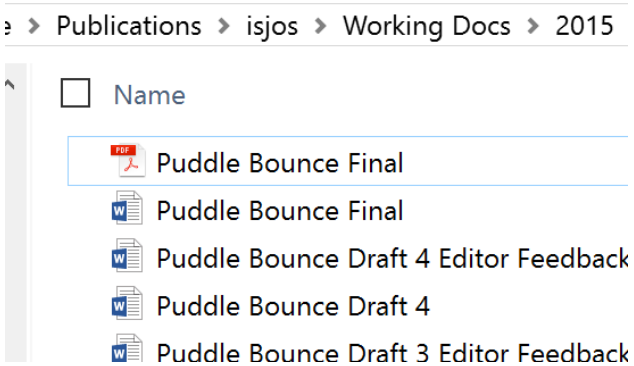
SRP: What is it?

Opportunity to **Publish**

ISJOS Publishing Process

- Submitted to ISJOS for Review
- Accepted authors **mentored** through the publishing process

ISJOS.org
International Scholastic Journal of Science



Student Research and Publishing

How does it benefit students?

SRP: How does it benefit students?

Students in the **SRP Program**

VS.

Students in the
Standard Inquiry-Based Science Program at ISB

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SRP: How does it benefit students?

Students in the **SRP Program**

Shown to have a **significant positive effect ($p < 0.05$)** on students' ability to:

Analyze data

Think critically and **problem-solve**

Formulate a research question

Read and **write** scientific reports or papers

SRP: How does it benefit students?

Students in the **SRP Program**

Shown to have a **significant positive effect** on students':

Confidence in ability to **contribute to science**

Confidence in ability to **do well in future science courses**

Ability to **work** both **independently** and **collaboratively**

Time management

SRP: How does it benefit students?

Students in the **SRP Program**

Shown to have a **significant positive effect** on students':

Desire to **enroll in** a university program in **science**, **engineering**, or **medicine**

Desire to **get involved in** scientific **research** while at university

Preparation for more **advanced scientific coursework** and **research work**

SRP: How does it benefit students?

"[after 4 years of university] I realize ***how important having a published paper is*** *in the academic world now, and how favorably it is looked upon. I wish I had understood this earlier."*

SRP: How does it benefit students?

"Publishing a paper for the Journal of Science was ***one of the highlights of my high school education*** *and I feel very grateful for having had that opportunity."*

Student Research and Publishing

*Can **you** do it?*

SRP: Can you do it?

Crucial Conditions

Students

Motivated to excel in the sciences ✓

Curriculum

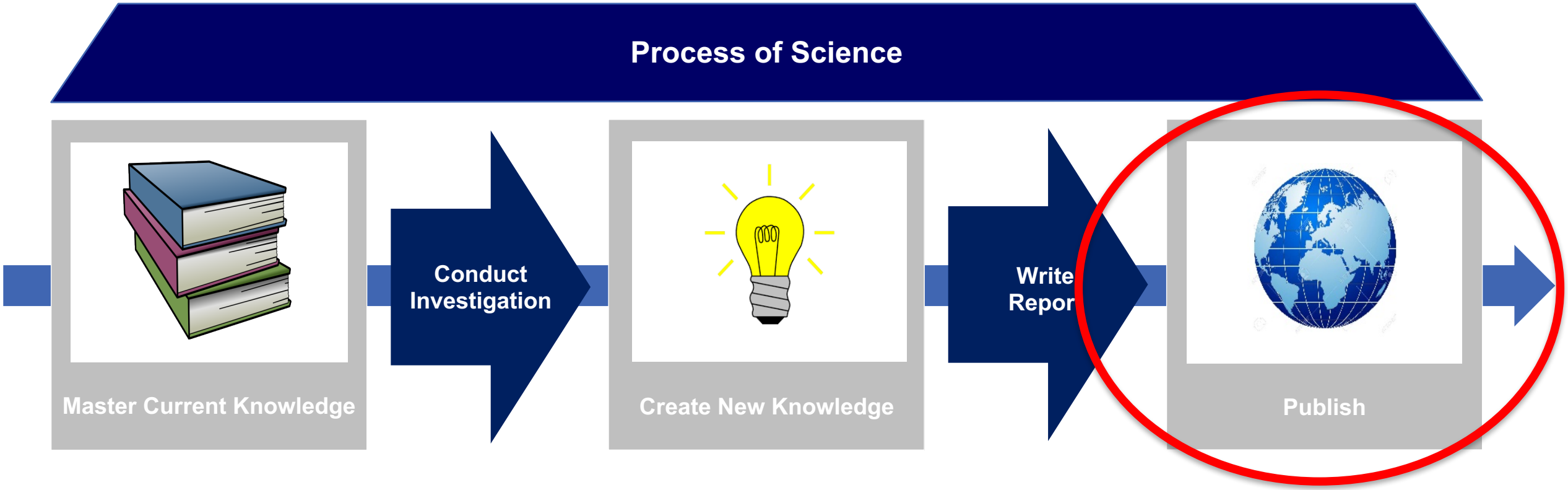
Significant time for lab work ✓

Equipment

Computers and data-logging equipment available ✓

SRP: Can you do it?

Students focused on becoming Scientists



SRP: Can you do it?

Students introduced to peers' published work

ISJOS.org
International Scholastic Journal of Science

YOUNG SCIENTISTS journal (UK)

JOURNAL OF EMERGING INVESTIGATORS (US)

The Journal of STUDENT SCIENCE AND TECHNOLOGY
La revue pour les ÉTUDIANTS EN TECHNOLOGIE ET SCIENCES (Canada)

SRP: Can you do it?

Helping Students develop a Publishable Research Question

Characteristics of a Publishable IA Research Question

- Original, or
- Extension of previous work
- Entry-level (Theory & Equipment)
- Completed in given time frame

Places to look for ideas

- ISJOS papers
- Ignoble Awards
- Mythbusters
- Youtube: keywords “cool science”

SRP: Can you do it?

Helping Students develop a Publishable Research Question

Suggested Topics

- Sound, Music
- Sports, Bouncing Balls
- Chemistry of Foods
- Plant Growth

Equipment and Sensors Available to Students

- Computer & Analog Instruments
- Familiar & Unfamiliar
- Unusual Equipment
- Supplies

SRP: Can you do it?

Student IA Reports Evaluated against ISJOS Criteria

ISJOS Publication Criteria

Originality

Validity

Confidence

Continuity

Importance

SRP: Can you do it?

IA's submitted for Review

ISJOS Publication Process

Submission of Required documents

Review

Reviewer Feedback & Guidelines

SRP: Can you do it?

Drafting, Revision, and Publication

ISJOS Publication Process

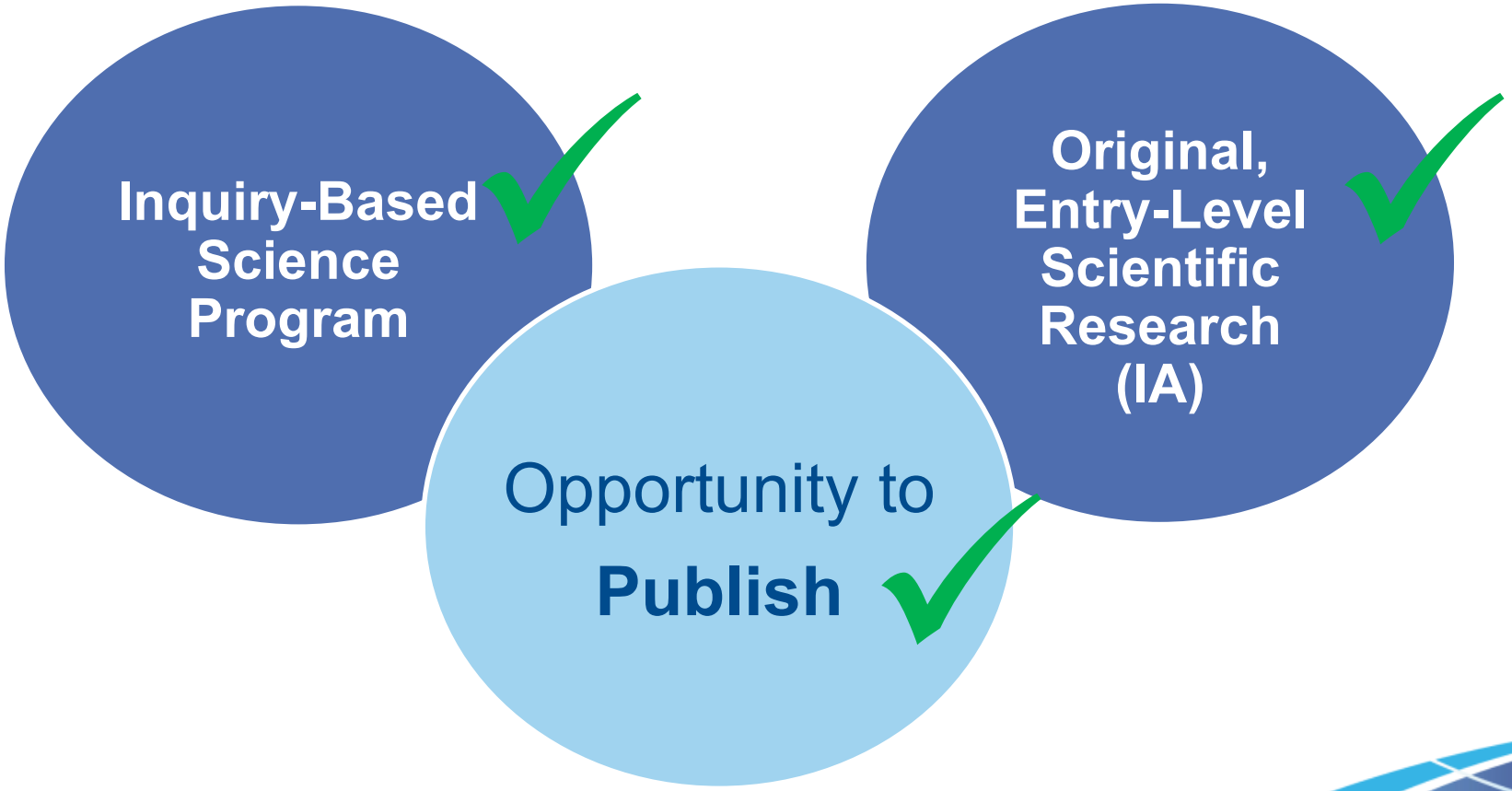
Draft Paper Submitted

Revision Process with Associate Editor

Publication in ISJOS!

SRP: Can you do it?

Yes, You Can!



SRP: You Can Do it!

Turn your

Science Students

into

Student Scientists!

Resources

StudentScientists.org

- Resources on the SRP program and its implementation

ISJOS.org

- Website of the International Scholastic Journal of Science

Editor@isjos.org

- For all links, a copy of this presentation, or further discussion

Thank You!
Questions or Comments?